Strategic Management of Complex Sites
Federal Remediation Technologies Roundtable (FRTR)

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Topics for Discussion

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

- 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
Operating Anaconda Smelter
Enduring Commitment

- These sites required an extensive commitment to endure through extensive data collection, negotiations and development of trust with 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 within 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 from stakeholders
  - Other
- Produce summary analysis and recommendations
“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

**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
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

- Ensure Protectiveness
- Compliance Responsibilities
- Total Site Responsibilities

Insert Service Provider-Community/County/State or 3rd Private Party
Questions
Environmental & Water Resources

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