

G2 PARTNERS

Strategic Management of Complex Sites

Federal Remediation Technologies Roundtable (FRTR)

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Topics for Discussion



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- Define complex site
- Examples
- Enduring Commitment
- Develop Site Strategy
- Identify Options
- Measure Site Progress
- Ultimate End-State

Complex Remediation Sites

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- Areal extent of sites – regional impacts, drainage basins, miles of river, mining districts
- Contaminants occur naturally
- Primary remedy is waste in place
- Ultimate cleanup requires in perpetuity management
- Uncertainty of remedial standards
- Solutions require integrated remedy

Yerington Former Copper Mine

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Operating Anaconda Smelter

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Montana NPL Sites



Berkeley Pit – Butte, MT

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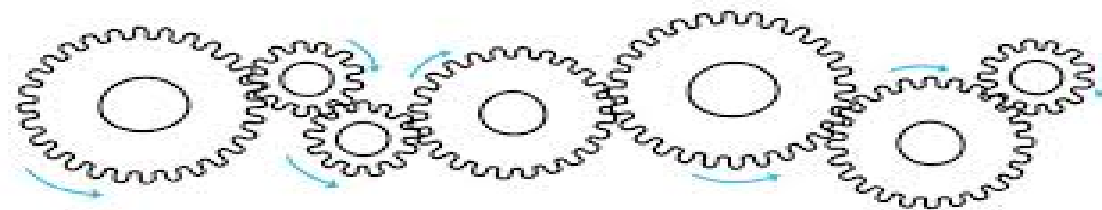


Enduring Commitment

- These sites required an extensive commitment to endure through extensive data collection, negotiations and development of trust w/ stakeholders.
- Development of an advocacy & engagement plan is critical to success of your site objectives.
 - **Engagement** with key stakeholders – community, and regulators
 - **Informing** the public with regulatory agreement on environmental progress using strategic venues on a continuing basis
 - **Advocating** for legislative and regulatory initiatives that promote reasonableness standards
 - **Delivering** messages through organizations, media (earned and otherwise), and third-party advocates
 - **Participating** in programs that support or align with business objectives

Many Moving Parts

- Sites within a SITE
- Holistic site conceptual Model
- Allow Sound Science to Lead Decisions
- Develop Trust w/ Stakeholders
- Pursue Reasonable Solutions



Develop a Strategic Plan

Site Setting

Location

Ownership

Site History

Driving Forces

Site Specific

Legal

Regulatory

Technical

Contractual

Exit Strategy

Recommended Project Strategy

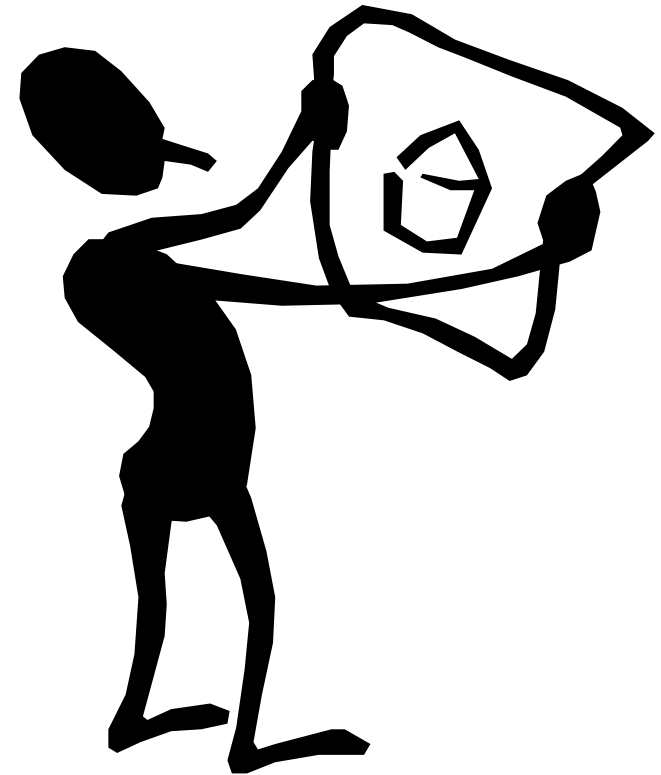
Explanation of Strategy Selected

Schedule

Figures

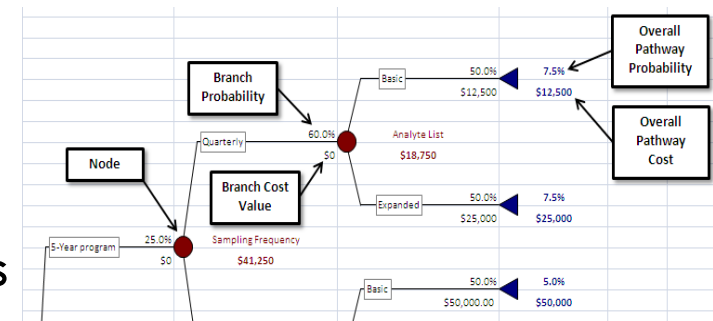
Economics

Periodic Re-assessment of Site Scenarios



Options within Plan

- Determine options available w/in strategic plan
- Options analysis
 - ▣ Decision tree modeling
 - ▣ Financials – probabilistic cost estimating
- Determine appropriate Levers
- Formulate potential scenarios and develop potential outcomes
- Review the scenario results and revise assumptions as appropriate:
 - ▣ Key drivers
 - ▣ Logical outcomes
 - ▣ Additional input form stakeholders
 - ▣ Other
- Produce summary analysis and recommendations



Measure Progress

“If you can’t measure it, you can’t manage it.”

- Impacted sites require reduction of risks
- Risks can be defined as uncertainties
- Measure risk reduction to understand progress
- Risks based on site conditions
- Risks can be characterized as Technical or Non-Technical

Risk Categories

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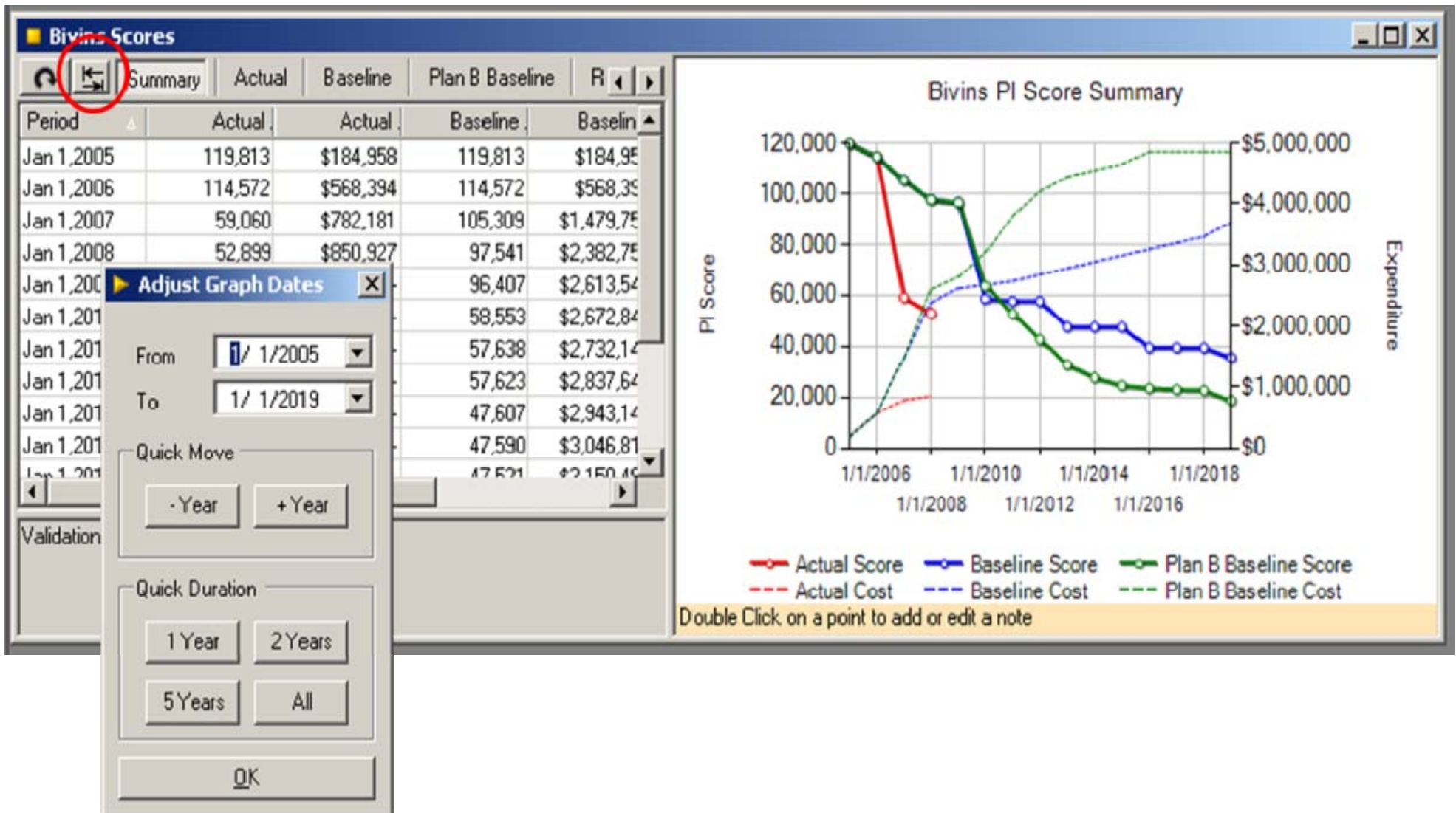
Technical

- ❑ Areal Extent of Onsite & Offsite contaminants
- ❑ Geology
- ❑ LNAPL or DNAPL
- ❑ Potential Receptors
- ❑ Status of Delineation
- ❑ Acute and Chronic water quality standards
- ❑ Re-vegetation/ Reclamation

Non-Technical

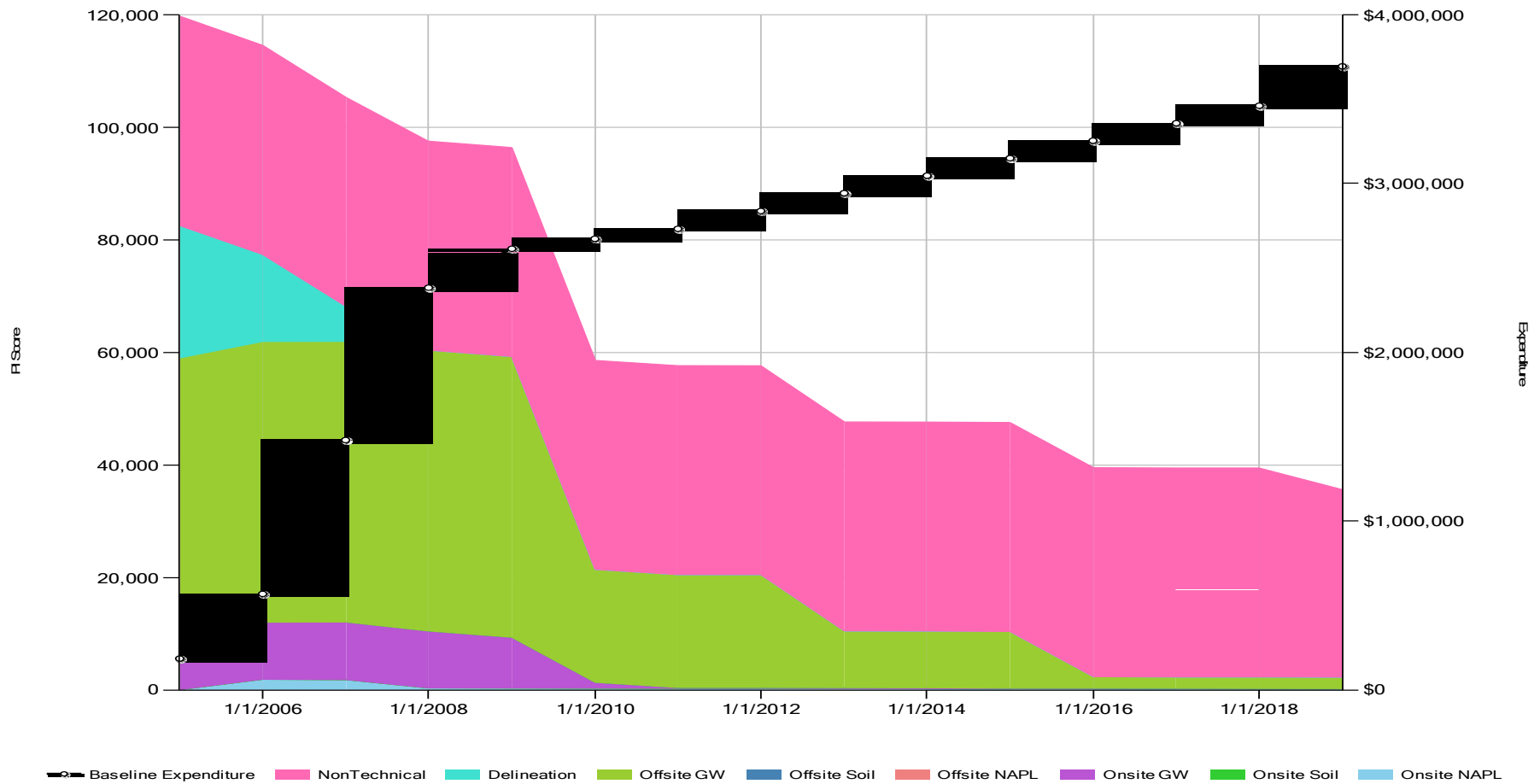
- ❑ Regulations
- ❑ Contractual Obligations
- ❑ Stakeholder Relationships
- ❑ Litigation Concerns
- ❑ Property Value
- ❑ Contractual Agreements
- ❑ Public Perception

Performance Model



Risk Profile

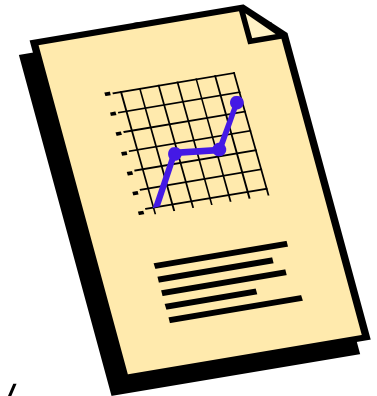
Fields Baseline



Potential Reports

Performance Indicators:

- Risk Reduction/Expenditures:
 - Measure Cost Efficiency
 - Encourage Business Management
- Risk Reduction Slope = Measure/Understand Impediments/
Cost of Delay/Apply Appropriate Resources
- Segregation of Site Risks:
Technical vs. Non-Technical, hydrocarbons, chlorinated compounds,
and/or minerals, Onsite vs. Offsite, Community Relations, Consultants
- Promote Cash Flow Accuracy



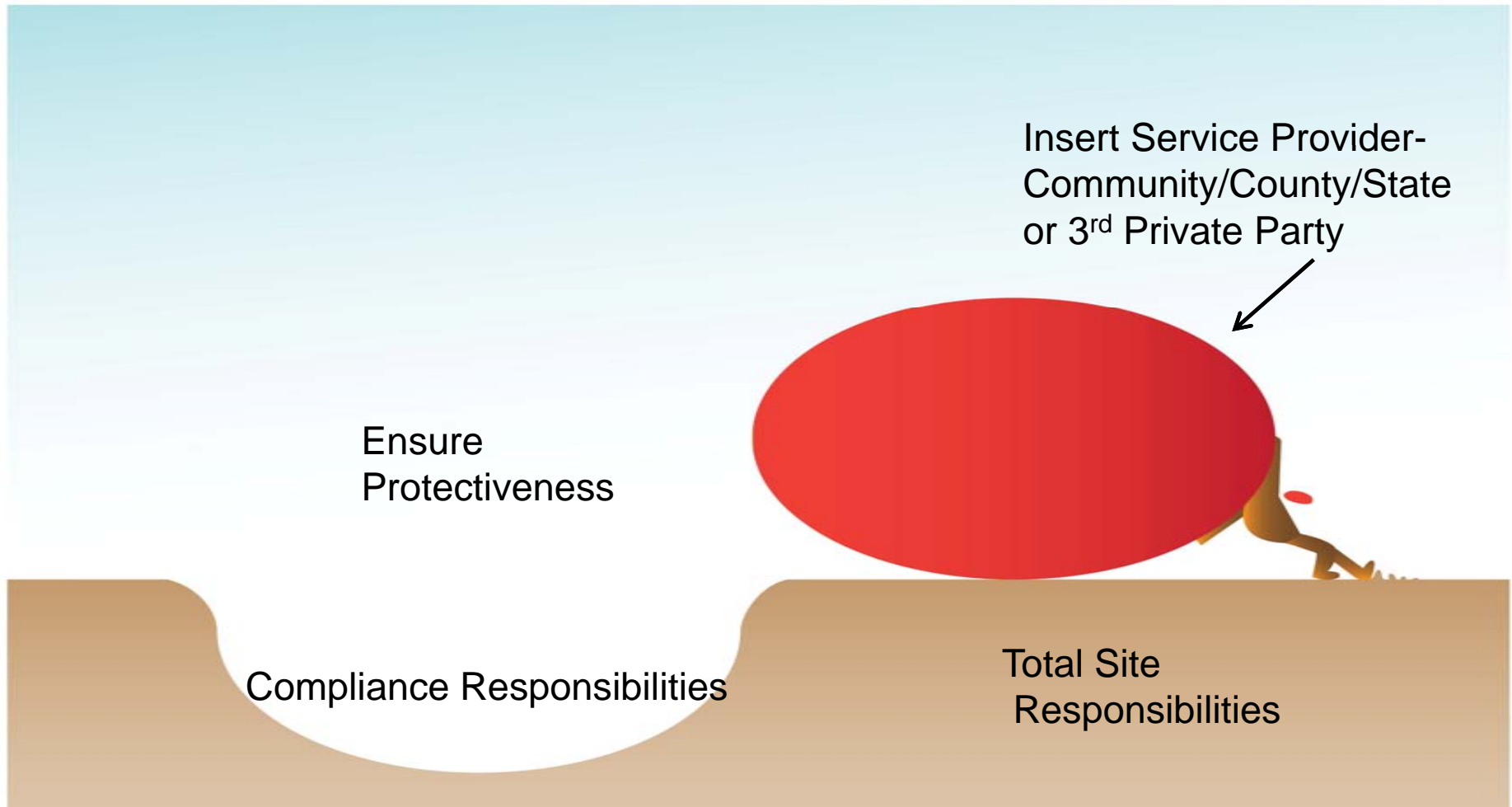
Implement Program

- Proceed through regulatory steps w/ a plan
- Allow sound science to drive protectiveness
- Implement interim remedies
- Negotiate through open dialogues
- Demonstrate through science lead studies to promote risk-based standards including TI waivers
- Ultimately CD should include protective terms that are achievable

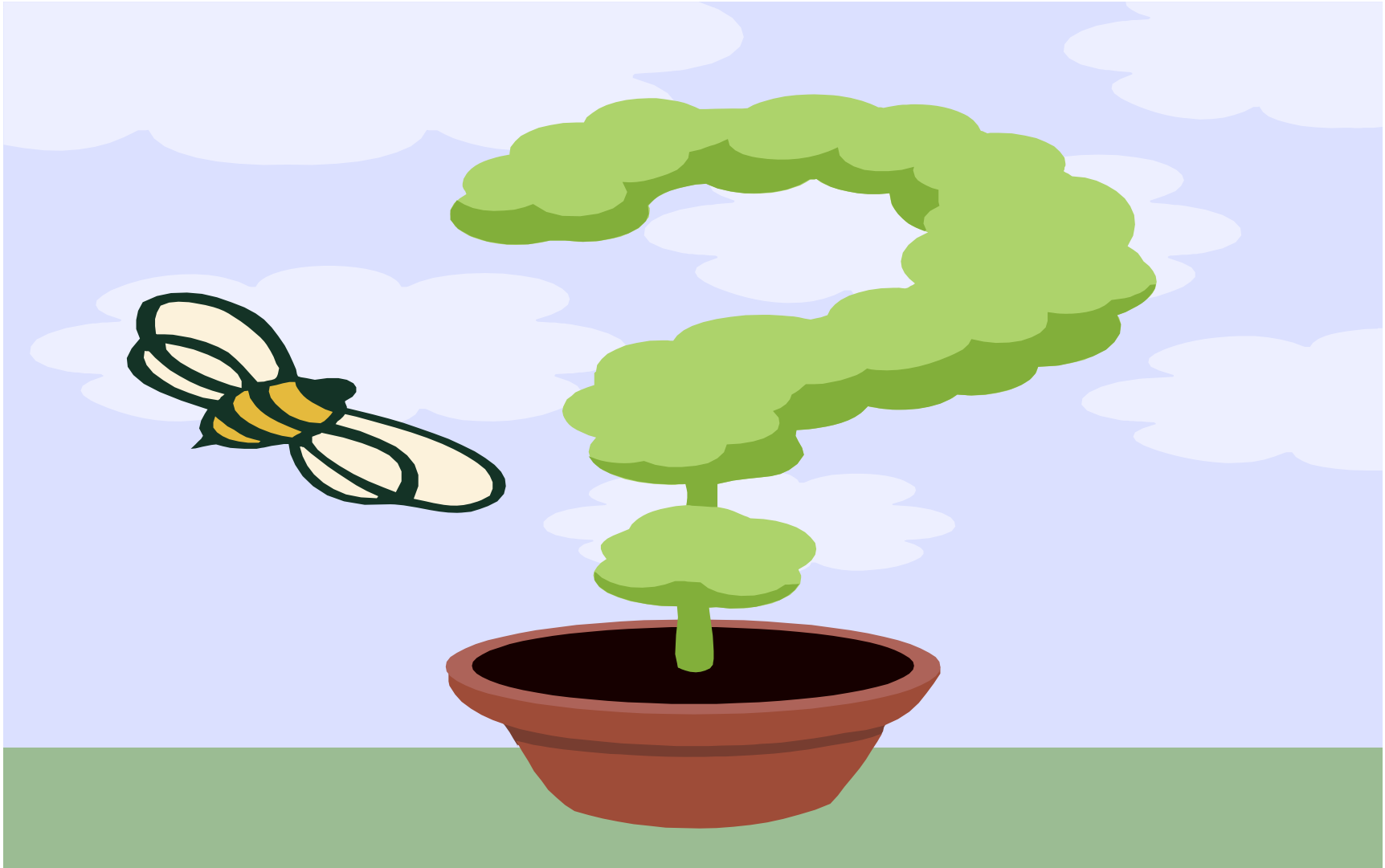
Progression to End State

- Minimal Active Remediation/Reclamation
- Achievable Standards
- Repeatable O&M Programs
 - ▣ Water Treatment Systems
 - ▣ Monitoring Services – Groundwater/Surface Water
 - ▣ IC's Management to demonstrate protectiveness
 - ▣ Address 5 year review findings
 - (Proactively vs. Reactively)

Transition Platform



Questions



Environmental & Water Resources

- **Remediation/Exit Strategy**
- **Support & Baseline for Unconventional E&P**
- **Compliance**
- **GIS Development & Data Management**
- **Community Engagement Program**
- **Project Management**
- **Environmental & ARO Disclosures, Financial Reporting**
- **HSE Program Development & Management**

