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Using Risk Assessments and Institutional Controls as Brownfields Cleanup Tools

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Introduction

States can achieve more efficient environmental cleanup, decrease the development of open space and reduce the effects of urban sprawl by redeveloping brownfields. A *brownfield* is an abandoned or unused commercial or industrial site where another use for it may be affected by contamination.

By amending cleanup standards in order to increase regulatory flexibility, many states have facilitated more brownfields cleanups. A cleanup standard tailored to the eventual use of the property is one option used in several state brownfields programs. In taking action, however, state policymakers will want to be aware of the scientific reasoning that would allow for relaxing environmental cleanup standards at brownfields sites. Essential to this understanding of varying cleanup standards is the concept of *risk*.

The potential risk of a detrimental health effect resulting from environmental contamination may be assessed through a study of the toxicity of the contamination at a site and the probability for exposure to workers during cleanup and to office or industrial workers or residents after the cleanup and reuse. Statistical analysis combines these factors to determine a level of risk that can be compared with other risk scenarios that occur in everyday life. Risk-based corrective action is a cleanup strategy that integrates exposures and risk assessment techniques into the traditional site remediation processes.

States use varying approaches to establish cleanup standards for brownfields projects. Some states tailor standards to future use categories—industrial, commercial or residential. Other states assess sites and set cleanup standards on a case-by-case basis. A few states have established categories of cleanup standards that are based upon the type of contaminated medium, either soil or groundwater.

Land use or institutional controls on brownfields that remain contaminated to some degree after cleanup—referred to as *residual contamination*—can lead to their reuse. Institutional controls are legal requirements that ensure a risk-based approach to cleanup maintains the appropriate levels of protection for public health and safety after the project has been completed. Environmental liens, easements and other property transfer restrictions are used by some states as an insurance measure to supplement relaxed cleanup standards.

As voluntary cleanup programs expand and modify based upon working experience, states learn about and develop policies about maintaining human and environmental health and safety at brownfields sites that have returned to productive use.

What Are Hazardous Wastes?

Hazardous wastes are harmful to human health and the environment if handled improperly.

Hazardous wastes are materials that can be harmful to human health or the environment if they are handled improperly. The Resource Conservation and Recovery Act (RCRA) defines a waste as hazardous if it is corrosive, reactive (can explode), or ignitable (can burn easily). Hazardous wastes can be either solid or liquid and include chemicals that are poisonous or linked to human health or ecological problems.¹ Chemical compounds commonly found at brownfields sites (listed in table 1) are considered to be hazardous wastes; however, hazardous wastes can also be found in a number of locations besides brownfields sites, including homes, small businesses, agricultural businesses, gas stations, schools, hospitals, military facilities and other government properties.

Risk assessments based on the redevelopment proposed for the brownfields site—open space, industrial, commercial, mixed-use or residential—determine whether users will be exposed to hazardous waste.

Fundamentals of Risk Assessment

Environmental risks and occupational hazards in redeveloping a brownfields site are based on determining the level of toxicity at the site and the amount of exposure to workers and future users. Determining the risk of redeveloping a brownfields site requires knowledge in several fields, including epidemiology, toxicology, biochemistry, and clinical medicine. Decisions are based upon the information provided to experts, but assessment guidelines allow policymakers and developers to make more consistent and informed decisions.

Table 1. Major Sources of Hazardous Waste at Brownfields Sites

Waste Generators by Industry	Waste Type
Chemical	Acids and bases, spent solvents, reactive chemicals, spent catalytic chemicals, contaminated residues, wastewater treatment sludge.
Petroleum/Refining	Acids and bases, spent catalytic chemicals, oily wastes, wastewater treatment sludge that contains heavy metals.
Metal Manufacturing/ Electroplating	Heavy metals, acids and bases, cyanide wastes, wastewater treatment sludge that contains heavy metals.
Mining	Metals, acids and bases, cyanide.
Vehicle Maintenance	Paint wastes that contains heavy metals, lead acid batteries, spent solvents, used oils.
Printing	Heavy metals, acids and bases, waste ink, spent solvents.
Dry Cleaning	Spent solvents, ignitable wastes.

Source: U.S. Environmental Protection Agency, *RCRA: Reducing Risk From Waste*, (EPA530-K-97-004) September 1997, <http://www.epa.gov/epaoswer/general/risk/risk-1.pdf>, 8.

Risk assessments consist of all or part of four steps.

- Hazard identification—determining whether a particular pollutant is linked to a particular health effect.
- Dose-response assessment—determining the relationship between the amount of exposure and the probability that the health effect in question will occur.
- Exposure assessment—determining the extent of human exposure before or after application of regulatory controls.
- Risk characterization—describing the nature and the magnitude of the human risk and any related uncertainties.

Hazard identification requires determining the location, levels and mobility of chemicals. Redevelopment plans may require sampling in areas where exposure could occur. If the

Brownfields Issue Checklist

Due to the uncertainty and complexity of the risk assessment process, policymakers and the public should consider developing an issue checklist.

1. Understand the concerns of the public and state and federal regulators.
 - What is the history of the site, what governmental agencies are involved?
 - What policies and regulations are involved
 - What advocacy groups are involved?
2. What are the underlying science issues?
 - How good is the environmental data?
 - What are the public health and environmental issues?
 - What populations are affected, what is the basis for the concerns?
3. How good is the available information?
 - Does the data confirm concerns?
 - How large is the population at risk?
 - What data is lacking?
4. Are concerns about the brownfields site well documented?
 - Are the pollutants really hazardous?
 - Was the sampling of hazards properly conducted and evaluated?
 - Are the risks well documented?
5. Are the corrective actions linked to the risk assessment?
 - Do the proposed actions meet the state and federal regulatory objectives?
 - Are the actions similar to regulatory actions at similar brownfields sites?
 - Do the proposed actions satisfy all stakeholders?

future land use has not been determined, sampling needs to be conducted over a larger area and with more comprehensive testing. Dose-response assessments often use toxicity values provided by federal regulatory agencies based on laboratory tests. Exposure assessment measures or estimates the intake of pollutants from the air, water, soil or food by various combinations (inhalation, skin or oral exposures); exposures can vary over time and location, affecting assessments. Risk characterization involves combining the results of the previous steps to provide a quantitative estimate of risk levels under various exposure levels.

Risk assessments are evaluated based upon the end use of the property. Industrial and commercial operations, in comparison to residential or community uses, can proceed to redevelopment with higher levels of re-

sidual contamination. With the information provided from risk assessments, environmental protection agencies can implement risk-based cleanup strategies to redevelop these sites.

Targeted Brownfields Risk Assessment Program

The U.S. Environmental Protection Agency (EPA) provides the targeted brownfields risk assessment program to states, tribes and municipalities to minimize uncertainties about the contamination underlying brownfields that formerly used hazardous wastes in their operations.² EPA can provide screening assessments (historical investigations and preliminary site investigations); full site assessments (sampling to identify the types and concentrations of contaminants and the areas of contamination requiring cleanup); and the establishment of cleanup options and cost estimates based upon future uses and redevelopment plans.

State Risk Assessment Initiatives

States have taken different approaches to applying risk assessments to their brownfields programs.

Michigan has completed baseline environmental assessments (BEAs) at more than 3,000 properties since 1995. The state's land-use-based cleanup approach considers the different land uses (residential, commercial, industrial) and exposure potentials; cleanup standards are based on exposure assumptions. Residential cleanup standards reflect the presence of children and the possibility of soil contact through gardening. Commercial land use and cleanup standards rely on less contact with soil and are less restrictive than the residential criteria.

Oregon provides financial assistance to landowners and local governments to participate in risk assessments; the state Department of Environmental Quality (DEQ) provides technical assistance. State legislation established specific acceptable risk levels for human and environmental exposure; the level of risk is different for threatened or endangered species than for other plants and animals. The legislature and DEQ support flexible cleanup approaches based upon the level of risk and future use of the site. Information from the risk assessments also can leverage other resources for site cleanup and redevelopment. Property owned by local governments, quasi-public agencies such as a port authority, nonprofit/community development organizations or private parties potentially is eligible for brownfields risk assessments.

State legislation in Oregon established specific acceptable risk levels for human and environmental exposure.

Pennsylvania's Land Recycling Program has completed 864 cleanups at 769 sites across the state since 1965. The state provides funding for environmental assessments in distressed communities through grants to municipalities, nonprofit economic development agencies and others. Cleanup plans are based on statewide health standards. In order to receive cleanup liability protection, a developer must select one or a combination of the three remediation standards—background, statewide health or site-specific.

Institutional Controls

Institutional controls are land use management tools that can eliminate or minimize human exposure to residual contamination. These controls are legal and administrative re-

strictions that limit access to a brownfields site. Institutional controls are used when the contamination remaining after cleanup does not allow unlimited use of or unrestricted exposure to the property.

Institutional controls provide long-term protection of human health and the environment.

Institutional controls can be proprietary, governmental or informational. A *proprietary* control is contained in a deed or other legal document that transfers the property and places restrictions on land use through easements and covenants. A deed restriction places conditions on use and transfer of land to ensure that contaminated property will not be used inappropriately. *Governmental* controls are restrictions that state and local governments can impose, such as zoning restrictions or building permit conditions. *Informational* controls notify future users and the public about residual contamination. Information may be maintained in state registries of contaminated properties, deed notices or advisories. These controls generally are used as a secondary measure to ensure the overall reliability of other institutional controls.

State Actions

Arizona and **Montana**³ have created separate acts to require institutional controls on brownfields sites. **Michigan**, **New Jersey** and **North Carolina**⁴ have incorporated institutional controls into comprehensive brownfields statutes or other cleanup legislation. Specific state institutional controls include the following.

- **Arizona**, **California** and **Colorado**⁵ require that institutional controls be recorded with the county clerk or state environmental regulatory office. The California registry is updated monthly and is available through the Internet (http://www.dtsc.ca.gov/database/Calsites/Deed_List_Name.cfm).
- In addition to established procedures for imposing legally enforceable institutional controls, **Arizona**⁶ has a fund to maintain them.
- **New Jersey**⁷ requires periodic reports by the property owner about institutional control maintenance and requires that the state environmental regulatory agency report on those controls every five years.

- **Colorado** and **Michigan**⁸ require a notice to the state environmental regulatory office of real estate transfers of a brownfields site or changes in its use.

Under common law, land use restrictions found in deeds and other legal documents “run with the land” and bind current and future property owners only when the restriction benefits an adjoining property. However, **Connecticut**⁹ law allows third-party enforcement of proprietary institutional controls.

Despite the availability of institutional controls, state use of them is inconsistent. Some states do not apply institutional controls to all qualifying sites. Inconsistency also exists between state-mandated and voluntary cleanup programs. Institutional controls may be required for sites under mandated programs but be optional for voluntary, or the provisions may be the opposite: required for voluntary programs but not for mandatory. Whatever the case, experts caution against making institutional controls so restrictive that future developers will be discouraged from taking on brownfields redevelopment projects.

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Uniform Environmental Covenants Act

The National Conference of Commissioners on Uniform State Laws established a uniform environmental reuse agreements committee in 2001; the committee drafted the Uniform Environmental Covenants Act. The act seeks to return previously contaminated property to commercial use and notes that the lack of common principles that can be applied to the situation is a leading cause for many sites to remain hazardous and unused. The model act focuses on the selection of institutional controls (IC) that are legally actionable, even against common law doctrines that could limit enforcement. A final version of the act will be approved in August 2003.

Federal Action

Institutional controls specifically are provided for in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or Superfund) and the National Contingency Plan. Institutional controls are used in cleanup programs administered by the EPA, and the departments of Energy and Defense. Each agency has guidance not only for selecting and implementing institutional controls in cleanups, but also for base closures.

Under the institutional control provisions, local governments can use up to 10 percent of a grant to enforce measures.

President George W. Bush signed the Small Business Liability Relief and Brownfields Revitalization Act (PL 107-118) into law in January 2002. Under the institutional control provisions, local governments can use up to 10 percent of a grant to enforce measures. The law encourages states to create institutional control recording requirements. EPA is prohibited from taking enforcement action on site releases, provided the state maintains a public record of its cleanup sites. This creates a state incentive to establish an institutional control record for brownfields sites.

Notes

1. U.S. Environmental Protection Agency, *RCRA: Reducing Risk From Waste* (EPA530-K-97-004), September 1997, <http://www.epa.gov/epaoswer/general/risk/risk-1.pdf>, 5,6.
2. U.S. Environmental Protection Agency, *Targeted Brownfields Assessments* (EPA 500-F-98-251), November 1998, <http://www.epa.gov/brownfields/pdf/tba.pdf>.
3. Ariz. Rev. Stat. Ann. 49-158 (2003), Mont. Code Ann. 75-10-727 (2001).
4. Mich. Comp. Laws 324.20120b (2003), N.J. Rev. Stat. 58-10B-1 (2003), N.C. Gen. Stat. 130A-310.30 (2002).
5. Ariz. Rev. Stat. Ann. 49-158 (2003), Cal. Health & Safety Code 25398 (2003), Colo. Rev. Stat. 25-15-321 (2002).
6. Ariz. Rev. Stat. Ann. 49-159 (2003).
7. N.J. Rev. Stat. 58:10B-1 et seq. (2003).
8. Colo. Rev. Stat. 25-15-319 (2002), Mich. Comp. Laws 324.20120b (2003).
9. Conn. Gen. Stat. 22a-133P (2003).

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