Sustainable Remediation Initiative

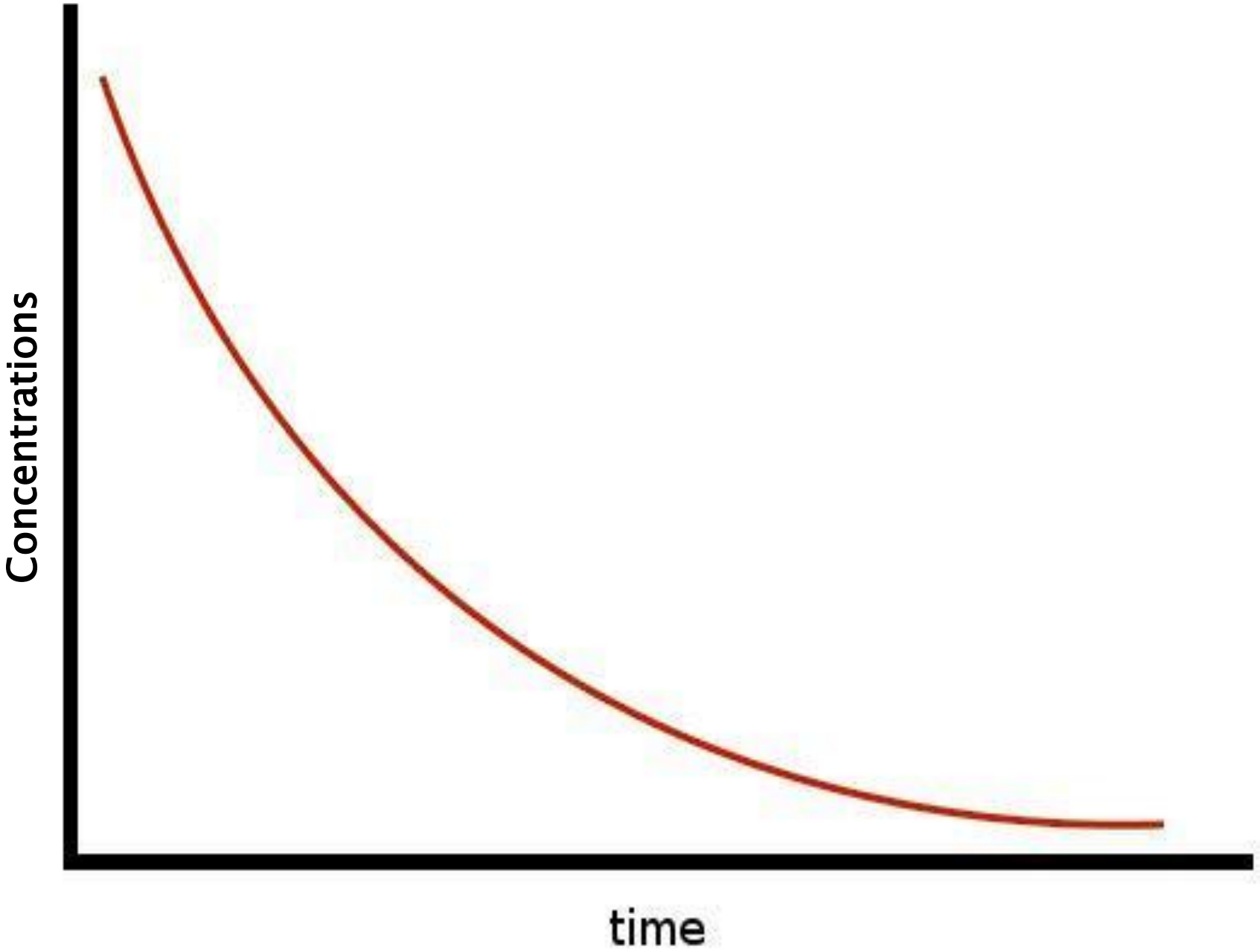
SRI

SURF

INTERSTATE TECHNOLOGY REGULATORY COUNCIL ITRC

energy API

- Collaboration of US Organizations
  - Sustainable Remediation Forum (SURF),
  - Interstate Technology & Regulatory Council (ITRC),
  - API Energy
- seeking to promote the understanding and implementation of sustainable remediation
- supports acceptance of the ITRC Green and Sustainable Remediation (GSR) Framework


Concentrations
time

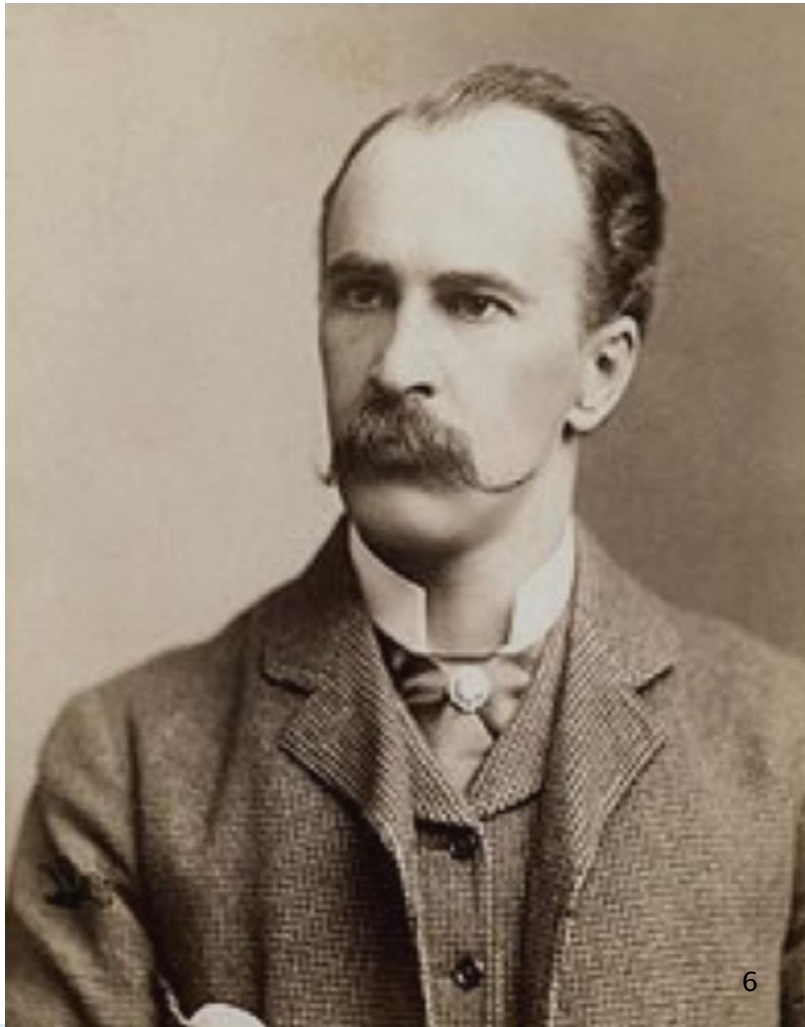
Could it be that sometimes … ?

"The remedy is worse than the disease."

Francis Bacon

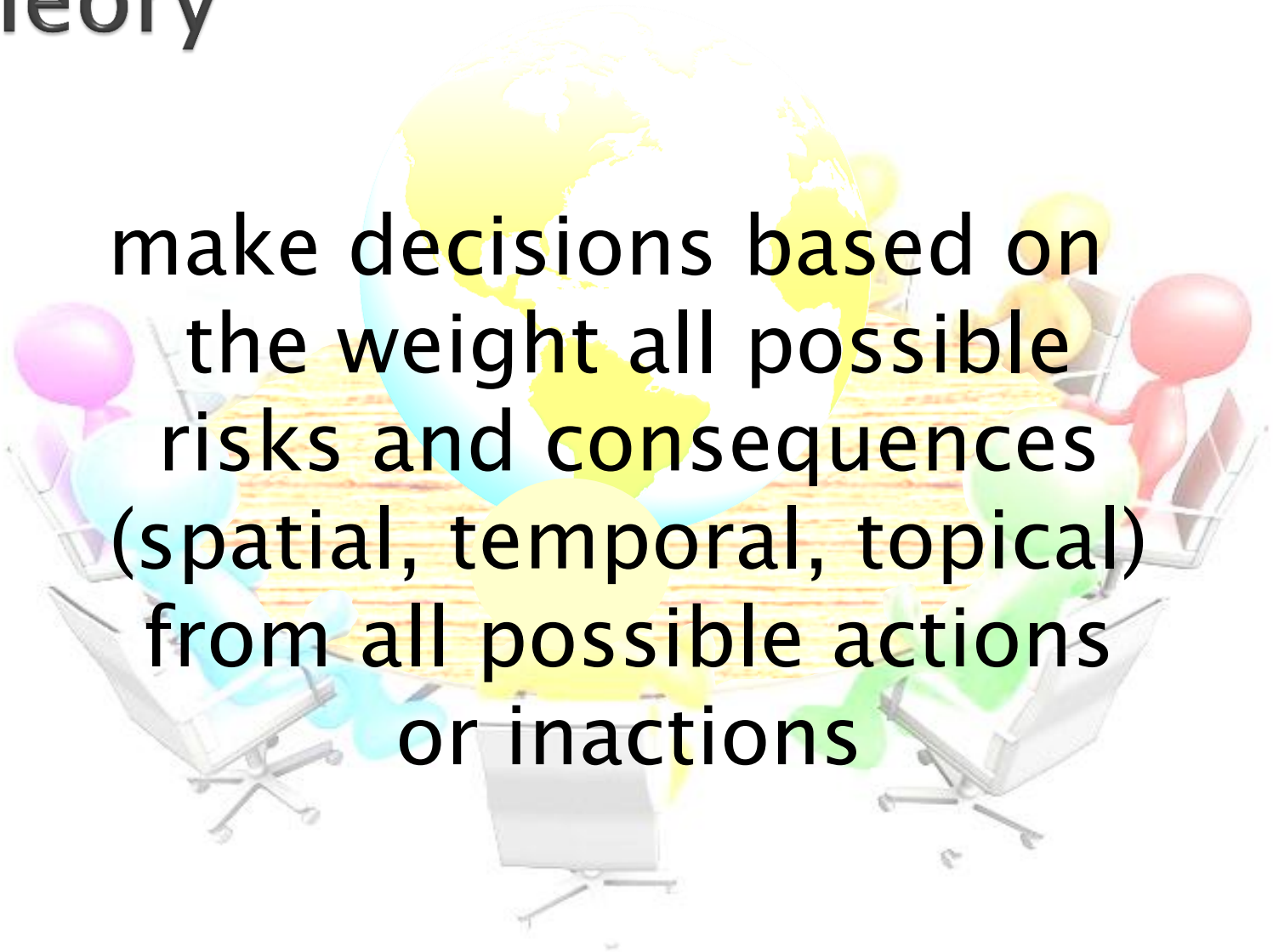
Holistic approach …

- "The good physician treats the disease, the great physician treats the patient who has the disease."
  - William Osler



Theory

Theory



make decisions based on the weight all possible risks and consequences (spatial, temporal, topical) from all possible actions or inactions

Practice

Practice

stakeholders prioritize issues and determine: boundaries, metrics, tools, weighting, solutions


Worldwide Services
ups
655120
Official Express Delivery Company

US Frameworks: ASTM, SURF, ITRC

- SURF (2009)
  - "White Paper" Remediation Journal 2009
  - "Guidance Documents" Remediation Journal 2011
    - Framework, Metrics, Footprint and LCA
- ITRC (2011)
  - GSR-1 Green and Sustainable Remediation: State of the Science and Practice
  - GSR-2 Green and Sustainable Remediation: A Practical Framework
- ASTM (2013)
  - ASTM E2876-13 Standard Guide for Incorporating Sustainable Objectives Into Cleanup
  - ASTM WK35161 – New Practice for Greener Site Assessment and Cleanup

Common SR Process Elements

1. Select appropriate stakeholder team
   - process to reach general consensus
2. Define current project status:
   - evaluate/update conceptual site model in SR terms: social, environmental, economic
3. Choose project goals, metrics, and tools:
   - prioritize key issues, select boundaries, determine appropriate evaluation level
4. Evaluate options for project:
   - develop options fit for future use of property and evaluate with weighted costs and benefits
5. Implement most appropriate option
   - document, monitor, optimize

ITRC Evaluation Levels

ex: Level 1 – List of BMPs

Best Management Practice	***Possible*** benefit(s) arising		
	Environment	Social	Economic
1. Generic BMPs			
Work safely - avoid drilling in the highway or busy areas where possible		✓	✓
Minimize vehicle miles - combine jobs where possible	✓	✓	✓
Minimize waste sent to landfill	✓	✓	✓
Re-use excavated soils or secondary aggregates where fit-for-purpose	✓		✓
Minimize consumptive use of water	✓	✓	✓
Avoid creating new pollution impacts - don't drill through confining layers without appropriate protection	✓		✓
Store fuels and recovered fluids is structurally sound, stable and bunded containers	✓		✓
Avoid multiple mobilizations	✓	✓	✓
Combine remediation works with other earthworks and site development	✓	✓	✓
Adopt a sustainable procurement policy	✓	✓	✓
Hold project meetings by telephone or video conference	✓	✓	✓
Don't allow plant or equipment to run on 'idle'	✓	✓	✓
Direct vehicle movements away from residential areas		✓	
Minimise noise, vibration, dust (etc.) and limit use of such equipment to normal office hours		✓	
Inform neighbours about potentially noisy activity before it happens		✓	
Incorporate natural attenuation into remedial strategy, either as the main approach or in a 'treatment train'	✓	✓	✓
Use bailers or low-flow samplers where monitoring data will be fit-for purpose	✓	✓	✓

ex: Level 2 – Simple Matrix

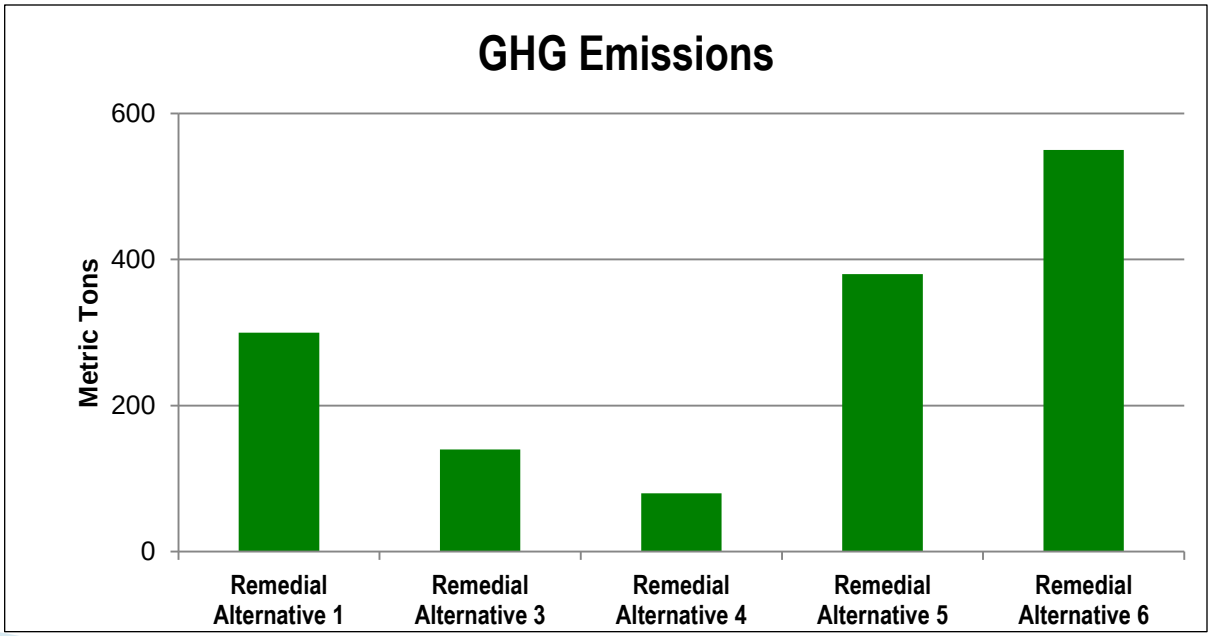
Metric	Excavation	Bioremediation	Soil Vapor Extraction
Greenhouse gases	😐	☺	☹
Solid waste	☹	☺	☺
Sensitive species	☹	☺	😐
Community disturbance	☹	☺	☺
Community acceptance	☺	☺	😐
Cost	☺	😐	😐

Red = low performance
Yellow = average performance
Green = good performance

ex: Level 3 – SiteWise ™ Results

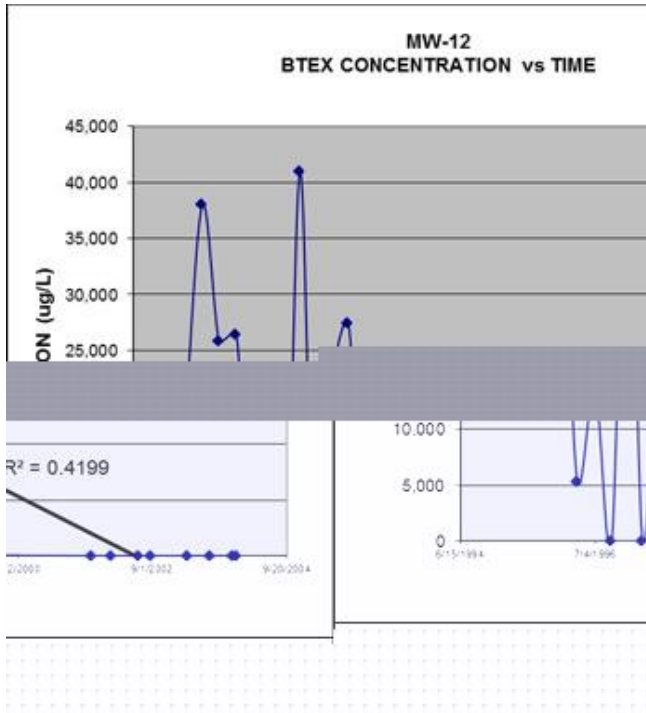
Remedial Alternative	Energy (MMBTU)	Emissions (Metric Tons)			Accident Risk Injury
		GHGs	NO_x	SO_x	
Alternative 1	3.05	300	0	0	0
Alternative 3	3.05	140	0	0	0
Alternative 4	3.05	80	0	0	0
Alternative 5	0.22	380	6.0E-05	1.0E-06	3.14E-06
Alternative 6	0.22	550	6.0E-05	1.0E-06	3.14E-06

Comparative graph generated for each metric

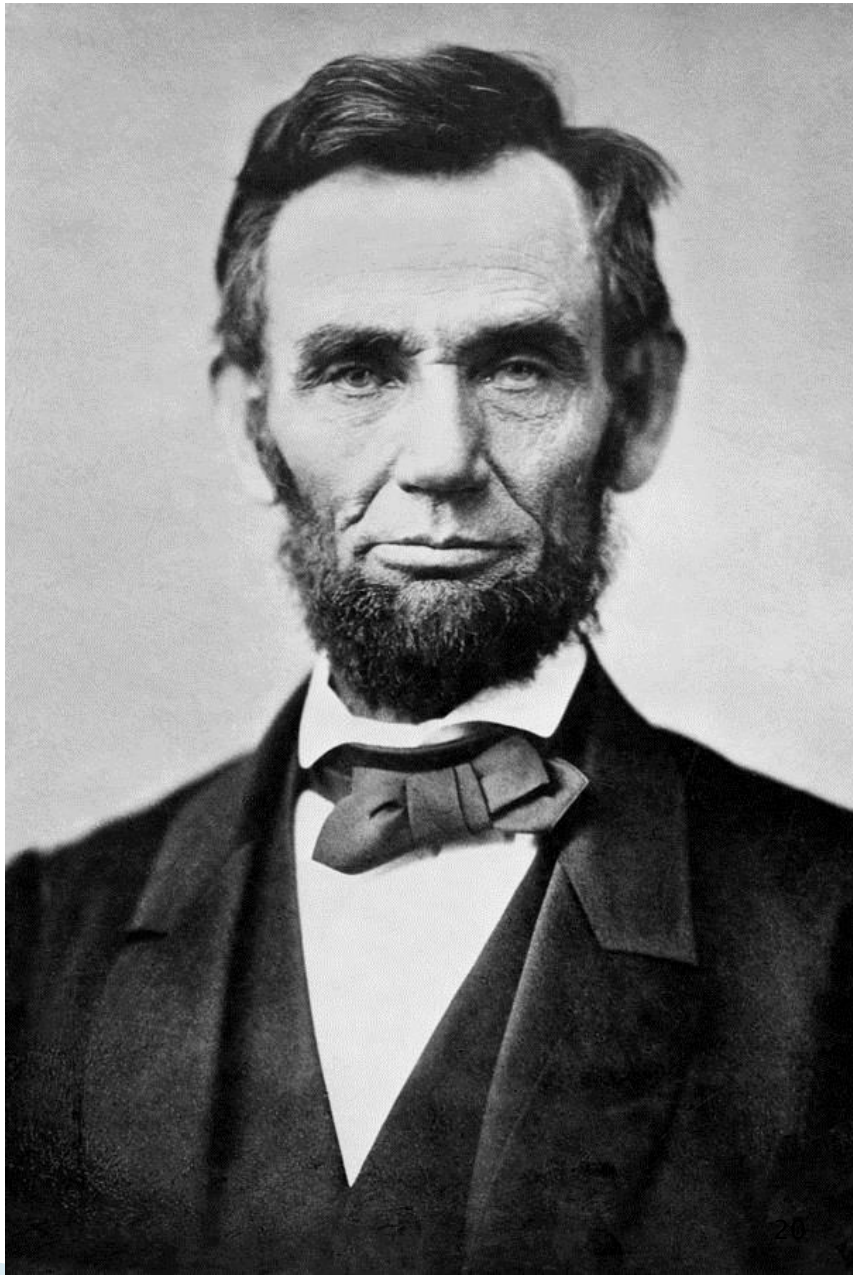


http://www.ert2.org/t2gsrportal/SiteWise.aspx


INDIANA
Brown fields
PROGRAM
Brownfields Program
Environmental Stewardship.
Economic Development.
See how we can assist your community
learn more


MW-12
BTEX CONCENTRATION vs TIME
45,000
40,000
35,000
30,000
25,000
10,000
5,000
0
R² = 0.4199

"It is not 'can any of us imagine better?' but 'can we all do better?' The dogmas of the quiet past are inadequate to the stormy present. As our case is new, so we must think anew, and act anew."




TEAR
DOWN THE
WALL

SRI

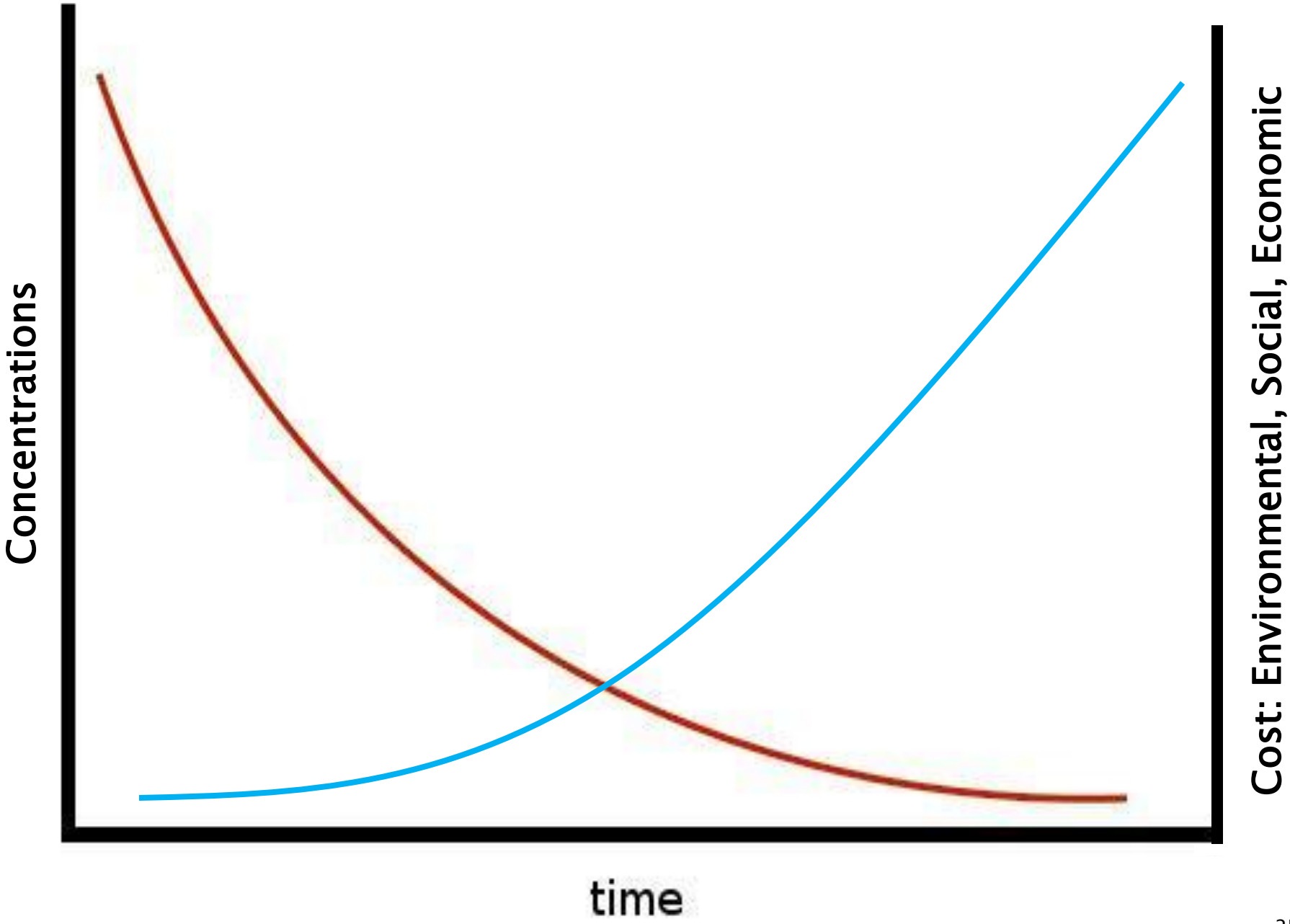
Sustainable Remediation Initiative

Sustainable Remediation is …

- NOT
  - “Technology”
  - New
  - Excuse
- Flexible
- Scalable
- Stakeholders
- Simple
- Holistic
- Process
- Concept
- The Best!

SR Benefits

- Stakeholder buy-in
- Better solutions
- Long term planning
- Maximizes utility
- Easy to implement:
  - Regulations
  - Policy
- do it!


Concentrations
Cost: Environmental, Social, Economic
time

ASTM Guides

- Two Guides
  - Green Remediation (WK35161)
  - Standard Guide for Integrating Sustainable Objectives into Cleanup (E2876-13)

SURF SR Framework

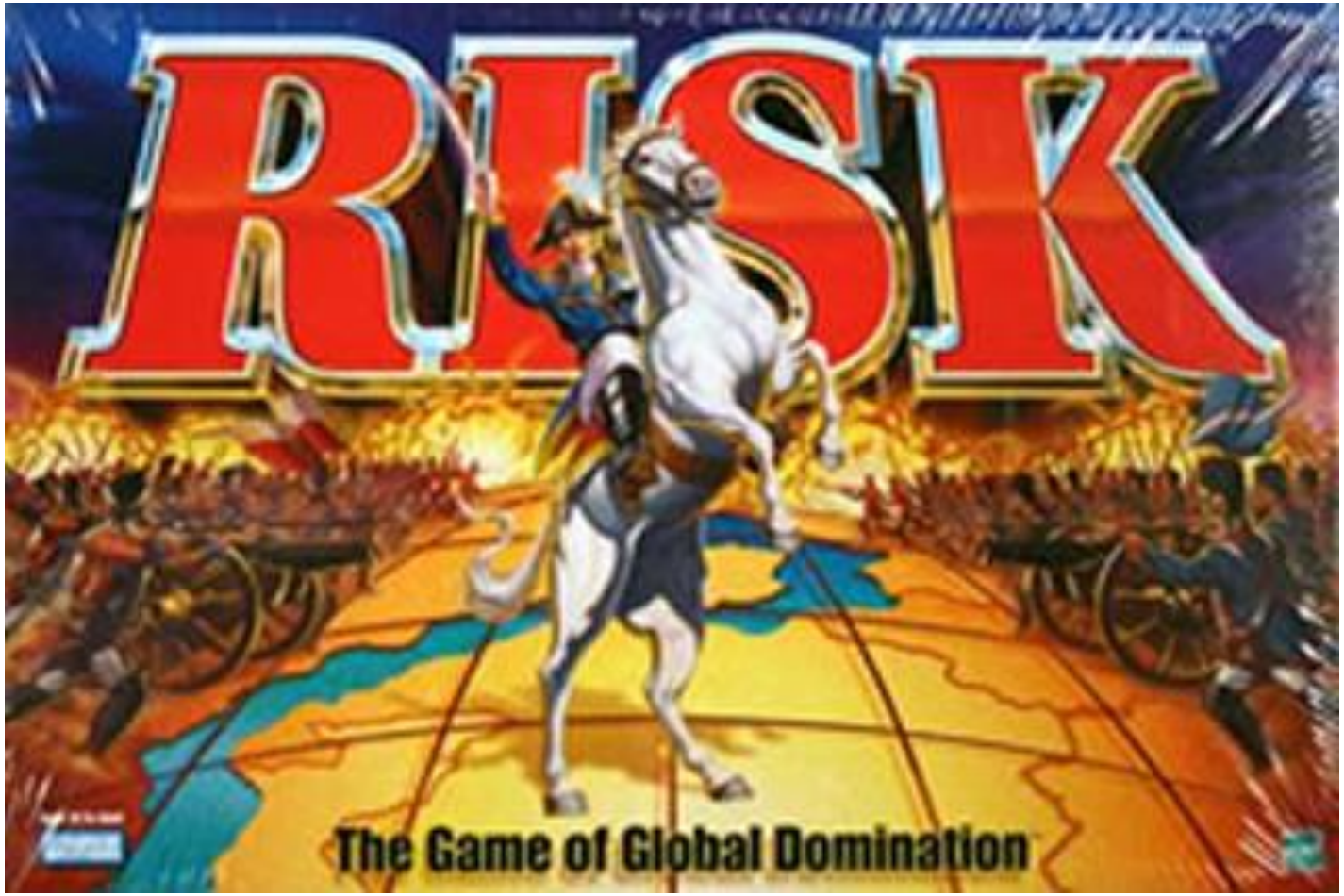
"Framework for Integrating Sustainability into Remediation Projects", **SURF Summer 2011**

- Process-Based Versus Goal-Based
- Plan for Future Use of Property
- Tiered Sustainability Evaluation
  - Tier 1: standardized, non-project-specific **qualitative** evaluation.
  - Tier 2: project and non-project specific **semi quantitative** approach.
  - Tier 3: detailed project-specific **quantitative** evaluation.
- Whole system considerations
- Stakeholder Involvement
- Most relevant sustainability parameters

ITRC GSR Framework

"Green and Sustainable Remediation: A Practical Framework" **ITRC November 2011**

- Process-Based Versus Goal-Based
- Plan to incorporate GSR into any project phase
- GSR conceptual site model
- Stakeholder Involvement
- Boundaries, Goals, Metrics, Tools
- GSR Evaluation Levels
  - Level 1: Best Management Practices (BMPs)
  - Level 2: BMPs + simple evaluation
  - Level 3: BMPs + advanced evaluation
- Flexible and Scalable
- **By States for States**



Eliminate vs manage

23

1000

100,000,000

0

3,000,000

20000

- Flexible
- Scalable
- Holistic
- Stakeholder
- At worse: compromise
- At best: synergy