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THE DEVASTATING EFFECTS OF ACID PRECIPITATION

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Acid Rain: In Search of a Legal Solution

by

Holly Clayton Hazard

INTRODUCTION

Almost one-half of the lakes in the Adirondack Mountains of Northern New York State are so acidic that they can no longer provide a habitat for fish. The number of these acid lakes has increased ten times in the past 50 years. The acids have destroyed entire communities of brook trout, lake trout and other fish species. They have also focused the attention of legislators, industry officials and environmentalists on the devastating effects of acid rain and on its probable sources. The Department on Energy and the Environmental Protection Agency have prepared pamphlets, reports and books on the possible causes of, and cures for, acid precipitation. The Senate has conducted extensive hearings on the subject. Scientists have developed models to track pollutants across regions. As the investigation continues, interested private citizens are becoming increasingly aware that substantive action must be taken.

The private property owner, the tourist and the resort manager in an area such as the Adirondacks all have an interest in the land and water damaged by acid rain. Environmentalists have an interest in the stability of the ecological system. These interests hold different degrees of legal significance. The private property owner and the resort manager have a legal interest in the destroyed land; they have lost a property value and profits. The vacationer and the environmentalist probably do not have a legally defensible interest in the land. They cannot show a personal harm, at least not to the degree the land owner can. Therefore, this article will concentrate on the remedies available to those with an economic or property interest in land damaged by acid rain.

Sources such as electric utilities and smelting operations cause acid rain by emitting sulfur dioxide (SO_2) and nitrogen oxide (NO_x) into the air. In the past, the damage has occurred primarily in the Adirondacks and New England, but is now spreading throughout the East. Studies conducted in 1980 in the Shenandoah National Forest in Virginia show evidence of the problem in the Blue Ridge Mountains and the Southeast and into Florida. This article focuses on SO_2 because industrial sources are responsible for these emissions, whereas automobiles and other vehicles are responsible for emitting NO_x. The damage that NO_x causes will be discussed, but bringing an action against individual auto owners, trucking companies and bus lines presents a much different and much more technically difficult problem than bringing suit against the industries responsible for SO_2 emissions.

A private citizen with an interest in damaged property must consider the many complex facets of the acid rain problem before deciding to bring his case to court. He must evaluate evidence on the damage done, who is responsible, how they are responsible, and how they can be brought to court. The most difficult facet of litigation is proving the cause and effect relationship between a pollution source and a specific lake dying in the mountains hundreds of miles away.

ACID RAIN: THE SOURCE AND THE DAMAGE

Acid rain is an environmental phenomenon that results from SO_2 and NO_x emissions and alters the ecosystem of the land it affects. The sources of these emissions include electric utilities, iron ore smelters, and automotive equipment, in addition to natural sources such as volcanoes and lightning. After SO_2 and NO_x are released into the atmosphere, they react with other chemicals to form sulfate or nitrate. These sulfates and nitrates then travel through the atmosphere and eventually fall to earth in the form of acid rain.

1. The Source

The major sources of SO_2 pollution are the emissions from fossil-fueled power plants, nonferrous smelters and steel manufacturing plants. As these industries burn fossil fuel to generate energy, the fuels release SO_2 into the atmosphere through the plant's smokestack. Sulfur dioxide emissions from these and all other sources account for about 70 percent of the acid rain problem, while nitrogen oxide is responsible for the rest. NO_x emissions originate from petroleum combustion in automobile engines. Although NO_x is a less severe problem than SO_2 at the moment, the concentration of NO_x is increasing at a faster rate than SO_2.

When sulfur and nitrogen oxides are released into the atmosphere, they undergo a chemical change and become sulfuric and nitric acids. The length of time that the acids travel through the air is a source of some controversy in the scientific community. Although scientists are certain that long-range transport of these pollutants does occur, they have not conclusively established the impor-

Holly Hazard is a third year student from northern Virginia. She has performed government related work in Washington, D.C., and this article reflects her current interest in environmental law.

tance of long-range transport of acid precipitation on local areas. To litigate successfully for damage resulting from acid rain, the plaintiff must advance strong evidence of long-range transport. Meteorological conditions such as wind, turbulence, convection, thermal layers, frequency and type of precipitation, orographic and water body information influence the length of time that a pollutant travels through the air. A litigator must identify and evaluate these factors before he can successfully prove that the long-range transport of air pollutants has influenced the chemical composition of a local ecosystem.

2. Effects and Damages

Acid rain becomes a destructive force because as SO_2 falls to earth it changes the chemical make-up of the environment. It increases the concentration of acids and alters the acid/alkaline balance in various ecosystems. The increased acidity in our rainfall has many effects on our environment and our lives. Direct effects include damage to lakes, soil, and forests, destruction of fish and plants and accelerated deterioration of buildings. Indirect effects include economic losses due to failed crops and tourism decline. Scientists are now examining the human health effects of drinking water from corroded pipes.

The measure for acidity in all compositions is the pH scale. The scale measures the number on unattached positively charged hydrogen ions in a solution. It is a logarithmic scale with values from 0 to 14. Values below 7 are "acidic" and above 7 are "alkaline." Normal rain is slightly acidic; it has a pH value of 5.6. Scientists recorded rain falling in New York, Ohio, Connecticut and Massachusetts as having an annual pH value of 4.1-4.2 in 1976-1979. That is, the acidity was over ten times the acidity of normal rainfall. Values as low as 2.1 have been reported in the United States.

Aquatic Effects

The increased acidity in our lakes has had a devastating effect. According to the testimony at a Senate Committee hearing, 264 of the 2,877 lakes in the Adirondack Mountains can no longer support life. As the acid level in a body of water rises, the activity of micro-organisms, which are responsible for decomposing organic matter and thereby adding nutrients to the water, decreases. Snails and crayfish, which are very sensitive to acidity, die out rapidly. Other fish suffer from calcium depletion in their bones and skeletons and become dwarfed or deformed.

Acid rain becomes more lethal to fish as a result of "acid shock" which occurs in the springtime when the winter's snow, laden with acids, begins to melt. This water flows into a lake, increasing the sulfate level in a short period of time, thereby creating an extreme chemical shock to aquatic life. If this shock occurs during the spawning season the female may fail to reproduce, or her eggs may have an abnormally high mortality rate. Sulfates falling onto the soil also cause damage to fish life by leaching aluminum into the water. The acids release aluminum ions through a chemical reaction betwen the oxides and the aluminum present in the soil. The aluminum runs off into the lake, causing damage to the gills of fish and eventually causing their suffocation.

Frogs, salamanders and other amphibians which depend on small pools of melt water for breeding are also affected because of the acidity level in these pools. These species are sensitive to the increased acids, and as a result, fail to breed. Not only may this lead to the extinction of the species, but it also causes a break in the food chain affecting animals that prey on lower life forms.

While the damage to the lakes is evident from the decline in the native species, the sources are not as evident. Scientists have noted naturally occurring acid lakes in this country for over a century. These lakes are typically located at high altitudes, are weakly buffered and silacious. Although the National Academy of Sciences has found that naturally occurring acidic lakes are "the exception rather than the rule," plaintiffs who intend to sue for damages to a lake with these characteristics would have a very difficult, if not impossible, task to prove that the damage was not due to natural causes.

Damage to Soils and Vegetation

Acid rain affects land and vegetation by inhibiting the growth of micro-organisms. The slowed decomposition of debris inhibits the recycling of nutrients in the soil depriving vegetation of these same nutrients. Additionally, acid rain decreases fertility, reduces the growth rate and causes defoliation in trees and plants by damaging the embryonic tissue. The heavy metals which acid rain causes to leach out of the soil are not only toxic to fish, but also to plants and animals.

The effect of acid rain on soils and plants varies with the thousands of species. The plant's protective covering, the need for the affected nutrients and the susceptibility to exposure to heavy metals, all cause a different degree of harm to different species. Experimental studies show that after exposure to acid rain, broccoli, mustard greens and radishes do not grow to the same weight as plants in a non-exposed control group. The fact that the damage occurs has been proven; the amount and the type of damage varies with each ecosystem.

Effects on Wildlife

The imbalance in one area of an ecosystem usually causes reverberations throughout the entire system. Birds and mammals which depend on lower organisms affected by acid rain are disappearing. The common loon, which feeds on affected fish, has declined in population over the past 15 years. One study has shown other birds and mammals, such as the American mink, muskrat, Great Blue heron and several species of ducks, to be particularly susceptible.

Effects on Buildings and Structures

Acid rain not only affects the land, lakes and living creatures, but also causes chemical reactions with materials. The rising pH level in rain can speed up the corrosion process in metallic roofing, cars, statues, and other exposed surfaces. Building surfaces erode much more quickly after exposure to these acids because the acid in the precipitation leaches chemicals out of stonework just as it does out of the soil. Statues in Greece which have stood since the fifth century, B.C., have disintegrated in the last decade because these pollutants have turned the marble into gypsum, a much softer stone. Although the Greek statues evidence a severe environmental problem, insufficient research has been conducted in this area to know the full extent of the causes and the damage.

Damage Claims in Litigation

A report prepared by the Department of Energy in 1981, summarized the effects of acid precipitation on aquatic life, land, vegetation and humans. The Department found that only the effects on aquatic life were conclusive. The studies concerning other parts of the ecosystem were based on laboratory experiments and circumstantial evidence. An interagency task force found it "extremely difficult" to separate the damage to buildings and structures from acid rain as opposed to normal wear. It found "little evidence to suggest that such effects have occurred in North America." The effects on crops and vegetation were "uncertain." Given the state of the research concerning the damage to soils, vegetation, wildlife and humans as a result of acid rain pollution, a litigant would have difficulty proving that acid rain is the cause of any of the damage suffered. The aquatic ecosystem is the only sector of the environment for which scientists have established clear and convincing evidence that acid rain has caused harm. The damage to water, plant life, and fish as a result of lower pH levels is indisputable.

The theory of the case will determine in some part what damages a plaintiff may claim. The damage claims available for each theory vary dramatically. The litigant must not only choose a theory that will win his case, but also one which will provide the proper relief. Under the Federal Clean Air Act and Clean Water Act, monetary damages are not available. Under tort theory, the plaintiff may claim injunctive relief or monetary damages after successfully proving his case. Courts have used two methods to calculate damages under tort theories: the "diminution-in-value" method and the "reasonable restoration cost" method. Under a trespass theory, the courts usually employ the diminution-in-value theory; that is, the difference in value before and after the damage. In a successful trespass action, damages are always allowed, even if the plaintiff cannot prove actual damage. Traditionally, the courts have granted an injunction as a result of a successful nuisance claim. The courts have relaxed this theory in pollution cases and have awarded permanent money damages when the relief has been more equitable for the parties involved.

Property damage estimates as a result of the actual damage to the environment are not easy to assess. The plaintiff may estimate his damage as the reasonable cost of restoring the lake. The usual method of restoration is through liming, which is an expensive process. The State of New York spends approximately $150,000 a year for liming its lakes. Because liming is so expensive, the courts may find it an unreasonable form of relief and instead award diminution-in-value of the lake before and after the damage. The major loss incurred is not the damage to the lake itself, but the damage to the fish and plants in the lake. Usually a land owner may not claim damages for wild animals on his property. This is based on the supposition that animals move across boundaries and really belong to no one. Fish do not move freely across boundaries and the property owner should include the destruction of the fish in his damage claim.

The cost to the State of New York as a result of the declining fish population is $15 million in recreational income. One economic impact study traced the damages from a fossil fuel plant to the land, vegetation and human health damage, and estimated the total impact to be $770,000 per year. The impact studies vary as to the cost of pollution based on how detailed the assessment of damages is.

In the celebrated case of *Commonwealth of Puerto Rico v. SS Zoe-Colocotroni*, 628 F. 2d 652 (1st Cir. 1980), the State of Puerto Rico claimed damages resulting from an oil spill off its coast for the destruction of an entire ecosystem ranging from mangrove trees down to the destroyed micro-organisms. The court limited recovery to what was practical to restore. The courts are likely to use a "reasonableness" test in assessing damages as a result of pollution damages. The land owner must evaluate his loss and the various methods for assessing that loss. He must document his loss and come to court with a reasonable assessment of the damages.

QUESTIONS OF SUBSTANTIVE LAW

The Federal statutory law relating to acid rain is quite limited. Neither the Clean Air Act, nor the Clean Water Act deal directly with sulfates or nitrates and only the Clean Air Act regulates SO_2 and NO_x emissions. Different laws and theories are applicable to one suing within a State as opposed to across State or national boundaries. Therefore, the American citizen who incurs damages as a result of acid rain has a series of hurdles to overcome before obtaining a successful judgment. He must consider the jurisdiction of the court, the probability of a sympathetic judge, and favorable precedents. He must choose a theory of law for the damages claimed. He must decide whom to sue: a smelter, a utility, or possibly the government. Finally, and with the most difficulty, he must prove the cause and effect relationship between the defendant and his property. Each of these decisions will vary with the relationship of the property owner to the defendant.

1. Federal Substantive Law

Federal law, even with the increased emphasis on environmental legislation, has fallen short of providing relief to individuals whose property has been damaged by air pollution. Laws enacted in the 1970's dealt with setting standards and monitoring compliance between the pollutors, the state, and the federal government, but these statutes do not call for remedies to private individuals for continuing damage as a result of pollution. This may have been due to the optimistic notion that once the programs were enacted, pollution damage would cease, absent violation of the statute. If industry violated the statute, the government could invoke the civil penalties provided for in the statute. Sulfates and nitrates, however, are not regulated under the Acts. Pollution damage as a result of these acids not only has no private remedy under the statutes, but, because the statute does not address the pollutants directly responsible for acid rain, the government also has no cause of action to press civil charges.

2. State Substantive Law

Even though no state has enacted a statute dealing directly with private damage for acid rain pollution, state common law tort theories present the most promising alternative for bringing an action. Trespass and nuisance are the two theories likely to succeed; both have been

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Uranium Mining and Milling in Virginia

By Ronald H. Rosenberg

This article is an outgrowth of a study prepared for the Virginia Environmental Endowment concerning federal and state regulation of the uranium mining and milling industry. The study was undertaken in response to the discovery of mineable quantities of uranium ore in Pittsylvania and Culpeper Counties in Virginia. The Marline Corporation began a serious effort to obtain approval for a mine and mill complex in Pittsylvania County. This article is an attempt to place that effort in the context of the environmental concerns associated with uranium production and to explain the regulatory structure that governs the uranium industry.

Uranium Mining and Milling in the United States

The bulk of the American uranium mining and milling industry is located in the arid western states. New Mexico, Wyoming, Texas, Colorado, Utah and Washington are the most significant states as measured by uranium production. Currently, the uranium industry is in a state of recession. The price of processed uranium or yellow cake has dropped to almost half of what it was a few years ago. This probably could be attributed to two important factors. First, import restrictions on yellow cake have been gradually lifted. The price of the commodity on the international market is less than that of domestically produced yellow cake. Secondly, the deceleration in the growth of the nuclear power industry has cut the demand for fuel rods. The nuclear power generators are the largest consumers of uranium fuel production. However, projections for the nuclear power industry foresee no significant growth over the next two to three decades. These factors have led to layoffs and declining exploration, mining, and milling activity. It is within this context of market decline that the Marline Corporation's development interest is to be viewed.

Against this background the Marline Corporation is seeking to develop a mine-mill complex in Pittsylvania County, Virginia. The Marline project appears to be the first serious attempt to mine and mill uranium in a "net precipitation climate," or a non-arid climate. This is significant because of the tailings or waste products produced by the milling operation. The tailings are first disposed of in a semi-liquid form, and then they are allowed to dry out. This can be accomplished in the arid West; however, in Virginia this sort of drying is not likely to occur. Because the tailings will probably retain more water in Virginia than in the western states, the likelihood is greater that harmful heavy metals and radioactive materials will percolate out of the tailings pond and migrate into the groundwater causing severe water table pollution. In 1983 the Virginia General Assembly, concerned with the impact of a mine-mill complex, enacted a moratorium upon uranium mining. It allowed the exploration for uranium to continue At the same time the General Assembly designated the Uranium Advisory Group (UAG) of the Virginia Energy Commission to study the benefits and costs of the Marline proposal and to recommend courses of action that the legislature could adopt. On January 13, 1984, the Virginia Energy Commission formally recommended to the General Assembly that: (1) the moratorium on mining continue until the General Assembly adopts legislation governing the subject of uranium production, (2) the UAG continues to study the subject, and (3) an intergovernmental Task Force be established to assist the UAG in its study. After more than two years of effort the legislative study commission is still attempting to define its policy recommendation on the uranium issue.

Uranium Production Technology

Uranium mining and milling constitutes the "front end" of the uranium fuel cycle. In order to understand the significance of the uranium mining question as a matter of public policy, a brief technical understanding of procedures is necessary. The nuclear fuel cycle includes mining and milling of uranium, concentration of the uranium oxide into fuel, fabrication of the uranium fuel rods, and the use of the rods in nuclear reactors. The exploratory phase of mining, that is finding the uranium, has been completed by the Marline Corporation. Marline has decided that the size of the ore body and its quality are of a suitable nature to warrant the construction of a mine-mill complex. There are two types of mining techniques that are practicable in Virginia, underground (deep) and open pit mining. Marline has apparently concluded that the best way to exploit the Pittsylvania deposit is by the latter method. The open pit method is easily understandable. Using heavy machinery, the mining company exposes the uranium ore so that it can be easily removed and transported to the nearby mill for processing. The open pit method is best suited for relatively large ore bodies situated within a few hundred feet of the surface of the earth. In the course of reaching the ore, the overburden, earth, and rock overlining the mining site is excavated, hauled away, and stored for future use in reclamation of the mine.

Once removed from the ground, the ore is hauled from the mine to the mill for processing. At the mill the uranium ore is crushed into a powder, mixed into a paste, and an acid or alkaline solution added to leach out the uranium. The uranium is then precipitated out and dried into a yellow powdery material called "yellow cake." The yellow cake is then placed into metal drums and

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shipped to a plant where the uranium will be concentrated into a form that can be used as nuclear fuel. The uranium is then shipped to another plant where it will be fabricated into fuel rods for use in nuclear reactors.

During the mining and milling process the uranium releases a low level of radioactivity. The radioactivity is so low that the yellow cake needs no special handling while being shipped. However, a potential danger lies in the emission of radon gas released when the ore is mined and put through the milling process. The radon gas, if allowed to concentrate in the air, can pose a significant hazard to human health. This is especially true in an enclosed area, such as an underground mine or mill structure. Probably the largest and enduring problem associated with the mining and milling process is the disposal of tailings (or waste products) produced by the conversion of uranium ore into yellow cake. It is expected that for every four pounds of yellow cake extracted, about one ton of tailings are produced. These tailings contain a low level of radioactivity from the uranium left in the ore during the milling process. In addition, the tailings may have components of dangerous heavy metals. The average mill in the United States consumes 2,500 tons of ore per day and in essence creates the same amount of tailings in that period of time. Over the course of several years, an average mill can produce a significant amount of tailings. This, in turn, creates a significant environmental and public health concern.

Uranium mining presents many of the same environmental consequences that are already present in other hard rock mining operations. The overburden and waste rock removed to reach the deposits, water pumped out of the mine when the water table is reached, the dust created by these operations, and the scarring of the land itself by the digging and heavy machine operations are the major environmental effects of mining. The mill operation produces effects on the air and possibly the water

Photo by Chevron Resources Company

The Panna Maria Uranium Mine in Hobson, Texas. Overburden, the layer of earth that covers the ore, is removed to facilitate open pit mining. Huge earth-moving machines can carry 40 tons of material per load.

quality located near the mill. Up until now, the uranium mill operations in the western states have not allowed direct discharges of pollutants into surface waters. As mentioned before, the mill tailings pose one of the most significant effects on the environment because of their quantities and toxicity. The health effects of radon gas in concentrated quantities is now fairly well established. As radon decays, it produces radioactive daughters. Radon or its daughters, if inhaled by humans, cause a significant rise in the chance of developing cancer. Presently the two main areas of concern for radon inhalation are underground mines and in uranium mill operation buildings. In the past, another source of concern was the use of these tailings as fill materials in construction. The radon gas accumulated in these structures are in quantities that pose a significant health hazard. The use of tailings as fill in house construction in Grand Junction, Colorado, sparked enough concern for Congress to pass legislation to control the disposal of mill tailings and to provide funds for remedial treatment of these sites.

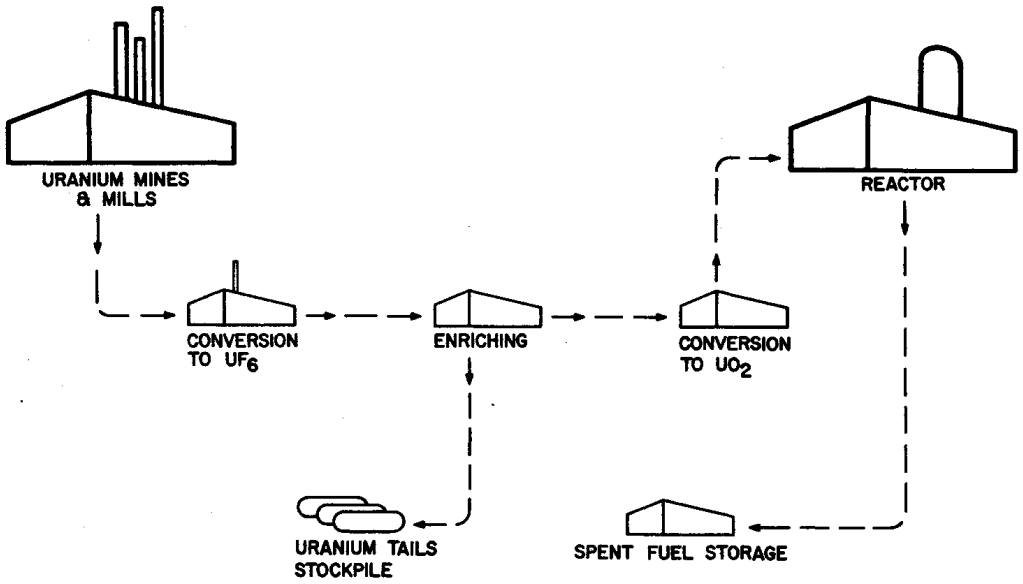
Uranium Mining and Milling Regulatory Scheme

Uranium mining and milling operations are regulated by several independent statutes. The primary act is the Atomic Energy Act (AEA), as amended by the Uranium Mill Tailings Radiation Control Act (UMTRCA) passed by Congress in response to the Grand Junction incident. The AEA gives the Nuclear Regulatory Commission prime regulatory responsibility for the uranium milling operations and their tailings. It, however, also allows for the delegation of NRC responsibility in this area to individual states under the Agreement States Program. This program applies only to limited areas of the nuclear industry. Milling is one of the areas that can be delegated to a qualified state having a program approved by the NRC. Under the UMTRCA minimum standards for environmental quality for both the NRC and Agreement States control of mill tailings have been established by the Environmental Protection Agency. The NRC's authority, however, does not extend to uranium mining. This is still reserved to the states.

The NRC is also required under the National Environmental Policy Act (NEPA) to make an environmental impact statement (EIS) for each major action significantly affecting the environment. Granting a license for an uranium mill is considered a major federal regulatory action and therefore an EIS is required. An applicant for a license is required to spend a considerable amount of time obtaining background data on the environmental implications of the milling activity that it has proposed. Ultimately the NRC is required to prepare a full environmental impact statement on the proposed license. Under the Uranium Mill Tailings Act agreements states are required to follow a similar procedure. It must be noted that complete regulatory control over the uranium industry is not consolidated into one federal agency. Many aspects of the uranium recovery process are governed by other acts and agencies. To complicate the entire situation, a number of these federal statutes allow the delegation of federal authority to state approved programs,

(Continued on page 15)

Light Water Reactor Nuclear Fuel Process



The uranium "yellow cake" is taken to other facilities for conversion into uranium hexafluoride (UF_6). This compound is enriched and converted to uranium dioxide (UO_2), which is fabricated into fuel pellets for use in most nuclear reactors.

GREAT VIRGINIAN

(song)

I am a Great Virginian
It could once be plainly seen
If you ain't from Virginia
You don't know what it means
To have bronze-bearded forebears
With a hundred tales to tell
I am a Great Virginian but I've blown it all to hell

I am a Great Virginian
If you don't believe me look
In a yellowed social register
Or your fourth grade hist'ry book
Great-Great-Grandpa's house in Williamsburg
Plantation on the James
And all I got from all that was a hairline and a name

I am a Great Virginian
It says so on a card
At Virginia's University
From which I'm ever barred
I never cracked a book up there
I wrecked my Daddy's car
And all I got from that jive was some folklore and a scar

I went down Monument Avenue
A bottle in my hand
I leaned on someone's statue
I was far too gone to stand
The Young Policeman asked me if
I knew where I was at
I said, "Yes, Sir, I think I do." Upon the ground I spat

I am a Great Virginian
That is what I tried to say
To the Handsome Young Policeman
As he led me away
"I've got grey hairs in my beard
And a hundred tales to tell
I am a Great Virginian but I've blown it all to hell

They found him in the port-a-john
A banjo on his knee
It looked as if he'd frozen stiff
While on a drunken spree
And on the wall in a spidery hand
His dying words were writ
"I was a Great Virginian but I let it go to waste"

I am a Great Virginian
It is written in my genes
If you ain't from Virginia
You don't know what it means
To have bronze-bearded forebears
With a hundred tales to tell
I am a Great Virginian but I've blown it all to hell

by J. Owen Alderman, '86

The UCC and ME in Process

By Ingrid Michelsen Hillinger

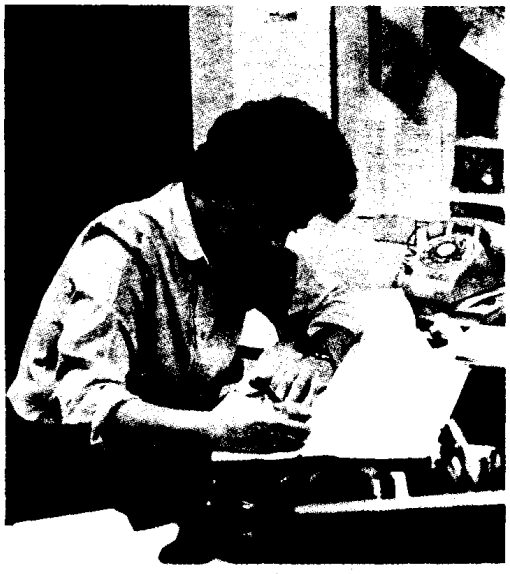


Photo by Bill Stanislaw

Ingrid Hillinger is an Associate Professor of Law at Marshall-Wythe where she teaches contracts and commercial law. This article reflects her passion for the "Code."

This past fall, I was invited to attend a three-day conference on the Uniform New Payments Code ("the NPC")[1], sponsored by the American Law Institute, the American Bar Association Committee on Continuing Legal Education and the Permanent Editorial Board for the Uniform Commercial Code. My reaction to the invitation was something akin to what I suppose would happen if Paul Newman asked me out for lunch. Only my love for family, Marshall-Wythe and country surpasses my love of and interest in the UCC and anything connected with it. Having devoted the better part (read that "waking moments") of an entire summer to a UCC problem which required extensive research into the UCC's tumultuous legislative history, the prospect of actually witnessing the UCC "in process" both excited and intrigued me. During the time that the UCC drafters debated and defended their Code (from about 1949 until 1962), doubting Thomases repeatedly questioned the need for a single uniform code covering all facets of a commercial transaction. Many took an "if it ain't broke, don't fix it" attitude. They argued that the existing law was certain and a massive overhaul would precipitate endless litigation. These individuals believed that ambiguities and trouble spots in the existing law could be and should be remedied by limited, focused changes. The law did not need and these critics did not welcome a uniform commercial code with its difficult terminology,concepts, and rephrasing of every existing legal principle. As I plodded through the hundreds of pages of committee reports, law reviews and testimony of this period, I found myself invariably siding with the drafters. They were unquestionably the good guys, wearing the white hats and championing the cause of reason and commercial good sense. I reacted to the Code's critics with naked disbelief and scorn—after all, how could *any*one in his right mind doubt the rationality of a uniform commercial code?

History repeated itself at the NPC conference. Scores of people went to the floor microphone to question the need for a uniform payments code, arguing that needed changes and clarifications could be accomplished by amending the existing code rather than by creating a whole new code. Although history was repeating itself, I was troubled because I seemed to be on the wrong side. I, too, was wondering why we needed the NPC and whether my allegiance had switched to the dark side. Did my opposition stem from an illegimate source, *viz.*, six long and hard years, devoted to figuring out Articles 3 and 4? A commentator once noted that some of Article 3's oddities[2] stemmed from dutiful reverence of loyal sons to the N.I.L.[3] It occurred to me that I might have become a loyal daughter of Article 4. By the end of the conference, I was relieved to know that the NPC drafters had persuaded me of the need for major change. The conference taught me a valuable lesson. It is a whole lot easier to make judgments about history than to judge history in the making.

Although this particular draft of the NPC will never see the light of day because the critical interest groups—banks, consumers and academics—all had serious problems with it, something like it is definitely on the horizon. The following synopsis provides a glimpse of the new joys and challenges that lie in store for all of us.

At the moment, thanks to financial and technological ingenuity, a variety of payment systems exist. Of course, there is the old and definitely unchic way of paying—cash. Also, there are the tried and true methods of check and promissory note. In the past couple of decades, payment by 3 party charge cards, the "plastic money" of VISA, Master Card, etc., has become extremely popular. More recently, electronic transfers—wire transfers—are the vogue. In addition, there are other, less well known payment systems. The so-called "off-line debit card" is conceptually identical to the check. The buyer gives the merchant his debit card, which the merchant then uses to prepare a slip. The buyer who signs the slip thereby directs his bank (the card issuer) to pay the merchant. The merchant forwards the slip through the bank collection process. When the slip arrives at the bank which issued the debit card, the bank pays the merchant in accordance with the buyer's instructions. This kind of payment is not accomplished by electronic means. An "on-line" debit card does effect payment by electronic transmission. It is referred to as a "point-of-sale" (POS)

transaction. The merchant has a computer terminal in his store and uses the buyer's debit card to debit the buyer's bank account and credit the merchant's account before the buyer leaves the store with his merchandise.

There is also the "ACH" method of payment (automated clearing house) whereby parties can prearrange automatic payment. An ACH *credit* is prearranged by the payor—e.g., an employer can pay his payroll by directing his bank to credit periodically his employees' accounts. An ACH *debit* is an automatic, prearranged debit by the payee. For instance, by prearrangment of the parties, a utility company, as payee, can initiate a debit against a customer's account on a periodic basis. In addition, payment can occur through an automated teller machine (ATM) which is a computerized banking terminal. In 1982, ATMs handled more than 2 billion transactions and involved in excess of $240 billion dollars.[4] The sheer volume of checks that must be processed today has produced another development, *viz.* check truncation. Rather than moving checks through the country, the first bank in the collection process retains all checks it receives. Thereafter the check collection process and payment are accomplished by electronic transmissions between all the banks. The number and kinds of payment systems are mind-boggling and no end is in sight.

Presently, Article 3 governs promissory notes, Article 4 governs checks, the federal Electronic Funds Transfer Act (EFTA) governs electronic transfers and the federal Truth-in Lending Act (TILA) addresses 3 party credit cards. No statutory law exists with respect to ACHs, ATMs or "on line" debit cards. No one is sure whether Article 4 governs "off-line" debit cards. Article 4 applies to "items," which § 4-104(g) defines as "any instrument for the payment of money even though it is not negotiable." Article 4's application to truncated checks is also problematic, where is me item?

The different bodies of law governing the different payment systems not surprisingly provide different rules. Not only does this affect user choice, it also creates an impossible situation if the payment system in question is an amalgam of two or more payment methods. One conference speaker said that he had recently received a package of checks called "Master check." The letter accompanying the checks described them as "companion check loans" to be treated like a cash advance—"no one will know you are using credit." He had a charge card but no checking account with the bank that had sent the checks. How would one characterize that situation to determine the applicable law?

The proliferation of payment systems and discrete bodies of law or no law at all led the NPC drafters to conclude that a single unified law concerning payments should be implemented. A unitary approach would avoid the legal quagmires and inconsistent approaches which have resulted and will continue to occur under our present state of affairs. The drafters believed that the "new legal framework should not distort user choices among different systems."[5] To this end, the drafters imposed the same legal consequences on all kinds of transactions wherever technology and the nature of the transaction permitted similar treatment.[6] The NPC proposes to replace Article 4, the EFTA and TILA. It also seeks to establish statutory rules for all those payment systems for which no statutory law presently exists and the common law is characterized by confusion and inconsistencies. At bottom, the drafters intended the NPC to do for disparate payment systems what Article 9 did for disparate security devices.[7]

A unitary approach to all payment systems required an approach which would, of necessity, cover both paper and non-paper based transactions. This, in turn, necessitated a whole new terminology and the NPC creates it with a vengeance, much to the bewilderment and audible groans of the audience. (I re-experienced the despair I had felt as a student taking Commercial Law I.) To begin with, we do not have "banks" under the NPC, we have "account institutions." We have "account institutions" rather than "banks," because the word "bank" does not encompass credit unions, mutual funds, savings and loan institutions, Mastercharge, ATMs, and other forms of life which are implicated in today's payment systems. Section 53(1) of the NPC defines an "account institution" as "any person which in the ordinary course of its business maintains accounts for its customers." That seems simple enough until you get to the definition of "account," which § 50(1) defines as "a liability in money" (that covers banks, credit unions, etc.), "credit extended" (that covers finance companies such as VISA or Mastercharge) or "interest in assets on which orders may be drawn or to which orders may be credited" (that covers mutual funds).

Because the NPC only applies to "orders," its definition of "order" is critical. Section 10(1) defines "order" as "a complete and unconditional direction by a person to pay (a) a sum certain in money; (b) from an account which may be accessed to pay a person other than the drawer or the drawee; (c) to take place immediately or at a definite time; (d) to or for the benefit of a specific payee, which may be the drawer or bearer and (f) identifying the drawer and if it is a written draw order, signed by the drawer." Although the NPC's "order" bears some resemblance to Article 3's definition of a negotiable instrument, there are several differences. First of all, the NPC obviously does not require a writing. As a result, it only requires a signature if there is a writing. Secondly, under Article 3, "bearer" can never be a specific payee but under the NPC, "he" can. Thirdly, the NPC adds a new thought by requiring an account which can be accessed to pay someone other than the drawer or drawee. The drafters deliberately excluded two-party charge cards from NPC coverage. Finally and most significantly, the NPC eliminates those dear little "magic words" of negotiability. What does that mean in terms of the fundamental concepts of negotiability, holder in due course rights and the ability to cut off claims and defenses? The NPC has a complicated answer to that. Claims and defenses are not cut off as against a consumer drawer or with respect to any order which states that it is not entitled to "due course" rights.

While some of us just mourned the passing of a venerable tradition, the banking spokesmen were furious. "Just exactly *how* did the drafters propose to distinguish a consumer order from a non-consumer order?" The banking interests viewed the situation as yet another instance of the law "dumping" on the banks. Professor Hal Scott, Chief Reporter for the NPC, responded that the banks obviously would have to figure out some way to identify consumer accounts and hence consumer orders, but in light of technology and banking ingenuity, he felt that surely the problem was not insurmountable. He sug-

gested a specially colored check or a special computer symbol.

The consumer interests vehemently objected to the consumer/non-consumer order distinction on other grounds. Section 50(12) defines "consumer account" as an account "in the name of one or more individuals *unless* such individuals have represented in writing to the account institution that the account is not to be used primarily for personal, family or household purposes." Although § 800(4) imposes civil liability on an account institution which advises an individual to misrepresent his intentions with respect to the account's use, the consumer interests maintained that lower charges could persuade individuals to waive their consumer account protection. Rational consumers might opt for lower charges and presumably nonconsumer accounts would involve lower charges because banking risks were less.

The debate was followed by a huge (and heated) discussion about the advisability of allowing non-consumer drawers to eliminate due course rights by stating so on their instruments. This attack clearly surprised and bemused the drafters. Somewhat incredulously, they responded that Article 3 presently permits that. For instance, an individual can eliminate any possibility of a subsequent holder in due course by simply scratching out the words "to the order of" on his check. Even though the drafters were absolutely correct—they were not really changing anything at all—they failed to persuade the audience of that fact. The audience perceived this change as fundamentally threatening our orderly commercial society. (I found this concern to be uncommonly silly. Who would take either a check with the words "to the order of" scratched out or a NPC order indicating that due course rights were not available?)

The NPC distinguishes between "draw orders" and "pay orders." A draw order is "an order initiated by the drawer and *transmitted to the payee . . .*" A check, for instance, is an example of a draw order. A "pay order" is "an order initiated by the drawer *to the drawee* directing the drawee to pay . . . the payee . . ." The speaker on this topic said that a draw order *pulls* funds back from the payor account institution to the account institution of first deposit for the benefit of the depositor, while a pay order *pushes* funds from the payor account institution to the account institution holding the payee's account. This push/pull metaphor obviously enamoured all the drafters. My initial response was "huh?" If you read it twenty times, you realize that the difference between a draw order and a pay order is to whom you give the order: draw orders go first to the payee, pay orders go directly from the drawer to the drawee.

Because the NPC applies to non-paper based payment systems, the term "holder" became useless—holder of what? Therefore, the NPC had to create a new person. He is the "funds claimant." Because you cannot indorse non-writings, indorsers and indorsees had to go too. The NPC substitutes in their stead "transferors" and "transferees." That seems manageable until you get to pay orders when you have "funds transferors" and "funds transferees." The "funds transferor" is the person directed to pay. The "funds transferee" is the person who is to receive payment. Even that is tolerable. It is only when you realize that there can be "funds claimant transferors" and "funds claimant transferees" that one begins to despair. Bowing to technological advances, the NPC's new cast of characters also includes a new villain, the "interloper." He is the fellow who intercepts an electronic transmission and changes either the amount of the order or to whom it is payable or both. (By the time he was introduced, we were all tired and I was punchy. "Home, home on the range where the deer and the interloper play" kept going through my mind.)

All of this new terminology and pushing and pulling did not sit well with the audience. In addition to general confusion, noises began to be made that maybe electronic transfer payment methods were different from checks which were different from credit cards and the differences really justified different treatments. At about this time, it also came out that Article 3 would continue to govern promissory notes and Article 4 might have to remain to govern promissory notes collected through banking channels. The NPC then would *not* replace Articles 3 and 4. It would be *in addition* to Article 3 and 4! (I must admit to a fleeting sense of pleasure that if the NPC were adopted, our Commercial Law I course would have to be 8 credit hours.)

By the end of the three days, it was clear that no one much liked the NPC. Consumer interests believed that the NPC gave fewer rights to consumers, the banks believed that it gave too many rights to consumers. Everyone thought that the language and terms were unduly complicated. Finally, over and above everything else, actual adoption of the NPC seemed impossible. In light of the supremacy clause, states could not successfully enact the NPC because it overrides federal law, *viz.*, TILA and EFTA. That left as the only alternative federal enactment. No one dared to entrust the NPC to Congress. The overall consensus then, for one reason or another or several, was negative in the extreme.

Although this draft of the NPC will surely not be approved, and perhaps the basic dream of a uniform payments code will never become a reality, certainly some of its suggested clarifications of existing law will be adopted. For those devotees of Articles 3 and 4, here is a quick run down of issues you considered in Commercial Law I.

1. The NPC adopts the reasoning of the *West Side* case and eliminates completion of the process of posting as a benchmark for final payment. § 420.
2. A cow no longer qualifies as a negotiable instrument, nor do bricks, tissue paper or cocktail napkins. According to comment 1 to § 101, a payor account institution is only required "to pay authorized orders initiated *by an access device provided to the drawer by the account institution.*" Banks customarily do not issue the above as means to draw on accounts.
3. Much to the objection of those in attendance, the NPC sounds the death knell to *Price v. Neal*. The drafters justified overturning this ancient doctrine by noting that with check truncation, the payor account institution cannot verify the drawer's signature. Even with non-truncated checks, banks do not verify signatures because it is uneconomical to do so. Section 204(1) sacrifices the finality afforded by *Price v. Neal* in favor of imposing the loss on the party who dealt with the thief.
4. The sum certain requirement is satisfied even if the order contains a variable interest rate, if that interest rate is based on a widely and publicly quoted

interest rate, such as the federal funds rate or prime rate of a particular account institution.

5. The NPC gives the intended beneficiary of a check a direct cause of action in conversion against the depository account institution, thereby codifying the present, albeit tortured, judicial "interpretation" of § 3-419(3) (§ 205(1).)
6. Section 50(3) defines "good faith" as the "absence of bad faith. Bad faith is dishonesty in fact, malice in the conduct or transaction concerned, or willful or reckless disregard of known material facts." (The banking representatives really kicked and hollered about this change. We were treated to impassioned pleas to shield banks from courts who might construe bank stupidity as bad faith. Banks maintained that the Code should protect their stupidity.)

I want to end my observations as I began them,—on a personal note. Professor Scott, a short man with wiry hair, typically sat at the front table facing the audience. He smoked. By the third day, he had taken to twirling his hair and chain-smoking. The situation must have been discouraging. On the first day, the chairman of the conference had said that, absent consensus from the assembled group, the NPC would never get anywhere. By the end of the conference, everyone knew what that consensus was and what it meant. As I watched the dream of a uniform payments code unravel and Professor Scott twirl his hair more and more rapidly, I felt very sorry for him and all the drafters who had worked for 6 years on the project. It was not until the last day, the last hour almost, that someone stood before the microphone and thanked the committee for their fine and hard work and noted that it had not gone unappreciated. At the time, I thought back to Karl Llewellyn and Grant Gilmore and wondered how they had managed to weather 20 years of hostile critics, powerful lobbying groups, sheer stupidity, infighting and every other unpleasantry that must be endured to make a vision become a reality. Emerging from the conference, I thought about the many unsung heroes whose blood, sweat and tears had changed our law for the better and paid my respects.

Post-Script: On February 20, 1984, the *Daily Press* carried an AP story headlined "Laws lacking on electronic crime actions." The article discussed a Justice Department report expressing great concern about the inadequacy of existing *criminal* laws with respect to electronic fund transfer and computer crime. Although electronic crimes have the same consequences as traditional theft,

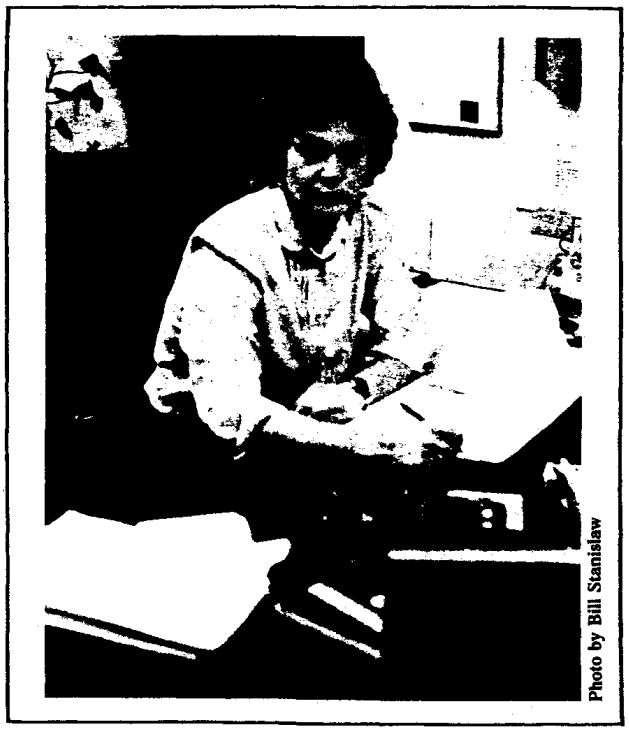


Photo by Bill Stanislaw

the traditional requirements for theft may not be present. For one thing, an electronic command may not constitute a taking. For another, the contents of a computer memory bank may not be property. In addition, criminal fraud requires misrepresentation to a person and legally, a computer may not be a person. According to the report, the absence of law, in conjunction with the proliferation of electronic based systems and the concommittant opportunity for crime, has created a critical situation. The absence of *civil* law produces an equally critical situation as courts attempt to allocate loss between innocent victims of these crimes. The NPC provides a set of rules allocating risks and can guide courts and also inform the parties at risk so that they can take steps to protect against loss (for instance, insurance) or allocate the loss differently by contract.

FOOTNOTES

1. The origins of the acronym "NPC" are almost as complicated as the NPC itself. The Uniform Probate Code got to "UPC" first. That scotched the name "Uniform Payments Code." The drafters added the word "new" to give the letter "N" which was not the letter "U" and therefore permitted an available three letter acronym.
2. The Article 3 definition of "value" which differs from the Article I definition of "value" is a good example of such an oddity.
3. "N.I.L." stands for Negotiable Instruments Law, the law which preceded Article 3 and which every state had enacted as of 1924.
4. The *Daily Press*, Monday, February 20, 1984.
5. Memorandum to National Conference of Commissioners on Uniform State Laws from Hal S. Scott, Reporter to the 3-4-8 Committee, dated June 15, 1983, p. 1.
6. Under the present situation, parties have different rights depending upon the payment system used. For instance, if a consumer pays a merchant by check, the consumer has no recourse against his bank once final payment occurs. If a consumer pays by a bank charge card, § 170 of TILA gives him certain rights.
7. In fact, on the last day of the conference, a young, bright and somewhat brash academic noted the similarities of purpose between the NPC and Article 9 and then criticized the NPC for tracking itself along the lines of Article 4 rather than Article 9. In his opinion, Article 4 was the Code's most poorly drafted article and therefore a terrible model. Fairfax Leary ("Fax"), one of the Article 4 drafters, a general Code gadfly and conference participant, sat close by. The audience's response of "oooh" suggested that it did not want Fax's name to be taken in vain.

tested in the area of environmental litigation and have met with some success. Of course, the applicability of state tort law to environmental litigation will vary from state to state.

Trespass

Trespass is defined as a direct invasion interferring with the exclusive possession of an owner in his land. It can be differentiated from nuisance because nuisance may be indirect and is concerned with use and enjoyment rather than possession. The line distinguishing the two theories is wavering, especially in the area of air pollution, because the direct/indirect dichotomy is becoming more relaxed. The precedent underlying the two theories may vary between states, and therefore, the litigant should research both theories for potential authority relating to acid rain damages. Litigants have used trespass successfully in a number of air pollution cases including cases dealing with noxious gases, florides, and sulfur dioxide. In 1959, the Supreme Court of Oregon held that invisible floride compounds settling on the land and rendering it unfit to raise livestock constituted actionable trespass.

In *Borland v. Sanders Lead Co.*, 369 So. 2d 523 (Ala. 1979), the Supreme Court of Alabama held that compliance with Air Pollution Control laws did not negate civil liability for property damage due to smelting activities. The plaintiff sued in trespass for property damage from invisible sulfur dioxide and lead emissions. The court evaluated the advances of science, specifically in chemistry and physics and stated that the concept of direct invasion of a "thing" must be reevaluated to encompass particles, albeit invisible which have a force and effect upon the land. This decision comports exactly with the theory needed in acid rain litigation. Sulfate, which cannot be seen, physically invades the land and destroys property.

The problem of proving causation remains even if one assumes that trespass is an appropriate theory. In the *Borland* case, the smelting operation was located next door to the plaintiff. This simplified causation problems. In the usual acid rain case, the source will be hundreds of miles away. The problems involved with this element of litigation will be discussed below under "Proving the Case."

Nuisance

A private nuisance is created by the interference with an owner's use and enjoyment of his land. Acid rain certainly falls into this category when it results in destroying a body of water on private property. Nuisance may be predicated on negligence if that negligence affects the private use and enjoyment of the land. Once a litigant has proven that a nuisance exists, the usual remedy is for the court to issue an injunction. Courts have evaluated this remedy, especially in pollution cases, by looking at the relative impact of issuing an injunction versus awarding money damages to the plaintiff. In *Boomer v. Atlantic Cement Company*, 257 N.E. 2d 870 (N.Y. 1970), a court in New York evaluated the relative hardship involved in closing a cement plant or awarding money damages. The court held that the plant maintained a private nuisance by emitting dust particles which fell onto the plaintiff's land. The court substituted damages for injunctive relief because of the economic hardship involved in closing the plant. This evaluation in the area of acid rain would most likely lead to the award of money damages. Courts might be reluctant, especially in these difficult economic times, to close a utility or a smelter, thereby inflicting economic hardship, to save a lake. A court might enjoin a facility by ordering the use of lower-sulfur coal or more sophisticated equipment, but these remedies could have a costly impact on the communities purchasing the plants' products or services.

Litigants have been relatively successful using nuisance and trespass theories in air pollution actions. They present the most promising theories upon which to bring an action; however, they leave open the problem of proving direct causation and damages. Even if a court is sympathetic to the injury and willing to analogize from other legal theories to acid rain, if the litigant cannot prove causation, the court cannot award damages.

PROVING THE CASE

Under our system of justice, the defendant must be found liable for the offense with which he is charged, not for conducting an activity that may have led to the damage claimed. In the case of acid rain, the particular defendant, not his industry or his region, must be found to have emitted the specific SO_2 particles which caused damage to the plaintiff's property. SO_2 emissions may have a very brief residence time in the atmosphere on one particular day, and because of changing weather patterns, emissions from the same source may be transported hundreds of miles in a few days or weeks. Regardless of the litigant's theory of substantive law, he must be prepared to link the defendant to the actual damage caused. If the litigant is seeking to enforce standards violated under the Clean Air Act then he does not need to show damages; he must only prove that a violation has occurred. Under every other theory, however, the plaintiff must prove that the damage caused to his property can be traced to the defendant's source.

1. Scientific Models

Many variables including seasonal changes in wind direction, precipitation, stack height and topography affect the residence time of air pollutants. Scientists have considered these variables and have developed models to trace SO_2 emission sources. They have generated these models by selecting a grid point on a map and putting meteorological data into a computer to track the speed and direction of pollutants. Matrices have been developed for 238 Air Quality Control regions. One model has separated sources into three categories: utilities, industrial, and area sources. All models have been limited to calculate SO_2 emissions. Scientists developed the models to help make policy decisions in forecasting the effects on one region of a utility changing from one fuel source to another. Models have also been used to track the causes of emission standards violations in a particular region. The model developed by the Brookhaven National Laboratory, or the BNL model, is the one most relevant to the evidentiary problems of the private litigant. This model approximates the long range transport of SO_2 particles from individual point sources. The sources are

selected based on inventory sources in the Air Quality Control Regions and are comprised of both utility and industrial sources. This model is limited, as are the others, because data are limited to four months out of a single year. Also, even if the model identifies a source emitter, it can only identify a receiving area by region. This model could be used in class actions to prove damage to a region but not to a specific lake.

Local sources may be traced through the computer model technique. The Air Quality Model currently used by the EPA is considered reliable for distances up to 31 miles from the source. If an area is relatively industry-free (as is the Adirondacks region), and the EPA model tracks local source pollution, then the evidence reasonably points to the industry or, more likely, the utility, local to the damaged area. The proof is circumstantial, because sulfate cannot be "finger printed" as can oil in an oil spill case. Science is not yet capable of comparing the sulfate in a particular water body to the SO_2 coming out of a smokestack. Circumstantial evidence is a reasonable basis for deciding liability if one assumes it is based on reliable inferences. Given the circumstances above, the evidence pointing a particular source in a land area is a reasonable indication of liability.

Unfortunately, most acid rain problems do not stem from local sources and the litigant must present other evidence. Long-range transport models are not as well documented as local area models. Scientists must use more complex analysis and estimate more variables. Although the matrices represent significant strides in tracing emission sources they have not yet been fine-tuned. Unless the private litigant is interested in suing a region of pollutors under an enterprise theory, the matrix models are not yet a viable tool in litigation. The enterprise theory will be discussed below.

2. Remote Sensing

Remote sensing is an alternative to the matrix model. Remote sensing uses a set of technologies to collect information about the earth. It usually employs special aerial photography along with other sensory devices such as radar, thermal infra-red scanners and microwave radiometers, often in combination with computer processing and satellite communications. This technique is currently used to monitor violations under the Clean Water Act. Cameras using special film can identify landfill operations, unauthorized discharges of hot water into ambient water systems and discharges into water systems at unauthorized times. Litigators have also used remote sensing to monitor air pollution activities. In *Vermont v. New York State*, 417 U.S. 270 (1974), the technique was used to track a plume of smoke from a paper mill in New York State across the border to Vermont. Vermont used a Landsat satellite image to supplement the testimony of an expert witness. The remote sensing evidence was not actually admitted into evidence, however, because the case was settled.

Remote sensing is primarily used as a visual aid in cases in which the plaintiff relies on other evidence to prove his case. It is an innovative technique, and like matrix models, the courts have not tested or approved its reliability. Remote sensing does provide some advantages for the environmental litigant: it is capable of monitoring a large area which is needed to produce evidence of long range transport, and is also less costly than other types of monitoring. Since it is a new technique and one that has met with some skepticism, it does not have the requisite reliability as a basis for an action, at least not in cases in which other strong facts are not available.

3. Alternatives to Scientific Evidence in Tort Law

The litigant who is skeptical of the courtroom success of evidence based on matrices or remote sensing may nevertheless attempt to prove causation by using alternatives to the usual evidentiary tools. In some specialized circumstances in tort litigation the courts have allowed the plaintiffs to shift the burden of proof to the defendant. In *Summers v. Tice*, 199 P.2d 1 (Cal. 1948), the plaintiff was shot by one of two hunters. Because the plaintiff could not prove which of the two had actually pulled the trigger, the court left the burden to the defendants to prove they had not been the one to shoot. This same theory may be available to the plaintiff who does not know which source polluted his lake. In the case of acid rain, however, no well defined group of potential defendants exists. It is unlikely that all utilities or smelters in a region could be named in an action and the burden left to them to prove which was actually guilty. The group of possible violators usually will simply be too large in this circumstance.

A second theory used in tort law is the enterprise theory. Under this analysis, the plaintiff must only prove that *one* of the named defendants must be responsible. The theory is based on the proposition that when a product causes damage and the plaintiff is unable to identify the specific source, the industry as a whole should be responsible for damage caused by one of its products unless a defendant can prove he was not a party to the "enterprise." In *Hall v. E.I. Dupont Nemours and Co.*, 345 F. Supp. 353 (E.D.N.Y. 1972), children who were hurt by blasting caps sued six American manufacturers who comprised a substantial portion of the explosives industry. The court, stressing that the industry was centralized and used similar manufacturing processes, held the industry responsible for the damage. The theory has not yet been widely accepted. Furthermore, the probable defendants in acid rain litigation would come from different industries. Even those within the same industry may be more or less responsible depending on the variable sulfur level of the fuels burned at the individual plants.

The market-share theory is a third plausible alternative for frustrated plaintiffs in acid rain litigation espoused by at least one commentator as a method of getting compensation for damage due to acid rain. Under this analysis the court would use the test set down in *Sindell v. Abbott Laboratories*, 607 P. 2d 924 (Cal. 1980). Under the ruling in *Sindell*, the plaintiff need only show that:

(1) all defendants produced the injurious product;
(2) the plaintiff, through no fault of his own, cannot identify the defendant;
(3) the manufacturers joined produce a substantial share of the product. Each defendant is then held responsible for his "share" of the market.

Sindell dealt with the devastating side effects of a drug manufactured by many drug companies and sanctioned by the FDA. The plaintiff suffered from the drug, but did

not know which company had manufactured the actual drug consumed. The acid rain litigant may have problems applying this theory for a number of reasons. First, the *Sindell* case was based on a personal injury and not property or economic damage. The courts would probably be less likely to put the defendants in the position of presumed liability when the injustice is economic rather than physical. Second, the share of the market for the manufacturers of a specific drug is relatively easy to estimate if it is not known as a matter of fact. Market shares, however, cannot be computed across industries: one cannot calculate the relative "share" of the market of a smelter as opposed to a utility. The courts could modify the market share approach and apportion damages according to the relative amount of SO_2 emitted from each source. As mentioned above, however, modern scientific techniques are not yet advanced enough to pinpoint a source; if they were, that source could simply be sued individually.

Finally acid rain has become a political issue. Scientists cannot agree that the major cause is industry, although the evidence seems overwhelming. Industry, understandably, remains vehemently opposed to premature legislation because scientific evidence "can't identify the smoking gun." Given this climate, a court will probably not look favorably on the adaptation of personal injury tort theory to allow a plaintiff to recover for property damage.

Scientists have made significant strides in the last five years toward identifying the sources of pollution. At the present time, however, scientists can only define the evidence of causation in general terms and generalities will not win a lawsuit. The litigants in many instances simply does not have the necessary tools to produce the evidence needed to win a case.

ALTERNATIVES TO THE TRADITIONAL CAUSE OF ACTION

The state of the art in tracking air pollutants remains too primitive to allow a litigant a reasonable chance of success in a traditional tort case. Faced with diminished property values and possible business losses, he is therefore left to either suffer the loss or devise an alternative remedy for his damage. He may consider suing the federal government for the inverse condemnation of his property, or organizing with other damaged property owners to demand legislative enactment of statutory authority that will give him a basis for recovery. These two alternatives are not likely to meet with complete success, but may provide a reasonable, less expensive means for the litigant to recoup his losses.

1. Inverse Condemnation

Property owners have been forced to accept the risk of damaged property because the federal and state governments have in effect permitted industry to use the property as a waste site for its emissions. The government has allowed this because although proof of the damage in the Northeast is abundant, a one-to-one relationship from the source to the damage has not been established. Industry has lobbied that causation must be proven before suspected sources should be held responsible. Congress has looked at the impact on the economy of Ohio and Michigan of enforcing strict legislation. The government has made a decision to allow the pollutors to continue emitting SO_2 and to let the property owners lose their capital investment.

A property owner has a constitutional right not to have property taken without just compensation. What constitutes a "taking" has been the subject of many lawsuits over the years. Damage as an incidental result of government activity may be considered a taking, while complete destruction of property may not. The Supreme Court held in *United States v. Causby*, 328 U.S. 256 (1946), that government planes flying over a chicken farm and disturbing the occupants and their chickens constituted an easement and was compensable by the government. Acid rain causes analogous damage by interfering with the property in question through the use of air space. The government, however, is only indirectly involved. The argument that through the government's inaction, a litigant is entitled to compensation is a step removed from active government participation in an activity. To decide that the government is responsible for damage resulting from industrial pollution in which it took no part would open the doors to such a multitude of claims that the courts would be unlikely to find favorably for the plaintiff.

2. Citizen's Lobbies

The litigant has a final option in seeking compensation for acid rain damage; that is to demand legislation that will give him the right to bring a case to court. The federal and state governments have enacted legislation to redress other environmental harms such as oil spills and toxic waste. Acid rain is a serious problem. It is getting worse. If the owners of the land already affected do not demand that legislation be passed, then the situation can only lead to more serious consequences. Industry is opposed to legislation. If the citizens with a stake in the determination of the policy issues do not actively voice their complaints, then a future litigant will be in the same frustrating position as today's litigant.

CONCLUSION

Acid rain presents the perfect example of the problems involved in litigating environmental issues. Common law doctrines do not easily fit into the facts surrounding the case. Courts must redefine terms such as "physical invasion" or "trespass" in light of characteristics of pollution and the damage it causes. Statutory law is not yet completely developed and does not cover all the problems and effects of the pollution source. Industry is organized to fight the expensive procedures necessary to abate the problem, and research is insufficient to prove what the future implications will be if the legislation is not passed.

The litigant who wishes to sue for damages due to acid rain must consider the available substantive law. Only the common law of trespass and nuisance provide a reasonable chance for a successful suit. After choosing a theory of law, the plaintiff must gather the evidence linking the damage to its source. The general scientific evidence available today is usually not adequate to prove the liability of a specific defendant. The litigant may be successful in a specific action claiming tort damage to his property by a local source, but in the overwhelming number of cases, the potential defendant is not local. The property owner is an unfortunate victim of our system's inadequate accommodation of environmental rights and remedies. Until science can prove that a link between the

damage and the source exists, the time will not be ripe to litigate for the damage caused by acid rain.

The attorney, then, is left in the uncomfortable position of accepting that a valuable right may be violated and that he, despite his expertise concerning the law, cannot demand relief for his client. This conclusion leaves the lawyer in a frustrating position but not in a unique one. The lawyers of the late 1960's were in the same position when they confronted traditional air and water pollution problems. These attorneys turned to the legislature for enactment of the statutes necessary to rectify the inequities of a system in which the pollutor was not expected to pay for his damage. We have made great strides in some areas of air and water pollution and now must channel the same type of effort into demanding on diplomatic, political, legislative and social levels, an accounting for the unchecked violation of our lands and water through acid rain pollution. The attorney interested in a solution to acid rain pollution must focus his expertise in advocacy, not on the courtroom, but on the people who can change the law.

URANIUM

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volved are the Clean Water Act, the Clean Air Act, the Solid Waste Disposal Act, the Endangered Species Act, and the Wild and Scenic Rivers Act. Other federal statutes regulate work and safety in the mining and milling locations. Most of these laws are enforced through a permitting system that requires preoperational compliance.
while other acts permit federal regulation to be implemented by state agencies. Among the major laws in-

As one might suspect, at times there is considerable confusion over the proper allocation of regulatory responsibility in the uranium recovery operation. A significant problem facing a state considering the licensing of uranium mining is the acquisition of a clear understanding of regulatory responsibility under federal law. As Virginia moves toward the establishment of uranium production policy, it must clearly understand this allocation of responsibility and consider the adequacy of the existing regulations.

Conclusion

Virginia is now in the process of trying to decide what is to be done. Does the Commonwealth wish to become an Agreement State with the NRC? This would create new costs and require the establishment of knowledgeable regulators within the state government. However, the agreement state status would also give Virginia greater control over all aspects of the uranium recovery process and provide it with the opportunity to develop an overall regulatory scheme. More importantly, the Commonwealth through its elected officials must determine the more fundamental question of whether the benefits of the uranium production industry are justified by the costs imposed by it. Such a determination will require high quality information predicting the impact of the industry upon the environment and the public health within the affected area. This presents a policy issue that lacks sufficient evidentiary support. The most important task for Virginia in the upcoming year is the acquisition of this importnat information. Once acquired, the responsible officials can then make a knowledgeable judgment as to the desirability of this new industry.

SHIPLEY

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after weighing all the factors, to make a fairly high monetary award to a 45 year old homemaker whose marriage to a successful lawyer is dissolved after 20 years, while a considerably smaller award may be appropriate for a similarly situated 45 year old homemaker whose marriage lasted only three years. It is important to remember that equitable does not mean equal and that the EDA allows courts the discretion and flexibility to fashion appropriate awards.

The practice of domestic relations law in Virginia has been dramatically affected by the EDA. It has been called a "Divorce Lawyer's Relief Act," while a similar statute in another jurisdiction was described as a lawyer's nightmare and a judge's ball and chain. The costs of divorce litigation may increase. Comprehensive discovery may become an absolute necessity. Tracing problems will be encountered. The courts will have to determine how spousal and child support should be affected by the property distribution. Separation agreements should become much more common when the parties see that they may fare better through negotiation and compromise instead of leaving the distribution of their economic futures to the judge's broad discretion. Also, it is very likely that the courts will face a wide variety of tough questions on how the EDA should be construed and applied with regard to advanced degrees, established professional practices, partnerships, business licenses, retirement plans, pensions, and a host of other "property" interests. Although there is a steadily growing body of case law in many states to look to for guidance on these questions, the results on particular issues vary from state to state.

It will be impossible to assess the actual impact of the EDA on Virginia's domestic relations law and practice for several years because the bench and bar must have a chance to live and work with it. Notwithstanding these uncertainties and the statute's complexity, the EDA is a very important development and it should lead to greater fairness in the economic consequences of divorce.

*This article is based on a student comment at 17 Richmond Law Review 347 (1983) and an article by Sharon Henderson, Ingrid Hillinger and David Glazer published in 8 Virginia Bar Association Journal 4 (1982).

Virginia's Equitable Distribution Act

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Photo by Bill Stanislaw

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For many years Virginia's laws dealing with the economic consequences of divorce lagged behind the pertinent legislation and case law in the vast majority of the states. Traditional alimony was the only form of reimbursement allowed to a divorced spouse and until 1982 Virginia was one of only three states following the common law title approach to the distribution of property upon divorce; his, hers or theirs depending on legal title. In contrast, most states had come to recognize marriage as a partnership and were distributing property upon dissolution in accordance with equitable principles or, in eight states, under a community property regime.

In 1977 the legislature attempted to ameliorate some of the difficulties resulting from this traditional approach to support and property division. It authorized the courts to award a lump sum payment to a spouse in appropriate cases after considering, among other factors, the monetary and nonmonetary contributions of each party to the well-being of the family. Although this recognition of homemaker services was laudable, the Virginia Bar was not satisfied with that legislation and many lawyers believed the adoption of an equitable distribution scheme was necessary. The General Assembly responded in its 1982 session by enacting a comprehensive new statute replacing section 20-107 with sections 20-107.1 to 107.3, which deal with spousal support, child custody and support, and the allocation of property on equitable distribution principles. The most dramatic change brought about by this legislation is contained in section 20-107.3—the adoption of a form of equitable distribution of marital assets. The new law is commonly known as the "equitable distribution act" (EDA) and its passage revolutionized Virginia's domestic relations law and brought the Commonwealth into the mainstream.

Underlying the EDA is the belief that a spouse should have an interest in the assets accumulated during marriage which is not reflected or protected by the traditional approach to property which focuses on who holds legal title to the assets. The section recognizes marriage as a partnership and it allows the court, upon decreeing a final divorce or annulment, to enter a monetary award "[b]ased upon the equities and the rights and interests of each party in the marital property." It grants the courts broad discretion to effect greater justice and fairness between the spouses so as to make the economic incidents of divorce fair and equitable.

The EDA's rationale and objectives are easy to state but describing and understanding the new law's operation is another matter. Problems and pitfalls abound. Section 20-107.3 sets up a three step process by which the court, in its discretion, may make a monetary award for the distribution of marital property. First, the court must, if requested, identify all the real and personal property in issue and classify it as marital or separate property. Second, all the property must be valued. Experience in other equitable distribution jurisdictions shows that these steps often may be complex, time-consuming and very costly. Once the property is valued the third step requires the court to consider eleven factors to determine whether to make a monetary award. The EDA does not require an award—the grant and amount of the award is in the court's discretion. In addition, the law does not authorize the court to distribute the marital property. Rather, the court uses that property as the basis for making a monetary award. Virginia's EDA is a hybrid statute.

Among the eleven factors are the monetary and nonmonetary contributions of each party to the well-being of the family and to the acquisition, care and maintenance of marital property (these factors call for recognition of a homemaker's contributions); the duration of the marriage; the ages and physical and mental conditions of the parties; the factors which led to the dissolution of the marriage (marital fault); tax consequences; how and when items of property were acquired; and, there is a catch-all provision, "[s]uch other factors as the court deems necessary or appropriate to consider in order to arrive at a fair and equitable monetary award." Some of the factors, in particular marital fault and the catch-all, are controversial and it is uncertain which ones are of the greatest importance. The statute does not assign particular weights so it is reasonable to assume that what constitutes equitable distribution will depend on the facts of each case. For instance, a court might be justified,

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