SESSION 20

RCRA CORRECTIVE ACTION:

CORRECTIVE MEASURES STUDY /
CORRECTIVE MEASURES IMPLEMENTATION
Session 20 Agenda:
Corrective Measures Study/Corrective Measures Implementation

- Introduction
- Remedial Alternatives
- Performance Standards
- Balancing Factors
- Corrective Measures Study (CMS) Considerations
- CMS Pathway
- CMI
Why Are Corrective Measures Required?

- RFI results define the nature and extent of contamination and indicate that further action is required
- Contamination must be addressed
- Risk assessment results indicate site poses a risk
- Contaminant concentrations exceed action levels
- Note that a CMS may be required even if an action level is not exceeded
CMS Purpose

- Identify, develop, and evaluate potential remedial alternatives for removal, containment, and/or treatment of contamination

- CMS should focus on realistic remedies and consider the extent, nature, and complexity of releases and contamination

- If presumptive remedies are being considered, the purpose of the CMS will be to confirm that the presumptive remedy is appropriate

- If technical impracticability is evident, the CMS should provide justification, and stipulate performance standards that will be met
CMS Work Plan

- CMS Work Plan (optional)
  - Should include a description of current site conditions
  - Should establish corrective action objectives
    - Units, wastes, and hazardous constituents to be addressed
    - How Media Protection Standards will be attained
  - Description of approach to CMS
  - CMS schedule
Selecting Remedial Alternatives

- Site characteristics from the Site Conceptual Model
  - Site data
  - Environmental setting
  - Receptor proximity

- Waste characteristics
  - Effectiveness/feasibility limitations
  - Nature and extent

- Technology limitations
  - Reliability/fully demonstrated
  - Performance record
  - O&M history
Selecting Remedial Alternatives

- Other considerations
  - Based on good engineering practice
  - Capable of addressing all site problems and corrective action objectives
  - Evaluate only appropriate, implementable options
  - Need for any additional site characterization data
  - New or innovative technologies may require laboratory and/or bench-scale studies
Three Performance Standards For CMS

- Remedial alternatives must meet three performance standards:
  - Attain media cleanup standards
  - Control the sources of the releases
  - Protect human health and the environment

- The performance standards are considered the main goal of the cleanup and are non-negotiable

- All remedial and corrective measures alternatives must meet the performance standards
Three Performance Standards For CMS

- Attain media cleanup standards
  - Ability of alternatives to achieve the media cleanup standards identified in the permit modification or enforcement order
  - Does not necessarily mean removal or treatment of all contaminated material above specific constituent concentrations
  - Remedies may attain media cleanup standards through combinations of removal, treatment, engineering and institutional controls
    Wastes remaining in an engineered landfill under a cap

- Control the sources of releases
  - How alternatives reduce or eliminate to the maximum extent possible further releases

- Protect human health and the environment
  - How alternatives provide human health and environmental protection
If more than one remedial alternative meets the performance standards, consider the balancing factors to select the remedial alternative.

- The balancing factors are:
  - Long-term reliability and effectiveness
  - Reduction of toxicity, mobility, or volume of wastes
  - Short-term effectiveness
  - Implementability
  - Cost
  - State and community acceptance
Balancing factors are not ranked in terms of relative importance

- Any one of the balancing criteria may prove to be the most important based on site conditions (Site Conceptual Model)

- Example: A remedy at a certain site might be protective in the short term but not necessarily reliable in the long term
  - Capping a highly contaminated area may require long-term operation and maintenance, so may be more appropriate to remove the hot spots and then cap the residual contamination and implement an institutional control
Reliability/Effectiveness/Reduction

- Long-term reliability and effectiveness
  - Magnitude of residual risk
  - Adequacy and reliability of controls
  - Preference for treatment over containment, where appropriate, but does not preclude protective containment remedies

- Reduction of toxicity, mobility, or volume of wastes
  - Treatment process used and materials treated
  - Amount of hazardous materials destroyed or treated
  - Degree of expected reductions in toxicity, mobility, or volume
  - Degree to which treatment is irreversible
  - Type and quantity of residuals remaining after treatment
Effectiveness and Acceptance

- Short-term effectiveness
  - Protection of community during remedial actions (transportation-related risks)
  - Protection of workers during remedial actions (contaminated dust)
  - Environmental impacts (sediment disturbance)
  - Time until remedial action objectives are achieved
  - May conflict with first two factors (long-term reliability and reduction of toxicity, mobility, or volume of wastes)

- State and community acceptance
  - Should consider reuse and future planning
Implementability

- Ability to construct and operate the technology
- Reliability of the technology with regard to technical practicability
- Ease of undertaking additional corrective measures if necessary
- Ability to monitor effectiveness of remedy
- Coordination with other agencies and community
- Availability of off-site treatment, storage, and disposal services and specialists
- Availability of prospective technologies
Cost

- Capital costs for anticipated life of the remedy
- Operating and maintenance costs for anticipated life of the remedy
- Present worth costs
- Protection cannot be traded for cost
- Can be used to select less costly remedy that offers equivalent protection
- Timing influences cost
- Has caused confusion
- Cost can and should be considered when choosing among the remedies meeting threshold criteria
- Choose the remedy which most appropriately addresses the situation and provides the most efficient use of Agency and facility resources
The CMS should include information on:

- Performance
  - Effectiveness as a remedy
  - Limitations of remedy
  - Useful life (i.e., length of time the level of effectiveness can be maintained)
  - Resource availability in future life of technology
  - Appropriateness of technology
The CMS should include information on:

- **Reliability**
  - O&M requirements
  - Effectiveness under similar conditions
  - Historical technology combination of effectiveness
  - Flexibility to deal with uncontrollable changes
  - Failure impact on receptors

- **Safety**
  - Safety to nearby communities and environments
  - Safety to workers during implementation
THE CMS should include information on:

- Implementability
  - Constructability
    - Internal conditions
    - External conditions
  - Time
    - Time to implement
    - Time to produce results
  - Technical Practicability
    Will the technology be able to achieve media cleanup standards or performance standards?
CMS Considerations

CMS should include:

- Environmental assessment
  - Short-term and long-term beneficial and adverse effects of response alternative
  - Evaluation of any adverse effects on environmentally sensitive areas
  - Analysis of measures to mitigate adverse impacts

- Assessment will describe
  - Contaminant levels and characterizations on site
  - Potential exposure routes
  - Potentially affected populations
CMS Considerations

**CMS should include:**

- **Human health and ecological criteria**
  - Each alternative is evaluated to
    - Determine level of exposure and reduction over time
    - Determine overall protectiveness both during and after implementation
    - Compare residual levels to existing criteria, standards, or regulations (i.e., maximum contaminant levels (MCLs), action levels, water quality criteria)
CMS Considerations

**CMS should include:**

- Institutional factors for each alternative
  - Federal, state, and local environmental and public health standards, regulations, guidance, advisories, ordinances
  - Community relations aspects on the...
    - Design
    - Operation
    - Timing
    - ...of each alternative

- Capital cost estimates
  - Direct
  - Indirect
Typical CMS Pathway

- CMS Report Received
- Determine compliance with Order or HSWA permit
  - Evaluate adequacy and accuracy of development and screening for each alternative remedy considered
  - Evaluate accuracy of detailed analysis of remedies
  - Compare alternatives to corrective measures evaluation criteria and standard practices
- Prepare Draft Comments with detailed discussion of deficiencies
- Approve revised CMS
- Prepare Draft Statement of Basis or draft permit modification language incorporating proposed remedy
Typical CMS Pathway

- Finalize Statement of Basis, Draft Order, or Permit Modification
  - Document remedy and communicate the selection to the public
  - Identify any residual uncertainties
  - Summarize the corrective action activities conducted at the site
  - Summarize all public participation activities

- Issue Public Notices:
  - Dates of public comment period
  - Dates, times, and locations of public meetings
  - Locations of repositories containing Administrative Record
Typical CMS Pathway

- Administrative authority receives public comment and prepares responsiveness summary
- Permit modified or order issued
- Corrective measures implementation (CMI)
CMI Report Components

- Introduction
- Purpose
- Program Management Plan
- Community Relations Plan
- Design plans and specs
- Design phases (i.e., Preliminary, Intermediate, Final)
- Operations and Maintenance (O&M) Plan
- Cost Estimate
- Project Schedule
- Construction Quality Assurance (QA) Objectives
- Health & Safety Plan
# CMI Pathway

## Statement of Basis/Permit Modification/Order issued
- Document the remedy selection
- Technical description of remedy
- Cleanup standards
- Activities to demonstrate compliance
- Standards for waste management
- Procedures to close units
- Schedule
- Reporting requirements

## Design Documents
- Design plans and specifications
- O&M plan
- Construction QA objectives
- Schedule
- Amended cost estimate

## Corrective Measures Construction
- Responsibility and authority
- Construction quality assurance personnel qualifications
- Inspection activities
- Sampling requirements
- Documentation
- Conduct periodic oversight of activities

## Completion of Remedies
- All media cleanup standards in permit/order met
- Source control
- Remove or decontaminate implementation structures
Remedy Completion

Remedy is complete when:

- Remedy has been selected and implemented properly
- Remedy is consistent with anticipated future land use
- Cleanup or remedial goals are achieved
The following guidance provides additional information
