consulting engineers and scientists

Introduction to Brownfields: Site Assessment and Cleanup

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TAB
Technical Assistance for Brownfields
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What is a Brownfield?

• Under-used industrial or commercial properties
• Often abandoned because of perceived environmental contamination
• Commercial properties
• Mills
• Warehouses
• Factories
Benefits of Brownfields Redevelopment

- Protects human health and the environment.
- Increases the tax base in the local area.
- Restores or replaces dilapidated buildings and facilities.
- Strengthens central economic centers.
- Creates jobs.
- Utilizes existing infrastructure.
- Encourages inner city investment.
- Reduces suburban sprawl.
- Prevents the spread of the contaminants.
Key Players

- State Environmental Agencies
- State Economic Development and Planning Agencies
- Commercial Lenders
- Technical and Environmental Consultants
- Legal Counsel
- Citizens and Community Groups
- Local Government Agencies
- United States Environmental Protection Agency (EPA)
- Developers
- Local Community Development Corporations (CDCs)
- Federal Government Agencies
  - HUD
  - ACOE
Key Challenges

- **Environmental liability**
  - Manage liabilities associated with contamination
- **Financial barriers**
  - Additional cost to development
  - Cleanup costs greater than property value
  - Lenders hesitant to finance
- **Cleanup may add to development timeline**
- **Reuse planning**
• Operations that uses raw material to manufacture products:
  – textiles;
  – pulp, paper, and paperboard;
  – wood products for construction;
  – iron and steel for construction.

• Process:
  – cotton, wool, and other raw fibers;
  – wood and wood fiber, both virgin and recycled; and
  – iron, ore, coal, and metal scrap.
Characteristics of Mills

- Centerpiece of town
- Historic structures
- Readily accessible to transportation
- Existing utilities and infrastructure
- Large
- Multiple tracts of land
- Water bodies and rivers
- Opportunity for waterfront development
- Long development time periods
Types of Contamination at Mills

- **Textile**
  - Mercury, polychlorinated biphenyls (PCBs), lead and other metals, volatile organic compounds (VOCs), asbestos, petroleum

- **Paper mills and wood products**
  - Wood treating chemicals, creosote, VOCs, dioxins, lead, PCBs, petroleum

- **Iron and steel**
  - Lead, PCBs, petroleum, slag, asbestos

- **Railroad lines and spurs**
  - Polyaromatic hydrocarbons (PAHs), lead, pesticides

- **Underground storage tanks (USTs)**
  - Fuel oil
Phase I Due Diligence

• Goal: Identify “areas of recognized environmental concerns”
• Paper Search
• Historic Information
• Interview
• Site Visit
• Areas of Environmental Concern (ACEC)
  – Historic use, USTs, metal finishing, dry cleaners, types of manufacturing
Sources

• Leaking USTs
  – Fuel
  – Gasoline
  – Chemicals
• Contaminated fill
• Contamination from historic process
• Dry wells, drums, dumping
• Building contaminants
  – Asbestos
  – Lead paint
  – Mold
  – PCBs
Media

- Soil
- Groundwater
- Sediment
- Surface Water
- Soil Gas
- Indoor Air
- Building Materials
Field Investigation

• Subsurface Investigation
  – Soil borings/test pits/monitoring wells
  – Soil and groundwater testing
  – Soil gas testing
• Sediment and surface water sampling
• Indoor air testing
• Building materials
Test Pit Excavation
Monitoring Well Installation
Water Supply Well Sampling
Soil Vapor Sampling
Indoor Air Sampling
Building Materials

- **Asbestos**
  - Pipe and boiler installation
  - Suspended ceiling tiles
  - Wallboard and joint compound
  - Caulking and glazing
  - Mastic
  - Floor covering and tiles

- **Lead-based paint**

- **Mold**

- **Mercury**
Where PCBs are in Building Materials

- Construction between 1950s and late 1970s
- Caulking and grout in floor and wall joints
- Oil-based paint coating floors and walls
- Mastic and adhesives used under flooring (tiles and carpets)
- Sealants and finishing used on flooring
- Gaskets around windows and doors and in heating, ventilation, and air conditioning systems and ducting
- Window glazing
- Roofing and siding
What Materials are Likely Affected

- Ceilings
- Electrical equipment/fixtures
- Elevator shafts
- Expansion joints
- HVAC Equipment
- Masonry joints
- Painted surfaces
- Porous surfaces
- Roofs underlying soils
- Window and door frames
Cleanup and Development

- Remedial Action Plan
  - Establish Cleanup Goals
  - Determine if institutional control are required
  - Estimate Cleanup Costs

- Soil Cleanup

- Indoor Air

- Building Materials
  - Demolition
  - Restoration
How to Cleanup a Mill

• Soil
  – Excavation and off-site disposal of soil
  – Encapsulation
  – On-site treatment

• Indoor air
  – Vapor intrusion from solvents or gasoline
  – Sub-slab depressurization systems
Building Cleanups

- Abate asbestos, lead paint and PCBs
  - Significant costs
  - Asbestos abatements are state regulated
  - PCB abatements are federally regulated and approved
  - Remove
  - Encapsulate

- Demolition Debris Management
  - Abate asbestos, lead paint and PCBs prior to demo
  - Asphalt, brick, and concrete
    - Crush and reuse onsite for backfill, grading and roadway bedding
Cohannet Mill, Taunton, MA

- Textile Mill
- 6.5 acres
- 140,000 square feet (sq ft)
- Railroad easement
  - Lead and PAHs
- Asbestos in building
- USTs and petroleum
- Transformer
- 64 Affordable residential units
- 18,000 sq ft commercial
- Riverfront greenspace
Forest City, Cumberland, RI

- Phase I and Phase II Due Diligence
- Part of Peterson-Puritan Superfund Site
- Arsenic, lead, PAHs, oil in soil. Encapsulated to prevent exposure
- Deed restriction
- PCB-contaminated building debris
MASS MoCA, North Adams, MA

- Textile Mill
- National Historic Register
- 13 Acres
- Electronics Manufacturer
- PCBs, trichloroethylene (TCE) and heavy metals
- Soils excavated and capped
- Largest center for contemporary arts
- 19 galleries, 100,000 sq ft exhibit space
- 60,000 sq ft office and retail
North Dam Mill, Bidderford, ME

- Textile Mill
- Heart of city’s downtown
- Lead-contaminated soil, asbestos, lead paint
- Asbestos and lead paint abatement
- Soil capping
- Residential / commercial