

US EPA ARCHIVE DOCUMENT

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



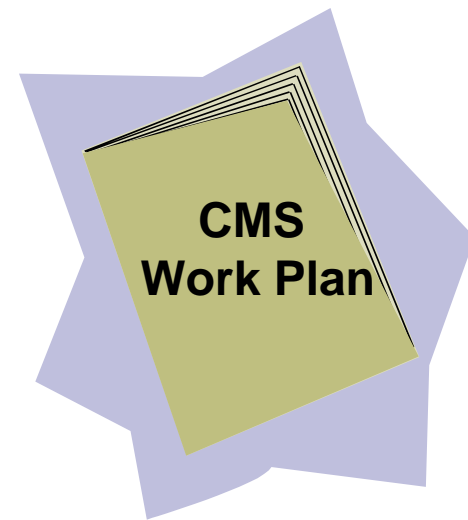
CMS Purpose

- ▶ 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



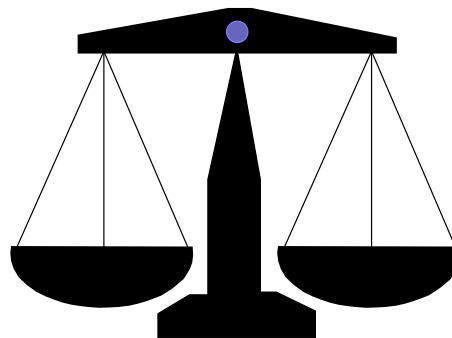
If more than one remedial alternative meets the performance standards, consider the balancing factors to select the remedial alternative

- ▶ 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

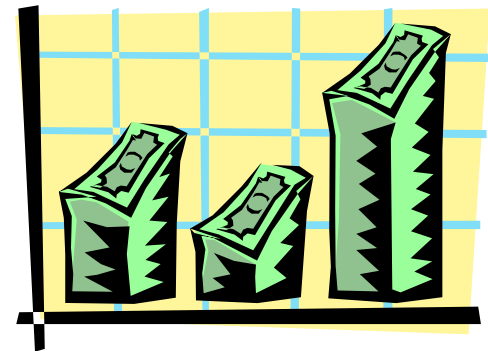
Implementability

- ▶ 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 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 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 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

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

- ▶ U.S. Environmental Protection Agency. 1991. Guidance on RCRA Corrective Action Decision Documents: The Statement of Basis Final Decision and Response to Comments. (OSWER Directive 9902.6). February 1991.
- ▶ Final Guidance on Completion of Corrective Action Activities at RCRA Facilities. Federal Register. Volume 68, No. 37. February 25, 2003.

