

The Environmental Opinion: Basis for an Impaired Value Opinion

First presented at the 1992 Appraisal Institute national meeting in Boston, Massachusetts, this article offers a comprehensive view of what an environmental opinion must provide to support an appraisal opinion. Some of the myths associated with environmentally impaired property values are dispelled, and a number of commonly used phrases and terms are more precisely defined and explained.

Over the past several years the subject of how to value an environmentally impaired property has been discussed from a number of perspectives. The Appraisal Institute has issued "Guide Note 8" to the *Standards of Professional Appraisal Practice*, which advises appraisers not to exceed their training and expertise when appraising properties whose values may be adversely affected by environmental factors.

A number of related terms and phrases that have come into common use appear to have precise meanings but upon examination are anything but precise. In addition, the very legal and regulatory foundations of how environmental issues are resolved appear to be illogical and unfair. How can appraisers reasonably function under such conditions?

This article is the distillation of a number of years of experience both on the

author's part and on the part of many environmental and appraisal professionals with whom the author has had extensive contact. The goal is to present a comprehensive view of what an environmental opinion must provide to support the appraisal opinion.

MYTHS

The following list dispels some of the myths associated with environmentally impaired property values.

1. The presence of an environmental risk devalues a property.

While this is often true, the mere presence of an environmental risk does not automatically imply devaluation. To devalue a property the environmental risk must: 1) result in a cost to remediate the problem; 2) result in an increased oper-

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ating cost; and/or 3) result in a perception in the marketplace that the property is less desirable than a property without that environmental risk present. It should be noted that the presence of some environmental risks may enhance value in the proper circumstances. For example, a wetland, when preserved and utilized as a part of the amenities of a development, may tend to enhance value.

2. Environmental risks that affect value are regulated.

This is patently false. Probably the simplest example is that of underground storage tanks (UST)—less than 35% of all USTs are regulated. Remediation costs, however, can be imposed on a property whether the tank from which the leak originated is regulated or not. In fact a regulated tank may impose less of a value penalty than an unregulated tank because state insurance funds may assist in the remediation of a leak from a regulated tank. Such funds may not be available for an unregulated tank.

3. The impaired value can be established through the use of the sales comparison approach.

Unfortunately, this is not the case. Each environmental impairment to value is as unique as a fingerprint, and generally in ways that are not obvious or amenable to adjustments. As an example consider two commercial office buildings built to the same structural plan, both containing spray-on asbestos applied to the same specifications, but in different political jurisdictions. One building was built for a single tenant, the other for speculative rental. There would likely be more walls, phone lines, and power lines in the second building than in the first, and it would not be unusual to find a lower level of maintenance in the second than in the first. The net result would be that the present value of the cost to deal with the asbestos would more heavily affect the second building. If the different political jurisdictions had different asbestos treatment rules, then the value would reflect this fact also.

4. An environmental risk in location A is also an environmental risk in location B.

This may not be true for two reasons. First, the political jurisdiction in which A is lo-

cated may have developed more stringent requirements than B. Under the existing laws a city may have more stringent rules and regulations than the state, and state regulations may be more stringent than federal regulations. Second, an environmental risk is defined by the total risk system as outlined later in this article. The specific circumstances resulting in a threat to human health or the environment in one physical location may not be present in another location. More likely, the environmental risk may be present in both locations but not to the same degree, resulting in vastly different remediation plans and costs.

5. A Phase I audit will establish a purchaser as an "innocent purchaser."

This is a pleasant idea that dies hard. To the best of this author's knowledge and that of all of his associates, a purchaser of industrial or commercial property has never been held by the courts or the U. S. Environmental Protection Agency (EPA) to be an innocent purchaser. The innocent purchaser concept is thus far a "safe harbor with no water." The reason is that there is no established standard for what constitutes "all appropriate inquiry" under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, Superfund).

6. A Phase I audit will provide absolute assurance that a property is "clean."

Like the idea of innocent purchaser, the idea that any Phase I audit will provide absolute assurance that a property is clean is a myth. An environmental investigation is an attempt to prove the unprovable, to prove that the needle is not in the haystack. It is logically and scientifically impossible to prove a negative hypothesis and regardless of how much time, energy, or resources are expended, absolute assurance is impossible.

7. The Phase I audit will provide the required information to establish the impaired value.

This is absolutely false except in the single case when the Phase I audit indicates that the property is unlikely to contain an environmental risk and the impaired and unimpaired values are therefore identical. The Phase I audit does not, cannot, and will not contain the information necessary to establish the impaired value.

DEFINITIONS

As stated, definitions in the environmental field are fuzzy at best, and certainly are subject to legal and professional controversy. For the purposes of this article I propose the following definitions.

Phase I environmental value assessment (Phase I EVA).

The Phase I EVA is designed to answer two questions: Is there a reasonable basis to suspect the presence of an environmental risk (the subject matter of the classic Phase I audit)? Are there environmental restrictions on the use of the property?¹

Phase II EVA.

The Phase II EVA, given that the Phase I EVA has found a reasonable basis to suspect the presence of an environmental risk, is designed to demonstrate, to a reasonable degree of scientific certainty, whether the suspected environmental risk is or is not present. The reasonableness of the level of remaining uncertainty is a client decision. This definition follows the classic Phase II audit definition.

Phase III EVA.

If the Phase II EVA has demonstrated the presence of an environmental risk, the Phase III is designed to accomplish the following objectives: 1) to quantify the type and extent of the environmental risk; 2) to develop a remediation plan that will be acceptable under the National Contingency Plan (NCP) or other governing rules and regulations; 3) to develop budget estimates for the implementation of the remediation plan; and 4) to identify any restrictions on use or incremental operating costs required to prevent or minimize future environmental liabilities. The first three items are normal parts of Phase III audits. Item 4 is specific to valuation and is rarely, if ever, a part of a traditional Phase III audit.

Environmental risk.

An environmental risk has four component parts: risk source, primary control mechanism, transport/secondary control

mechanism, and target. Each of these components must be evaluated according to a specific set of protocols outlined in the NCP (a part of CERCLA) in order to determine if a risk exists and the appropriate response plan if so.

- The risk source is the source of potential damage to human health or the environment.
- The primary control mechanism is the means by which the risk source is maintained under control to prevent damage to human health or the environment.
- The transport/secondary control mechanisms are the available means by which the risk source, given a failure of the primary control mechanism, may be transported to the immediate vicinity of the target. Secondary control mechanisms are natural or man-made obstructions contained within the transport mechanism that may retard the movement of the risk source.
- The target(s) may be human beings or sensitive environments such as nature preserves, wetlands, or endangered plant or animal species.

Environmental impairment (to value).

Assuming that an environmental risk exists, an environmental impairment to value may exist if the risk 1) restricts the use of the property; 2) imposes incremental ownership costs on the property; and/or 3) makes the property less desirable in the marketplace.

Uncertainty.

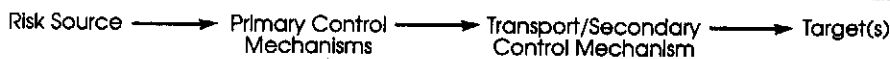
In a condition of uncertainty, an event cannot be assigned a probability of occurrence.

Risk.

In a condition of risk, an event can be assigned a probability of occurrence. Therefore, risk can be quantified while uncertainty cannot be quantified (although attempts can be made to estimate the magnitude or range of values for an uncertain event).

1. This was written prior to the publication of the American Society for Testing and Materials (ASTM), "Standard Practice for Environmental Site Assessments," (ASTM E 1527-93), *Standards for Phase I Environmental Site Assessments* (Washington, D.C.: American Society for Testing and Materials, 1993). Within limits these standards directly address the questions outlined here.

FIGURE 1 Environmental Risk System



Stigma.

The value impact of uncertainties. For the purposes of this discussion stigma shall refer to the value impact of environmentally related uncertainties—uncertainties resulting from the presence or assumed presence of an environmental risk.

Unimpaired value.

The unimpaired value of a property is the value considering all restrictions on use and costs of ownership other than those imposed by the presence of an environmental risk.

Impaired value.

The impaired value is derived from the unimpaired value according to the following relationship. It is the value giving due consideration to the impact of environmental risks known or assumed to be present:

$$I = U - C_{NCP} - C_R - C_F - M_U$$

where

I = Impaired value

U = Unimpaired value

C_{NCP} = Cost to implement the NCP-defined remediation plan

C_R = Cost of restrictions on use and/or environmental liability prevention

C_F = Impaired financing cost

M_U = Intangible market factors

It should be noted that C_{NCP} will be the environmental equivalent of the "typical" construction cost. Many courts have held that the only recoverable environmental costs from a third party are those costs defined by application of the NCP.

Remediation.

Remediation as defined in the NCP and common usage can consist of one or more of the following methods for dealing with a specific environmental situation.

- *Do nothing.* This is not to be taken literally. The "do nothing" option consists of a determination that

specific physical action is not required at the present time, but that continuous observation (as with an operations and maintenance program) may be required to identify changed circumstances that may require implementation of another method in the future to protect human health and/or the environment.

- *Repair.* The restoration of the primary control mechanism(s) to a functional state whereby the risk source may be maintained such that human health and/or the environment are protected.
- *Operations and maintenance program.* A specific, written program of daily functions, training, equipment, and discipline intended to provide observation of the environmental risk and the maintenance of the primary and man-made secondary control mechanisms.²
- *Isolation.* The prevention of access to a risk source except possibly by trained and equipped personnel. Isolation may be accomplished by something as simple as a fence, or by something as complex as a controlled-atmosphere structure.
- *Encapsulation.* The construction or application of a physically (to the risk source) impermeable membrane. The purpose of the encapsulation is to isolate the risk source from the transport mechanism and thereby from the targets.
- *Enclosure.* The construction of a physically impermeable and structurally sound barrier around the risk source and its primary control mechanism. The difference between encapsulation and enclosure is in the structural strength of the barrier.
- *Removal with disposal.* The physical removal of the risk source, usually involving the destruction of the primary control mechanism, and the

2. Under the Occupational Safety and Health Administration's (OSHA) Worker Protection Rules an operations and maintenance program is now virtually required for almost any organization coming under OSHA or OSHA-equivalent jurisdiction.

disposal of the risk source in another location.³

- *Removal with destruction.* Destruction means the reduction or transformation of the risk source to non-risk elements or form. If it can be accomplished, the destruction of the risk source after removal is the only method for cutting off future liability, although it will do nothing about any liabilities associated with the past presence of the risk source or the actual removal and destruction activities. Generally removal with destruction is technically difficult and expensive.

Cost to control/cost to cure.

Especially with respect to soil, surface water, and groundwater contamination, the concept of a "cure" for an environmental impairment is essentially meaningless, at least over any reasonable economic time frame such as several decades. For this reason the use of the phrase "cost to cure" can be extremely misleading and the more accurate phrase "cost to control" should be applied to remediation activities. A careful examination of the major environmental laws such as CERCLA or the Resource Conservation and Recovery Act (RCRA) will clearly indicate that control is the objective, cure being implicitly if not explicitly recognized as a usually unattainable goal.

IMPAIRED VALUE OPINION DEVELOPMENT

In these definitions a new phrase was introduced—EVA. After much experience and research it has become obvious that the existing Phase I, II, and III audits, and even the new Phase I Environmental Site Assessment by the American Society for Testing and Materials (ASTM),⁴ do not address the needs of appraisers. While they deal with specific environmental laws, rules, and regulations, only rarely

do they address the issues of how environmental concerns will influence the costs of ownership, the highest and best use, or the restrictions on use that are the major concerns of appraisers. Value covers a much broader range of concerns than the environmental laws.

The ASTM Phase I Environmental Site Assessment is a case in point. A standard for an environmental site assessment to meet the requirements of "all appropriate inquiry" to establish "innocent purchaser" status under CERCLA is a welcome and highly important step toward regularizing commercial transactions. There should be no doubt that property owners informed that Superfund liability applies to a newly acquired property will have their whole day ruined, and certainly the value of the property will change if it becomes a listed site under Superfund. (Technically, the site will be a CERCLIS site until it has achieved a Hazard Ranking Score of 28.5 or greater, at which point it becomes a National Priorities List [NPL]⁵ or Superfund site.) Even without Superfund status, however, a property may be rendered substantially less valuable without a particle of a hazardous substance present because of environmentally driven restrictions on use. This is one issue among many other value issues only glancingly dealt with by the ASTM standards.

The ASTM standards also define a time in the past (1940) before which investigation, while recommended if information is readily available, is not required. While this may limit liability under CERCLA, the property owner may still face large remediation costs and an unmarketable property because of something that occurred earlier than the cutoff date. The major point, however, is that all parties must recognize that a Phase I assessment cannot develop the detailed information required to establish the impaired value of a property. The balance of this article will outline the data require-

3. Removal with disposal does not end the owner's (at the time of removal) financial risk; it freezes title to the risk source with that owner for as long as the risk source may exist in its new location. This may involve that owner in later Superfund liabilities even if the risk source is relatively benign.

4. ASTM E 1527-93.

5. CERCLIS (Comprehensive Environmental Response, Compensation and Liability Index of Sites) listing means that there is some basis to believe that the site may contain an uncontrolled or threatened uncontrolled release of a hazardous substance. CERCLIS is a precursor to NPL status. A site on the NPL is a site eligible for remediation under Superfund, a highly undesirable status for any property owner.

ments for establishing the impaired value, and the likely sources of these data.

DEVELOPMENT OF THE UNIMPAIRED VALUE OPINION (U)

The unimpaired value opinion is the basis for the development of an impaired value opinion, should one be required. An experienced appraiser with extensive local knowledge is best equipped for this task. It can be accomplished in much the same way as value opinions are typically developed, using the sales comparison, the income, and the cost approaches, but with some cautions.

The cost approach is probably the least vulnerable to distortions resulting from environmental impairments provided that it is recognized that typical construction may be considerably different from what has previously been considered typical in the marketplace. Assume, for example, that an industrial facility is to be constructed on virgin land in a municipality. The local publicly owned treatment works (POTW, or sewage plant to most of us) will have a National Pollution Discharge Elimination System (NPDES) permit that allows it to accept and handle specific quantities and types of wastes. If the industrial plant will discharge wastes other than those the POTW is permitted to handle, or in quantities greater than those allowed, then the typical construction of the industrial facility will have to include a pretreatment works that will be required to have its own NPDES permit. If the facility will be processing liquid hazardous materials it may need to have a stainless steel floor drain system and special overflow catch basins. It also may need to pretreat storm water and have a specially constructed area for the storage of solid and liquid hazardous substances and wastes. All of these items would be considered typical construction in light of current environmental rules.

It is possible that the POTW may place a restriction on the commercial or industrial facility by not having sufficient capacity to accept additional sewage of any

type. In 1990, the Ohio Environmental Protection Agency (EPA) prohibited any new connection to Dublin, Ohio's, sewer system until its capacity problems were resolved, a situation that lasted almost a year.

Establishing the unimpaired value with the income approach is more complicated. Specifically, the existing income and expense streams may be influenced by the presence of hazardous substances through depressed rental rates or inflated expenses. Ideally, the expenses associated with environmental issues in the operation of a property should have their own line item in the budgets and financial records, for example for the operations and maintenance program noted previously. Unfortunately owners do not yet recognize the usefulness of specific identification of environmental costs as a liability-reduction device, both for themselves and their lenders.⁶ This of course assumes that an owner is responding properly to the presence of an environmental risk. Appraisers must exercise care to ensure that these income offsets and expense increases are identified and adjustments are made to arrive at the unimpaired value. Otherwise the impaired value opinion may include a second adjustment for the same items, effectively lowering the value of the property twice for the same concerns.

The sales comparison approach may cause the most problems in establishing the unimpaired value because comparables may not be comparable. How is it possible to know for sure whether the comparable sale prices have an adjustment, downward or upward, for an undisclosed environmental problem? An owner may be reluctant to reveal that a plume of contaminated groundwater underlies a property to anyone other than a buyer, and the buyer may be motivated to pay a premium price for the property because it is the buyer's plume. If the environmental problem were known without detailed information on the specific cost to remediate that specific problem, it should be obvious that an adjustment to sale price would be difficult to make un-

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6. In June 1993 the Securities and Exchange Commission published "Staff Accounting Bulletin 93," *Federal Register*, v. 58 (Washington, D.C.: Department of the Treasury, Office of the Comptroller of the Currency, June 14, 1993): 32843, requiring disclosure of environmental liabilities and the methods for developing the amount to be disclosed.

less one of the parties to the transaction were willing to reveal the amount of the adjustment.

A knowledgeable local appraiser is critical to establishing the unimpaired value of a property, especially when the local marketplace's reaction to an environmental concern tends to be strong or the local authorities are contemplating a change in the environmental criteria for properties and the sales comparison approach is to be used. The unimpaired value opinion must be just that—the value of the subject as if no environmental impairments exist. If it is not, the relationship for establishing the impaired value opinion will be compromised.

THE COST OF REMEDIATION AS ESTABLISHED THROUGH THE NATIONAL CONTINGENCY PLAN (C_{NCP})

It would be nice to be able to provide a single impaired value opinion for a property as opposed to a range of impaired values. Unfortunately this is not going to be possible unless a client is prepared to pay for Phase III-level work and to wait a period of months—if then. Short of Phase III work it is only possible to provide a range of values that, depending on the quality of the Phase I and II work, may be relatively broad. This is a result of the uncertainties involved in developing estimates based on incomplete information in a number of critical areas, as will be discussed next. Prior to a Phase III, the situation is roughly equivalent to asking a contractor to estimate the cost of a building before the specific site is known or the floor plan or structural/architectural design has been implemented.

The NCP⁷ sets forth the protocols for determining how the human health/environmental risks will be mitigated. Generally these protocols require the following steps.

- Characterization of the environmental risk. Specifically, this means the identification of each of the risk sources present; the identification of the primary control mechanisms and their current and likely future status with respect to the protection

of human health or the environment; the analysis of the transport and secondary control mechanisms to determine their efficiency in bringing the risk source and the targets into proximity to each other; and the identification of targets, whether human or sensitive environments.

- Analysis of the environmental risks to determine if an actual threat to human health or the environment exists as well as the extent or severity of that threat.
- Identification of the Applicable and Relevant and Appropriate Requirements (ARARs) that will govern the objectives and methods for site remediation. Simply identifying the federal, state, and local remediation requirements is a major task and may consume hundreds of hours of risk assessment and site engineering work and require large quantities of analytical data. In the simplest cases of the remediation of asbestos in commercial office buildings or the remediation of leaking underground storage tanks, the need to formally identify the ARARs has been dealt with through codification of the responses required for these common situations. The uncommon situations require far more highly specialized analysis from health risk professionals, engineers, attorneys, and others.
- Development of risk/benefit estimates and implementation budgets for each of the available remediation alternatives.
- Selection of the most appropriate remediation strategy based on the following objectives in order of priority.
 1. Protection of human health or the environment
 2. Technological feasibility
 3. Economic feasibility
 4. Local considerations developed through public hearings or specialized requirements such as the capabilities of the local POTW or landfill

7. The National Contingency Plan (NCP) is set forth in the *Code of Federal Regulations* at 40 CFR, Part 300.

From the appraisal viewpoint this process is critical and produces the value of C_{NCP} needed in the impaired value relationship. From the owner's viewpoint something even more important may result. If litigation for recovery of remediation costs is even remotely contemplated it will be necessary to demonstrate that this process has been used to establish the methods and thereby the recoverable costs for remediation.

The NCP process will provide several key items of information to an owner and an appraiser. First, it provides the estimated costs and timing for remediation activities from which a present value of remediation costs can be calculated. Second, the process should provide a clear outline of restrictions on use resulting from the presence of an environmental risk at all stages of the projected remediation—before, during, and after. Third, the process should reveal some specialized areas of concern for an owner and an appraiser, particularly in the evaluation of marketplace uncertainties. This may include the possibility of litigation against the owner for contamination of neighboring properties or damage to individuals or natural resources.

As mentioned, the development of the value of C_{NCP} is equivalent to the specification of the typical cost of an improvement, and all other remediation costs are either deficient or superadequate for the purposes of an appraisal. The value of C_{NCP} can only be developed through the formal consideration of the NCP for the specific site, called a Remedial Investigation/Feasibility Study (RI/FS), or through a less formal analysis that nevertheless considers all of the same issues. The minimum information required to develop C_{NCP} is normally that produced through the Phase III analysis of the subject property—Phase I or II data will be insufficient for anything other than an approximation over a broad range because of the large degree of uncertainty.

COST OF RESTRICTIONS ON USE (C_R)

The number and type of environmental restrictions on use is large and increasing. The Clean Air Act provides for a system of discharge permits that in certain local jurisdictions may extend to the local

body shop or drycleaner and specify the annual quantity of particular substances that the facility may release into the atmosphere. If the facility exceeds the permitted level, either technological means must be employed to reduce emissions below the specified level, the facility must purchase from another facility additional discharge capacity, or the facility must restrict its operations. The permit itself thus takes on a value related to the demand for the right to discharge the substance and the cost of the technology to reduce discharges of that substance. If the cost of discharging is high, the highest and best use of the property may be restricted to some upper limit of discharge capacity, and thereby some upper limit of productive use.

In a similar vein although without the tradability aspects, the NPDES permits may significantly restrict the upper capacity limit of a property's highest and best use, or preclude certain uses altogether as a result of a lack of discharge capacity for liquid wastes. In a different category, the ability of a firm to dispose of its solid waste may be severely limited by the capacity of landfills or other storage facilities to accept the waste. The local environmental lobby may also provide limiting factors on the use to which a specific property may be put, with or without formal regulatory restrictions.

Restrictions on use also may take the form of wetlands or sensitive environment concerns, and these limitations may be in the form of permanent or semipermanent impediments to development. The cost of development of a property containing a wetlands will be significantly greater than the cost of development for a property without wetlands if the wetlands must be disturbed in any way. The cost of simply obtaining a 404 Dredge and Fill Permit from the Army Corps of Engineers can be substantial in terms of both direct engineering costs to support an application and the delay in development time. If the wetlands are to be destroyed, mitigation in the form of the construction of replacement wetlands at a ratio of from 1:1 to greater than 1:3 (area destroyed versus area constructed as a replacement) may be required, depending on the jurisdiction and type of wetlands. Replacement may not be possible, thereby precluding the intended use. Replacement

Positive market factors are often ignored in developing an opinion concerning stigma.

wetlands may also carry an ongoing maintenance cost to the owner of the original wetlands property that can be both substantial and perpetual. Endangered species may totally preclude development. It should be remembered that endangered species include both fauna and flora.

The Clean Water Act, the Clean Air Act, the Solid Waste Disposal Act, the Endangered Species Act, the National Environmental Policy Act if federal funds are involved, the Toxic Substance Control Act, and others may all place restrictions on how a property can be operated and its ultimate productive capacity. The RCRA will impose operating restrictions on businesses generating a quantity, sometimes a surprisingly small quantity, of hazardous substances or wastes as defined in that law.

Each of these laws, and others that while not specifically environmental laws have environmental components, may generate a need to provide long-term preventive measures. This is especially the case in light of the fact that insurance to cover environmental problems is generally not available, necessitating the accrual of a self-insurance fund to cover this contingency. Whether such a fund should be treated as a business expense or as a capital investment is an accounting and tax decision, but the need for the fund is obvious and the present value of this reasonably anticipated future expenditure will have an influence on the value of the property.

THE IMPACT OF MARKETPLACE UNCERTAINTIES

To this point the analysis has concerned issues that are presumably quantifiable. They are only partially quantifiable, however, for reasons to be explained shortly. Until remediation has been accomplished there are a great number of areas mentioned previously where only rough es-

timates can be provided regardless of the amount of time spent in investigation or analysis. It is for this reason that Peter Patchin and others have argued that prior to the completion of remediation the marketplace may extract a premium over the estimated cost of remediation of as much as 100% to 200% of that estimated cost. This premium is based on the estimated cost of remediation, not on the unimpaired value of the subject. There is no relationship between the cost of remediation and the unimpaired value of the property and an appraiser is well advised to keep this principle in mind.

Market factors may also indicate that the impact of the estimated costs is not as great as the estimate because of offsetting factors such as the demand for the subject in the local marketplace, the availability of substitutes, the perceived quality of cost estimates, or the perceived value of indemnifications and warranties by the seller, and not infrequently the degree of familiarity in the local marketplace with respect to the specific environmental condition. These factors may all work toward reduction of the total impact on value.

Stigma, as the term has been used by other writers in the field,⁸ implies a negative. This may be the case in some situations, but the term "market factors" used here is intended to imply that positive offsets may be possible.

With respect to stigma, or the negative side of offsetting market factors, several points arising from recent field experience should be made. First, stigma resulting from environmental impairments does exist and is supported by excellent data in specific cases. Second, the basic concept of stigma is being badly abused, particularly by buyers of properties in an effort to obtain lower prices from the sellers. Third, the positive market factors are often ignored in developing an opinion concerning stigma. Based on what is currently known, market factors may be broken down into a series of

8. James A. Chalmers and Scott A. Roeher, "Issues in the Valuation of Contaminated Property," *The Appraisal Journal* (January 1993): 28-41; Bill Mundy, "The Impact of Hazardous Materials on Real Property Value," *The Appraisal Journal* (April 1992): 155-162; Bill Mundy, "Stigma and Value," *The Appraisal Journal* (January 1992): 7-13; Bill Mundy, "The Impact of Hazardous and Toxic Material on Property Value: Revisited," *The Appraisal Journal* (October 1992): 463-471; Peter J. Patchin, "Valuation of Contaminated Properties," *The Appraisal Journal* (January 1988): 7-16; Peter J. Patchin, "Contaminated Properties—Stigma Revisited," *The Appraisal Journal* (April 1991): 167-172; and O. R. Colan Associates, Inc., *The Effect of Contamination on the Market Value of Property* (Research report prepared under contract to the Federal Highway Administration and currently in an unreleased draft form).

component factors that must be dealt with in the appraisal of an impaired property. These are:

$$M_U = f(U_E, U_R, U_M, U_F, C_I)$$

Read $M_U = f()$ as: Market factors are a function of the variables inside the parentheses, where

- U_E = Uncertainty concerning engineering estimates of cost to control
- U_R = Uncertainty concerning regulatory requirements, present and future
- U_M = Uncertainty concerning the marketplace's reaction to the presence of an impairment in a given condition. This may result in a positive or negative offset
- U_F = Uncertainty concerning the financial marketplace's reaction to the presence of an impairment in a given condition
- C_I = Change in the marketplace's reaction to the presence, or past presence, of an impairment over time

U_E —The uncertainty concerning engineering estimates for the cost to control or cure. Although an amazing number of appraisers do not wish to hear about this, refusing to hear about it unfortunately will not make the problem go away. The problem is that the engineering estimate is not for the cost to build a building. Typically a remediation project, especially one involving soils or groundwater, is actually conducted on the basis of "dig until there is nothing to dig." Punching a few holes in the ground in an effort to determine where the contamination is will not provide more than an approximation of the true final volume of soils to be removed and treated, for example. Therefore stigma must contain an element that represents this uncertainty in the engineering estimate versus the audited, after-completion cost.

U_R —In addition to the uncertainty concerning engineering estimates there is uncertainty concerning regulatory decisions that govern a specific situation. Unfortunately, regulatory decisions are not based on pure science, but on science, politics, and sometimes the individual reaction of the specific regulator assigned to the case. Further, regulations change with time, generally to a more stringent view of what is clean. This may necessi-

tate a change in the scope of remediation work or a complete overhaul of the work. Also, regulatory decisions are contingent, not final, decisions. Clients often ask whether a regulatory agency will issue a "clean bill of health" after the work has been completed to the agency's specifications, and unfortunately the answer is always no. The impact of regulatory uncertainty on the value of the property thus must be considered.

U_M —The uncertainty concerning the marketplace's reaction to the presence (past or present) of an environmental impairment is the most often discussed component of stigma. Some may, with justice, argue that it is stigma, and is comparable to the reaction of the marketplace to a deficiency. This view may overlook the importance of the other factors identified here.

Marketplace uncertainty is generally a function of several factors: 1) the strength of demand for the subject property in the marketplace (stronger demand, less uncertainty); and 2) the knowledge of the buyer relative to the environmental impairment (greater familiarity, less uncertainty).

U_F —There is also uncertainty concerning the financial marketplace's reaction to the presence of an environmental impairment. As reported by a number of studies, most notably those performed by Mundy & Associates, the financial marketplace has a widely varying reaction to the presence of an environmental impairment. The reaction appears to depend on a number of objective and subjective factors including 1) the financial strength of the institution; 2) the status of the subject property's local economy and market demand (U_M); 3) the type and extent of the environmental impairment; 4) the perceived quality of the technical analysis of the environmental impairment (U_E); 5) the perceived status of the regulatory attitudes toward the impairment (U_R); and 6) the visibility and quality of the impairment's remediation.

C_I —The impact of stigma on the value of a property has a strong time-dependent relationship. Both Peter Patchin and Bill Mundy have been exploring this relationship in various articles and presentations over the past few years, and understanding of the time-dependent nature

of stigma is growing. In Figure 2, this is summarized using a graph that follows Bill Mundy's work.⁹

Assume for the purposes of discussion that a property has an unimpaired value of U at time t_0 and that some time later it is discovered that the property has a case of the polygoshawfuls. Ignoring the issues of C_R and C_F for the moment to simplify the discussion, at first the marketplace finds itself unfamiliar with polygoshawful and the severity of the contamination is not known, so no one is willing to purchase or finance the property. The new market value I_1 at this time t_1 cannot be greater than zero (no willing buyer, possibly no willing seller, and no financing, therefore at least no market value). This may be thought of as a pure stigma effect, S_1 , and primarily depends on the marketplace's reaction to all of the uncertainties.

This condition will extend for some period of time, generally until the extent of the problem has become reasonably quantified (e.g., until the cost for remediation under the NCP has been established). At this point the value of the property becomes I_2 . I_2 is greater than I_1 because some of the uncertainty has been resolved (e.g., the estimated cost to deal with the problem, C_{NCP} , is known).

In general, it should be noted that I_2 is still less than the unimpaired value U minus the estimated cost to deal with the problem C_{NCP} . The difference is accounted for as the new stigma amount, S_2 . The reason for the difference is that while some of the uncertainties have been resolved, other uncertainties continue to exist. The marketplace still does not know whether the actual cost to deal with the problem has been correctly estimated (U_E); whether the regulators will approve the remediation program (U_R); whether the property will be truly clean or if the definition of clean will change, rendering the property once again unclean (U_R again); whether lenders will lend or on what terms (U_F); and so on.

When the remediation activity required under the NCP has been completed, a new market value is established, I_3 . This new value is likely to be greater than $I_2 + C_{NCP}$ because again some

of the residual uncertainties will have been resolved, particularly the uncertainty in the engineering estimate (U_E) and some (although not all) of the uncertainty in the regulatory reaction (U_R). The uncertainty in the marketplace's reaction to the contamination (U_M), even though cleanup has been affected, will still remain to some extent, as will the uncertainty concerning financing (U_F), resulting in a new stigma amount, S_3 . From this time t_3 to a point in time t_4 in the future, these uncertainties appear to dissipate and the property achieves a new market value of I_4 that, while not quite back to the original unimpaired value U , is close to that value leaving a new stigma of S_4 . Indications are that the time required to achieve this status is three to five years after the completion of remediation.

After time t_4 the property will probably gradually close the gap between the value I_4 and the unimpaired value U . That is, the magnitude of S_4 will shrink toward zero. This gap may never completely close, however, if there is an incremental transaction cost levied against the property for increased "due diligence" on the part of each new buyer because of the past existence of an environmental risk. There may be other factors influencing the magnitude of stigma, but it is hoped that this paints a somewhat detailed picture of the manner in which stigma operates in influencing the impaired value of a property.

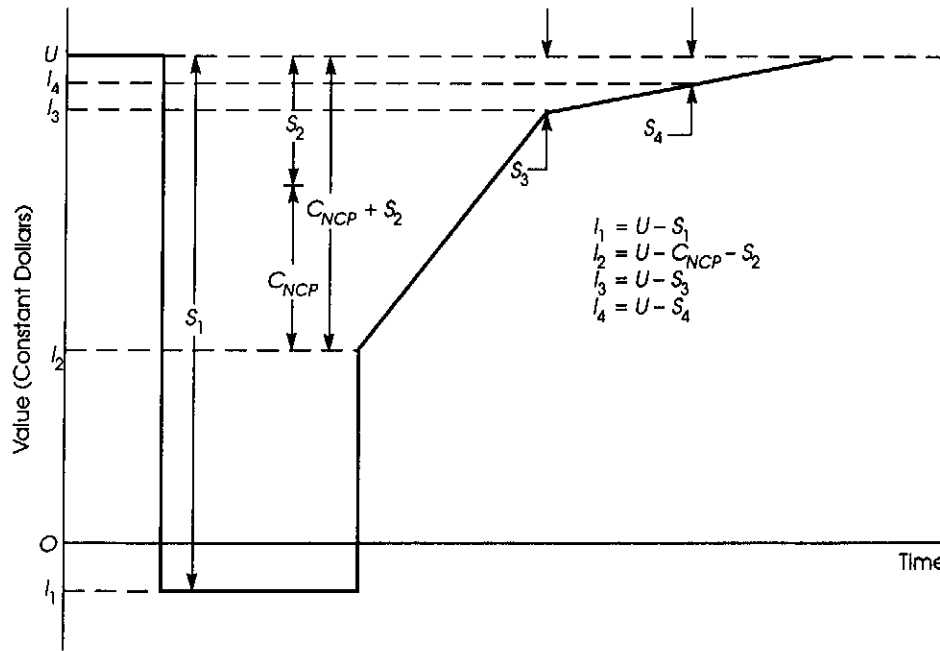
As noted, stigma is only one aspect of the market factors. The forces of demand for the subject, the perception of the quality of indemnifications, and the degree of the public's familiarity with the environmental concern may operate to offset the negative implications of stigma.

IMPAIRED FINANCING COST (C_F)

At this point an appraiser should be able to establish or estimate any financing cost penalties associated with the property. The report of the environmental experts and a knowledge of the unimpaired financing cost should provide the basis for developing a clear and accurate picture of how financing institutions are likely to view the situation. In light of the new lender liability rules promulgated by the EPA, the

9. See Mundy, "The Impact of Hazardous and Toxic Material on Property Value: Revisited."

FIGURE 2 Impaired Value Versus Time



position of the lender is beginning to clarify, although not necessarily to the extent that lenders would like, and some assurances regarding lender liability have been provided. The key parameter is that if a lender does not become overly involved in the management of the debtor's business to the extent that the management of environmental risks is influenced, the lender can be reasonably assured of maintaining the "secured creditor" exemption offered under Superfund.¹⁰

While the lender liability rule and the *Nurad* decision are important, credit concerns may be more important in lender decisions. The provision of several key items of information developed in the foregoing C_{NCP} and C_R analyses may positively influence the credit decision and the financing costs. For example, if the lender knew that the debtor's budget planning included provisions for the remediation of existing environmental risks, provisions for protection against future additional environmental risks, a self-insurance fund to provide financing for emergencies, and similar information, a more positive response may be forthcoming. It is even possible that the more forward-thinking lenders may choose to assist in the financing of such programs and may at least recognize that the develop-

ment and implementation of these specific budgets can provide key information on what a lender must not disturb if involvement in the debtor's financial operations should become necessary.

In any event, the willingness of lenders or others in the financial marketplace to finance an environmentally risky situation, and the terms of that financing compared to the terms of financing for a similar but nonrisky situation, will allow for the development of the last key piece of information necessary to the establishment of the impaired value opinion—the incremental cost of financing. Both debt and equity holders have a significant role in this part of the analysis as both may demand increased rates of return to compensate for increased risks. An appraiser should seek to quantify and document this area to the greatest extent reasonable under the circumstances.

CONCLUSION

The impaired value opinion, defined as:

$$I = U - C_{NCP} - C_R - C_F - M_U$$

will be a difficult and complex appraisal assignment if something more than a broad range of value possibilities is to be provided to the client, and much of the

10. *Nurad, Inc. v. William E. Hooper & Sons, Co.*, CA 4, No. 91-1775, as reported in Bureau of National Affairs, *Toxics Law Reporter* (Washington, D.C.: Bureau of National Affairs, November 20, 1991): 757.

information required is simply not within the area of normal appraisal data development. An appraiser must rely heavily on complex technical assessments performed by other experts who are not generally familiar with the broad scope of information required to establish value. To deal with these concerns it would seem that appraisers should follow several practices with respect to both clients and the suppliers of information on environmental impacts.

With respect to clients, appraisers should make the following points clear from the beginning.

- An unimpaired value opinion can be rendered subject to the quality of verifiable data available within each of the approaches used to establish value.
- A so-called Phase I audit will not allow an appraiser to express an impaired value opinion and is unlikely to provide critical information about restrictions on the highest and best use resulting from environmental restrictions on use. Further, the Phase I audit and even the ASTM Phase I Environmental Site Assessment are only part of the basic information required to determine whether an environmental impairment to value exists.
- Environmental experts must be retained by the client, and analytical investigations must be conducted to a level of assurance acceptable to the client that will provide reasonable quantitative estimates of the remediation plan, budgets, and use restrictions on the subject property. Without these plans, budgets, and use restrictions it is not possible to provide a reasonable range of estimated impaired values for the subject property.
- Until the completion of remediation it will only be possible to specify a range of values, possibly with a most likely value, for the impaired value opinion. The breadth of the range of values will totally depend on the quality and completeness of the environmental expert's work, and is not within the control of an appraiser.

To support the development of C_{NCP}

to cover expenditures for existing environmental impairments, C_R to cover future expenditures, C_F to estimate the incremental cost of financing, and S to estimate the impact of uncertainties on the marketplace's perception of value, an environmental expert must provide to an appraiser the following key assurances and information based on that expert's work.

- Assurance that all reasonable efforts have been expended within the constraints of time, available resources, and defined scope of work as set forth by the client to identify the environmental risks associated with the property, and all reasonably identifiable environmental constraints on the use or operation of the property.
- Assurance that at least an informal analysis of the existing situation has been performed in reasonable conformance with the NCP or its applicable equivalent, and that the expert's budgets and recommendations reasonably conform with the NCP requirements.
- A budget, including expenditure timing that may extend 20 to 30 years into the future, which covers the planned response actions for dealing with the existing environmental impairments.
- A budget for the operations and maintenance program that will almost certainly be required for any commercial or industrial property. This may be limited in form to the costs for the owner to reasonably ensure that tenants are complying with all applicable environmental laws. Because the owner of the property is the first party that will be held responsible without regard to who actually created the problem, however, this is a reasonable cost of ownership.
- A budget to accrue funds for emergency response to environmental problems. This is essentially the provision of a self-insurance fund and will be highly dependent on the specific property situation and use.
- A budget for the implementation of needed upgrades to the property to bring it into compliance with applicable environmental laws and reg-

ulations and to minimize future liabilities. This will generally be a capital expenditure budget and may be an integral part of the construction costs for a new facility. An appraiser's concern will be to recognize whether these expenditures are now a necessary part of the typical improvement under the specific circumstances.

With respect to market factors, environmental experts should provide quantitative information on the sensitivity of their estimates to changes in fundamental assumptions such as the quantity of materials to be remediated, changes in remediation costs or restrictions on use if the contamination is more or less severe

than indicated, the probability of the acceptance of the remediation plan by the governing authorities, and an estimate as to the possibility that at the completion of remediation no further contamination will be discovered at a later date or that the rules governing the cleanliness of the site will change in a manner that will result in re-remediation. It should be remembered that these will be expressions of uncertain future events; at best they will be highly qualified and qualitative, and an appraiser will have to form an opinion as to how the value of the property will be perceived by the marketplace under these circumstances. Not to be ignored are the market factors that may act to mitigate the negative aspects.