“The Role of Insurance and Regulations in Dealing with Environmental Risks”

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The Role of Insurance
and Regulations in Dealing
with Environmental Risks

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1. INTRODUCTION

For several years, the relationship of insurance and public policy has been the subject of significant commentary. The discussion has ranged from an analysis of the interrelationship of insurance and the tort system as compensatory tools\(^1\) to the special role insurance plays in protecting societal assets from potentially crippling losses\(^2\). One area that has not been explicitly a focus in these discussions is the potential use of insurance as a regulatory compliance tool.

Environmental issues have emerged only recently as a primary area of societal concern. The first major attempt to create a national policy for protection of the environment was in 1969 with passage of the National Environmental Quality Act\(^3\). The Environmental Protection Agency (EPA) was created one year later, in 1970\(^4\). Environmental regulation of hazardous materials began in 1976 with enactment of the Resource Conservation and Recovery Act (RCRA)\(^5\). RCRA was designed to protect the environment, conserve natural resources and provide "cradle to grave" legislation governing the handling of hazardous waste. Its provisions also prevented open dumping and facilitated the conversion of existing open dumps to facilities that pose no danger to the environment or to public health.

The liability imposed by RCRA applies primarily to companies that deal with hazardous materials in the normal course of their business. Four years later, in 1980, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA\(^6\), to address the environmental problems RCRA did not adequately --- problems created by hazardous waste produced and abandoned in the past.
These environmental statutes, combined with regulations developed since their passage, have created standards of behavior that often serve as the basis for legal action. Tort law is the liability system for dealing with claims for injury resulting from environmental damages, including those arising from exposure to toxic chemicals.

This paper shows how insurance coupled with well-specified regulations can complement the current liability system in dealing with certain types of environmental risks. As we will indicate below, insurers are most likely to offer coverage for those risks where there are well-specified standards and there is sufficient data to be able to estimate the nature of potential claims by the insured party and the size of the resulting payment. This insurance should protect a firm’s assets from perceived random claims that are related to either human diseases (asbestosis, cancer) or property damage (cleanup of waste) while providing compensation to a victim based on contractual conditions.\(^7\)

The paper presents two case studies of how insurance has been used in practice to deal with asbestos remediation and Superfund liability on property value where contamination may exist. These examples should be viewed as a starting point for discussion and debate among researchers and policy makers as to the opportunities and limitations of the proposed approach.

2. THE INSURABILITY OF ENVIRONMENTAL RISKS

Insurance is a mechanism to contractually shift risk. An insurance market exists because, on the one hand, insurers are able to find safety in providing coverage
against a large number of risks, and, on the other hand, insureds want and need protection from the possibility of an unexpectedly large loss resulting from injury, disease or an accident associated with their processes, operations or products. Insurance also can protect the firm against the costs of having to remediate environmental contamination that is discovered in the future. Not everything is insurable. In some situations, the amount of potential loss cannot be quantified or the coverage may violate existing laws. In many cases, a premium that satisfies both the buyer and the seller cannot be reached.

A. Conditions of Insurability

The conditions of insurability were formalized in a book by Berliner (1982)\textsuperscript{8} and applied to issues of environmental risk by Kunreuther (1987)\textsuperscript{9}. Two fundamental problems arise when environmental-related insurance concepts are tested against the basic criteria of insurability.

First, the courts have required insurers to pay damages for losses insurers never intended to cover. This is a direct result of policy coverage interpretation problems, which have intensified due to changing definitions of liability. To address this problem there is a need to maintain the integrity of the policy language. Every insurance policy defines the contractual limits of coverage, establishes the Maximum Possible Loss ("MPL"), and describes precisely what risks are insured. If the policy language is interpreted differently than the insurer intended, the original MPL may be drastically affected and the insurer will have to be exposed to losses that the premium was not designed to cover.\textsuperscript{10}

Because of changing policy language interpretation, the determination of loss and
loss limits has been arduous and the setting of rates extremely difficult.

The second fundamental problem is that many environmental problems lack the historical information necessary for traditional actuarial modeling in contrast to conventional coverages. Statistically valid information on the probability and magnitude of loss based on historical claims experience generally does not exist in the environmental arena. Companies, therefore, cannot calculate the potential claims component of their product using traditional actuarial techniques. Faced with these problems, most traditional insurers have chosen not to explore the environmental market.

To deal with this problem, there is a need to specify the frequency of losses of different magnitudes as well as the maximum possible insured loss, so that appropriate premiums can be specified. Since most environmental risks are a result of governmental policy, and have been classified as such only recently, little historical loss data exists on these exposures. Hence other methods of loss assessment must be found.

B. Using Science to Develop Insurable Products

The role of science is critical to the development of sound environmental insurance products. Scientific models have been used by environmental insurance providers as replacements for historical standard actuarial models to define the maximum possible loss, average loss and the frequency of loss.

The scientific modeling process is based on a thorough examination of the insurance opportunity. Each risk characteristic is analyzed in detail. The pressure
points relating to randomness, causes of loss, limitations of loss and customer selection are uncovered. These are used to identify insurable situations that exist within the market. The key components of the scientific approach are:

1. The environmental risk must have a generally accepted scientific or engineering standard for assessing the environmental factors associated with the risk. The standard serves two purposes. It can be used to screen out potential clients as candidates for insurance who do not meet the standards. It also can be used to determine the magnitude of losses under the assumption that the insured party is adhering to this standard. A uniform standard can arise from government regulation (e.g. the number of permissible asbestos fibers in the air as determined by OSHA or EPA), from industry itself (e.g. product specifications by trade associations) or from financial institutions (e.g. determination that the radon levels are below a prespecified level before a mortgage is issued on property).

2. A well-defined protocol, such as how to undertake an environmental audit, must be developed to characterize the risk. This protocol which normally incorporates the engineering standard, should be based on sound scientific principles and backed by scientific data. This requires the insurance company to develop close associations with members of the scientific world.

3. Underwriting standards must be developed based on the integration of the existing engineering standard and the scientifically-based model. These underwriting
standards, which are often associated with the characteristics of the firm or the property being insured, are utilized to characterize the quality of potential clients. For example, if an asbestos remediation policy is being considered, then the insurer will want to determine whether the firm is following appropriate safety procedures as part of its underwriting standard. If so, it may only be willing to provide insurance to those firms who follow particular safety guidelines.\(^\text{11}\)

4. Rates must be based on the scientific models coupled with the underwriting standard. The resulting premium structure reflects the use of non-traditional models since historical data on these environmental risks do not normally exist. These rates reflect the degree of uncertainty associated with the risk. For example, suppose a group of experts agree that their best estimate of the chances that an individual will contract cancer by being exposed to a particular substance for a certain length of time is \(p = 0.001\). At the same time the experts note that there is a great deal of uncertainty surrounding this estimate. The insurer is likely to specify a higher rate to cover this risk than for a more certain risk where \(p = 0.001\).\(^\text{12}\)

5. Insureds must be closely monitored to ensure that their behavior conforms to the original scientific model. Otherwise the rates charged by the insurer will not reflect the risk as determined by the scientific modeling activity.

6. The original model must be adjusted as additional scientific and statistical information becomes available over time.
In summary, a risk is insurable if one can determine the frequency and magnitude of losses within some reasonable limits. Having well-specified standards enables the insurer to undertake scientific modeling that will enable it to determine the degree of uncertainty associated with the risk. The greater the uncertainty the higher the premium is likely to be. By developing underwriting standards to separate good risks from bad and by monitoring activity, uncertainty is reduced on the magnitude of claims and future rates can be refined.

3. MARKETING ENVIRONMENTAL INSURANCE

The basis of insurance depends upon an insurer being able to attract enough customers so that a risk can be spread among a large number of insureds. In specialty insurance markets such as environmental insurance, the law of large numbers requires that a statistically significant number of insureds be included in the defined risk pool. Further, the creation of a product is of little value if it is not accepted by the market. The role that insurance can play in monitoring behavior is limited by the number of policyholders.

Marketing presents unique challenges in the environmental insurance arena. The challenge is for the insurer to create products that satisfy the conditions of insurability. The open question is whether there will be a sufficiently large market for the product so that it becomes profitable for insurers to offer it. There are no easy answers as to how one markets a new insurance product but one can delineate a set of opportunities and barriers for creating a market for the product.
A. Role of Well-Specified Regulations

As stated earlier in this paper, a key ingredient in the insurability of an environmental risk is that a well-specified standard be accepted by those affected by the risk. From a marketing standpoint, a given standard must be widely accepted in the market as a precondition for the successful sale of the insurance coverage. The standard can be imposed by government regulation (e.g. maximum number of asbestos fibers in the air) or it can be voluntary accepted (e.g. firms ensuring that the pollution associated with producing particular goods do not exceed certain levels which they impose themselves.)

If firms do not accept certain standards then it may be difficult to market insurance as illustrated by the case of underground storage tanks. One effective methodology for early detection of leaks in underground storage tanks is the regular measurement of fluid levels in the tanks. An unexpected drop in fluid level indicates a leak. Monitoring fluid levels could be a standard which would enable insurers to offer coverage for providing protection against leaks. In other words, insurance that protects against the impact of a potential leak can be designed based on the monitoring. The insurance will not be marketable, however, if customers do not adopt reasonable fluid monitoring requirements.

B. Customer Motivation

Normally insurance is purchased by firms to protect themselves against unexpected losses. Customers frequently purchase environmental insurance for very different reasons. Sometimes the purchase of environmental insurance is mandatory. Government regulations regarding underground storage tanks, for example, require
that owners demonstrate that they have the financial capacity to pay for potential cleanup from tank leakage. Insurance is one method to meet this requirement. In some states, insurance is the only method smaller owners of tanks can use to meet this requirement.

In other instances, customers purchase environmental insurance in order to free the company to proceed with its core business activity, unimpeded by environmental risk. For example, a commercial property owner may be unable to lease commercial space because asbestos exists on the premises. The owner may, rightfully, have little concern about health risks arising from the asbestos, but he or she needs insurance for asbestos exposure to allay potential tenants’ concerns and lease the property.

Similarly, an asbestos abatement contractor may not be concerned about the health impacts of an asbestos release during abatement activity. However, property owners will require insurance coverage for exposure as a prerequisite for starting the job. The insurance is purchased to meet short-term business requirements, not to provide protection against asbestos-related risks.

A securitized mortgage manager may purchase environmental insurance on properties in the portfolio in hopes of earning a higher rating on the securities, not because of environmental concerns. A real estate developer saddled with a potentially contaminated property may be willing to pay for environmental insurance, even at a premium price, in order to sell a property the market perceives as environmentally tainted.

The purchase of environmental insurance may also be driven by a business’ low
tolerance for risk. Firms will purchase insurance to assuage concerns about the impact of an environmental incident or discovery upon the financial viability of the business. If there is significant ambiguity as to whether an environmental risk will threaten a company's business, insurance is likely to be viewed as a valuable protective mechanism.

C. Challenges of Insurance Distribution

The distribution system for traditional insurance products also becomes a handicap in the environmental insurance field. Most insurance brokers are comfortable with the vast array of established products available to offer their corporate customers. Environmental coverages, however, are very different. The core of the product may involve extensive engineering information, which is often foreign to the insurance broker and the corporate risk manager.

In addition, since many environmental coverages are based, at least in part, on environmental regulations, brokers must familiarize themselves with a new body of knowledge. Changes in regulations and new interpretations by the courts of both environmental law and insurance coverages present an additional sales barrier that brokers must overcome.

Brokers may also have to present environmental insurance options to an entirely new set of corporate decision-makers. Traditionally, the insurance purchase is the sole purview of the corporate risk manager, who selects the insurance based on the options presented by the broker. Environmental coverages introduce a whole new cast of characters, any of whom may have more authority and decision-making capability than the risk manager. General counsel, operations managers, vice
presidents of acquisition, finance, marketing or business development may all have a vote in the final purchase of environmental insurance coverages.

Since these coverages are new and there is limited awareness within corporate structures of their importance, companies often have not included the cost of this form of protection in their budget. Therefore, money must be diverted from other corporate endeavors. A more likely scenario is one where the decision to buy environmental risk insurance is postponed until money becomes available and corporate decision-makers become more comfortable with the entire concept. This is especially true with voluntary insurance coverage that is not connected to a specific corporate event, such as the sale of a property.

4. THE CURRENT SYSTEM FOR DEALING WITH ENVIRONMENTAL RISKS

A. The Role of Enterprise Liability

Tort law is the body of common law that deals with wrongs committed between parties outside of contractual obligations. The two functions of tort law are, (1) to provide the basis for recovery for an injured party, and, (2) to deter others from engaging in similar activities. Over the past 40 years, an emerging development in tort law has been the concept of enterprise liability which imposes strict liability on a defendant engaged in certain activities.

A tort action based on negligent acts of a defendant requires that several items be proved before recovery is permitted\textsuperscript{13}. Historically, plaintiffs have had to prove the following in order to recover damages:

1. That a standard of care was owed the defendant by the plaintiff;
2. The standard of care was violated by the negligence of the defendant;
3. The acts of the defendant were the causal connection to injuries suffered by the plaintiff; and
4. The damages suffered by the defendant are measurable.

Damages generally consist of bodily injury or harm to property. Any claim for liability begins with the plaintiff establishing that the defendant violated some standard of proper conduct. The standard of proper conduct may be developed several different ways, but, in the area of environmental claims, it most generally flows from a standard established by a governmental regulatory agency. These standards, or regulations, in turn, are usually based on policy mandates from Federal or state legislative bodies. For example, the primary legislative standards dealing with hazardous waste are detailed in provisions of RCRA and CERCLA. The EPA is responsible for developing guidelines applicable to most legislative standards. In some areas, however, different government agencies may have jurisdiction over a particular problem area. In those instances, several regulations, some potentially conflicting, may apply to the same behavior. The courts play the key role as arbiter to determine if standards have been violated.

Once a standard of behavior has been established, the plaintiff ordinarily must prove that the defendant was negligent in violating that standard. Tort law, however, is constantly evolving. Over the past 40 years, an emerging development in tort law has been the concept of enterprise liability. Enterprise liability removes the requirement that a plaintiff must prove negligence when a defendant engages in particular types of activity. Instead, it imposes strict liability on a defendant engaged
in those activities without a showing of negligence.

Enterprise liability has emerged as the tort theory applicable to product liability claims\(^\text{14}\) and to injuries from environmental claims and toxic chemicals\(^\text{15}\). One reason for this development was the argument by legal scholars, subsequently adopted by the courts, that manufacturers could police their activities and products through quality control much more easily than consumers could detect defects\(^\text{16}\). Even more importantly, the concept of enterprise liability was stimulated by the anticipation that this approach would force manufacturers to invest in loss prevention activities so that the marginal benefits of reducing the loss equal the marginal costs of investing in the mitigation or prevention measures\(^\text{17}\).

These legal developments were motivated by the view that risk should be spread across the entire population. By making manufacturers and service providers strictly liable for losses caused by their activities, the cost of this liability could be included in the selling prices of their products. Then, instead of claimants needing to prove negligence, funds accumulated from this built-in cost of liability would be available for any claimant establishing that he or she was damaged by a product, regardless of the negligence of the manufacturer. In other words, the tort system, through strict liability, was expected to play the role that insurance is traditionally designed for—spreading risk across a population of similar risks\(^\text{18}\).

**B. Challenges of the Current System**

Even assuming that strict liability is imposed on a defendant in an environmental claim situation, the next essential component of recovery is the establishment of a causal link between the activity of the defendant and the injury
sustained by the plaintiff. The enterprise liability doctrine still requires that this causal connection be established. In fact, there is an implicit assumption that the enterprise liability is a type of insurance system whereby those exposed to a risk pay a higher price for the product or service in return for financial protection against damage or injury. For this reason the risks that enterprise liability covers should meet the conditions of insurability.

Under the current regulatory system most environmental risks do not meet these insurability conditions. Today there is limited scientific evidence on the relative importance of specific chemicals in causing diseases to humans and injury to the environment. The fields of toxicology and epidemiology are limited in their ability to deduce human cancer risks from animal biocassays due to different sensitivities between humans and animals. Toxicologists will rarely conclude that humans face a known risk because animals in a controlled experiment contract a disease\textsuperscript{19}. Furthermore, there is little concrete evidence to suggest that more scientific studies and risk assessments will clarify the situation\textsuperscript{20}.

The biggest problem for both plaintiffs and defendants today is establishing a causal link between exposure to hazardous materials and the alleged injury or disease\textsuperscript{21}. Failure to establish a causal link may prohibit recovery even where plaintiffs clearly establish they have suffered injury. Defendants are likely to abandon entire areas of activity rather than produce products or services which they perceive expose them to random, high cost liability\textsuperscript{22}.

Even for diseases such as asbestosis or mesothelioma where there is greater understanding of causality, it is often difficult for the courts to assign liability\textsuperscript{23}.
For example, it is difficult to know whether Steve McQueen contracted mesothelioma because he worked with asbestos in the shipyards during World War II or wore an asbestos suit when driving a race car.\textsuperscript{24}

There are likely to be enormous transaction costs and legal expenses incurred by companies in arguing who (if anyone) is responsible for specific losses when an individual claims injury. The RAND study on asbestos litigation costs revealed that plaintiffs only receive an estimated 37 percent of the total dollars spent by defendants and their insurers. The remainder is consumed in transaction costs, including legal fees.\textsuperscript{25}

5. A PROPOSAL FOR MODIFYING THE CURRENT SYSTEM

Figure 1 illustrates a system of regulation and insurance to reduce losses from environmental risks. It emphasizes the importance of well-specified standards, inspections and monitoring procedures. These features are designed to make it more likely that a risk will be viewed as insurable and marketable, while satisfying the social goals of environmental policy. We describe each of the features of this approach below.

A. Develop Well-Specified Standards

A set of clearly specified standards should be set by the relevant regulatory agencies after consulting with the interested parties associated with a particular risk. These standards will substantially reduce the uncertainties associated with the technology-based standards now used to determine a firm's liability for some environmental risks. A well-specified standard would be more desirable from the
Figure 1: A Program of Well-Specified Standards with Insurance
firm's as well as the insurer's point of view. Such standards are easier to monitor and provide greater certainty as to potential liability.

To illustrate the benefits of this feature, consider the problem faced by firms governed by "Best Available Technology" requirements today. Existing standards require that current Best Available Technology be used as part of a firm's operation. Hence, if a new technology is developed, firms are unclear as to their liability if they fail to adopt it. Insurers are reluctant to provide coverage against liability for these risks because they are unclear as to how "Best Available Technology" standards will be applied.

B. Inspections to Determine Whether Standards Are Met

If a well-specified standard is adopted, it is possible to determine whether it is being met by inspections and monitoring. Inspections can be mandated by a government or regulatory agency. Elevators are inspected periodically to ensure that passengers are safe; buildings are inspected to make sure that they meet existing fire codes. Inspections can also be required by private sector institutions. For example, insurance companies often require inspections of property before providing coverage.

C. Provide Insurance Against Specific Losses

If private insurers are willing to provide policies covering the costs of claims this would have advantages over the current system for two principal reasons. First, insurance is more effective in encouraging deterrence. Insurers have financial incentives to closely monitor the activities of their policyholders and guarantee compliance with the standards. Enforced compliance with regulatory standards is a better deterrence vehicle than the perceived random imposition of liability under the
current system.

A second reason why insurance is desirable is that the terms of compensation can be contractually set rather than being determined by the courts. This can substantially reduce the transaction costs that are associated with the current system while at the same time deemphasizing the importance of establishing a causal connection between exposure and compensation. As will be illustrated later in this paper, an insurance policy can provide for compensation at predetermined levels solely based on release of hazardous materials.

For insurance to be a viable policy option, however, the conditions of insurability and marketability need to be fulfilled. If a clear standard is specified and an appropriate inspection is conducted to ensure that the standard is met, the insurer would be able to estimate the probability and outcomes associated with the risk to determine an appropriate premium to charge. If the uncertainty of the risk is very high, then insurers may want to set high rates. If these premiums exceed customers’ willingness to pay and insurance is not required, then the risk would be considered unmarketable.

D. Monitoring and Control Procedures

Monitoring and control procedures that can be easily implemented are necessary ingredients for the success of an insurance program. Insurers would periodically check a firm’s operations to make sure it is following a set of previously specified guidelines. If the firm has been lax in following the guidelines, three options are normally open to the insurer:

1. require the firm to undertake a set of remediation measures as a
condition for continued insurance;

(2) raise the premium to reflect the additional risk; or

(3) cancel the insurance policy.

E. Periodic Review of Standards

Over time, more accurate data will become available through the application of increasingly sophisticated risk assessments and the compilation of new data on losses and claims payments from insurance companies. Therefore, it makes sense to review the standard at prescribed intervals, such as once every five years, in order to evaluate the impact of these data on the risk in question.

6. TWO ILLUSTRATIVE EXAMPLES

This section describes two examples in which insurance is currently available to protect a firm or individual against liability from environmental risks. The first example, which involves the use of insurance to protect contractors engaged in asbestos remediation work, illustrates how a well-specified standard enabled insurance premiums to be based on risk. In addition, favorable market conditions permitted product introduction and acceptance.

The second example, involving insurance to protect owners of property from potential liability for unknown contamination on their land, describes the attempt by insurers to develop premiums based on risk when a standard is only imperfectly specified and accepted by the market.

A. Illustrative Example 1: Asbestos Abatement Liability Coverage

Nature of the Problem  Asbestos is the common name for a group of natural
minerals that occur as masses of compact or relatively long, silky fibers. In the 1960s, the mineral was identified as a carcinogen -- a product known to cause cancer in human beings. Medical evidence established that airborne asbestos fibers that are inhaled or swallowed are linked to a number of diseases, including asbestosis (chronic lung disease), lung cancer, and mesothelioma (a cancer affecting the membrane lining of the chest cavity). In the early 1970s, the government began banning the use of asbestos.

Beginning in the early 1980s, significant pressure developed in American society to remove asbestos from existing structures. This pressure was fueled by public concern over the health effects of asbestos exposure, as well as by government requirements that schools be surveyed to determine the extent of asbestos contained in their structures\(^26\). In the early to mid 1980s, both the Environmental Protection Agency (EPA)\(^27\) and the Occupational Safety and Health Administration (OSHA) issued regulations for asbestos removal work\(^28\).

The governmental regulations for asbestos removal contain clear specifications for job site monitoring, worker protection procedures, transportation and disposal of asbestos fibers and proper removal techniques. The job site monitoring requirement is to be carried out by independent industrial hygiene firms\(^29\).

**Feasibility of Insurance** Relying on this regulatory framework, insurance firms began offering insurance coverages for contractors involved in asbestos removal work. These policies assumed the liabilities of contractors for property damage and bodily injury were created as a result of a release of asbestos fibers in excess of the
permissible exposure levels at a job site location.

The scientific literature on the effects of exposure to asbestos clearly identified the key factors leading to disease manifestation: fiber concentration and duration of exposure multiplied by yield dosage. A careful examination of asbestos abatement methods and practices revealed that engineering protocols were available to limit asbestos fiber exposure, especially for third parties outside the work area. The ability to monitor the abatement contractor’s adherence to these protocols was also present.

Having demonstrated that satisfying the criteria of insurability was feasible, insurers proceeded with three tasks to move the product from concept to reality:

1. Define coverage
2. Develop loss model/pricing
3. Test marketing

**Define Coverage** The Asbestos Special Liability Policy was crafted to provide coverage for the insured’s legally liable damages to third parties for bodily injury or property damage that occurs during the course of asbestos abatement activities. Customized policies were drafted which precisely outline the risks to be covered by insurance.

Standard policies were not utilized because when risks are not clearly outlined and the intent of the policy remains somewhat ambiguous, the doctrine of adhesion leads to court rulings, which are consistently unfavorable to the insurer. In contrast, clear policy language that details definitions of occurrence, damages, coverage
triggers, exclusions and exceptions to exclusions have fared much better in the courts. Environmental insurance providers therefore concluded that the customized policy overcomes the weakness of standard policy forms and is likely to be upheld in court.

**Loss Model/Pricing** An extensive review of the medical literature was undertaken with particular emphasis on dose response models articulated by OSHA\textsuperscript{30}. In promulgating standards which regulate occupational exposure to asbestos for industry, OSHA developed quantitative risk assessment models to project excess mortality and morbidity as a function of dose. For each of four different disease classes (i.e., lung cancer, mesothelioma, asbestosis, and gastrointestinal cancer), mortality and morbidity was shown to vary with the concentration of airborne asbestos fiber and the duration of exposure.

In accordance with the OSHA models, it was possible to estimate the relative frequency of disease manifestation associated with specific exposure levels to asbestos fiber and to construct proprietary mortality/morbidity tables for each disease class for exposures anticipated from typical abatement activities. Abatement activities have lower exposure than levels associated with occupational hazards.

The expected loss frequency associated with abatement contractors required additional data, specifically, the number of third party persons in close proximity to abatement activities, the asbestos fiber concentrations outside the work area and the duration of exposure during abatement. These fiber data, along with project duration distributions accumulated from a sample of actual abatement projects, permitted estimates of the dosage of asbestos experienced by third parties outside the work area. Synthesizing these data with the mortality/morbidity tables described above, it
was now possible to project disease manifestation frequencies in terms of contractor revenues.

Loss severity, or the cost associated with claims from asbestos abatement activities, was estimated from the comprehensive cost studies prepared by the RAND Institute of Civil Justice\textsuperscript{31}. These studies presented size of loss distributions from asbestos lawsuits prior to the 1982 Manville bankruptcy, providing breakdowns of victim compensation, defense litigation costs and unallocated loss expense. Conservative trend factors and disease latencies were selected to estimate ultimate loss distributions and expenses associated with adjusting losses.

**Test Marketing** Assessing the marketability of asbestos liability coverage did not require extensive analysis because obtaining liability coverage for abatement contractors was a precondition of their obtaining work.

Based on their original modeling, more than 50,000 asbestos abatement projects have been insured by ERIC. The insurance company has consistently reviewed the operations of its insurers, including air monitoring data on releases of asbestos fibers. The number of incidents involving fiber release have been minimal (less the 100), and damage payments have been well within anticipated guidelines.

**B. Illustrative Example 2: Property Transfer Liability Coverage**

**Nature of the Problem** The Comprehensive Environmental Response, Corporation and Liability Act (CERCLA), commonly known as Superfund, governs hazardous waste produced and abandoned in the past. It mandates a strong liability scheme that dictates that those responsible for environmental contamination will, to the extent possible, pay the costs of cleanup. The courts have interpreted CERCLA as
imposing a system of broad liability of three types:

1. Joint and several liability

   Imposes liability without respect to proportioning liability among parties. If a business is liable for any portion of a contamination, it may have liability imposed for the full cost of the contamination cleanup.

2. Retroactive liability

   Imposes on current owners of a property, liability for all environmental cleanups now required, even for activities undertaken by prior owners which may have been perfectly legal at the time the activity was carried out.

3. Strict liability

   Imposes liability without requiring a showing of criminal intent or contribution. A business can be liable for a current environmental cleanup solely because contamination now exists at unacceptable levels, even if the current owner had always complied with prior standards of behavior.

CERCLA specifies that four classes of people can be held liable for environmental cleanup costs:


2. Any person who formerly owned or operated a facility at the time of disposal of any hazardous substance.

3. Any person who arranged for disposal or treatment of a hazardous substance at any facility owned or operated by another person (a "generator").

4. Any transporter of hazardous waste to a facility.
In order to protect themselves from the possibility of having to pay for cleanup costs, purchasers of property and their lenders perform pre-acquisition site assessments to identify potential contamination. Site assessments have significant limitations in detecting all contamination, leaving the new owner and the lender exposed to potentially significant liability.

**Feasibility of Insurance**  Insurance coverage has been designed to assume the liability of owners from potential Superfund exposure. This Property Transfer Liability (PTL) coverage protects commercial real estate purchasers and their lenders from liability for contamination that is present, but as yet undetected on the property.

To obtain this coverage, a customer must obtain pre-acquisition site assessments from an independent engineering consulting firm that has been pre-qualified by the insurance company to conduct assessments. Any contamination discovered during the site assessment will be excluded from coverage. A PTL policy has the potential of significantly impacting on the private marketplace and its response to CERCLA.

First, by requiring a review of properties for contamination, PTL demands that existing contamination be identified. By identifying the problem in advance of the transaction, the cost of removing the contamination will be included in the value of property. The magnitude of the unknown risk (contamination that is not uncovered by assessment) is reflected in the insurance premium. In essence, this insurance becomes a tool to both discover and quantify the costs associated with existing
environmental contamination—making it a powerful instrument of environmental policy.

The three tasks necessary to move the productive concept to reality are characterized as follows:

**Defining Coverage**  PTL insurance is designed for commercial properties, as opposed to industrial or residential properties. Low contamination frequency associated with commercial properties makes the insurance affordable to a large audience of buyers.

**Develop Loss Model/Pricing**  The contamination rate of commercial properties has averaged about 12 percent nationally. This figure was determined by ERIC from a data base of 9,000 environmental audits. This rate is the percentage of properties that have contamination in excess of permissible government exposure levels. Pre-acquisition audits will still fail to detect contamination when it actually exists on some of the properties. In these situations a claim would be filed by a property owner who had PTL coverage.

To estimate the potential losses associated with contamination that was not detected by a pre-acquisition assessment, an examination of the costs of Federal and state mandated cleanups at more than 3,000 sites was undertaken. Available data indicates that the average cost of remedial action (CORA) (1991 dollars) ranges from $102,000 for underground storage tanks (USTs) to just over $33 million for Federal National Priority List (NPL) sites.

Once potential loss frequency (failure to discover contamination) and ranges of severity are understood, the issue becomes that of determining how loss may be
distributed. A legal model based on 150 Federal and state statutes was constructed to understand loss allocation.

Based on the above data it is possible to determine a premium which reflects the risk and the uncertainty surrounding it. With a probability of contamination at $p=.1$ and the chances of a claim at $q<.10$, it is possible to offer insurance at a reasonable price even if the cleanup costs for undetected contaminated sites are unpredictable and in some cases may be relatively high.

**Test Marketing** Property Transfer Liability insurance was not marketable until potential customers were comfortable with the purchase of a pre-acquisition environmental assessment prior to purchasing property. Before assessments were an accepted form of business practice (i.e. a standard of behavior), customers added the cost of an assessment, to the cost of the insurance. The customer thus perceived the total cost associated with purchasing an insurance policy to be prohibitively expensive.

The shift toward market acceptance of environmental assessment for investigating property was vividly demonstrated in videotapes of more than 30 focus groups conducted across the country over a two-year period from 1991 to 1992. Initially, the research subjects, all vice presidents of acquisition of the country's largest development and investment companies, ordered an environmental assessment on properties only when contamination was suspected. However, during the eighteen months of the study, assessments became standard on all properties. The same attitudinal change was reflected in the lending industry as the majority of the nation's banks began to require assessments as preconditions for most bank-
financed real estate transactions\textsuperscript{32}.

It is also critical to the sale of PTL coverage that the cost of the insurance be included in the overall closing costs for the sale of a property. When the cost of insurance is framed against the cost of the property, and can be financed with the property, the environmental insurance avoids the problems of a non-budgeted expense.

C. Lessons Learned

In the process of examining the results of the creation and sale of the asbestos abatement and property transfer products, several lessons related to the potential public policy impacts of insurance on environmental exposures have been learned. First, by being based on well-specified standards, environmental insurance can provide an effective means of institutionalizing the standards. By monitoring its insureds activity as part of its ongoing underwriting, insurance companies provide enormous incentives for their insurers to comply with the standards. This is especially true where the insurance is "required" to permit the insured to perform its core business activity (e.g. where contractors must show insurance to work) or where it dramatically impacts the insurers ability to proceed with a specific business transaction (e.g. where environmental insurance is required to obtain financing). This monitoring function also deters undesirable behavior by increasing the consequences of non-compliance.

Second, as mentioned earlier in this paper, one of the two key functions of common law is to provide a means of recovery, or compensation. As a contract, insurance can both broaden or narrow the conditions upon which payment will be
made. Those conditions need not rely on existing tort doctrines as preconditions for payments to be made. In areas such as perceived environmental risks, it may be easier and less costly to all parties to adopt contractual conditions of payment rather than utilize the common law for imposing liability. For example, PTL insurance responds to releases of hazards above permissible exposure levels without regard to actual harm caused.

Finally, insurance performs both these functions with minimal ongoing governmental involvement. For example, based on accepted performance standards, which in the case of property transfer coverage were entirely privately created, the insurance industry undertook its own monitoring activity rather than relying on regulatory agencies.

7. CONCLUSIONS

This paper makes a case for the development of well-designed standards for some environmental risks so that they will be insurable and marketable. If insurance policies emerge for these risks, they provide a means of payments based on a contractual arrangement rather than through proof of causality.

Insurance coupled with clear standards and regulations encourage deterrence and loss-prevention activities. Firms and their insurers will have incentives to undertake inspections. Insurers will want to engage in monitoring and control efforts and impose appropriate penalties and premium increases for insurers who fail to meet existing standards. Furthermore, firms will be encouraged to pursue innovations that reduce future risks.
Currently, most environmental risks do not satisfy the basic conditions of insurability or marketability, and hence insurers are reluctant to provide coverage against them. The private market place has attempted to develop coverage for underground storage tanks, lead based paint exposures, landfills (both hazardous and non-hazardous), and other clearly identifiable exposures. Only limited success has been experienced in these areas. An understanding of the issues identified in this paper may assist policy makers in the design of regulations and creation of market conditions to permit the insurance industry to play a more central role in environmental policy. In large measure, the government can both create and destroy the conditions which would permit insurance to be developed and sold.
ENDNOTES


3. 42 USC 4331-4335, 4341-4347


5. 42 USC 6901-6987.


10. The classic case in this regards is Jackson Township where the court required an insurance company to pay for groundwater contamination. The insurance policy indicated that it would cover only "sudden and accidental damage" and this was interpreted by the courts to mean "unexpected and unintended". The case was appealed and eventually settled out of court but it sent a signal to the insurance industry that they had to be extraordinarily carefully with their policy language. For more information on the Jackson Township Case see Leslie Cheek 1990 "Insurability Issues Associated with Cleaning Up Inactive Hazardous Waste Sites" in Howard Kunreuther and Rajeev Gowda Integrating Insurance and Risk Management for Hazardous Wastes Boston: Kluwer Academic Publishers.
11. The insurer may still be willing to provide insurance coverage at a much higher rate than on its normal policy to a firm that does not meet a given underwriting standard but still wants coverage.


29. 29 CFR 1926.58 (f).

30. The preamble to the issuance of OSHA Asbestos Regulations for the Construction Industry (29 CRF 1926.58) contains an analysis of the relevant studies used by OSHA in setting the permissible exposure level (29 CFR 1926.58(c)).


32. Subsequent general survey results have confirmed the trends identified in the market research work. See Bennett, Mark J. "Survey Shows Lenders’ Widespread Adoption of Environmental Risk Management Policies", Real Estate/Environmental Liability News (Part 2) May 10, 1993.