



Sustainable Strategies for Site Remediation

RemTech: October 12, 2016

Michael Lakustiak and Monique Wismer

Eric Van Gaalen

Smart. Responsive. Efficient.

Sustainable Remediation



Lots, and Lots, and...Lots of Guidance

JANUARY 2011

Association of State and Territorial
ASTSWMO
Solid Waste Management Officials

FINAL REPORT:
GREEN REMEDIATION AT FEDERAL

Interim Guidance 10-01
5 March 2010



ENVIRONMENTAL QUALITY

DECISION FRAMEWORK FOR INCORPORATION OF GREEN AND SUSTAINABLE PRACTICES INTO ENVIRONMENTAL REMEDIATION PROJECTS



Groundwater recirculation well powered by a wind turbine at the Former Nebraska Ordnance Plant Superfund Site, Mead, NE. Photo by Ernie Gutierrez and used with permission of Curt Elmore, Missouri University of Science and Technology

Environmental and Munitions Center of Expertise
Interim Guidance

State and
federal
relevant
es.



Technical/Regulatory Guidance

ASTM Standard Guide for Greener Cleanups

Green and Sustainable Remediation: A Practical Framework



Sustainable Remediation White Paper—Integrating Sustainable Principles, Practices, and Metrics Into Remediation Projects

David E. Ellis
Paul W. Hadley

1.0 INTRODUCTION

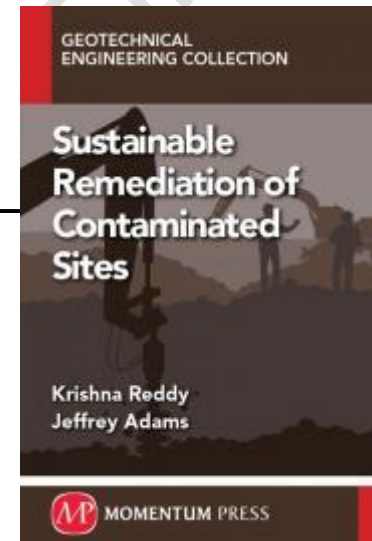
The remediation industry was born in the late 1970s, following a steady stream of highly publicized discoveries of toxic chemicals in landfills, drinking water, and even neighborhoods. The government responded to these discoveries of environmental contamination. Environmental laws were passed at the state and national level, and programs were created within environmental regulatory agencies to oversee and sometimes fund the cleanups. Industry and consultants kept pace by hiring staff, building programs, and initiating cleanups. The remediation industry was off at a sprint before it had learned to crawl.

With the public demand for swift and sometimes immediate cleanups, responsible parties and the remediation industry invested heavily in energy intensive engineered projects, such as groundwater pump and treat systems, well restoration and off site disposal, incineration, and thermal treatment. The public's attitude was that no cleanup could be initiated soon enough or implemented fast enough.

While such energy intensive remediation systems are well intended, they generally have not achieved acceptable cleanup levels (National Research Council [NRC], 2005). These energy intensive engineered remedies frequently cannot overcome the basic technical limitations encountered when recovering contaminants from the environment once the contaminants are widespread and dilute. As a result, most engineered groundwater remediation systems reach a certain concentration and go no further regardless of the energy expended. The concentration that can be reached is often far higher than the cleanup level.

Within the last ten years, a growing body of information suggests that global climate change can be correlated with fossil fuel use and carbon dioxide releases into the atmosphere. As members of the broader environmental industry, remediation experts are well aware of this concern and have firsthand knowledge of the potential contribution of energy intensive remediation systems to global climate change. For example, at one remediation project in New Jersey, it was estimated that the difference between two proposed remedies could be as high as 2 percent of the annual greenhouse gas emissions.

A Framework for Assessing the Sustainability of
Soil and Groundwater Remediation



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Elephant in the Room



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What Do We Want to Accomplish Today?



What Do We Want to Accomplish Today?



- Share Trace learnings
- What can we do TODAY?
- What can we consider for the FUTURE?

Case Study 1: Phytoremediation



Client cost
savings =
\$330,000



Improved safety
= 60,000 km of
driving avoided



GHG emissions
reduced =
24,000 t CO₂e



Sustainable Remediation



Case Study 1: Phytoremediation

Alternative Fuels	
Waste Reduction	✓
Recycling	
Renewable Energy	
Conservation of Resources	✓
Beneficial Land Reuse	✓



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Case Study 2: Subsoil Salinity Tool and Salt Risk Assessment



Client cost savings
= \$6,200,000



Improved safety =
1,100,000 km of
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GHG emissions
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t CO₂e



Case Study 2: Subsoil Salinity Tool and Salt Risk Assessment



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Alternative Fuels	
Waste Reduction	✓
Recycling	
Renewable Energy	
Conservation of Resources	✓
Beneficial Land Reuse	

Case Study 3: Tree Stimulation via Hormones



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Case Study 3: Tree Stimulation via Hormones



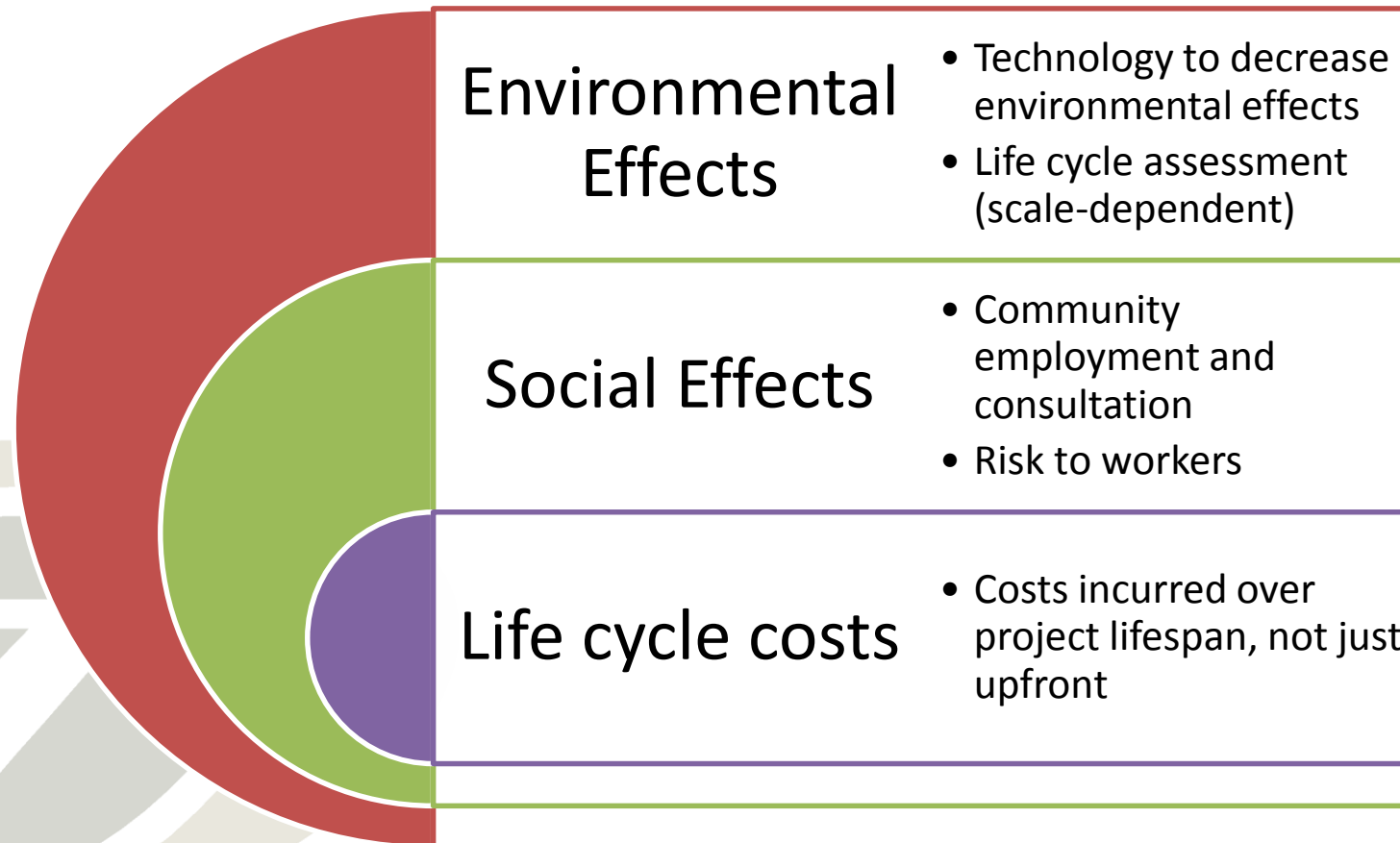
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What Can We All Consider Today?

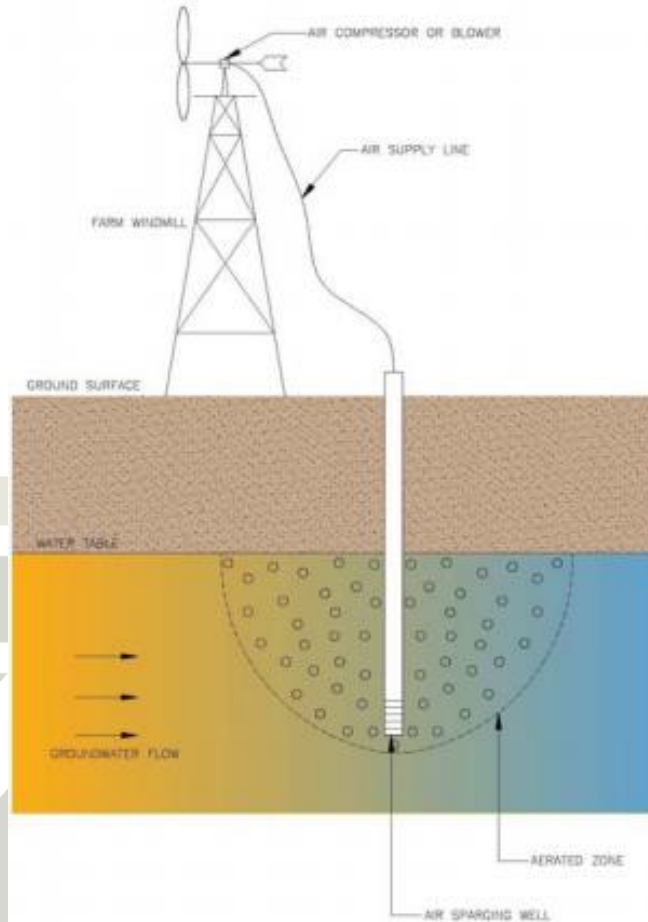


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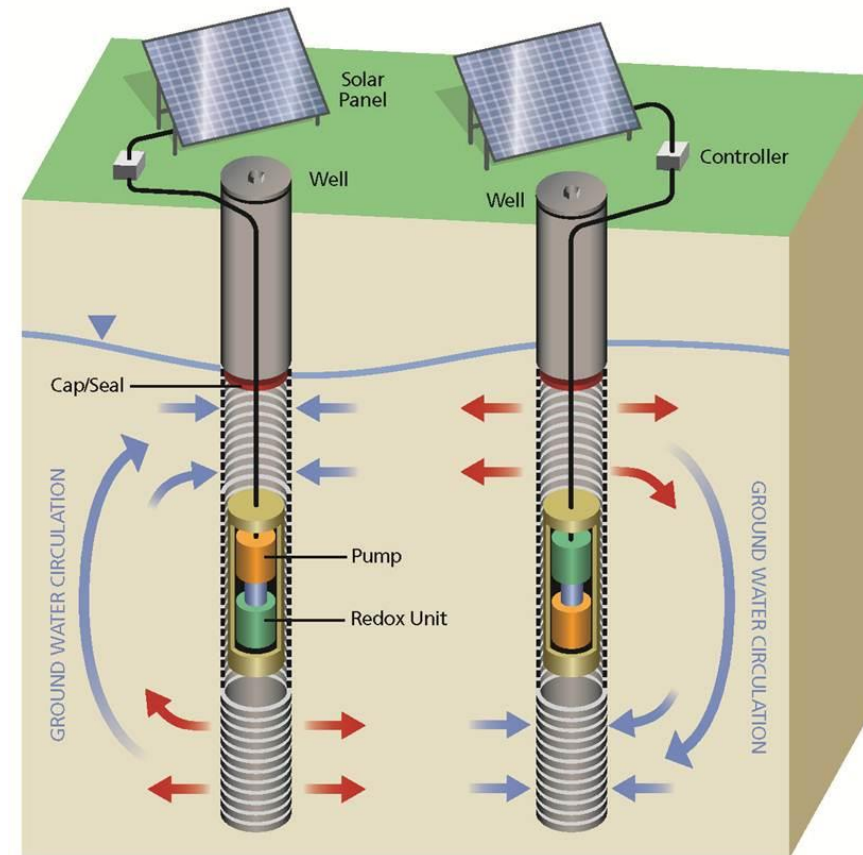
What Can We All Consider for the Future?



Technologies to Increase Sustainability



Source: <http://www.northeastern.edu/protect/research/p5/>



Source: <http://www.esaa.org/wp-content/uploads/2015/06/07-Paper41.pdf>

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Closing Thoughts

- Lots of opportunity
- Cost savings for clients
- Challenge: Start somewhere and start small!



Questions

Michael Lakustiak, B.A.Sc., P.Eng.
Senior Environmental Engineer
mlakustiak@traceassociates.ca

Monique Wismer, M.Sc., MBA
Division Manager
mwismer@traceassociates.ca

Eric Van Gaalen, M.Sc., P.Ag.
Environmental Scientist
evangaalen@traceassociates.ca

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