ASTM E 2435-05: Standard Guide for Application of Engineering Controls to Facilitate Use or Redevelopment of Chemical-Affected Properties

Design of Engineering Controls

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Considerations for the Design of Engineering Controls

- Performance standards
- Exposure pathways
- Design specifications
- Installation
- Monitoring and maintenance
- Activity and use limitations



Basis for Performance Standards

- Risk-based approach intended to:
 - Prevent direct contact
 - Limit migration of chemicals of concern

- Design life is equal to or lesser than:
 - Expected life of exposure hazard
 - Life of the structure or site use



Design Specifications Process

- Use qualified designers
- Secure multiple stakeholder input
- Develop basis of design information
- Specify design components
- Evaluate each design component
- Prepare record drawings



Exposure Pathway Considerations

Prevent direct contact:

- Obstruct direct contact with soil
- Impede the release of wind-driven soil particulates

Control soil or groundwater vapors:

Inhibit the migration of vapors into indoor air

Control groundwater flow:

Implement groundwater flow barriers



Engineering Covers





Soil Direct Contact Guidelines

Soil Engineering Control	Exposure Pathway	Thickness to achieve performance objective	
Asphalt	Contact, inhalation, leaching to water,	1-3 in. surface over 4-6 in. base	
Concrete	Contact, inhalation, leaching to water	3-4 in. surface over 4-6 in. base	
Flexible Membrane Liner (FML)	contact, <u>inhalation,</u> <u>leaching to water</u>	FML plus structural member	
Soil Covers	Contact, inhalation, leaching to water	Varies from 18 in to 60 in. dependent upon soil type	

Vapor Controls



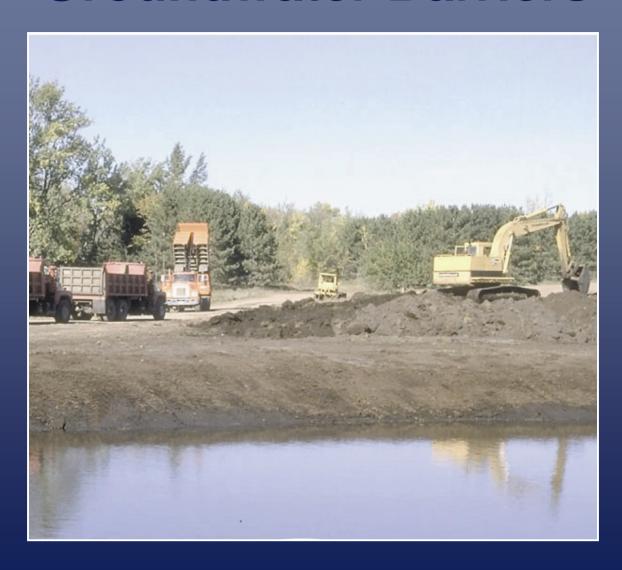


Vapor Control Technologies

- Prevention from entry
- Sealing
- Passive barriers
- Building pressurization
- Active soil depressurization (ASD)
- Removal after entry
- Building ventilization
- Air cleaning



Groundwater Barriers





Groundwater Control Technologies

- Seepage barriers
- Sealing utility lines
- Interceptor wells and trenches
- Slurry walls
- Permeable reactive barriers (PRBs)



Installation of Engineering Controls

- Establish QA/QC program
- Specify qualified installers
- Document installation



Monitoring and Maintenance Program

- Must comply with enforcement instruments
- Specify periodic monitoring
- Describe schedule and procedures
- Define how to assess monitoring results
- Define how to re-evaluate when end uses, regulations, or risk levels change



Monitoring and Maintenance Program





Soil Control Performance Monitoring Guidelines

Cover Type	Design Life	Inspection Frequency	Action Level
Asphalt	10 -15 yrs	Annual	Open cracks, alligator crack pattern
Concrete	20 – 30 yrs	Biennial	Open joints, wide cracks
Flexible Membrane Liner (FML)	50 Yrs	Annual	Tares, structural member movement
Soil covers	15 – 20 yrs	Semi-annual	Erosion, large cracks



Consideration of Activity and Use Limitations

- Identify the specific activity and use limitations
- Record the activity and use limitations in real property records



Summary

→ ASTM E 2435 – 05:

... outlines a rational, risk-based approach for the design, implementation and monitoring of engineering controls that can facilitate the use or redevelopment of chemical-affected properties



Contacts:

◆ To order copies of the ASTM 2435-05 Standard Guideline:

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