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GREEN BUILDING LAWS

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The green building movement has experienced rapid growth in the past several years and is now a highly visible part of the U.S. construction market. A number of interrelated factors have contributed to this rapid ascent, including tax and other financial incentives, rising energy costs, increased attention to climate change by prospective tenants and other end-users, and the introduction of independent standards and certification programs, such as the Leadership Energy and Environmental Design (LEED) Green Building Rating System, which provides a yardstick by which to measure sustainable construction. Also fueling demand is a growing perception that green buildings provide intangible benefits to their occupants, such as improved individual health and well-being, increased worker productivity, reduced health care costs, and increased employee retention.

In addition to market demand, the green building industry is being driven and shaped by a growing number of local ordinances and building codes encouraging and/or requiring the use of sustainable building techniques in public—and increasingly private—development projects. Initially, smaller cities and municipalities began putting incentive programs in place to encourage green development. Next, larger cities such as San Francisco, Philadelphia, and Chicago began requiring that green building techniques be used in all new public buildings. In December 2006, Washington, D.C. became the first major city to pass a green building ordinance applicable to private development (effective in 2012). Since then, many large cities throughout the country have been actively passing legislation requiring the use of "green" building technologies. In 2007 and 2008 alone, Baltimore, Boston, Dallas, Los Angeles, New York, and Philadelphia passed green building laws providing a wide-ranging combination of incentives and requirements in order to redirect development projects toward sustainable building techniques. Currently, approximately seventy-eight cities, twenty-four countries, nineteen towns, twenty-eight states, and twelve federal agencies have adopted some form of green building legislation or initiative.

Today, any large scale development project, particularly one in an urban area, will not likely go forward without considering application of sustainable building techniques. The decision of whether to pursue a "green" development affects all aspects of the project, including planning, budget, density, and timing, as well as all individuals who touch the project, including the architect, the builder, financial interests (including insurers), and all construction contractors and subcontractors.

Buildings, Energy & Climate Change

The public debate over climate change has focused increased attention on the role of energy efficiency in buildings. In May 2008, Representative Edward Markey (D-MA), chairman of the House Select

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Committee on Energy Independence and Global Warming, testified in a committee hearing that the building sector is the source of up to 48 percent of the country's greenhouse gas emissions, and an even higher percentage at the local level. The U.S. Green Business Council (USGBC) estimates that buildings in the United States are responsible for 70 percent of all electricity consumption, and 39 percent of all energy use. http://www.usgbc.org.

Green Building Standards

The foremost effect on the sustainable building industry has been the development of an industry standard, the LEED rating system. The majority of green building ordinances enacted in the United States incorporate by reference the LEED Green Building Rating System, which was introduced in 1998 by the USGBC, a nonprofit organization which provides independent certification of green buildings. Under LEED, ratings are based on a point system. Projects can achieve points for an array of sustainable building techniques based on a whole-building approach to sustainability. LEED emphasizes five key areas of human and environmental health: sustainable site development, water efficiency, energy efficiency, materials selection, and indoor environmental quality. The USGBC has developed a total of nine different LEED rating systems applicable to specific types of development, such as new construction, existing buildings, commercial, retail, and schools. Within each LEED rating system are four levels of performance, based on the number of points achieved by the project: Certified, Silver, Gold, and Platinum. After completing certain minimum requirements, a developer may select points from an array of options, most of which have a value of one point. The points in each rating level vary according to the type of building or development ranging from approximately 26-32 points for Certified to about 65-75 points for Platinum.

The LEED system has become the most commonly known and accepted standard for sustainable buildings in the United States, but LEED does not stand alone. The Green Globes U.S. system, founded in Canada by the Green Building Institute, has developed a loyal following for requiring less paperwork and less

bureaucracy than LEED. Internationally, other ratings systems exist, including the United Kingdom's Building Research Establishment's Environmental Assessment Method (BREEAM) (which was the genesis of both LEED and the Green Globes system), and Japan's Comprehensive Assessment Systems for Building Environmental Efficiency (CASBEE). In addition, the International Standards Organization recently issued ISO 15392, General Principles for Sustainability in Building Construction.

Green Building Laws

As a product of local governments, green building laws inevitably reflect the unique and local priorities of the community. Some green building statutes leave room for other sustainable building standards in addition to LEED. Dallas allows a developer to follow either the USGBC's LEED program or Green Built North Texas, a green building initiative by the Homebuilders Association of Greater Dallas. Other cities have chosen to alter the LEED rating system by customizing the points system. Boston's Zoning Commission incorporated the LEED standard into its zoning code by reference and relies on the LEED rating system, applicable to projects that are 50,000 square feet or fifty residential units or greater, but also created four additional points that developers can earn and put toward the total twenty-six points needed in order to be LEED Certified. These four Boston-specific LEED points reflect the city's priorities in the areas of "modern grid" (providing for at least 10 percent onsite generation of energy), historic preservation, groundwater recharge (rainwater capture), and "modern mobility" (facilitating access to public transportation).

Despite these differences, the dominant model for local green building requirements (as opposed to incentives only) is to require the equivalent to either LEED Certified or LEED Silver. Among major cities that have adopted green building requirements for private developments, there is a growing consensus that the requirement should apply to projects exceeding 50,000 square feet or fifty residential units in size. Los Angeles, Boston, Dallas, and Washington, D.C. have all adopted this threshold.

Most statutes do not require developers to achieve actual certification, but only that they meet the equivalent of the certification criteria. Certification can be a costly and time-intensive process. Certification does offer credibility, to both prospective tenants and future purchasers, and in particular for developers who plan to resell the building, an investment in up-front time and energy to obtain LEED certification may pay off down the road. In an environment where being LEED "certifiable" is a legal requirement, owners who do not seek certification will have to keep equally detailed paperwork proving the green elements of the building were actually put in place, in order to respond to any future legal challenges.

While some critics argue that these legislative requirements will merely drive development outside the city limits, that effect, if true, will soon dissipate as smaller cities and municipalities also adopt green building laws with lower size thresholds. Take the District of Columbia as an example: Developers wishing to avoid Washington's law requiring commercial developments of 50,000 square feet or more to meet LEED Certified standards (effective 2012), will only find more stringent requirements in the surrounding communities. Next door in Montgomery County, Maryland, private sector, nonresidential, or multi-family residential buildings of at least 10,000 square feet must achieve the equivalent to LEED Certified. Down the road in Annapolis, Maryland, buildings of 7,500 square feet or greater must earn LEED Certified. Further up the road in Baltimore, Maryland, starting July 1, 2009, commercial buildings or multi-family residential buildings of 10,000 square feet or greater must achieve a minimum rating of LEED Silver.

The LEEDing Standard

Despite LEED's dominance, the system has come under significant criticism for certain biases in its point system. Virtually every credit is worth one point, regardless of the installation cost or the relative effect on the environment. Most notorious is the point available for installing bike racks, an easy, inexpensive, and common fixture. This one point is equal to the one point obtained for developing a brownfield property or

the one point for using renewable energy, both of which are significantly more costly undertakings.

The LEED system also favors use of newly manufactured products and equipment over recycling or reusing old materials, which many consider to be the greenest technique of all. The system also gives no weight to the durability and degradability of construction materials, thereby giving precedence to today's construction materials without considering end-of-life waste generation.

Another criticism of the LEED rating system is its lack of flexibility. A point is either "achieved" or "denied," with no opportunity to obtain partial points for partial performance. Since the certification process occurs at the end of a project, when the work is fully completed, a builder's options to cure a small defect in one aspect of a point may be limited. Opportunities to appeal a denied point are also limited.

The USGBC is attempting to revise the LEED system in light of these issues. In May 2008, it introduced the ability to achieve certification online in response to criticisms that the system was overly paper intensive. The USGBC is currently in the process of developing LEED 2009, a complete review and revision of all of its developed ratings systems. Among other changes, LEED 2009 promises to take steps to harmonize the various ratings systems and to develop a method for weighting points.

Doing the Math

There is much debate over whether a green development costs more to build than traditional construction, and if so, how much more. Two consistent principles can be gleaned. First, there exists a pervasive belief that the "first costs" of a green building, sometimes referred to as the "green premium," are higher, which does deter a significant number of owners from pursuing a green development. Second, whatever its size, the green premium is expected to decrease going forward as green materials become more pervasive and professionals become more experienced with the design, commissioning, and LEED documentation requirements.

Estimates of the size of the green premium range anywhere from 1 percent to 10 percent for the lower LEED levels, and can go significantly higher for LEED Gold or Platinum. Among the many sources of the green premium are higher costs for green materials, additional costs of design, commissions, energy modeling, and the extensive documentation required for LEED certification, and the limited experience of professions with sustainable building techniques and the LEED certification process. Differences in analytical methodologies may explain some of the disagreement, but there is no clear answer to the question of whether building green costs more because, in an integrated design, it is next to impossible to separate out the "green" elements of the building. In reality, the actual cost will vary widely from building to building, depending on any number of factors, not the least of which is "how green" the building is.

When calculating the "cost" of "building green," most analysts focus on the "first costs," while paying little attention to the relative costs over the life-cycle of the building. Green building advocates tout the decreased costs to operate the building due to efficiencies in energy, water, and materials, as well as enhanced employee productivity and health, in arguing that green buildings are less expensive overall. One oft-cited study estimates that an average green building uses 30 percent less energy than a conventional building, a reduction worth approximately $60,000 per year for a 100,000-square foot building. Gregory H. Kats, *The Costs and Benefits of Green Buildings,* Oct. 2003, p. 27-28, http://www.cap-e.com/spotlight/index.cfm?Page=1&NewsID=25770. The same study estimates that over twenty years, the present value of lower operating costs and increased productivity and health of LEED Certified and Silver buildings is almost $50 per square foot, and which rises to over $75 per square foot for Gold and Platinum level buildings. *Id*. at 85. These figures far exceed even the highest estimated green premium.

Initial investment costs in a green building can also be offset by an array of financial incentives, especially those built on brownfield sites, ranging from tax credits (including tax increment financing), grants, financial aid, reduced property taxes, or reduced permit fees. *See*

www.dsireusa.org. Apart from the financial incentives, many jurisdictions have focused on encouraging green building through intangible enhancements difficult to value, such as expedited permitting for projects promising to achieve LEED certification and a "density bonus," increasing the potential rental value of the building placed on the lot. For example, Seattle now allows greater heights and/or greater maximum floor area for commercial and residential buildings that achieve a LEED Silver rating (in addition to providing affordable housing and other public amenities). Arlington, Virginia, has a similar program that allows commercial developers to achieve a greater Floor Area Ratio (FAR) than is allowed under the local zoning ordinance depending on the level of LEED certification that is achieved.

Turning Brownfields Green

For brownfield developments, green building laws present both new opportunities and new challenges. A brownfield site naturally lends itself to accruing several points in the site selection category. Under LEED 2.2 for New Construction and Major Renovations, a contaminated property is granted one point for being a brownfield (proven either through submission of a Phase II site assessment report or official determination by a governmental agency). A brownfield also can usually obtain one point in the Site Selection category for avoiding development of "inappropriate sites" (such as prime farmland, undeveloped land below the elevation of the 100-year flood plain, and land inhabited by endangered species or that is close to wetlands). Due to their location in previously developed urban areas, brownfield sites are often well-poised to achieve points for Development Density & Community Connectivity (for channeling development into areas of existing development), Public Transportation Access, and Building Reuse (up to three points depending on percentage reused). In jurisdictions requiring that buildings of a certain size achieve a certain number of LEED points, the decision to use a brownfield will advance the project several steps towards meeting this legal requirement.

Yet, there is no denying the fact that a green brownfield development is more complicated than an ordinary green development project. Covenants, releases, and exemptions from government and third-party claims may be difficult to perfect. Deed notifications and special site use requirements (such as recycling of storm water or capping a site) may complicate resale or other development goals.

For brownfield sites with historic buildings on them, the developer will find that the green building programs are in conflict with many historic building and "landmark" requirements. For example, the installation of modern energy-efficient windows is in conflict with the desire of preservationists to preserve original windows. The reuse of existing walls may hinder energy efficiency.

Liability Risks

As the green building movement grows, the risk of liability grows with it. This particular stage of rapid growth combined with a continued debate over the best approach to greenness, and the continued evolution of building standards as well as green laws and regulation, pose significant risks for all involved in the project.

In the event that a project slated for LEED certification fails to achieve that goal, there inevitably will be potential questions of liability. After the fact, it may be difficult to determine who was responsible for failing to achieve a certain LEED point. For this reason, it is critical that contracts for green buildings address with specificity the roles and responsibilities, and respective liabilities, of all involved.

There is potential liability for future owners and future tenants of the building as well. Many "green" products are new to the market and there is a potential for misrepresentations or miscommunication regarding the expected building performance. Buildings may fail to achieve the promised levels of energy or water efficiency.

The insurance industry has started to tackle "risk transfer" for green buildings. In 2006, Fireman's Fund began offering Green-Gard, the first insurance product designed for green commercial buildings. Green-Gard coverage targets the unique property exposures of

green commercial buildings, such as coverage of alternative water and power systems, and provides for full replacement of standard green systems and materials. It also contains green upgrade coverage which allows insureds to replace standard systems and materials with green alternatives. The Chubb Group of Companies and Travelers recently announced initiatives to develop insurance products and services targeted towards the green energy sectors. Insurers have also for many years provided "cost cap" insurance for the risk that brownfield remediation expense will exceed an estimate based on governmental requirements.

All signs indicate that the green building movement will continue to grow and evolve going forward. Practitioners in this area would be wise to carefully examine the potential liabilities of their clients from all sides of the project and to take appropriate precautions to manage these risks.

THE NEW ASTM VAPOR INTRUSION STANDARD: BUYER BEWARE

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The controversial new ASTM E2600-08 Standard Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions is intended to be a voluntary standard to define good commercial practice for conducting vapor intrusion assessments, but substantially misses the mark. Going well beyond a "reasonably conservative" screening process, the new standard stigmatizes properties unnecessarily, diverts financial resources to unproductive ends, and potentially undermines the recent stability brought to "All Appropriate Inquiry" by ASTM E1527-05. Those who contemplate purchasing an ASTM Vapor Intrusion Assessment, and environmental practitioners generally, are advised to consider the alternatives.

One of the hottest issues in environmental regulation today is vapor intrusion (VI). VI occurs when chemical vapors migrate into a structure, typically as a result of volatilization of chemicals in the soil or groundwater. Regulators are increasingly focused on the health risks of VI and the VI exposure pathways in site remediation projects. That VI may materially degrade indoor air quality is a liability concern to building owners and managers, tenants, and employers. Consequently, VI may materially affect property value and poses significant liability risk for buyers, lenders, and other parties involved in real estate transactions.

As a result of the increased attention on VI, regulators and industry are starting to respond. The U.S. Environmental Protection Agency is expected to issue guidance on appropriate risk and cleanup levels for VI by the end of 2008. Some states are also drafting legislation on VI. Most recently, the American Society for Testing Materials (ASTM) adopted the "Standard Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions" (Designation: E 2600-08 or the "VI Standard"). Although the VI Standard is voluntary, it sends a strong signal to practitioners regarding what may soon be required for due diligence in real estate transactions. It also clouds the issue of whether an ASTM E 1527- 05 Phase I Environmental Site Assessment (the "Phase I Standard") will continue to constitute All Appropriate Inquiry for purposes of CERCLA liability. This article takes a closer look at the VI Standard as it sets the stage for what's to come, both in the regulatory arena and in practice.

ASTM developed the VI Standard in an effort to define a good commercial and industry practice for conducting vapor assessments on parcels of real property, either independent of or in conjunction with the Phase I Standard. In contrast to the release-based inquiry of the Phase I Standard, the VI Standard is a health based inquiry that extrapolates from release-based public records and table values to generate presumptive health risks. Most practitioners will recognize that ASTM's Phase I Standard already considers releases into structures to be a "recognized environmental condition" (REC). The problem, however, is that the Phase I Standard is unclear, because it also considers indoor air contamination a

"non-scope consideration." Rather than clarify the Phase I Standard, ASTM merely suggests that the VI Standard "may" be used as a "voluntary supplement" to the Phase I Standard.

The new VI Standard expansively defines "vapor intrusion condition" (VIC) as "the presence or likely presence" of chemicals of concern in the indoor air environment of "existing or planned structures" caused by the release of vapor from contaminated soil or groundwater either on the property or in "close proximity" to the property at a level that "presents or may present an unacceptable health risk to occupants." ASTM did not intend the VIC to include conditions that do not normally represent an unacceptable health risk to occupants and that generally would not be the subject of an enforcement action if brought to the attention of regulators. *De minimis* levels, therefore, do not constitute a VIC. However, ASTM also defines a "potential vapor intrusion condition" or "pVIC," broadening the scope of properties adversely categorized by the VI Standard by including multiple layers of subjective speculation. The effect of such speculation is multiplied by an overly conservative factual trigger—a series of table values that are applied to possible contaminant sources of record—leading to the presumptive presence of pVIC if facts do not rule out such presence within a critical distance (see below). Every property within a critical distance of a contaminant plume is a pVIC until proven otherwise, but properties located much farther from the contaminant source could be labeled pVICs if insufficient information is available to disqualify the target property as a pVIC.

Summary of the ASTM E 2600-08 Standard

The VI Standard establishes a four-tier screening assessment process that is designed to answer the question of whether a *potential* VIC exists. The screening process must be performed by an "environmental professional" who has qualifications similar to those required for Phase I site assessments, but who also has specific VI expertise. The standard moves progressively through each tier until the potential VIC is ruled out or confirmed, and, if applicable, mitigated. Depending on the circumstance, the tiers do not need to be followed sequentially.

Tier I—The Initial Screen. The Tier I assessment seeks to address whether there any known or suspected contaminated sites within minimum search distances and, if so, whether there are any chemicals of concern for VIC risk. If there are chemicals of concern, then the assessment addresses whether there is a contaminated plume within a critical distance at levels that exceed risk-based concentrations, using applicable state or federal criteria. A "critical distance" is the linear distance from the nearest edge of a contaminated plume to the nearest edge of an existing or planned structure on the property, or, if there are no structures, the property boundary. If the critical distance is less than 100 feet for VOCs and less than 30 feet for total petroleum hydrocarbons and liquid non-aqueous phase liquids, then a pVIC is *presumed* to exist. Ultimately, Tier I addresses whether a pVIC exists or whether a VIC is unlikely to be an issue at the target property.

Some practitioners are concerned that Tier I presumes a pVIC to exist absent other information. The new VI Standard makes it likely that a pVIC will be determined to exist based upon minimal information regarding activities on other sites (such as an upgradient leaking underground storage tank), possibly resulting in a pVIC based upon insufficient or misleading information regardless of whether contaminants of concern are, in fact, located beneath the target property. This could pose problems for the owner or lessee, who may feel compelled to remove the pVIC determination by going forward with the other VI tiers and incurring additional expense.

Tier II—Semi-Site-Specific Screening. Tier II compares risk-based numeric screening criteria to existing or newly collected soil, soil gas, and/or groundwater data to determine whether a pVIC still exists. Tier II involves the review of data to determine the size and characteristics of the plume, status of remediation, and specific concentrations of contaminants of concern. Soil, soil gas, or groundwater samples are compared to generic state or federal recognized baseline concentrations, or to site-specific ones developed using ASTM Guide E-1739. Tier II also provides detailed guidance on data needs and analysis and minimum questions to be evaluated. If a pVIC exists, the analysis either proceeds to a more

detailed assessment in Tier III, or moves to preemptive vapor mitigation efforts outlined in Tier IV.

Tier III—Detailed Assessment. Tier III takes a more sophisticated look at testing and seeks to better define the potential VIC. Both interior and exterior testing are utilized to determine the more precise concentration levels and point of exposure. Tier III provides detailed guidance on the scoping of services, including variability in data models used to project potential impacts, to determine one of three results: a VIC exists, no VIC exists, or it cannot be determined whether a VIC exists.

Tier IV—Vapor Mitigation. If a VIC is confirmed on the property, mitigation is "necessary," or if the buyer of VI services wants to bypass prior tiers of investigation, preemptive mitigation may be performed. Tier IV provides approaches for VI mitigation, including engineering controls, institutional controls and site-specific remediation and building design. However, selection, design, and implementation of mitigation practices are beyond the scope of the VI Standard.

Concerns Regarding Unintended Effects

Many who have analyzed the VI Standard agree that there are concerns. First, speculation based on overly conservative factual triggers is sure to unnecessarily taint many properties with a "pVIC" finding that will result in stigma unless additional costs are incurred to resolve the uncertainty. Second, the ASTM's connection between the VI and Phase I Standards sets a dangerous precedent for expanding all appropriate inquiry either in law or in fact. Which loan officer would hesitate to require an Environmental Site Assessment (ESA) to include the VI Standard when the cost of such "career termination" insurance would be borne by the borrower?

The problem with the VI Standard is apparent in ASTM's admission that, "No Vapor Intrusion Screen can wholly eliminate uncertainty regarding *potential* VICs" (emphasis added). Moreover, a pVIC is presumed to exist if "there is insufficient data to ascertain the presence *or likely presence* of the COC ["Contaminant of Concern"] in the indoor air environment of existing *or planned* structures on a target property" (emphasis added). The natural tendency of one contending with a VI assessment will be to spare no expense in gathering data in an attempt to curb the speculation. The scientist performing the work confronts a definitional bar set too low, and is encouraged to layer speculation about *potential health threats* on top of speculation about the occurrence of chemical substances in the indoor air of existing *or planned* structures, on top of speculation about the occurrence of chemical vapors in the environment. Such is an exercise that only plaintiffs' lawyers will treasure and in which consultants should be warned not to engage.

Practical Suggestions

Any potential buyer of an ASTM Vapor Intrusion Assessment should weigh the potential benefits carefully. More than likely, one would be better off acquiring actual VI data or, if involved in a real estate transaction, increasing the scope of the ASTM Phase I ESA to include the vapor intrusion pathway. Affected industry should determine whether it wants to start down the slippery slope of expanding the requisite criteria of all appropriate inquiry, while paying considerable sums of money for mere speculation. The authors believe industry would be better served by institutionalizing a vapor testing protocol, a public database of actual test results and VI assessments, and a set of construction standards for vapor mitigation systems for new and existing buildings, perhaps confined to those located in or adjacent to areas zoned industrial or known to have been used for industrial or petroleum purposes. Society is best served by an approach that more directly focuses monetary investment on science and engineering designed to confirm and eliminate *actual* threats to human health.

BACK ISSUES

Back issues of this newsletter can be viewed on the Environmental Transactions and Brownfields Committee Web page at *www.abanet.org/environ/committees/envtab/newsletter/archive/.*

IMPLEMENTING THE UNIFORM ENVIRONMENTAL COVENANTS ACT—WORKING IN THE TRENCHES

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As of mid-June, twenty-three states had adopted some form of the Uniform Environmental Covenants Act (UECA or the "Act"), which was approved by the National Commission on Uniform State Laws in 2003 and supported by the American Bar Association. Several other states may adopt a version of the law before the end of legislative sessions in 2008.

Given the several years that have passed as states implement the law, it is now possible to offer some observations on issues that arise. This short article identifies several implementation issues, and offers suggestions to ease labor in the trenches for practitioners and others. (The article assumes some familiarity with UECA. Those who desire information on the uniform act should point their Web browser to: http://www.environmentalcovenants.org/ueca/DesktopDefault.aspx .)

Which Programs? When UECA is adopted, state agencies and stakeholders will be making decisions about which state programs will rely on Environmental Covenants. UECA does not disturb any substantive aspect of underlying environmental law, and was intended to allow easy integration into federal and state programs including Superfund, hazardous waste, and voluntary cleanup programs. Therefore, states are free to decide whether and when to apply the Act. In many states, because of the importance and frequent use of voluntary cleanup programs, those programs are often the first to consider UECA and its issues. Further, practitioners and states will have to decide whether ongoing transactions or consent agreements that are under negotiation will include an Environmental Covenant under the Act.

Re-Executing Older Deed Restrictions? UECA is careful not to disturb previously adopted institutional controls, deed restrictions, or similar covenants. However, practitioners will have to decide whether it is good practice to re-execute older institutional controls and deed restrictions under the Act to provide the additional protections and mechanisms allowed under the Act. At least one state has set deadlines for the re-execution of prior-recorded deed restrictions under the Act, raising interesting issues of how that will be accomplished, particularly where properties have changed hands.

Educating Lenders, Brownfield Developers, and Other Stakeholders. State Environmental Covenants Acts are typically passed with the support of the leading state environmental agency, the lending communities, real estate developers, and others. However, legislative support in the state capitol does not translate to experience in the trenches where clients and their counsel will have to understand the Environmental Covenants, how they work, and how they may be drafted. Education can help, and Section of Environment, Energy, and Resources members and Environmental Transactions and Brownfields Committee members have unique expertise to share.

Adoption of a Model Covenant? Some states have attempted to adopt "model" covenants for use in their programs by practitioners and agency staff. The National Conference on Uniform State Laws has been collecting models, and states may wish to consider those models found on NCUSL's Web site. Note that some of the models have, on a state-by-state basis, picked up additional provisions as "add-ons," which are not included in the Act. These have included, for example, a requirement to inspect and report annually on compliance with the Environmental Covenant, or requirements to notify additional parties of the existence of the Environmental Covenant.

Determining the Need for Subordination. Because UECA does not affect prior-recorded interests, it is possible that prior interests such as mortgages or easements could allow foreclosure to wipe out the Environmental Covenant under traditional real property concepts. Alternatively, it is possible that an easement, recorded before the Environmental Covenant, could give the easement holder the right to conduct activities without regard to the Environmental Covenant. For

example, an easement that would allow excavation for replacement of a sewer line could allow excavation in contaminated soil without regard to the terms of the Environmental Covenant. Before executing an Environmental Covenant, environmental lawyers will have to work with their real estate counterparts to ensure that there is an adequate title search and identification of any prior recorded interests that may affect the Environmental Covenant. Note that at least one state has varied from UECA and provided that prior recorded interests are, by law, automatically subject to the provisions of an Environmental Covenant.

Obtaining Subordination. Although subordination is a time-honored practice in the real estate world, environmental practitioners who are seeking subordination for an Environmental Covenant will now have to explain the proposed activity and use limitations to lenders and others who may not be familiar with environmental concepts. Gaining consent may be challenging in some cases.

To secure subordination, it may be necessary to enter into a separate agreement with the prior interest holder to address how activities may be conducted by the prior interest holder consistent with the Environmental Covenant. For example, if a utility holds an easement and now must comply with restrictions on soil excavation, it may be wise (or necessary) to enter into an agreement with the utility on exactly how excavation will be conducted, ensuring proper notice and safety procedures.

Impact on Timing of Transactions. If an Environmental Covenant is to be adopted in the course of a transaction, counsel and clients will have to consider the additional time needed for interaction of the agency on the Environmental Covenant, a title search, and other efforts to draft or negotiate the Environmental Covenant. More time may be required if subordination is necessary or if there is to be a separate agreement with prior interest holders. In any event, practitioners will have to advise their clients at the outset on how these issues may be addressed in the course of resolving the environmental issues, even if a transaction is not afoot.

As with any new law, the Environmental Covenants Act solves several important problems and creates new challenges and opportunities for practitioners. And, although environmental protection has never been a linear process, implementing the Environmental Covenants Act can be an easier process for those who educate themselves and others.

Although the substance of this article is solely the responsibility of the author, the experiences shared by the following attorneys are acknowledged and appreciated: Mary Ellen Ternes, Mark A. Stevens, Robert Gelblum, Pamela K. Elkow, and Maki Iatridis.

ENVIRONMENTAL LIABILITIES— HOW TO BETTER UNDERSTAND THEM THROUGH MONTE CARLO ANALYSIS

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Monte Carlo analysis is widely used in the financial industry to calculate the value of companies, to evaluate investments in projects at the corporate level, or to evaluate financial derivatives. More recently, environmental practitioners have recognized that this technique is well suited to the establishment of environmental reserves.

Assessment of environmental liabilities to establish realistic and defensible reserves represents a unique challenge for most organizations. Often the dollar value of the potential liabilities is not fully understood because the underlying conditions that generated the liabilities have not been fully investigated or remediated. For the same reason, the timing of when the liabilities may come due is not certain. The likely costs for the investigation and remediation can be fairly comfortably estimated within a range, which may be fairly large. Over time, as the investigation or remediation of conditions that generate these liabilities

progresses, uncertainty and the range of possible costs diminish. The traditional, standard method of providing a single value on the balance sheet for environmental reserves may conform to generally accepted accounting principles and standard accounting practices, but may not reflect reality.

Producing a more accurate statement of environmental liabilities on an organization's balance sheet presents some clear benefits. Overstatement can tie up assets, have an impact on the efficiency of capital usage, and diminish the company's value. Understatement can misrepresent the financial condition of the company and overstate its value. The challenges associated with accurately assessing environmental liability are similar to those involved in valuing options, such as stock options. The actual future price of a stock cannot be known in the present as it depends on how various possible outcomes play out over time. Similarly, environmental liabilities are not always fully known and depend on how various possible outcomes play out over time. Statistical modeling in the form of a Monte Carlo analysis can be used to develop a response to this double-edged sword.

Monte Carlo simulations are used to simulate real-world outcomes. Such simulations can be used to take into account overlapping issues and various combinations of possible outcomes.

Traditional methods for estimating liability rely on an analysis of each issue individually. They assign a mean value to each issue and then add them up to develop a reserve number for the total outstanding environmental liabilities. Monte Carlo simulations run all issues together in a single trial and provide a single liability value for that trial. The simulation repeats this trial over and over until a distribution, rather than single value of likely liabilities, is developed. From this distribution, the user can identify not only the most likely numeric estimate for total liabilities, but also an understanding of the range of possible outcomes.

Using a Monte Carlo simulation begins with an identification of all outstanding environmental issues that an organization is facing. This may require site inspections, researching government databases, contacting relevant federal, state and local agencies and government departments (via Freedom of Information Act requests), interviewing case managers, and understanding the on-site and off-site history of the subject site. At this point, the work done does not differ from that which is done for a standard liability analysis.

From this research it is possible to make certain assumptions with regard to the possible outcomes for each reserve issue. Each issue is analyzed separately. An outcome tree is built and probabilities of occurrence are assigned. For example, a tank removed in 1980 may or may not have leaked. The first outcome would be an investigation. The next possible outcome may be that the tank did not impact the environment, in which case the only cost might be limited sampling and filing the paperwork to obtain a closure determination from the relevant agency. On the other hand, the tank may have leaked and impacted the soil and/or groundwater. From these possible outcomes one can develop a host of appropriate remediation outcomes. At this point, the Monte Carlo approach still does not differ from the traditional approach.

Next, based on knowledge of the site and its geology, and past experiences at this or similar locations, likelihoods and ranges of costs are assigned to each of the outcomes. These outcomes and their distribution are then assigned within the model ensuring that alternative outcomes are modeled so as to preclude them occurring in the same trial.

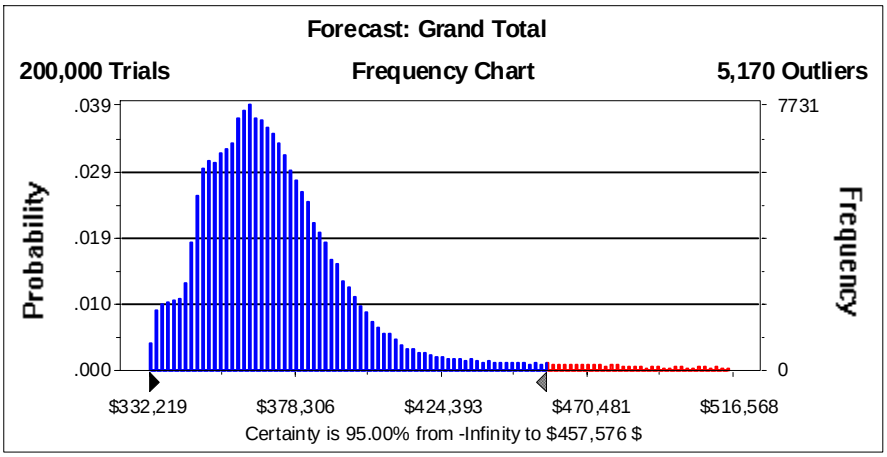
Once the model is run and the distribution of costs is determined, a reasonable set-aside, or reserve, can be determined. In statistical analysis 95 percent is considered an acceptable standard; however each organization can determine its percentage based on its own risk profile, keeping in mind its fiduciary responsibilities. Once the model is set up, updating requires much less effort. Updating on an annual basis is a typical procedure for most clients in that it takes into account any changes that may have an impact on potential liability and maintains the model's integrity.

An example of a total reserve is shown in Figure 1. As can be seen, there are arguably many reasonable reserves this company could establish for current and

Figure 1

Forecast: Grand Total

Percentile	$
0 %	$335,000
10 %	$350,000
20 %	$355,000
30 %	$360,000
40 %	$365,000
50 %	$370,000
60 %	$375,000
70 %	$385,000
80 %	$390,000
90 %	$410,000
95 %	$460,000
100 %	$1,575,000



The chart above illustrates the distribution of outcomes while the table demonstrates the amounts of potential liabilities and the percentage of outcomes that were equal to or less than the liability amount shown. All environmental liabilities exceeded $335,000. Similarly, all outcomes were less than $1,575,000. The median value was approximately $370,000. The mean value was approximately $380,000. Outcomes were below $460,000 95 percent of the time. These values can be contrasted to the current reserves on the balance sheet of $4.5 million.

future potential environmental liabilities. In this situation, the financial analysts recommended a reserve of $500,000. Their recommendation represents more than 95 percent of the modeled outcomes but does not set-aside the highly unlikely total of $1,575,000. It also exceeds the most likely outcome of $335,000. This company had $4.5 million in current reserves—significantly overstating their needs by millions of dollars. The model helps companies keep their forecasts in order and allows them to plan more effectively.

In conclusion, the Monte Carlo simulation provides more accurate estimates than traditional forecasting methods for environmental liabilities. There are also other applications for the Monte Carlo simulation. They include, but are not limited to, valuations for acquisition purposes, demonstrating financial guarantees, and self- insurance necessary to demonstrate compliance with state regulations. The possibilities are endless, the likelihood is measurable and, most importantly, more reliable.

NOTE: The name "Monte Carlo" originated with physicists Stanislaw Ulam, Enrico Fermi, John von Neumann, and Nicholas Metropolis during World War II. They were applying randomness and repetitiveness processes that are analogous to gambling at a casino, in order to model neutron multiplication in fission devices. Source: "The Beginning of the Monte Carlo Method," N. Metropolis, Los Alamos Science, Special Issue 1987. Retrieved from http://library.lanl.gov/cgi-bin/getfile?00326866.pdf on June 4, 2008.