Remedial Action Cost Risk Management from Record of Decision through Remedial Design

January 2007

Introduction

- Remedial Action (RA) Costs Issues
  - developed during remedial design phase
  - inconsistent (often higher than) with estimate presented in the ROD (derived from Feasibility Study)
- RA Funding Challenges
  - EPA budget uses costs presented in the ROD
  - actual RA funding need may be greater
  - limited national RA funding

Objectives

- Identify key cost risk elements after ROD is signed
- Recommend post-ROD cost risk management process
- Manage RA cost risk from ROD through RD

Risk/Uncertainties Analysis

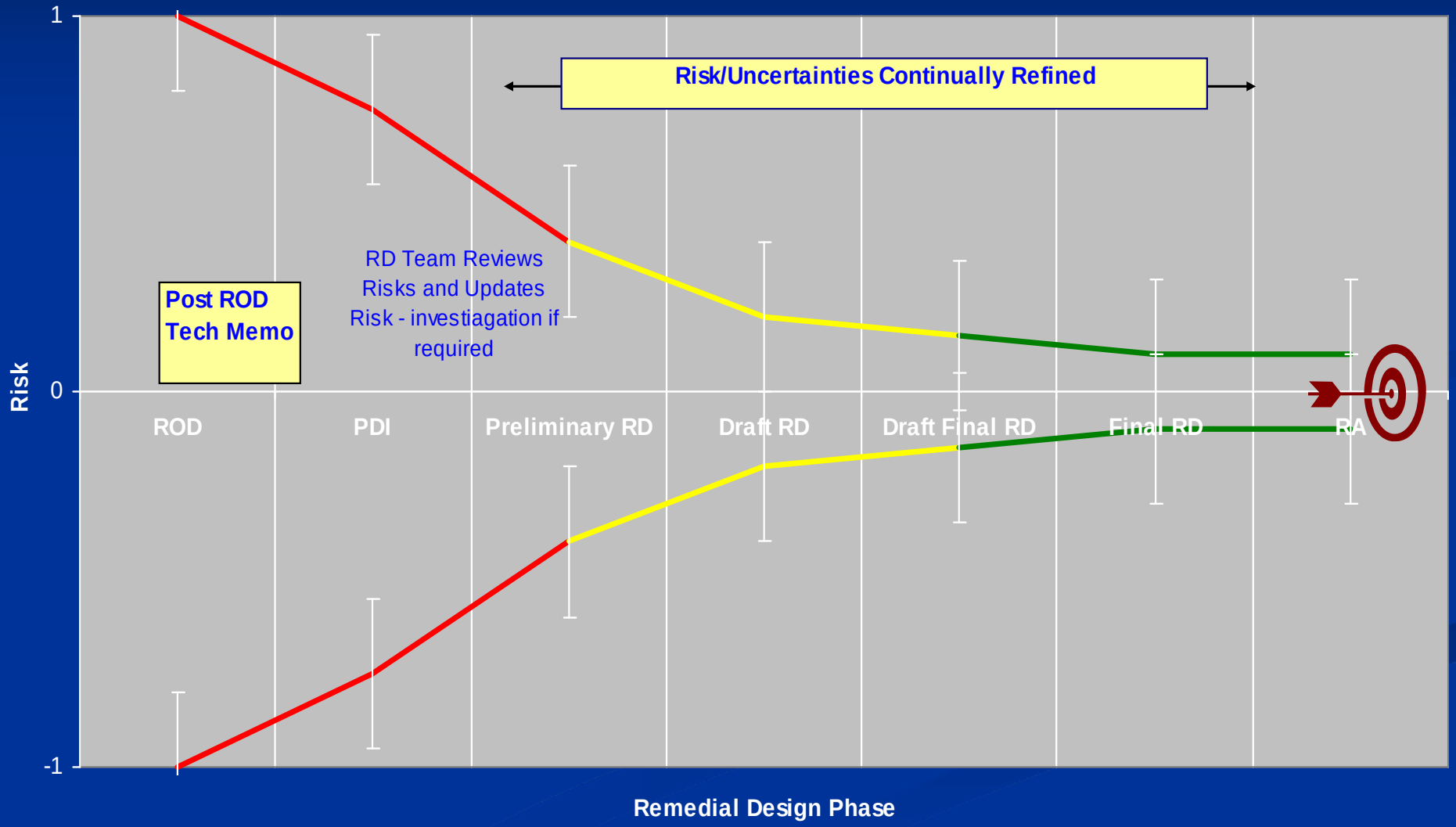
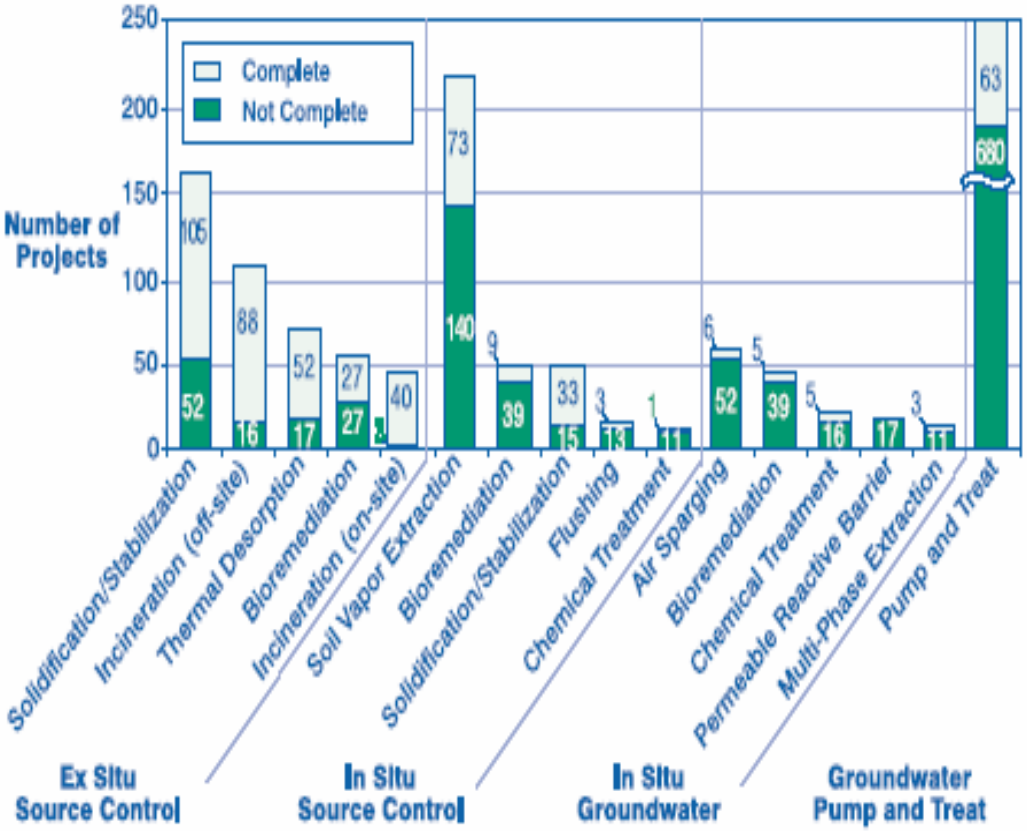


Figure 4: Superfund Remedial Actions: Number of Projects Completed by Technology (FY 1982 - 2002)*



*Includes information from an estimated 70% of FY 2002 RODs.

Sources: 3, 4, 5, 7, 11. Data sources are listed in the References and Data Sources section on page 50.

Source: Treatment Technologies for Site Cleanup: Annual Status Report (Eleventh Edition), February 2004

Key Cost Risk Elements for Ex Situ Source Control

- Increase in waste/soil volume as defined in the pre-design investigation
- Remedial investigation data gaps
- Excavation extends below water table
- Contaminant partitioning
- Change in transportation method
- Change in disposal cost
- Engineering controls

Key Cost Risk Elements for In Situ Source Control

- New information from pilot study requires remedy modification
  - additional extraction/injection points required
  - change in air emission requirements
  - change in treatment process
  - additional monitoring required

Key Cost Risk Elements for In Situ Groundwater

- New information from treatability study and/or pilot study requires remedy modification
  - additional injection/monitoring wells required
  - extension of treatment period
  - additional chemicals/enhancers required
  - additional monitoring required

Key Cost Risk Elements for Groundwater Pump and Treat

- Change in discharge options
- Change in treatment process
- Change in extraction rate and system size
- Geohydrologic dynamics

Higher cost risk to long term remedial action and O&M

Common Cost Risk Drivers

- RI data gaps
- Regulatory changes
- Cost escalation due to time lag between FS/ROD and design
- Change in remediation approaches due to external factors
- Additional site information revealed during design

RA Cost Risk Management Process

Signed ROD
- ID RA alternative
- RA costs derives from FS

Post ROD Tech Memo
- ID cost risk drivers
- Completed promptly after ROD
- Qualitative not quantitative
- Discuss PDI needs

RD Kickoff Meeting
- RD scope
- ID PDI needs
- Revisit/revise memo
- budget/schedule
- changed site conditions
- ID EPA/State drivers

Pre-design Investigation
- Fill in data gaps
- Update memo
- ID cost risk drivers changes

Preliminary RD
- Major design elements (plans)
- Specification outline
- DAR outline
- Preliminary RA cost estimate
- Update memo
- Construction strategy
- RA Funding strategy
- DAR - discuss cost risk drivers
- Update FS cost estimate

Draft RD
- Draft design package
- Draft RA cost estimate
- DAR - discuss risk

Final RD
- Final design package
- Final RA cost estimate

NIMBY Superfund Site

- ROD Summary
  - Operable Unit 1 - Excavation and offsite disposal of metals and VOC contaminated soil above cleanup criteria
  - Operable Unit 2 – Pump and Treat groundwater VOC plume above 50 ppb

RA Cost Risk Management Process for NIMBY Site

OU 1 - Soil

Signed ROD

- RA costs derived from FS

Post ROD Tech Memo

- ID cost risk drivers
  - contaminated soil volume
  - disposal options
  - engineering controls
- Discuss PDI needs

RD Kickoff Meeting

- ID PDI needs
- ID disposal option change
- ID EPA/State drivers
- Revisit/revise memo

Pre-design Investigation

- Fill in data gaps
- Update RA cost estimate
  - transportation
  - disposal
  - volume increase
- ID EPA/State drivers
- Update memo

Preliminary RD

- DAR- discuss cost risk drivers
- Funding strategy
- Construction strategy
- Prepare preliminary cost estimate
- Update memo

Draft RD

- Construction estimate
- DAR - discuss cost risk

Final RD

- Final design package
- Final RA cost estimate

RA Cost Risk Management Process for NIMBY Site

OU 2 - Groundwater

Signed ROD

- RA costs derived from FS

Post ROD Tech Memo

- ID cost risk drivers
  - discharge options
  - treatment process
  - extraction rate
- Discuss PDI needs

RD Kickoff Meeting

- ID PDI needs
- Revisit/revise memo
- disposal option change
- ID EPA/State drivers

Pre-design Investigation

- Fill in data gaps
- Update memo
- Treatment process change to accommodate discharge change
- Update cost estimate
  - treatment process
  - O&M
- ID EPA/State drivers

Preliminary RD

- Preliminary design
- DAR- discuss cost risk drivers
- Funding strategy
- Construction strategy
- Prepare preliminary cost estimate
- Update memo

Draft RD

- Construction estimate
- DAR-discuss cost risk

Final RD

- Final design package
- Final RA cost estimate

Questions?