RCRA Corrective Action Training Program: Getting to YES!

Strategies for Meeting the 2020 Vision

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Module 4

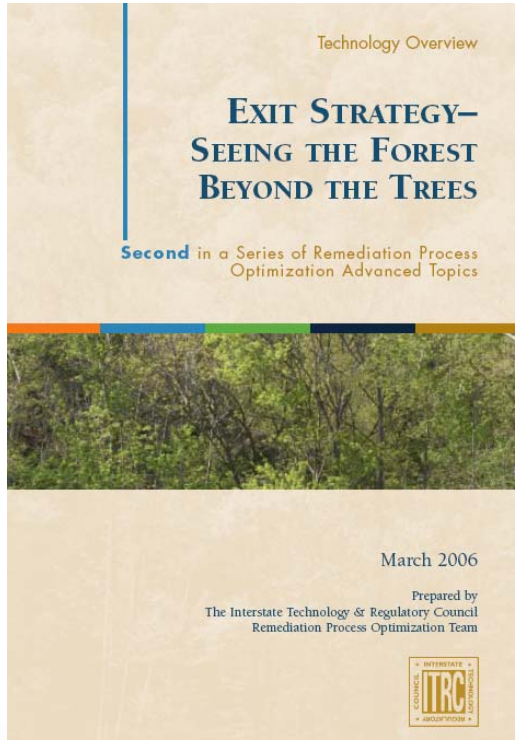
Starting with the End in Mind: Building an Exit Strategy

Module Overview

- Define Exit Strategy
- Identify the benefits of developing and implementing an Exit Strategy
- Consider different perspectives
- Review elements of a performance-based Exit Strategy
- Getting to YES with an Exit Strategy

Definition of Exit Strategy

- *A dynamic and succinct plan for accomplishing*
- *specific performance goals within a*
- *defined time period to*
- *assure protection of human health and the environment.*



Benefits of an Exit Strategy

- Builds consensus
- Puts an end in sight
- Measures progress
- Tightens schedule and budget
- Establishes a plan for “Getting to YES!”

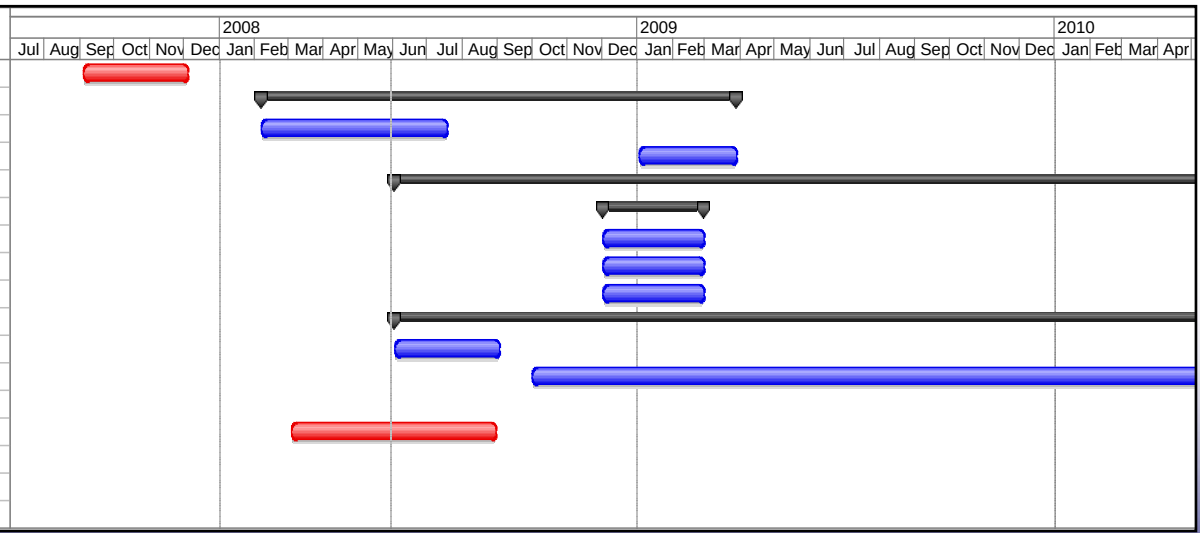
Elements of a Performance-based Exit Strategy

1. Schedule
2. Conceptual Site Model
3. Remedial Action Objectives (RAOs)
4. Remedies and performance expectations (means to achieve RAOs)
5. Performance metrics
6. Decision criteria

1. Schedule

- Start with the end
- Address present through CA Complete
- Develop with all stakeholders
- Understand that data gaps are okay

ID	Task Name
27	**Determine Groundwater Treatment to MNA Criteria**
28	**Select Groundwater Remedy**
29	Pilot Study
30	Restrictive Covenant
31	**Perform active treatment**
32	**Implement Soil Remedy**
33	Installation and start-up
34	Site restoration
35	Closure
36	**Implement Groundwater Remedy**
37	Installation and start-up
38	Operation
39	Site closeout or implement MNA
40	**Calculate predicted cleanup time**
41	**Passive Treatment**
42	MNA sampling and reporting
43	Annual evaluation of MNA program



Basis of Exit Strategy Schedule

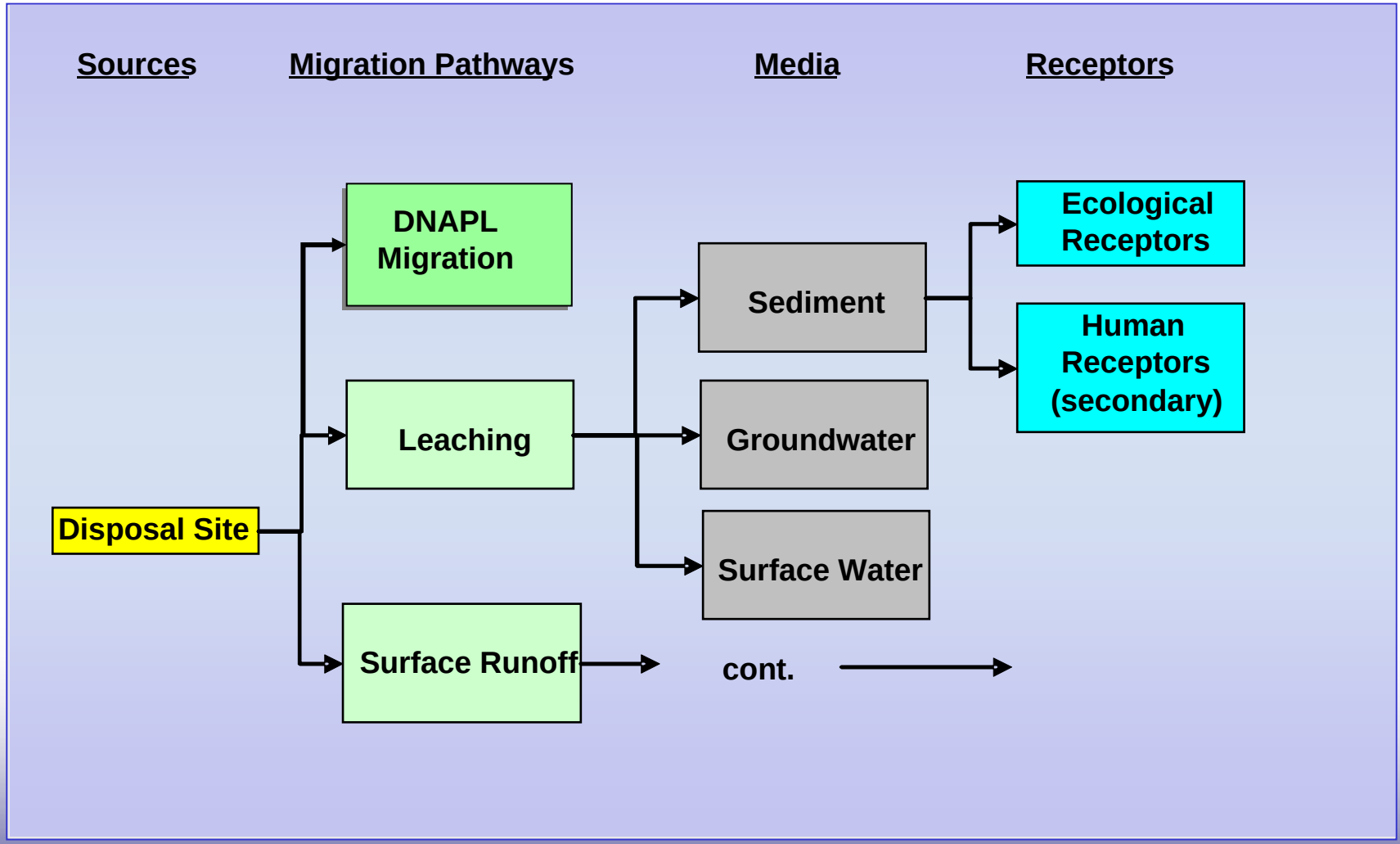
- Anticipated use and cleanup criteria
  - Operating facility: usually industrial
  - Revitalization: based on development plan
- Cost
  - Operating facility: life cycle costs, Net Present Value (NPV)
  - Revitalization: land value / use

2. Conceptual Site Model (CSM)

- Indicates what is known or suspected:
  - Sources
  - Fate and transport
  - Exposure pathways
  - Potential receptors
- Organizes data in relation to project goals
- Focuses resources to fill data gaps

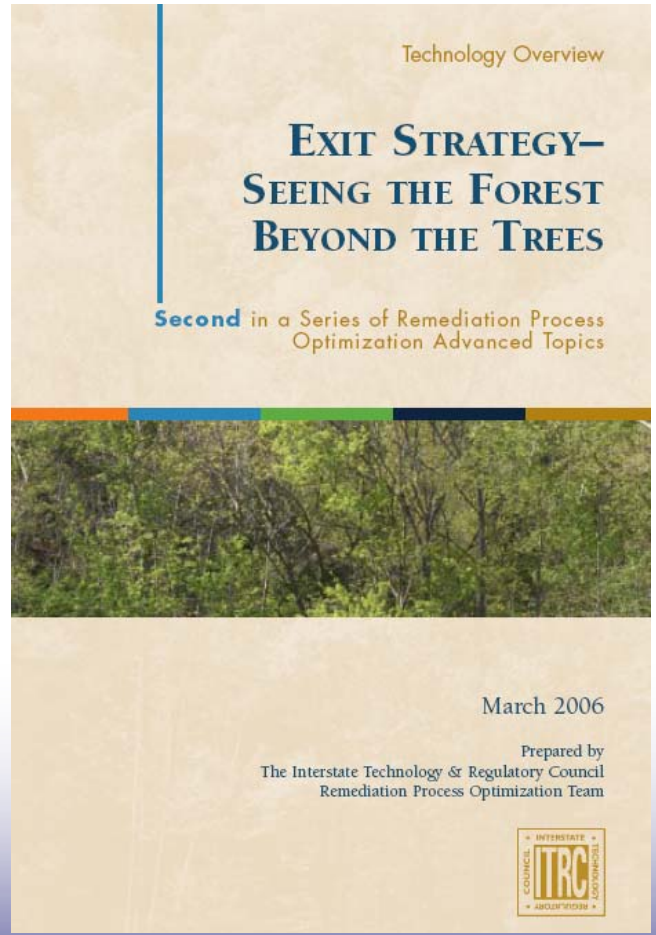
(continued)

CSM


Sources
Migration Pathways
Media
Receptors
Disposal Site
DNAPL Migration
Leaching
Surface Runoff
Sediment
Groundwater
Surface Water
Ecological Receptors
Human Receptors (secondary)
cont.

3. Remedial Action Objectives (RAOs)

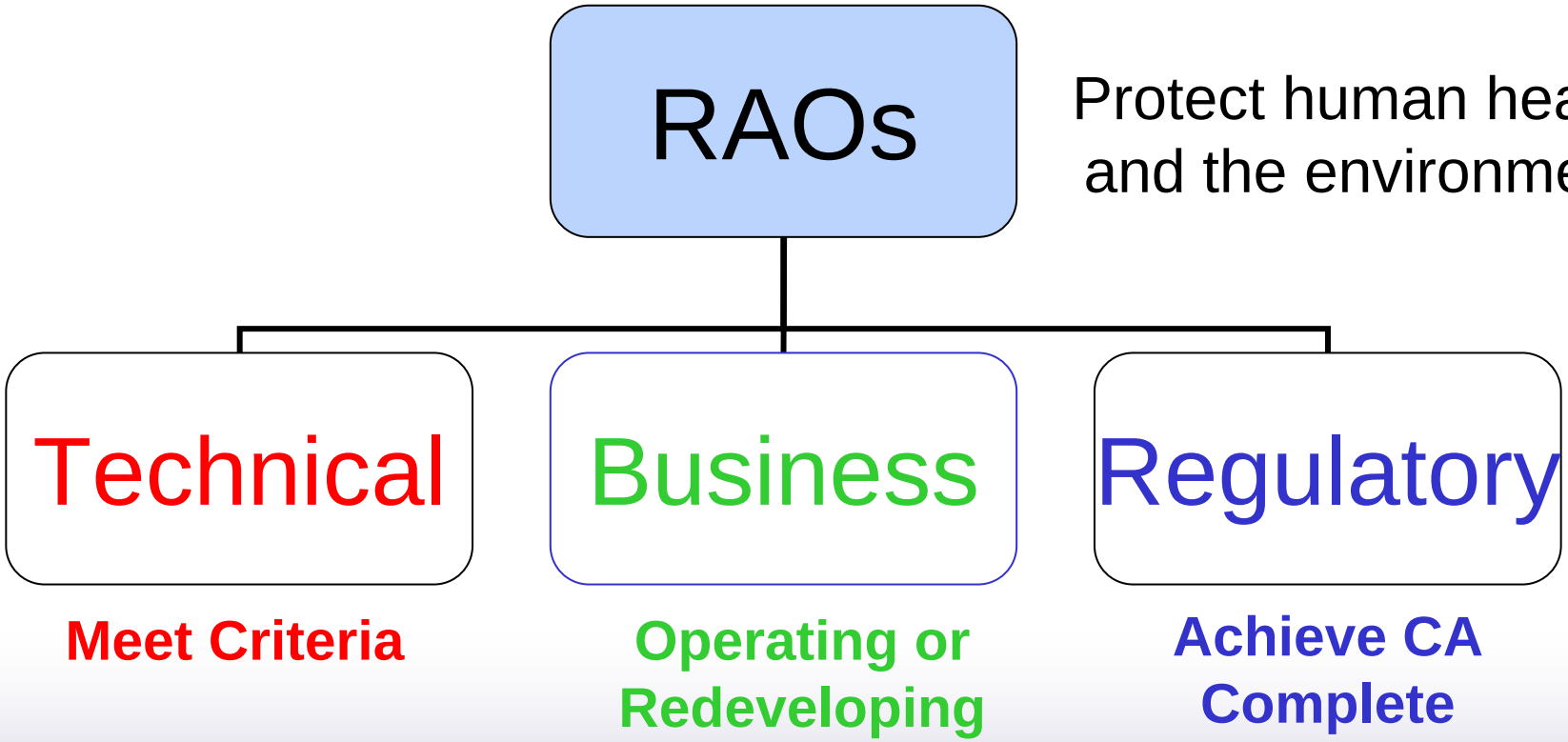
- *Completion criteria that must be achieved*
- *to reduce risks and hazards to potential receptors*
- *to acceptable levels under reasonable exposure scenarios*



RAO Considerations

- Exposure scenarios
- Facility operations
- Environmental conditions
- Timeframe (consider 2020)
- Remediation costs

RAO Perspectives



Input from the public should be considered as it can impact all of the above components.

- ✓ Plume Stability
- ✓ No off-site contamination
- ✓ No SW discharge

Congratulations!

CA 900 CA Complete w/ Controls

Technical Endpoint: Meet state criteria
Regulatory Endpoint: CA complete w/ controls
Business Endpoint: Donate land for county park

Start with RAOs

Facility with accelerated cleanup to allow recreational land use

Sports Complex 2015

Long-Term Stewardship

Corrective Action Complete

Restrictive Covenant

Risk-based Criteria

Parcel Transfers

STRUCTURAL SUPPORT: Stakeholder buy-in

Excavation

Chemical Oxidation

AS/SVE

Bio-augmentation

FOUNDATION: FLEXIBLE, PERFORMANCE-BASED PERMIT

Assessment & Remediation Performance Standards

Menu of Remedial Technologies

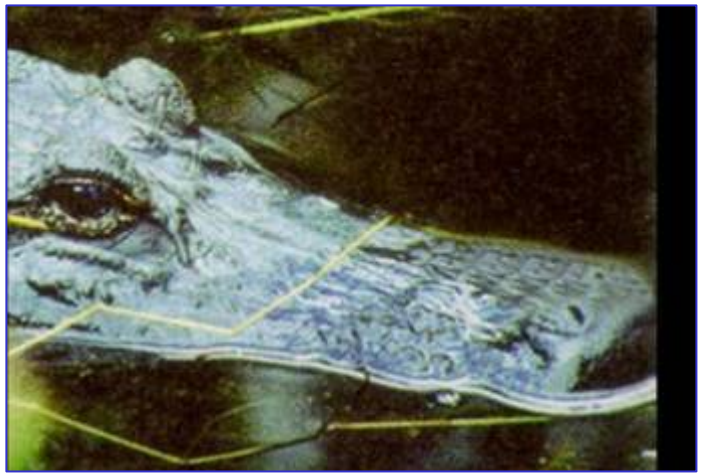
4. Remedies and Expected Performance: *Redevelopment*

Business RAO: Mixed use development

Regulatory RAO: CA complete w/ controls

Technical RAO: plume stability, ecological sustainability

Remedy Components

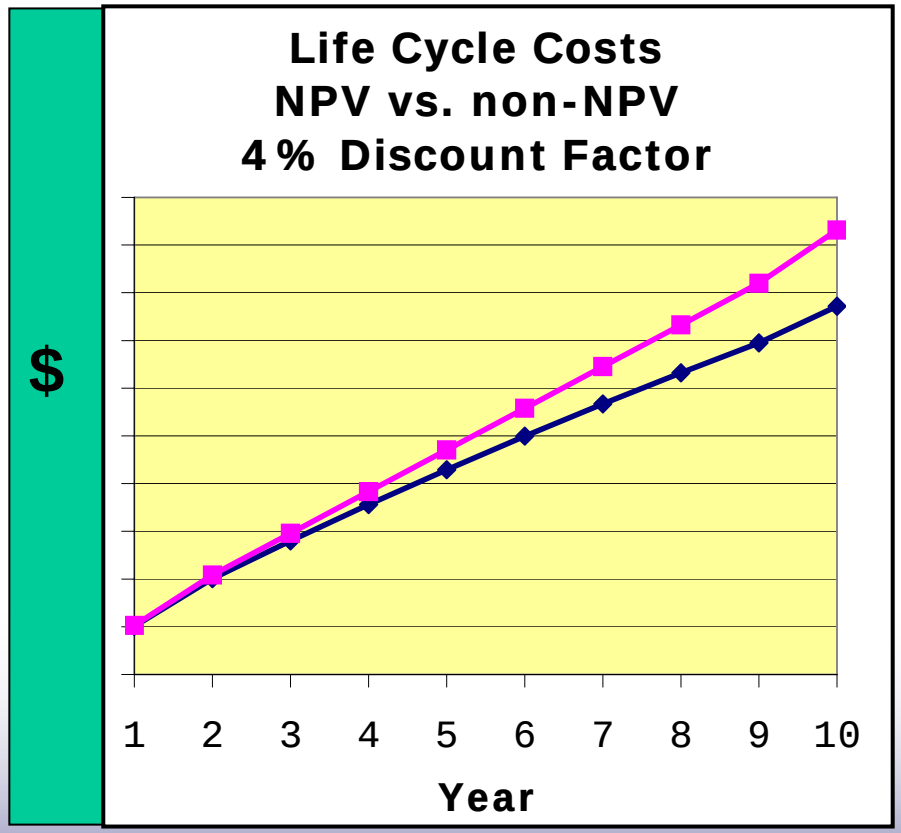


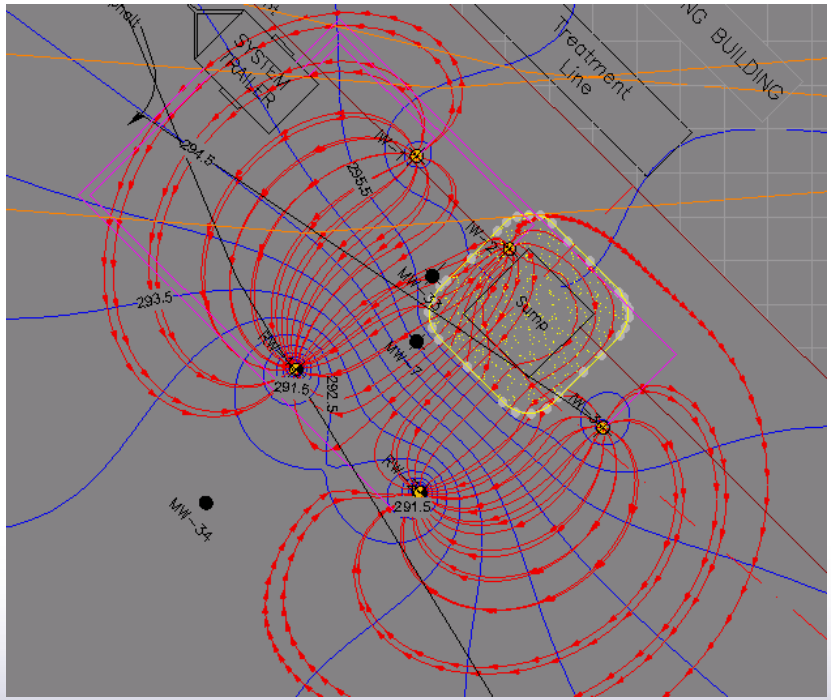
Establish wildlife corridor for sensitive species

Excavate landfills

Stabilize plumes

Remedies and Expected Performance: *Continued Use*

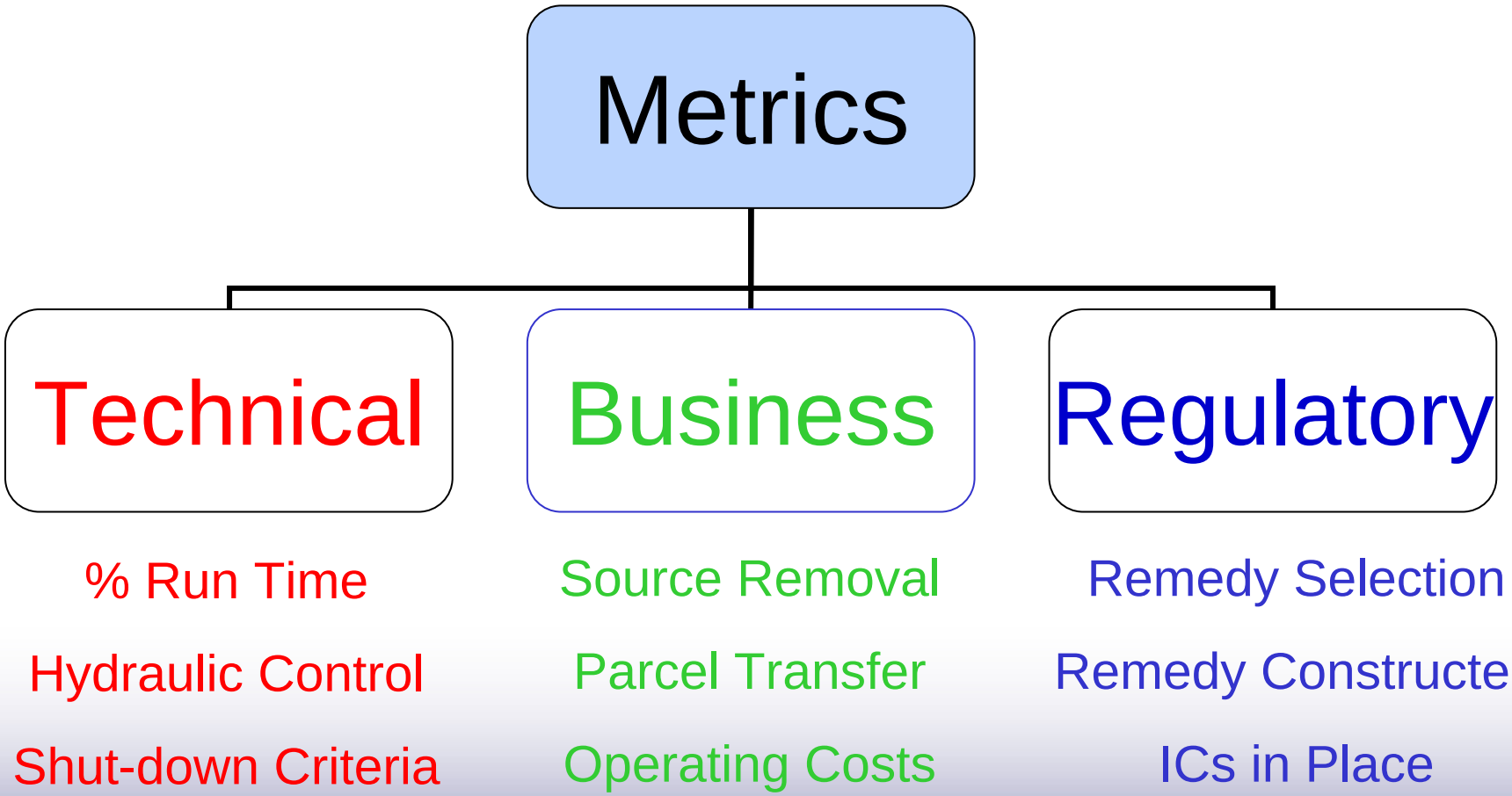




5. Performance Metrics

- Types:
  - Operational
  - Risk reduction
  - Response completion
- Timing:
  - “Fast track” (redevelopment)
  - Longer-term cleanups (operating facilities)
  - 2020 milestones

Performance Metrics Perspectives

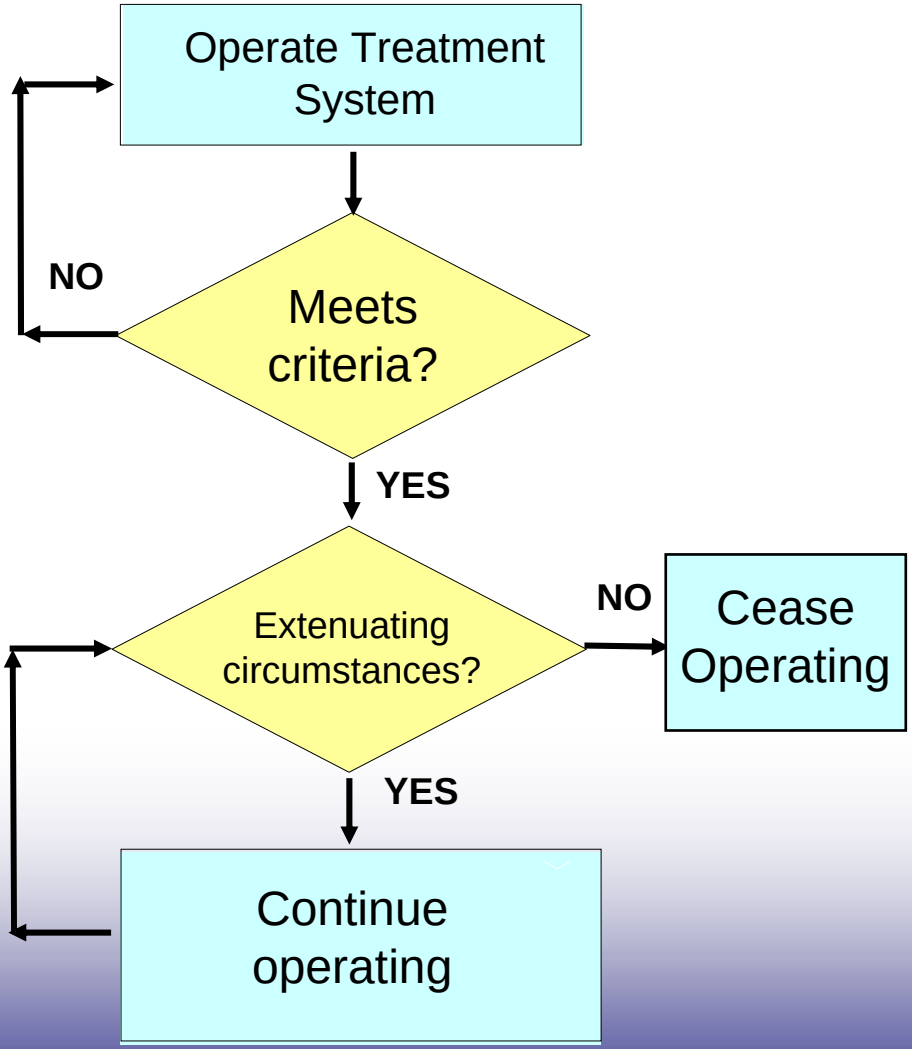


EXAMPLE

<u>Metrics / Milestones:</u>
Meet residential soil criteria, stabilize groundwater

<u>Remedy components:</u>
excavate soil, air sparge, restrictive covenant

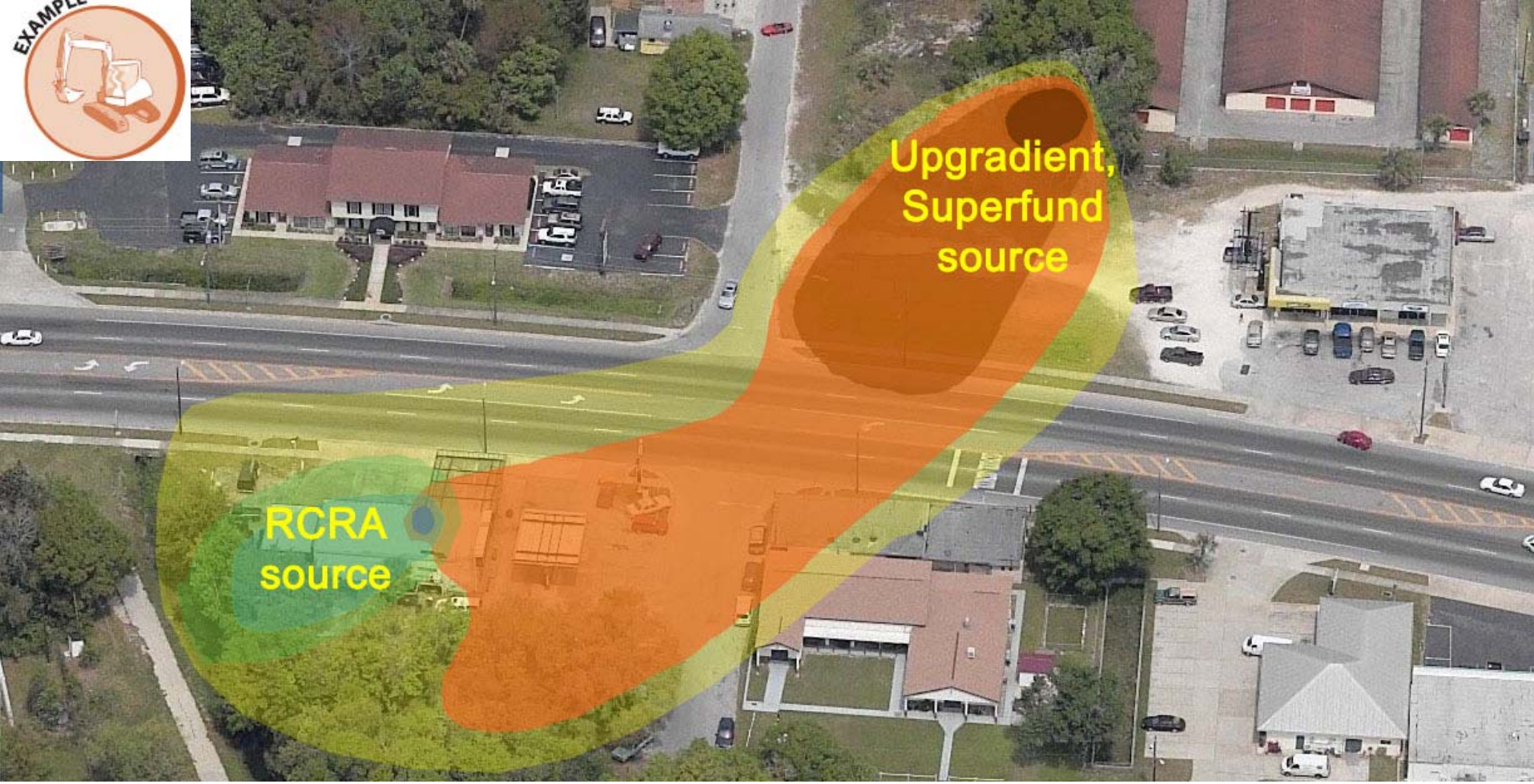
6. Decision Criteria



- "If …. then …"
- Applies monitoring and metrics
- Expect success but plan for possible failure

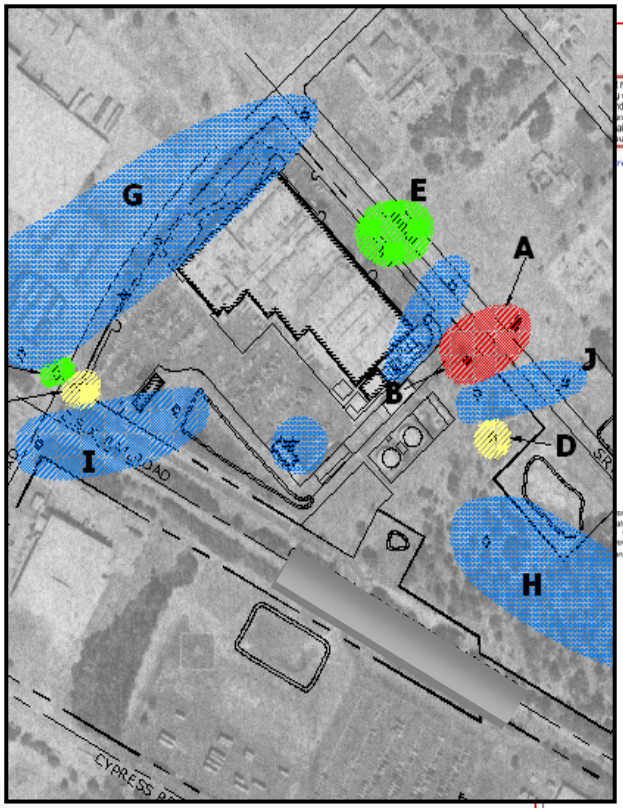
Decision Criteria Examples

- If/then action statements
  - If “X” consecutive monitoring well samples are clean, abandon the monitoring well
  - If air emissions drop below criteria, eliminate off-gas treatment
  - If plume distribution is wider than expected, add air sparge points

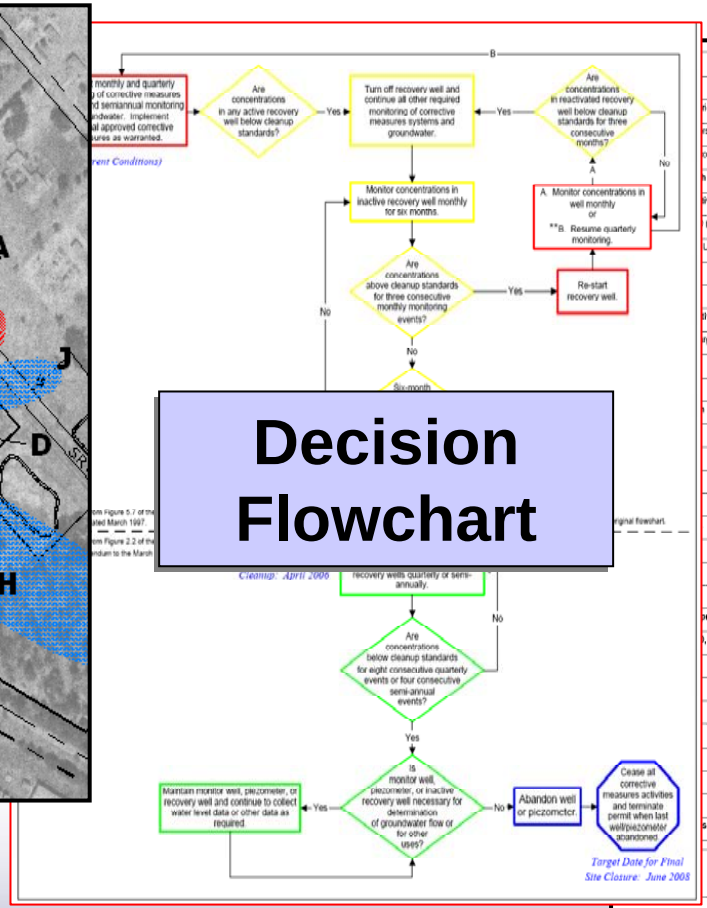


- Source removal – milestone
- Meet background levels – milestone or endpoint?
- Does Consent Order remain in force?
- Do residential criteria have to be met?

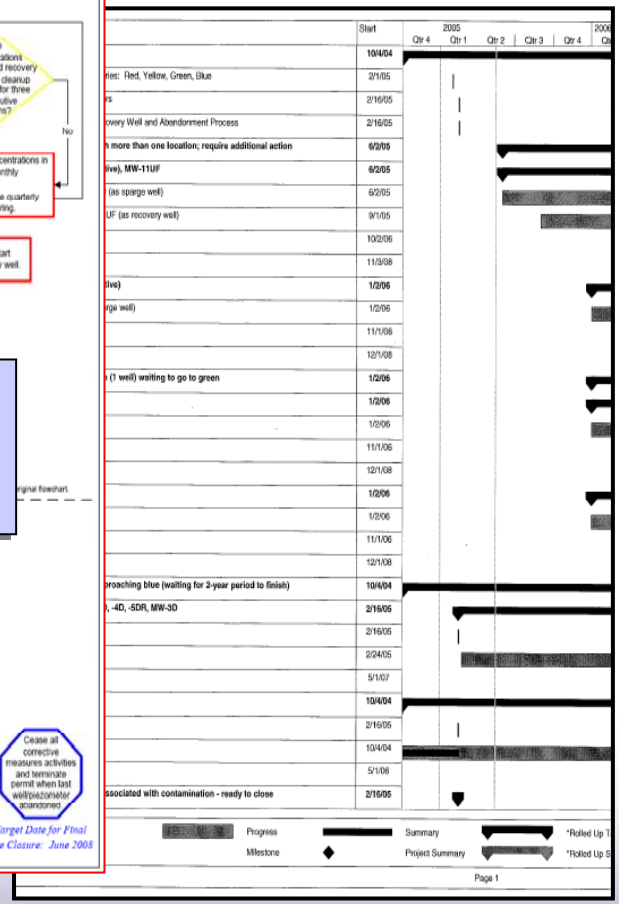
Complete Exit Strategy



Map reflecting CSM, remedies



Decision Flowchart



Schedule w/ RAOs, metrics

Summary

- The Exit Strategy can change with evolving site conditions and improved technical understanding.
- A performance-based Exit Strategy supports sound environmental management and efficient use of resources.
- The Exit Strategy is a useful tool for meeting the 2020 CA goals.