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THE ROLE OF THE SCIENTIFICALLY AND TECHNOLOGICALLY LITERATE ATTORNEY IN THE APPLICATION OF PREVENTIVE LAW TO LOW ENTROPY CORPORATE DECISION MAKING AND LONG-RANGE PLANNING

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A PARADIGM FOR THE APPLICATION OF PREVENTIVE LAW TO CORPORATE DECISION MAKING AND LONG-RANGE PLANNING BASED ON CONSIDERATION OF ENTROPY

The use of preventive law has become an increasingly useful and effective method for coping with a wide array of potentially long-term legal liabilities. This is especially true in the corporate setting. Perhaps this can be viewed as a logical and necessary step in the evolution of the legal system. If the various stages in a generalized scheme of the dispute resolution process are examined, these stages can be placed, roughly in order of occurrence, on a scale of increasing disorder. [n.1] Although it is well known in the physical sciences that the natural tendency of spontaneously occurring events is to take place so that entropy (chaos, disorder) increases, this has not been demonstrated to be necessarily so for social or legal phenomena. However, in this model it is useful to consider the law of the jungle and the injustice of an unremedied wrong as being characterized by higher states of legal entropy (more disorder) than the lowest state of legal entropy, the ordered state dominated by *156 the rule of law. The path begins with a departure from that state, an injury, which may lead to a dispute where there is conflict between people regarding the injury. [n.2] Elements involved in the development of the dispute are the traditional naming, blaming and claiming. Once there is a dispute, movement tends to be along the order- disorder axis toward states of progressively higher legal entropy such as litigation, self-help, and, ultimately, an unremedied wrong.

In this model legal elements are envisioned as deterrents to movement along the path from order to disorder. For example, when a dispute degenerates into litigation curative law may provide a remedy leading to successful dispute resolution, and, with it, a return to a more ordered state. In the context of this model preventive law is defined as "a branch of law that minimizes the risk of dispute, and simplifies the resolution of those disputes that do arise." [n.3] Thus, preventive law is the first legal element to occur as a deterrent to movement along the continuum from order to disorder. When legal entropy starts to increase preventive law can be used to stop the natural tendency toward chaos

and provide a route back to an ordered state. Stated another way, the morass of litigation can be avoided if the dispute is avoided altogether by the particular form of long-range planning known as preventive law. Long-range planning to provide simplification for those disputes which inevitably do occur may ease their resolution. This can be accomplished through contract law. The area of preventive law that deals with these foreseeable disputes has been termed substantive preventive law, while procedural preventive law is focused upon the simplification and resolution of unforeseeable conflict.

The effective use of substantive and procedural preventive law necessarily entails a high level of legal consciousness that includes an awareness of the possibility of that use. With rising levels of legal consciousness has come the development of statutory preventive law, which, in effect, dictates the minimum level of consciousness which is contemporaneously acceptable. It has been stated [n.4] that:

[P]reventive justice is upon every principle of reason, of humanity, and of sound policy, preferable in all respects to punishing justice ... This preventive justice consists in obliging those persons whom there is probable ground to suspect of future misbehavior, to stipulate with and to give full assurance to the public, that such offense as is apprehended shall not happen; by giving pledges or securities for keeping the peace ...

*157 Statutory preventive law has the effect of raising the level of certainty in the legal system, and, thereby, reduces the need for contractual measures to provide for dispute prevention and resolution, even though custom tailored contractual resolution systems still may be advantageous in many situations. [n.5]

In the modern world dominated by science and technology, preventive law has an increasingly important role to play. When a technological development moves along a vector into the future that crosses the boundary of the law- science interface, the legal implications and consequences of that encounter must be dealt with. The traditional legal response has been to deal with the situation after there is a problem, not before it occurs. At this point in time there may already have been significant movement along the path from the state of low legal entropy to one of higher legal entropy, and, thus, there is an imperative to use some of the traditional legal tools to deal with the situation. Even at this stage a technologically literate lawyer may be able to provide a better resolution at lower cost through the use of preventive law techniques of dispute resolution and long-range thinking than could be provided through the use of traditional legal methods. However, intervention at an earlier stage when there has been little or no progression toward legal chaos is the most effective and least costly way of dealing with the eventual encounter at the law-science interface. This can only be accomplished by long-term planning and preventive lawyering, and this requires a sufficient knowledge of both the legal, and scientific and technological realities to be able to foresee future intersections of legal and technological axes which will result in conflict. The role of the scientifically literate attorney is of central importance for the practice of preventive lawyering and long-range planning in this arena.

Before this kind of preventive lawyering can be employed, traditional barriers to its use must be overcome. Therefore, it will be useful to examine briefly some of the sources of barriers to the use preventive law before proceeding to specific developments and the prospects for the future.

The first and perhaps the most important barrier to the use of preventive law has been traditional legal thinking that there is no problem until there is a perceived injury leading down the pathway of increasing legal entropy toward litigation. Growth of the methods of contract law, which were mentioned above, has occurred as a response which forestalls this growth of legal disorder or provides for simplified resolution at early stages where order is still relatively high. However, the *158 inadequacies of traditional legal orientation have resulted in the explosive growth of statutory preventive law, especially in areas with significant law-science interfaces, such as the environmental area. Even now when a legal axis and a technological axis intersection results in conflict, the tendency very often is to approach the conflict with traditional legal tools that are extremely costly and which are not suited to providing an efficient long-term solution. The overall cost to society is enormous, and growing recognition of these costs is fueling the growth of statutory preventive law.

Just as a problem of this type arises at the law-science interface by the intersection of legal and technological axes, the legal resolution will inevitably involve technological elements. The best legal solution for a technologically generated legal problem, in fact, may be a technological solution. In practice technological solutions are often imposed in a resolution of the legal conflict. For example, when the health of workers is damaged through exposure to a chemical in the workplace, resolution of the resulting legal conflict may involve the legal solution of compensation to the workers, and a regulatory mandate for an accompanying technological solution, the reduction of exposure to the chemical in the work environment. Again, there is an important role to be played by the scientifically literate lawyer.

A second major barrier to the use of preventive law stems from the way decisions are made in the corporate world. Even though a detailed analysis of this subject is beyond the scope of this writing, a brief examination of the subject will provide significant insights. In the area of economic growth [n.6] and the related area of technological innovation and competitiveness [n.7] a central issue is the relative merits of long-range thinking and planning versus short-range reactive behavior. It has been asserted that the growth of technological knowledge is one of the major determinants in future economic growth. [n.8] Since the exploitation of technological advances requires their incorporation into capital investment, the link between technology and economics will become increasingly intimate. [n.9] In the corporate world decisions at the highest level are made by managers. In the context of technological innovation the *159 environment in which these decisions are made has been described by Landau. [n.10]

> [T]he private sector must also operate within a macroscopic environment established primarily by the Government's fiscal and monetary policies. These policies, which control the "demand side" of the economy, are generally shaped by political exigencies

and by reactions to the many short-term and cyclical problems that beset the economy. As a result these policies have changed frequently.

Such a volatile macroeconomic environment can be inhospitable to major investments in research and development and can therefore hinder prolonged economical growth. Science and technology require distant planning horizons; they are bound to be undervalued if returns on investment in research and development are measured within a short time frame.

An economic climate that puts a premium on quick returns has in fact prevailed in recent years ... As a consequence managers skilled in financial matters have often been favored over engineers in promotions and salaries, and short-term research-and-development projects have been favored over longer-term work that might produce technological breakthroughs.

In a discussion of U.S. versus Japanese technological competitiveness, specifically with regard to the likelihood of commercial exploitation of recent superconductivity breakthroughs, Rustum Roy has said: [n.11]

To think there is any U.S. company that can compete with the Toshibas, Sumitomos, Mitsubishis, and Kyoceras in this field in making commercial products is ridiculous. No one here would have the strength to stay in the business long enough to sustain the upfront money. If any company dared spend the amount of money needed, it would be the victim of a corporate takeover. In fact, if you ask me, it is Wall Street that's the villain here. It's the enemy of American R & D.

Given the picture of corporate decision making presented above, it is understandable that short shrift has been given to the long-range planning that would necessarily be involved in effective preventive law. With a few notable exceptions, encounters at the law-science interface have been coped with by short-range thinking primarily involving legal fire-fighting. The preceding discussion makes clear the broad systemic conflict between long-range thinking in addressing problems of the future and the short-range imperatives of the current political and economic environment. The scenario presented envisions corporate decision making as being dominated by short-term economic thinking, and, perhaps, by short-range traditional legal thinking.

It has been suggested that there are four phases in the typical response pattern of the chemical industry when an environmental issue is raised. [n.12] First there is a flat denial that there is any problem. This is followed *160 by an admission that there is a problem, but that it is a very small problem and nothing needs to be done about it. In the third phase the problem is admitted, but the argument is made that it is too costly to correct. In the fourth phase there is a publicly forced correction, followed by the resumption of business as usual. This characterization of the phases of the industry response implies that there is a mixture of short-term economic thinking and of traditional legal thinking involving denial and delay at work in the formulation of the strategy of the response. Following this course never actually succeeds. A publicly mandated solution will be imposed later. But a side-product of this strategy is the addition of fuel to the fire of the societal conflict, with industry seen as part of the problem rather than as part of the solution.

The public mandate for statutory preventive law that results in this scenario makes other options for the resolution of the issue difficult or impossible. With statutory preventive law as currently used, involving rigid mandates with minimum standards, fixed timetables and other generally inflexible resolution pathways, it might be better to opt for market directed environmental incentives. [n.13] It has been suggested that economically favorable market-directed incentive-driven solutions are inimical to those with a stake in the status quo, whether in industry, the governmental bureaucracy, or in the environmental movement itself. [n.14]

The system presently is in a state of high tension, with pressure from the short term imperatives outlined above in a shifting balance with pressure from an increasing level of social consciousness. With regard to the environment the social consciousness of the American public and much of the rest of the world took a quantum leap more than two decades ago with the publication of Rachael Carson's book, The Silent Spring. The rising level of public consciousness consists of awareness of environmental problems, health and safety concerns, consumer product safety and quality, and other related concerns. Added to this are awareness of two global environmental problems which have gone beyond the theoretical stage; these are the problems of stratospheric ozone depletion [n.15] and the global rise in temperature due to the green house effect. [n.16]

*161 The powerful influence of these extremely newsworthy global environmental problems is brought home by Du Pont's recent decision to phase out CFC's totally. [n.17] And there is a growing awareness that the largest problems, those of global magnitude, are just as real as the often more easily quantifiable local problems. [n.18] [n.19] The ozone hole over the Antarctic is real; no one doubts the connection with CFC's any longer; and, more surprisingly, none of the predictive models of the most pessimistic forecaster foresaw its development. [n.20] Now there is evidence of ozone depletion on a world-wide scale, and aberrations in atmospheric conditions over the Arctic which may resemble the early stages of the Antarctic development. [n.21] In the face of growing evidence that our abuse of natural ecosystems has reached global limits or even exceeded them, there can no longer be any justification for denial or delay.

The increasing public consciousness has had an effect on the political system that has resulted in the growth of statutory preventive law. This in turn has had very great economic consequences. Thus, we find a system with many internal conflicts, the most profound being that between long-range thinking and planning and short-term imperatives. Public consciousness in the environmental, safety and health areas will continue to grow as it is pumpted by news of very real problems of increasingly wider, even global impact. Favorable solutions to the problems of economic growth and technological competitiveness are imperative for the future. Thus, there is a powerful motive for rejection of short-term thinking in favor of long-range thinking and planning, with long-range economic incentives being an integral part of the shift. The scientifically and technologically literate lawyer who uses preventive law effectively has an important role to play in making this change in our society.

At this point in time there is a convergence of forces: a heightened public consciousness of environmental, health and safety concerns, and quality of life issues; a growing awareness that short-term economic and legal thinking presents a barrier to these problems as well as those of innovation and economic competitiveness; the promise of changes in political policy at the highest level in the direction of increased statutory *162 preventive law; and, ultimately, the demonstration by members of the scientific community that through the operation of outdated thinking and policies for coping, global limits to the ecosystem have already been reached. Thus, there is a compelling mandate for an increasingly important role to be played by the scientifically literate attorney in the application of preventive law to corporate decision making and long-range planning. We will turn now to some specific elements of that role, especially in the environmental area as it concerns the chemical industry.

THE EVOLUTION OF SUBSTANTIVE PREVENTIVE LAW

In the area of hazardous waste generation and disposal the chemical industry is a major actor. A 1981 EPA study estimated that approximately 14,100 firms in the United States generate hazardous wastes, [n.22] with about 70% of the waste generated being attributable to the chemical industry. [n.23] Until a decade ago as much as 90% of the hazardous waste in the U.S. was improperly disposed of. [n.24] Then in 1978 the Love Canal situation and the Valley of the Drums focused the nation's interest on the hazards of toxic chemical wastes which had been disposed of improperly. In addressing the regulation of growing mountains of non-hazardous waste, Congress had passed the Resource Conservation and Recovery Act of 1976 (RCRA), [n.25] which included mandatory cradle to grave regulation of hazardous wastes. [n.26] Starting in 1979 section 7003 of RCRA [n.27] was used as authority to bring suit in federal district courts seeking cleanup of hazardous waste sites. RCRA was amended in 1980 and again in 1984, as Congress responded to increasing public concern about the long term consequences of improper disposal of hazardous wastes. The hazardous waste disposal regulations were strengthened as were criminal sanctions. [n.28]

*163 A key element in the development of RCRA as substantive preventive law is the interpretation of the grant of authority to the Administrator in section 7003 when some action related to hazardous waste "... may present an imminent and substantial endangerment to health or the environment...." [n.29] With the passage of time there is movement down the pathway of increasing legal entropy from the initial realization that there is a potential for injury in the future to the high entropy state where injury has occurred or is occurring and may already be very difficult and costly to remedy. The basic question with this and other environmental legislation is, at what point is there authority to act? Fortunately, there had been considerable development of the thinking on this point before RCRA was brought to bear on the problem, as shown by the legislative histories and case law related to other legislation is this area. The purpose of the imminent and substantial endangerment provision of the Clean Air Act has been described as follows: [n.30]

> The levels of concentration of air pollution agents or combination of agents which substantially endanger health are levels which should never be reached in any

community. When the prediction can reasonably be made that such elevated levels could be reached even for a short period of time--that is that they are imminent--an emergency action plan should be implemented to reduce emissions of air pollution agents and prevent the occurrence of substantial endangerment.

In a discussion of the imminent hazard provision of the Safe Drinking Water Act (SDWA), the House Committee Report expressed a similar line of thought: [n.31]

Administrative and judicial implementation of this authority must occur early enough to prevent the potential hazard from materializing.... While the risk of harm must be "imminent" for the Administrator to act, the harm itself need not be. Thus, for example, the Administrator may invoke [Section 1431 of SDWA] when there is an imminent likelihood of the introduction into drinking water of contaminants that may cause health damage after a period of latency.

The approach to be taken in the effective administration of these legislative acts is preventive in nature. Action should be taken before the harm occurs. It is not necessary or desirable to wait until there is an injury and then seek a remedy.

*164 A key case in the development of substantive preventive law in the environmental area was Reserve Mining Co. v. EPA. [n.32] With regard to the Federal Water Pollution Control Act (FWPCA) the opinion stated: [n.33]

Provisions of the FWPCA are aimed at the prevention as well as the cure of water pollution. The initial sentence of the FWPCA reads:

> The purpose of this chapter is to enhance the quality and value of our water resources and to establish a national policy for the prevention, control, and abatement of water pollution. [33 U.S.C. section 1151(a).]

The term "endangering," as used by Congress in section 1160(g)(1), connotes a lesser risk of harm than the phrase "imminent and substantial endangerment to the health of persons" as used by Congress in the 1972 amendments to the FWPCA. 33 U.S.C. section 1364 (Supp.1974).

In the context of this environmental legislation, we believe that Congress used the term "endangering" in a precautionary or preventive sense, and, therefore, evidence of potential harm as well as actual harm comes within the purview of that term. (footnote omitted)

Section 1364 referred to in the quotation above grants the Administrator of EPA emergency powers to file suit for an immediate injunction when pollution presents an "imminent and substantial endangerment to the health of persons." The opinion then went on to adopt a standard for the term "endanger". [n.34]

We deem pertinent the interpretation given to the term "endanger" by Judge Wright of the District of Columbia Circuit in his analysis of the congressional use of the word "endanger" in the context of a provision of the Clean Air Act. 42 U.S.C. section 1857f-6c(c)(1)(A) (1970). Judge Wright observed:

> The meaning of "endanger" is, I hope, beyond dispute. Case law and dictionary definition agree that endanger means something less than actual harm. When one is endangered, harm is threatened; no actual injury need ever occur.

* * * * *

"Endanger," ... is not a standard prone to factual proof alone. Danger is a risk, and so can only be decided by assessment of risks.

* * * * *

[A] risk may be assessed from suspected, but not completely substantiated, relationships between facts, from trends among facts, from theoretical predictions from imperfect data, or from probative preliminary data not yet certifiable as "fact." [Ethyl Corporation v. Environmental Protection Agency, No. 73-2205 (D.C.Cir., Jan. 28, 1975) (dissenting op. at 11, 31-33) (emphasis in original) (footnote omitted).]

*165 Although the analysis by Judge Wright which was quoted in Reserve was from the panel dissenting opinion, after rehearing en banc, Judge Wright delivered the majority opinion in the Ethyl case. [n.35] In discussing Section 211(c)(1)(A) of the Clean Air Act the "will endanger" standard was further developed: [n.36]

1. The Precautionary nature of "Will Endanger." Simply as a matter of plain meaning, we have difficulty crediting petitioners' reading of the "will endanger" standard. The meaning of "endanger" is not disputed. Case law and dictionary definition agree that endanger means something less than actual harm. When one is endangered, harm is threatened; no actual injury need ever occur. Thus, for example, a town may be "endangered" by a threatening plague or hurricane and yet emerge from the danger completely unscathed. A statute allowing for regulation in the face of danger is, necessarily, a precautionary statute. Regulatory action may be taken before the threatened harm occurs; indeed, the very existence of such precautionary legislation would seem to demand that regulatory action precede, and, optimally, prevent, the perceived threat. As should be apparent, the "will endanger" language of Section 211(c)(1)(A) makes it such a precautionary statute.

The Administrator read it as such, interpreting "will endanger" to mean "presents a significant risk of harm." 38 Fed.Reg. 33734. We agree with the Administrator's interpretation. (emphasis in original, footnotes omitted).

Ethyl's defense in the case was based on the premise that the legislation surely could not mean what it said. The discussion of Section 202 provides another example: [n.37]

Petitioners also rely on Section 202 to support their strict reading of Section 211. Ethyl suggests that Section 202 is more lenient than Section 211 in that it allows regulation of "likely" dangers.... Section 202 provides that the Administrator may regulate

The emission of any air pollutant [from any new motor vehicle] which in his judgment causes or is likely to cause or to contribute to, air pollution which endangers the public health or welfare.

42 U.S.C. section 1857f-1(a)(1) (emphasis added). While this language may be unnecessarily opaque, we think a fair reading disproves petitioners' suggestion. The italicized language upon which petitioners rely refers not to the causal relationship between air pollution and health, but to the relationship between automobile emissions and air pollution. Thus regulation may not be premised on a threshold determination of likely danger; rather regulation must be premised on a determination of danger, a finding that "air pollution which endangers the public health" is the end product of the emission to be regulated. This is essentially the same finding of endangerment as under Section 211. (emphasis in original).

*166 The opinion went on to adopt as a standard the precedent set in Reserve Mining, "... we conclude that the 'will endanger' standard is precautionary in nature and does not require proof of actual harm before regulation is appropriate." [n.38]

In considering the magnitude of the risk sufficient to justify regulation the Ethyl opinion adopted the principle of Reserve Mining. "Reserve Mining convincingly demonstrates that the magnitude of risk sufficient to justify regulation is inversely proportional to the harm to be avoided." [n.39] An example of this principle is provided by the nuclear power industry, where the probability of a meltdown is considered to be quite small, but extensive requirements for precautionary measures are nevertheless justified because of the magnitude of the harm which would result if the low probability event were to occur.

In discussing the interplay of questions of fact and questions of policy, the opinion went on to state: [n.40]

> [W]e read Section 211(c)(2)(B) as incorporating the common sense approach which the courts have developed in applying Section 4(b) of the APA. Where EPA's regulations turn crucially on factual issues, we will demand sufficient attention to these in the statement to allow the fundamental rationality of the regulations to be ascertained. Where, by contrast, the regulations turn on choices of policy, on an assessment of risks, or on predictions dealing with matters on the frontiers of scientific knowledge, we will demand adequate reasons and explanations, but not "findings" of the sort familiar from the world of adjudication.
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> Amoco Oil Co. v. EPA, supra, 163 U.S.App.D.C. at 180-181, 501 F.2d at 740-741 (emphasis added). Thus the Amoco court read the limited findings necessary for action under Section 211(c)(1)(B) as a flexible requirement that demanded actual findings for questions of fact and something less-- "adequate reasons and explanations"--for questions of policy. (footnote omitted).

In discussing the absence of any requirement for findings in Section A, the opinion went on to state: [n.41]

> We find that deletion of the findings requirement for action under Section 211(c)(1)(A) was a recognition by Congress that a determination of endangerment to public health is necessarily a question of policy that is to be based on an assessment of risks and that should not be bound by either the procedural or the substantive rigor proper for questions of fact.

*167 Nowhere is the clash of diametrically opposed philosophies more clearly laid out than in the following passage. [n.42]

Questions involving the environment are particularly prone to uncertainty. Technological man has altered his world in ways never before experienced or anticipated. The health effects of such alterations are often unknown, sometimes unknowable. While a concerned Congress has passed legislation providing for protection of the public health against gross environmental modifications, the regulators entrusted with the enforcement of such laws have not thereby been endowed with a prescience that removes all doubt from their decision making. Rather, speculation, conflicts in evidence, and theoretical extrapolation typify their every action. How else can they act, given a mandate to protect the public health but only a slight or nonexistent data base upon which to draw? ... Sometimes, of course, relatively certain proof of danger or harm from such modifications can be readily found. But, more commonly, "reasonable medical concerns" and theory long precede certainty. Yet the statutes--and common sense--demand regulatory action to proven harm, even if the regulator is less than certain that harm is otherwise inevitable.

Undoubtedly, certainty is the scientific ideal--to the extent that even science can be certain of its truth. But certainty in the complexities of environmental medicine may be achievable only after the fact, when scientists have the opportunity for leisurely and isolated scrutiny of an entire mechanism. Awaiting certainty will often allow for only reactive, not preventive, regulation. Petitioners suggest that anything less than certainty, that any speculation is irresponsible. But when statutes seek to avoid environmental catastrophe, can preventive, albeit uncertain, decisions legitimately be so labeled? (footnotes omitted).

The Ethyl opinion clearly had a great impact in the development of the thinking of those in a position to advance the concepts of substantive environmental law. Consider the report of the Conference Committee Report on the Toxic Substances Control Act. [n.43]

The conferees wish to note that while the unreasonable risk of injury must be imminent, the physical manifestations of the injury itself need not be. Rather, an imminent hazard may be found at any point in the chain of events which may ultimately result in injury to health or the environment. The observance of actual injury is not essential to establish that an imminent hazard exists. The conferees intend that action under the imminent hazard section be able to occur early enough to prevent the final injury from materializing.

However, all was not sunshine and light. For example, in United States v. Midwest Solvent Recovery, Inc., which was the first case to interpret section 7003 of RCRA, the court denied injunctive relief without a showing of irreparable harm, as traditionally required for injunctive relief. [n.44] *168 But in United States v. Vertac Chemical Corp., the court assumed the substantive nature of section 7003, and in granting injunctive relief stated: [n.45]

The public exposure to dioxin creates some health risk. As much as humanly possible this risk must be removed. We adhere to the view of the Eighth Circuit in Reserve that "the existence of this risk to the public justifies an injunctive decree requiring abatement of the health hazard on reasonable terms as a precautionary and preventive measure to protect the public health."

In so doing we are not unmindful that the proof with respect to the harmful effect of dioxin on humans is far from conclusive.

Of course, dioxins are now considered to be some of the most potent carcinogens known to man. The use of section 7003 to obtain injunctive relief on a showing of risk of harm, in effect resulting in an extension of the court's equitable powers, was endorsed in United States v. Price. [n.46] Jones v. Inmont Corp. provided a reinforced footing for section 7003 of RCRA when the opinion stated: [n.47]

We find that the imminent hazard provision of section 6973 [42 U.S.C.] does indeed impose liability, distinct from that imposed by any other RCRA provision, on those contributing to activities that may present an imminent and substantial endangerment. We hold, therefore, that section 6973 does contain a substantive provision, the violation of which can properly form the basis for a suit by a private citizen.

In considering the 1984 amendments to RCRA, the House Energy and Commerce Committee stated: [n.48]

Section 7003 has always provided the authority to require the abatement of present conditions of endangerment resulting from past disposal practices, whether intentional or unintentional. These endangerments may be immediate or long-term problems.

In the period between the 1980 amendments to RCRA and 1984, several cases had restricted the application of section 7003. [n.49] [n.50] [n.51] These were *169 disposed of by the Conference Committee report on the 1984 amendments: [n.52]

... the district court decisions in United States v. Wade, United States v. Waste Industries, and United States v. Northeastern Pharmaceutical and Chemical Company, Inc., which restricted the application of section 7003 are inconsistent with the authority conferred by the section as initially enacted and with these clarifying amendments.

Case law since the 1984 amendments has more consistently reflected the intentions of Congress, and has resolved a number of questions concerning retroactivity, joint and several liability, intervention, individual liability of corporate officers and shareholders, and recovery of cleanup costs. [n.53] [n.54] [n.55]

Liability under section 7003, as well as defenses and possibilities for future developments in the case law have been discussed at length, with the possibility of private citizen actions under the sections providing a powerful argument that continued development of substantive environmental law under RCRA is inevitable. [n.56]

The purpose in this section has not been to provide an exhaustive, detailed study of the development of substantive environmental law, as that would be beyond the scope of this paper. What has been shown is that thinking in this particular area is increasingly long-range, that the philosophy of prevention has become established and that the trend is to place barriers to the development of high entropy legal states in the environmental area closer and closer to the low entropy end of the scale. This trend will continue in many areas and with many different pieces of legislation that attempt to deal with similar concerns. The traditional legal concept that there can be no remedy until there is an

actual injury, or proof of the causal link between some polluting activity and harm, has been discarded. This is shown in the language of the legislation itself, with the amendment process making this increasingly more clear. It is also demonstrated in the case law that has developed which supports this view, and in the legislative rejection of case law which is contrary.

*170 Industry has resisted these changes throughthe use of traditional legal defenses in an attempt to maintain the status quo and continue doing business as usual. This strategy for the defense has largely been a failure, unless temporarily delaying the inevitable can be viewed as a success. Even this short-term result is ultimately self-defeating if the long-term costs are considered. It is clear that in the future much will have to be done to clean up hazardous waste sites and deal with other environmental problems. In terms of pure economic costs, the movement is to allocate the costs to their point of origin, rather than to society as a whole. And the costs are increasingly social. A defense in a law suit that maintains that the detrimental effects of lead on health have not been proven and that nothing can be done to stop lead pollution until it occurs creates incredible bad press. Is this not a cost which must be considered? When large elements of society and the public are outraged at this stance, political pressure is generated that results in more regulation, that is, the growth of substantive preventive law. The business world should be asking itself whether it would not be better to discipline itself and engage in long-range, future oriented planning, rather than to have this regulation imposed upon them by government.

The gathering of forces will inevitably result in a shift to longer range thinking in the corporate world, with more consideration given to the real costs, both to business and to society. Although there are examples of this happening already, the question remains whether industry will make this move on its own or whether the change will be imposed upon it. A prime growth area in the field is that of criminal liability and punitive damages for environmental offenses. [n.57] [n.58] [n.59] [n.60] The prospect of hard time in prison for industrial business executives should do much to change their behavior, and their thinking on the subject. Another growth area will be in legal incentives for waste reduction and recycling. [n.61] There is growing evidence that traditional methods of production which result in large amounts of waste as by-products are not economically defensible *171 in themselves, even before considering the costs of proper disposal, legal liability, adverse public relations and the imposition of more regulation.

It is beyond the scope of this study to examine all of these areas in detail. However, some representative examples will be given that illustrate the trends and the possibilities.

THE CASE FOR A NEW ROLE FOR TECHNOLOGICALLY LITERATE LEGAL COUNSEL IN LONG-RANGE CORPORATE DECISION MAKING

The traditional role of legal counsel in the corporate setting, especially as it relates to corporate decision making, has been analyzed by Walter and Richards. [n.62] These

authors attribute a fundamental problem with traditional legal analysis to legal education based upon the study of appellate case law. [n.63] The resulting distorted view of legal reality arises from four sources: few lawsuits ever go to trial and fewer still are reviewed by appellate courts; appellate cases by their very nature represent exceptions to the accepted law; there is a delay of years between occurrence of the incident which caused the dispute and the availability of an appellate decision; the factual dispute in the case may not be of much concern at the appellate level. [n.64] The Upjohn case is a good example of the last point. [n.65] There may be a tendency of corporate counsel to base programs for the protection of corporate information on the standards set in this case for the attorney-client privilege and work product doctrine. However, the facts of the case were favorable to the company, including the fact that there was no injured party. Therefore, there are a wide variety of situations where reliance on these standards will not prevent the release of corporate information. [n.66]

The basic problem is that internal study of a corporation's environmental problems may produce written materials that could be used against the corporation at some point. In discussions of environmental audits and other techniques for a preventive law program, concern is often expressed that these written materials may turn into the proverbial "smoking gun". When advice is given about structuring the program to use these legal devices to protect corporate written information, *172 reliance on the standards in the Upjohn case probably is misguided. The point is that a true picture of the situation, as it most likely would apply to a corporation that is not in environmental compliance, cannot be gained from study of case law.

Legal education by the case law method also places too much emphasis on the adversary nature of law. [n.67] Consequently, non-adversarial methods of dispute resolution are not thought of as particularly important. Preventive lawyering techniques are largely ignored.

Another problem is that of professional parochialism, the idea that one who is not the product of legal education can neither think like a lawyer, nor manage the professional activities of the group. [n.68]

Lawyers exacerbate this problem by a facile adoption of the jargon of their clients, without concern for its underlying knowledge base.

Lawyers are trained to pick up jargon and develop a superficial understanding of subjects.... this superficial knowledge can lead to unsound risk management decisions. Rather than providing objective advice, the attorney will provide advice that mirrors the opinions of the client. This reinforces the client's opinions, rather than encouraging critical evaluation of the situation. Unfortunately, managers are ill equipped to recognize this problem because of the inability of the managers and attorneys to communicate effectively. This problem is rooted in their different professional paradigms.

The professional parochialism of both managers and lawyers must be put aside if there is to be effective integration of lawyers into long-term corporate decision making. To the extent that lawyers have maintained their traditional aloofness from business and

management, they themselves have prevented the development of a wider decision-making role for themselves. This attitude necessarily must change, because effective preventive law programs for the evaluation of potential legal risks employ management techniques, the most important of which is the feed-back control loop. [n.69] No professional has greater potential than the technologically literate attorney to play a major role in guiding and assisting the movement in corporate decision making from a short-term orientation to that of long-term thinking and decision making.

Short-term oriented corporate decision making and thinking is reinforced and left unchallenged by traditional legal thinking. If the attorney's duty to his client does not arise until his short-sightedness results in some conflict, then the attorney's role can be only that of legal fire fighting and traditional reactive lawyering. However, the resistance to change in the environmental area may in part result from other factors. "Philosophers who have been concerned about how people understand *173 facts ... have come to realize that what one sees is usually a product of cultural tradition; there are no acts of pure perception that are not dependent on prior value choices." [n.70] To the extent that cultural traditions and values play a role, corporate executives involved in decision making and traditional lawyers are uniquely suited to mutually reinforce each other in their resistance to change. On the other hand, if the message were to be delivered in other terms by trusted members of the legal community the corporate decision maker might be more inclined to move in the direction of self-enlightened change. As stated in the conclusion of Faith in Science, a report by the Center for Philosophy and Public Policy: [n.71]

> ... simply knowing some action will result in the deaths of some people who would not have otherwise died does not tell us whether the act is murder, killing, allowing some people to die, or even saving lives.... No matter how "neutral" the scientific work is, there may be no neutral description of it that can be incorporated into policy discussions. The psychological literature on decision making shows that people's preferences are often determined by the way a choice is described to them and can change under different descriptions that appear to be equivalent.

It may be of interest to consider examples of successful corporate preventive law programs. Where these programs are functioning in place with proven track records, those familiar with them emphasize that a key element in their initiation and successful operation is the support and interest of top management. [n.72] [n.73] [n.74] Initiation of a successful preventive law program in the corporate setting depends upon overcoming three key obstacles: a lack of commitment and resources by house counsel; uninformed or disinterested employees; and, most important, resistance and skepticism on the part of management. [n.75] Where house counsel is committed to developing a preventive law program based upon systematically giving attention to minimizing the risk that the company's affairs will be disrupted by future legal problems, a preventive *174 law education program may be effective in changing the attitude of management. [n.76] [n.77] Just as the thinking of management must be reoriented, the traditional legal thinking of house counsel itself must also be changed. [n.78] Because legal disputes arise from the perceived injuries of people, it is more important from the standpoint of preventive law to be able to predict what people will do, than to be able to predict what a

court would do if the dispute were allowed to develop and progress down the path of higher legal entropy to litigation. [n.79] It cannot be overemphasized that the likelihood of successful predictive analysis is enhanced when carried out in a low entropy, highly ordered milieu.

Within the corporate organization itself, incentive analysis of the day-to- day routine behavior of the people in the organization can be used to identify elements of the corporate reward system that may unknowingly provide incentives for legal risk taking. [n.80] To be successful in any preventive law program, counsel must have knowledge of the client's business and an awareness of the constantly changing legal environment within which the business operates. [n.81] Where the business of the client involves elements of science and technology, the ability of house counsel to practice preventive law successfully depends upon the abilityof counsel to understand the scientific and technological consequences of the business operation which could develop into intersections at the law-science interface. For a legal program to operate at the low entropy end of the scale it is necessary to have an awareness of both the legal and technological realities.

Many of the currently successful preventive law programs in the chemical industry have been developed as a result of self-examination and rethinking on the part of management in the wake of an incident which severely stressed the corporation. For example, for Allied-Signal Inc. it was the Kepone incident in the 1970's. [n.82] As the "incident" developed there were damage suits, Congressional and grand jury investigations, an SEC complaint and a great deal of unfavorable media exposure. The response of the company, then known as Allied Chemical, was the development of environmental policies and programs to bring *175 the company into environmental compliance. Elements of the Corporation's Health, Safety and Environmental Policy are the following: [n.83]

1. [The Corporation will] design, manufacture, and distribute all products and handle and dispose of all materials safely and without creating unacceptable risks to health, safety or the environment.
2. Establish and maintain programs to assure that laws and regulations ... are known and obeyed.
3. Adopt own standards where laws or regulations may not be adequately protective.
4. Every employee is expected to adhere to the spirit as well as the letter of this policy. Managers have a special obligation to keep informed ... and to advise higher management promptly of any adverse situation.

The policy was developed with the support of top management, and the programs that have been developed to carry out that policy have feedback loops to the Board of Directors and top management to ensure that operations at every level comply with that policy. One program is the Environmental Surveillance Program. Use of the term "audit" is avoided. [n.84] It is fairly common now for corporate programs to handle health, safety and environmental elements in the same basic program. Allied's surveillance reviews cover six areas: water pollution control and spill prevention, air pollution control, solid and hazardous waste, safety and loss prevention, occupational

health and safety, and product safety and integrity. [n.85] The formal written report that is a product of the review is sent directly to the company President with a request for a written reply. This important feedback loop keeps top management informed, and ensures that financial resources will be made available for any corrective action. [n.86]

About 20% of the action plans are reviewed to determine the level of internal compliance. The formal reports are written by the Surveillance Director and his small staff of professionals, who are not part of the legal department. The reports state factual observations, not conclusions, with the objective of finding weaknesses or deficiencies, which will be promptly addressed. It was felt that the disadvantages of having the program go through the legal department outweighed any minimization of risk which could be imparted by attorney workproduct or attorney-client privilege. [n.87] These documents could pose a risk, the *176 proverbial "smoking gun", in various types of legal encounters, but the philosophy at Allied is that the risk can be minimized by the way the report is written, a document retention program and, most important, by taking prompt measures to remedy any potential problems brought to light in the report.

There is a greater risk of creating smoking gun papers in one of Allied's Environmental Assurance Reviews. [n.88] These are in-depth, on- site inspections in which professionals utilize risk assessment techniques to evaluate procedures and control systems at facilities world-wide. If the review finds a potential bomb which has legal implications the report is edited by a lawyer, and it is addressed to general counsel seeking legal advice in anticipation of litigation. [n.89]

In the Annual Environmental Assurance Letter program the CEO requests each President to state his understanding of company policy and what is being done to implement that policy. [n.90] This triggers similar requests downward, and the theory is that an awareness of small scale problem areas will rise upward with the ensuing replies. This is another feedback loop that also provides internal pressure at all levels for awareness and implementation of company policy.

Allied feels that the economic benefits of its preventive law programs are substantial, even if difficult to quantify. [n.91] This has traditionally been a problem in justifying preventive law programs and a sticking point for management using traditional thinking. Although it may be relatively easy to measure the cost of a preventive program, it is very difficult to demonstrate an economic benefit for an event that does not happen, when the attitude of management is that the potential event could never happen to its company. That may be one reason why so many of the most successful programs have been started after just such an event. "Clients ... accurately assess the values of concrete lawsuits, but tend to underestimate the value of avoiding nonspecific future difficulties." [n.92]

Perhaps the most effective preventive law method for reducing legal risks in the areas of health, safety and the environment is waste reduction at the source. There is growing realization that the true costs of hazardous waste generation and disposal have not been properly *177 allocated. Unfortunately, much of the legislation in this area does not emphasize waste reduction, but, in fact, inadvertently provides disincentives for the

development of methods to reduce generation of waste, or to reuse and recycle it. [n.93] A major problem with the introduction of waste reduction programs is the high up-front costs of research and development for a process that generates less waste. Land disposal facilities are not a permanent solution. They have seemed attractive to varying degrees partly because EPA has kept the cost artificially low. [n.94] Again, this is an example of short-range thinking providing a dubious result, while consideration of all the factors involved which are presently easily foreseeable produces a much different assessment. [n.95] [n.96] [n.97] If it is desirable to reduce the exposure of employees to toxic chemical wastes for health reasons, and to reduce the risk of release of the waste into the environment, and to reduce the cost of disposal of the hazardous waste, obviously the most effective way to reduce all these effects is not to generate the waste in the first place. Another consequence of waste reduction programs is a reduced need for raw materials.

There have been many examples of waste reduction programs which are economically attractive even before the real costs of waste production and long-term disposal have been considered. [n.98] An example is the introduction of new technology by Occidental Chemical Corp. in its phosphorous production. [n.99] The new process, which provides for nearly 100% phosphorous recovery with resultant increased phosphorous production by 10% and nearly complete elimination of waste production, was found to be economically attractive in itself, before other costs were considered.

As with other examples of this type of problem, a familiar pattern is now being seen. The limits of easily utilizable land-fill have been passed, regardless of its actual efficiency as a method of long-term hazardous waste disposal. The search for new land-fill locations leads to the usual community response, "not in my back yard." Media attention is then increased and the result is political pressure. In fact, it would be unrealistic to expect a diminution in public concern, media coverage *178 or political pressure until there is a real turn-around. Political thinking now includes waste reduction at the source, [n.100] and direct economic sanctions for continued production of chemical bad-actors. [n.101]

The late 1980's and early 1990's have seen almost continuous, daily national and international media coverage in this area: scientific evidence of increasing ozone depletion and the link to CFC's; the drought in the U.S. midwest, accompanied by suggestions that we are now seeing the leading edge of climate modification due to the green-house effect; dead and dying lakes and forests due to acid rain; everything from dead whales to medical wastes, including AIDS contaminated blood samples, washing up on the beaches at the peak of the summer season. There is a growing awareness that after decades of trying to cope with hazardous wastes, more often than not efforts at containment have failed, for we have reached or passed the limits of the land, the atmosphere, and even the ocean.

Change will come, either in the destruction of the planetary environment if current policies continue, or, perhaps, eventually for the better, if there is the appropriate shift to long-range thinking and planning with consideration given to global limits. The need for

the scientifically and technologically literate lawyer and the opportunity for a meaningful contribution have never been greater.

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