

# **SuRF-UK: A framework for evaluating sustainable remediation options, and its use in a European regulatory context**

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Green Remediation Conference,  
9-10 November 2009, Copenhagen



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- Sustainable development
- The path to sustainable remediation
- What is sustainable remediation
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## Sustainable development

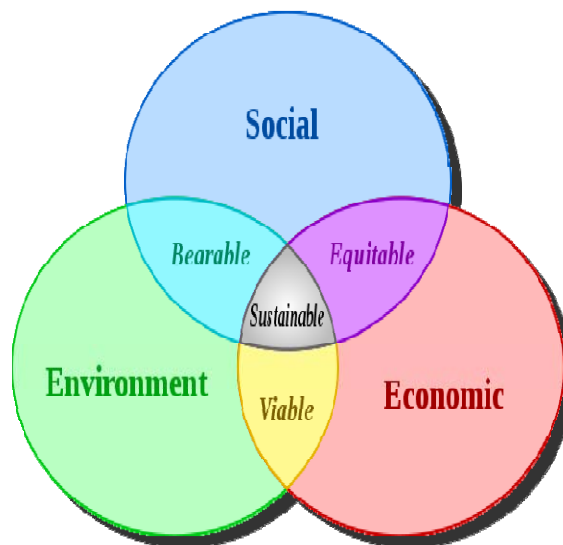
- *“development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs”*

Brundtland Commission, 1987

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## Sustainability Components



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## Is all remediation beneficial?

- Remediation seeks to reduce risks associated with soil and groundwater contamination, but also;
  - uses energy, natural resources;
  - can generate wastes;
  - introduces health and safety risks.
- *Key issue:* Remediation is not sustainable *per se*, and certain strategies / technologies may cause more damage than they solve.

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## Recent British legal cases

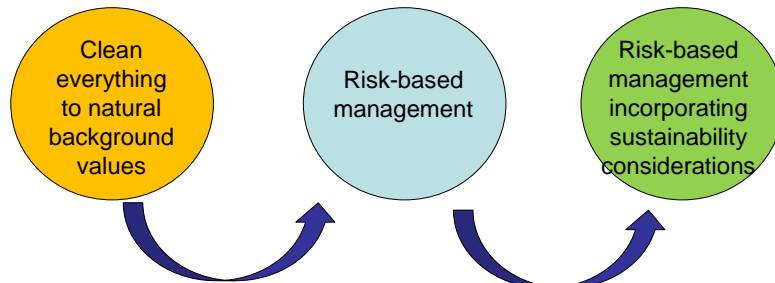
- Corby BC found negligent over steelworks remediation;
  - 16 birth defects allegedly due to exposure to contaminated dust
- Cotswold Geotech director on corporate manslaughter charge
  - Geologist died (2008) when site investigation trench collapsed



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## Evolution of Soil and Groundwater Management



Complete clean-up  
1. Usually not technically possible  
2. May not be necessary to prevent harm  
3. Uses finite resources

Increasing global concern about sustainability and increased understanding that not all remediation is beneficial. The impacts of remediation needs to be weighed against the benefits

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## SuRF-UK initiative

- UK-based project with regulators, industry, academics and consultants. Open forum meetings.
- Independent co-ordination by CL:AIRE ([www.claire.co.uk/surfuk](http://www.claire.co.uk/surfuk))
- Focus on holistic sustainability assessment of
  - high-level land-use planning ('Better by design')
  - remedial strategy selection
  - remediation technology selection
  - remediation implementation and verification
- Goals
  - A framework for assessing sustainable remediation
    - effective, practical, regulatory acceptance
  - Sustainability indicator review

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## European Union legislative context

- Draft EU Soil Protection Framework Directive (Feb 2009, stalled): '**Remediation shall consist of actions on the soil...due consideration to social, economic and environmental impacts...**'
- EU Water Framework Directive: *achieve good status unless ..infeasible ..disproportionate cost ..and the preferred solution is considered best balance of social, economic and environmental costs [i.e. sustainable]*

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## UK Legislative context

- Planning Policy Statements 1 and 23: underpin sustainable development through planning process
- Environment Act 1995 (s4) requires environment agencies to '*contribute to the goal of achieving sustainable development*'
- Environment Act 1995 (s39): environment agencies required to '*take account of the likely costs and benefits*' in enforcing powers
- Part 2A EPA1990: Contaminated Land remediation must meet '*test for reasonableness*'

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## SuRF-UK definition of Sustainable Remediation

- *The practice of demonstrating, in terms of environmental, economic and social indicators, that an acceptable balance exists between the effects of undertaking remediation activities and the benefits that those activities will deliver*

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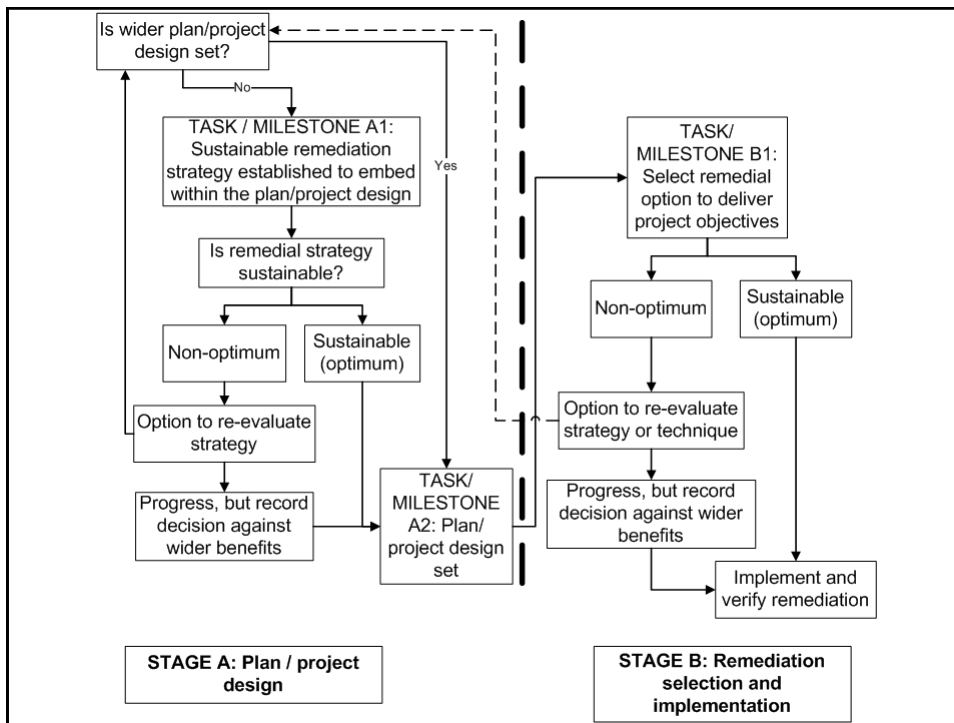


## SuRF-UK: Key principles

- Optimise remediation based on assessment of social, environmental and economic factors, but always ensure:
  - Principle 1: Protection of human health and the wider environment
  - Principle 2: Safe working practices
  - Principle 3: Consistent, clear and reproducible evidence-based decision-making
  - Principle 4: Record keeping and transparent reporting.
  - Principle 5: Good governance and stakeholder involvement
  - Principle 6: Sound science

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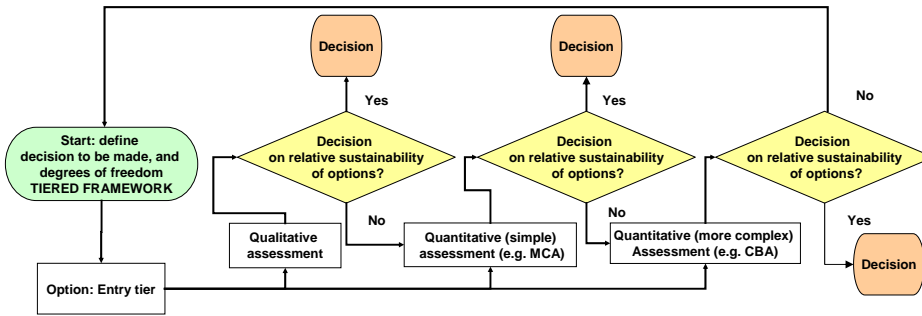




### SuRF-UK assessment points

	Spatial planning	Risk assessment	Options appraisal	Remediation implementation
<b>End point of risk-management stage</b>	Allocation of land-use within spatial plan and/or site-specific masterplan	Robust conceptual model: risks and uncertainties understood  Decision on need for remedial works, based on risk assessment	Remedial options reviewed and preferred approach selected	Remedial action complete and verified
<b>SuRF-UK assessment</b>	Remediation is considered alongside other factors in SEA and/or EIA  <i>'Better by design'</i>	Optimise remedial strategy  Optimise characterisation and avoid introducing new hazards	Technology selection	Optimise remediation operation and verification  Verify sustainability assessment assumptions

## Tiered sustainability assessment process



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## Sustainable remediation indicator categories

Environmental	Social	Economic
<ol style="list-style-type: none"> <li>1. Impact on air</li> <li>2. Impact on water</li> <li>3. Impact on soil</li> <li>4. Impact on ecology</li> <li>5. Natural resource use and waste generation</li> <li>6. Intrusiveness</li> </ol>	<ol style="list-style-type: none"> <li>1. impacts on human health and safety;</li> <li>2. ethical and equity considerations;</li> <li>3. impacts on neighbourhoods or regions;</li> <li>4. community involvement and satisfaction;</li> <li>5. compliance with policy objectives and strategies;</li> <li>6. uncertainty and evidence.</li> </ol>	<ol style="list-style-type: none"> <li>1. direct economic costs and benefits;</li> <li>2. indirect economic costs and benefits</li> <li>3. employment and capital gain;</li> <li>4. gearing;</li> <li>5. life-span and 'project risks';</li> <li>6. project flexibility.</li> </ol>

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## Summary

- Remediation is not a sustainable activity *per se*;
- Sustainable remediation builds on existing risk-management principles, but recognises that the act of doing remediation has environmental, social and economic impacts as well as benefits;
- Sustainable remediation optimises the overall benefit;
- An area of active research and regulator activity;
- SuRF-UK assessment framework recently published;
- Remediation industry can more directly contribute to achieving sustainable development

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## Acknowledgements

- SuRF-UK steering group
  - Prof Paul Bardos, r3 environmental ltd
  - Dr Brian Bone, Environment Agency
  - Dr Richard Boyle, Homes & Communities Agency
  - Dr Dave Ellis, Du Pont and SURF
  - Frank Evans, National Grid
  - Nicola Harries, CL:AIRE
  - Prof Jonathan Smith, Shell Global Solutions
- Participants in SuRF-UK meetings

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A Framework for Assessing the Sustainability of Soil and Groundwater Remediation

DRAFT COPY  
SUBJECT TO PUBLIC CONSULTATION  
MAY 09

APPLICATIONS IN REAL TREATMENTS

**CL:AIRE**

**Out for consultation**



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A Review of Published Sustainability Indicator Sets:  
How applicable are they to contaminated land remediation indicator-set development?

APPLICATIONS IN REAL TREATMENTS

**CL:AIRE**

**Downloadable**