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Acid Rain: Transnational Perspectives

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ACID RAIN: TRANSNATIONAL PERSPECTIVES

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> "The acid rain problem is in many respects so subtle, and the research so new and complex, that a clear picture of its nature and precise impacts will probably not be available for many years."[1]

Mostafa K. Tolba, Director of the United Nations Environmental Programme, observed that there are basically two aspects to current environmental concerns over transboundary pollution: determination by consensus of the likely effects specific pollutants have on the environment; and acceptance of legal responsibility for causing either a direct or indirect release of those pollutants.[2]

There are three major ways to reduce the sulfur oxide content of combustion gases: by using fuels which have low sulfur content, by desulfurizing fuels before they are burned or by desulfurizing stack gases

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1. G. WETSTONE & A. ROSENCRANZ, ACID RAIN IN EUROPE AND NORTH AMERICA 167 (1983).

2. Tolba, *Industry and Environment—The Next Decade* 1, 2, in 3 INDUS. & ENV'T 1 (1982).

after combustion.[3] The state of the art is such that all three of these approaches to problem resolution could be utilized at one degree or another with some measure of success.[4] The social, political and economic costs in developing and implementing any of these approaches are the crucial imponderables which—given the particular geopolitical condition of each state—will either enhance or impede problem resolutions here.[5] Direct costs often exceed tangible and immediate results and thus play havoc with environmentally sound decisions which are necessary.[6]

In the final analysis, the central question raised by transboundary acid pollution problems is whether modern industrialized societies can and will make intelligent responses to the emerging scientific information base which shows with alarming clarity the limits or tolerance of the earth to man-made pollution. Considered in this light, environmental acidification becomes only the most immediate and direct of a number of very serious international pollution problems.[7]

The course of transnational environmental management is all too often shaped by the restraining fear that all measures designed to control pollution are indeed inflationary; they raise the costs of production and thus, in turn, are in part responsible for the growing level of world unemployment.[8] It is, of course, necessary in order to establish an impetus for a sustained level of development that environmental factors be evaluated. After all, the principal goal of development "is to improve the standard of living in the best possible sense, and a non-polluted, safe environment is pre-requisite for such improvement."[9]

The purpose of this article is to evaluate current selected transnational efforts designed to meet and combat the problems of acid rain, evaluate the possible legal remedies available for violations thereof and

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3. Coppoc, *The Environment: No Respecter of National Boundaries*, 43 ALB. L. REV. 520, 522-23 (1979). Coal liquefication, gasification, underground coal gasification, oil desulfurization and fuel denitrogenation are also listed as possible control technologies. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 223-30.

4. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 223.

5. *See* D. PIRAGES, THE NEW CONTEXT FOR INTERNATIONAL RELATIONS: GLOBAL ECOPOLITICS 5 (1978); H. SPROUT & M. SPROUT, THE ECOLOGICAL PERSPECTIVE ON HUMAN AFFAIRS—WITH SPECIAL REFERENCE TO INTERNATIONAL POLITICS (1965).

6. D. PIRAGES, *supra* note 5.

7. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 170.

8. Tolba, *supra* note 2, at 3.

9. *Id. See* The State of the Environment: Selected Topics 1983, Report of the Executive Director, UNEP/GC.11/4, at 27 (Feb. 21, 1983), *reprinted in State of the World Environment*, 20 U.N. CHRON. 33, 41 (No. 5, May 1983) [hereinafter cited as UNEP/GC.11/4].

suggest avenues for discerning and evaluating a measured approach to environmental decisionmaking.

The world ecosystem cannot wait until scientific certainty is achieved in establishing the causal effects of acidification. Modest and equitable legislation of the type proposed by Congressmen Sikorski, Waxman and Gregg[10] is needed in order to pave the way for concerted effort here. The energetic and forthright approach of the Federal Republic of Germany to tackling the environmental problems of air pollution are to be applauded and, to a large degree, could well serve as a paradigm for legislative study and action. Bilateral conventions such as those being forged presently by the United States and Canada, [11] as well as the multilateral Convention on Transboundary Air Pollution are of some value as precursors to unified national response. A coordinated plan is needed. National laws which control sulfur emissions, international conventions and strong intergovernmental organizations which monitor conditions and develop policy, judicial recognition of liability for transboundary pollution, together with more cautious scientific research into the causes and effects of acidification, are necessary components of a realistic response to our global environmental problems.

I. The Etiology of Acid Rain

Home, industry and agriculture all utilize a considerable number of chemical substances in order to maintain high standards of living and control disease. To date, some four million chemical substances have been identified; yet of this number, anywhere from thirty thousand to fifty thousand are produced commercially.[12] A large portion of the remainder are considered intermediate waste products of laboratory chemicals which do not reach the public.[13] Many of these substances are ingredients in mixtures, solution powders and other products which probably reach a total number in excess of one million.[14] Discoveries of new chemical substances run into several thousand each year.[15]

The environment absorbs chemical substances in a variety of complex, yet interrelated, paths. Some are used as fertilizers, pesticides

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10. H.R. 3400, 98th Cong., 1st Sess. (1983).
11. G. Wetstone & A. Rosencranz, *supra* note 1, at 40-49.
12. U.N. Envt. Prog., Report to Governments 33, UNEP(05)R3 (1981). *See* UNEP/GC.11/4, *supra* note 9, at 18-30; Global Environmental Issues (E. El-Hinnawi & M. Hashmi ed. 1982) [hereinafter cited as Global Envtl. Issues]. *See generally* T. Stoel, Jr., A. Miller & B. Milroy, Fluorocarbon Regulation (1980).
13. *See* UNEP/GC.11/4, *supra* note 9, at 18-28.
14. *Id.*
15. *Id.*

and herbicides, and enter the environment through direct application.[16] Others, such as sulfur oxides, nitrogen oxides and polycyclic aromatic hydrocarbons, result from combustive processes.[17] Yet a third source of chemical substances are to be found from manufactured waste effluents which flow directly from the manufacture, transportation and consumption of almost all products used by and in a modern society.[18] Once having entered the environment, chemical substances undergo physical and chemical changes—including combination with other chemicals which—in turn—affect their toxicity.[19] Thus, through such a chemical transformation, what might be regarded as a relatively harmless chemical may become a toxic by-product in the environment and thereafter enter the food chain and accumulate in living organisms.[20]

1981 saw the beginning of the operational phase of The International Register of Potentially Toxic Chemicals (IRPTC), whereby a massive effort was undertaken both to collect and disseminate data concerning over three hundred chemicals included in its Working List of Selected Chemicals Substances.[21] Efforts are being undertaken to launch an effective information dissemination service as well for all participating member-states of the United Nations Environmental Programme.[22]

The emissions from the combustion of fossil fuels (principally sulfur oxides and nitrogen oxides) have, in large measure, contributed to an increase in the acidity of precipitation in many areas. It is estimated that between sixty to seventy percent of the problem is due to sulfur oxide emissions, with nitrogen oxides being responsible for the balance of the increase in acidity.[23] The phenomenon known as "acid rain" begins with the long-range transportation of these pollutants. Specifically, sulfur and nitrogen oxides are carried or transported through atmospheric currents for hundreds—even thousands of miles in some cases—transformed chemically in the process and thereby returned to earth as sulfuric or nitric acids.[24] The height of the smokestacks releasing the various emissions determines the extent and proportion of the pollution which will in fact return to the earth as a local

16. *Id.*
17. *Id.*
18. *Id.*
19. *Id.*
20. *Id.*
21. *Id.*
22. *Id.*
23. GLOBAL ENVTL. ISSUES, *supra* note 12, at 125.
24. *Id.*

dry deposition of sulfur oxide.[25] There is evidence which suggests that emissions from medium-sized power plants, for thirty percent of the time, will be transported further afield and, thus, not subject to local dry deposition.[26]

Those emissions of sulfur dioxide which are not deposited near stationary sources become diffused in the atmosphere.[27] Through oxidation they are transformed subsequently into sulfates.[28] Interestingly, sulfates have a longer atmospheric life than dioxide and are both dispersed and deposited primarily through forms of precipitation—rain or snow.[29] As a consequence of prevailing winds and strong precipitation patters, heavy aggregate deposits of sulfates have been found in various mountain regions—such as those in southern Scandinavia and the Adirondacks of New York.[30]

> No area has a monopoly on sulphur oxide production; nor has any industry. . . . As a general rule, most atmospheric sulphur emissions are from coal-fired electric power generating facilities or large industrial plants. But the largest single source of sulphur oxides in the world is the smelter at Sudbury, Ontario.[31]

Acid precipitation in the northeastern United States is derived largely from coal burned in the Ohio River Valley.[32] Most of the acid rain in Scandinavia comes from the industrialized countries of northwestern Europe.[33]

While the phenomenon of acid precipitation has been known and documented for over one hundred years, the most scientifically reliable data on the subject is less than twenty years old.[34] The first major treatise in this area was written by Angus Smith in 1872.[35] Interestingly, the first continent-wide network of monitoring stations designed to deal with acid rain was begun in 1952.[36] By 1960, it included some one hundred fifty measuring stations throughout western and eastern Europe. By measuring the number of hydrogen ions in the rain, the net-

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25. *Id.*
26. *Id.* at 126.
27. *Id.*
28. *Id.*
29. *Id.*
30. *Id.*
31. Clapham, *Acid Precipitation*, 5 MAZINGIRA 8, 15 (No. 3, 1981).
32. *Id.* at 16.
33. *Id.*
34. *Id.* at 9.
35. *Id.*
36. *Id.*

work has demonstrated clearly a progressive rise in the acid content of precipitation throughout the northern part of Europe during the last twenty year period.[37] There is also clear evidence of acidification of rainfall thoughout North America and Scandinavia.[38]

Continued expansion of acid precipitation threatens freshwater bodies in a number of areas of both eastern North America and northern Europe that are either in or adjacent to areas where precipitation is most acidic.[39] In addition to the loss of fish populations, these poorly buffered freshwater bodies also suffer the effects of acidification by and through negative growth changes occurring in such aquatic organisms as microdecomposers, algae, aquatic macrophytes, zooplankton and zoobenthos.[40] In fact, during the past two decades, the acidification of thousands of lakes and rivers in southern Norway and Sweden has been linked directly to acid from precipitation.[41] The addition of lime to acidified waters and soils could control, to some measure, the effects of acidification. Yet, the most enduring solution, indeed, the most feasible one as well, is to control air pollutants at their source.[42]

Although complete and unambiguous evidence is lacking, the proofs are such that forestation may well be affected far from sources of emission where the concentration of acid in air and precipitation are lower than where acute damage and visible symptoms occur.[43] Both in the northeastern United States and southern Scandinavia between 1950 and 1970, the rate of forest growth has declined significantly.[44] The complexity of terrestrial ecosystems is such, however, that acid rain is only one of numerous environmental stresses which may in fact negatively impact upon them.[45]

Another obvious effect of acid precipitation is its impact in hastening the deterioration of buildings and monuments—especially those constructed of limestone and marble. Tragically, many ancient limestone and marble buildings have sustained more damage in the last twenty years than in the preceding twenty centuries; this is especially the case with the Acropolis in Athens.[46]

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37. *Id. See generally* Wetstone & Rosencranz, *Transboundary Air Pollution in Europe: A Survey of National Responses*, 9 COLUM. J. ENVTL. L. 1 (1983).
38. *Id.*
39. GLOBAL ENVTL. ISSUES, *supra* note 12, at 126.
40. *Id.*
41. *Id.*
42. UNEP/GC.11/4, *supra* note 9, at 26.
43. GLOBAL ENVTL. ISSUES, *supra* note 12, at 127.
44. *Id.*
45. *Id.*
46. Clapham, *supra* note 31, at 11. *See also* UNEP/GC.11/4, *supra note* 9, at 18.

II. The Convention on Long-Range Transboundary Air Pollution

"Determined to protect man and his environment against air pollution" and seeking limitations to "gradually reduce and prevent air pollution including long-range transboundary air pollution,"[47] thirty-one of the thirty-four members of the Economic Commission for Europe (ECE)[48] signed on November 13, 1979, the first multilateral agreement to address the problems of transboundary pollution: The Convention on Long-Range Transboundary Air Pollution, which entered into force March 16, 1983.[49]

Stressing the need for better monitoring techniques for "measuring emission rates and ambient concentrations of air pollutants,"[50] "improved models for a better understanding of the transmission of long-range transboundary air pollutants,"[51] as well as an understanding of "the effects of sulphur compounds . . . with a view to establishing a scientific basis for dose/effect relationships designed to protect the environment,"[52] the Contracting Parties stress "education and training programmes,"[53] together with an exchange of information as critical to the success of the Convention.[54] Using the standard of "best available technology which is economically feasible," the contracting parties commit themselves to developing the policies and strategies necessary to combat air pollution discharges.[55] Two key provisions of the Convention are: (1) the emphasis on the need, continuation and implementation of the Co-operative Programme for the Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP), begun in 1978 and executed by the ECE in collaboration with the World Meteorological Organization and the United Nations Envi-

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47. Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, art. 2, U.N. Doc. ECE/HLM.1/R1 (1979), *reprinted in* 18 I.L.M. 1442 (1979) [hereinafter cited as Convention].

48. 18 I.L.M. 1442 (1979). The three members of the Economic Commission for Europe that did not sign the Convention on Nov. 13, 1979 were Albania, Cyprus and Malta. *Id.*

49. Article 16 of the Convention provides that: "The present Convention shall enter into force on the ninetieth day after the date of deposit of the twenty-fourth instrument of ratification, acceptance, approval or accession." *Id.* at 1449. *See Acid Rain—Action: Taken or Planned*, 20 U.N. Chron. 38, 42 (1983).

50. Convention, *supra* note 47, art. 7(b).

51. *Id.* art. 7(c).

52. *Id.* art. 7(d).

53. *Id.* art. 7(f).

54. *Id.* art. 8.

55. *Id.* art. 6.

ronmental Programme[56] and (2) the imposition of notice and consultative requirements on signatories whose changes in national policy are likely to have a significant impact on levels of transboundary sulfur pollution.[57]

The central weakness of the Convention is its failure to correct or at least counter Principle 21 of The Stockholm Declaration of 1972 which failed to define with precision the national responsibilities to control transboundary pollution, or to acknowledge the obligation to compensate when pollution damage occurs across transboundaries.[58] The ECE Secretariat is given a major role in overseeing the implementation of the Convention. Yet is has limited resources—there are only seven members in its environmental unit—and a wide scope of other responsibilities to the ECE itself.[59] Since neither specific timetables for action are yet set, nor numerical goals for pollution containment sustained, any practical value of the convention must be questioned.[60]

Perhaps the two most important achievements of the Convention are its provisions strengthening the European network for pollution data gathering[61] and the fact that for the first time in international environmental politics, Eastern Europe—with the exception of Albania—joined forces with Western countries in executing international agreement.[62] Interestingly, while the Eastern Europe signatories showed a spirit of cooperation in agreeing to structure monitoring stations for air quality and precipitation, and to pool the data obtained from these stations, they were unwilling to pool emissions data, claiming that such disclosures would reveal "sensitive economic and energy information to their Western competitors."[63] The Eastern states, together with the Soviet Union, did agree, however, to pool information

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56. *Id.* art. 9.

57. *Id.* arts. 5, 9.

58. *See id.* preamble, ¶ 5. *See also id.* art. 8(f), n.1. The United Nations Conference on the Human Environment held in Stockholm, Sweden, in June 1972, produced a declaration which enunciated twenty-six principles. Principle 21 recognized the sovereign right of all member-states of the United Nations "to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of the areas beyond the limits of national jurisdiction." UNEP, IN DEFENCE OF THE EARTH 47 (1981). The right of exploitation in Principle 21 has been the concern of many member-states of the United Nations. *See infra* notes 140-65 and accompanying text.

59. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 145.

60. *Id.*

61. *Id.*

62. *Id.*

63. *Id.*

regarding the amount of sulfur oxides crossing both directions of their borders.[64]

III. INTERNATIONAL ORGANIZATIONS

It has been suggested that the structures which are to be formed or those which presently exist to deal with environmental issues will ultimately chart the solutions to the very problems which brought them into being rather than the problem determining the structure and program content.[65] It remains for the structures to show with clarity the interdependence among environmental quality, economic growth, product control and energy and resource management.[66] The concept of complementary coexistence (as I choose to term it) as opposed to continuing conflict between environmental protection and economic development, is achieved with irregular success. Complex administrative bureaucracies duplicate and often even obfuscate concerted environmental work efforts.

Since the early 1970's, six international organizations have been in the vanguard of establishing a level of environmental balance among industrialized states.[67] They are: The Economic Commission for Europe (ECE),[68] the Organization for Economic Cooperation and Development (OECD),[69] the European Communities (of Iron, Steel and

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64. *Id.* at 146.

65. N. HETZEL, ENVIRONMENTAL COOPERATION AMONG INDUSTRIALIZED COUNTRIES: THE ROLE OF REGIONAL ORGANIZATIONS (1980).

66. *Id.* at 82. These policy areas are seen as reinforcing rather than conflicting with each other. Such an approach to environmental policies has reoriented and restructured the environmental program to reflect four themes: (1) Environment and Economics; (2) Natural Resources and the Environment; (3) Chemicals and the Environment and (4) Urban Affairs. *Id.*

67. Hetzel, *Environmental Cooperation Among Industrialized Countries*, 7 MAZINGIRA 38 (1983). *See* D. BOWETT, THE LAW OF INTERNATIONAL INSTITUTIONS (6th ed. 1982); F. VANLIER, ACID RAIN AND INTERNATIONAL LAW (1981).

68. The environment became part of the overall priority areas for cooperation within the framework of the ECE. In order to come to grips with advancing fears of environmental disharmonies, the ECE created two committees to deal with these problems: the Committee on Water Problems and the Working Party on Air Pollution. N. HETZEL, *supra* notes 65, at 34.

69. The OECD, based in Paris, includes countries in Western Europe and North America, as well as Japan, Australia and New Zealand. The OECD has led study and discussion of international environmental issues. In 1972, the OECD inaugurated a "Cooperative Technical Program to Measure the Long-Range Transport of Air Pollutants" in which eleven European nations participated. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 134-37. In 1974, the OECD Council adopted "Guidelines for Action to Reduce Emissions of Sulfur Oxides and Particulate Matter from Fuel Combustion in Stationary Sources" which recommended stronger national programs to control sulphur oxide pollutants and more effective legal and institutional mechanisms to deal with transboundary pollution. *Id.*

Coal),[70] The Council of Europe,[71] the Council for Mutual Economic Assistance (CMEA)[72] and the European Economic Community.[73] Perhaps with the exception of the European Communities, these organizations operate only a very loose corporate mandate. In reality, "they are a loose grouping of different intergovernmental committees and subgroups whose objectives are not only different but sometimes in conflict."[74] Given the rather transient nature of the various memberships comprising the working committees and the irregularity of their meetings, yet another reason may be discerned for the inconclusive posture of the organizations themselves.[75]

In 1971, seven separate agreements governing twenty-one environmental subject areas were executed by the member countries of the CMEA.[76] Five permanent commissions were created in order to deal with the task of seeking resolutions to the various complex problems and finding areas of common accord.[77] In 1973, a special Council for Environmental Protection and Improvement was created to coordinate all the environmental responsibilities of CMEA. For the six defined ar-

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70. M. WILCHER, ENVIRONMENTAL COOPERATION IN THE NORTH ATLANTIC AREA 8-9 (1980). During the 1950's and 60's, national relations in Western Europe reached a high level of policy harmonization and international cooperation. Beginning with the European Coal and Steel Community (ECSC) and the European Economic Community (EEC) established by the Treaty in Rome of 1957, there has been significant growth of policy harmonization and common institutions. With the Merger Treaty of 1972, the organizations were merged into the European Communities. *See* Mastellone, *The External Relations of the E.E.C. in the Field of Environmental Protection*, 30 INT'L & COMP. L. Q. 104 (1981).

71. N. HETZEL, *supra* note 65, at 39-41. The Council of Europe consists of three permanent sub-committees which constitute the bulk of the work program: (1) the Subcommittee for the Conservation of Wildlife and Natural Habitats; (2) the Sub-committee for the Planning and Management of Natural Areas and (3) the Sub-committee for Information and Training. *Id.*

72. M. WILCHER, *supra* note 70, at 99. The Council for Mutual Economic Assistance (CMEA-COMECON) and organizations designed for economic cooperation in Eastern Europe also attend ECE environmental meetings. This broadens the scope of European-wide organizations. *Id.*

73. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 149-51. The EEC relies on the "Commission" to develop, initiate and implement EEC policies. Furthermore, it acts as a mediator between governments on EEC matters and has autonomous decisionmaking powers. Among the more than forty environmental directives successfully initiated by the Commission are EEC-wide limits on new car emissions, gas-oil sulfur content, and ambient levels of sulfur dioxide and particulates. *Id. See also* M. WILCHER, *supra* note 70; P. DE REEDER, ENVIRONMENTAL PROGRAMS OF INTERGOVERNMENTAL ORGANIZATIONS (1978). *See generally* Hetzel, *supra* note 67.

74. N. HETZEL, *supra* note 65, at 47.

75. *Id.*

76. *Id.* at 44.

77. *Id.*

eas of environmental concern, six sets of Councils of Representatives and Coordination Centers were provided.[78]

In 1979, the European Communities published a report on the "State of the Environment" wherein the broad policy goals of the Commission for the 1980's were charted. Calling for new policy instruments to be designed in order to both clean up and prevent pollution, as well as to promote the improvement of environmental quality together with qualitative economic growth, the report called for Community acceptance of the concept of environmental impact assessments.[79]

In 1980, the Council of European Communities published its Directive on Air Quality Limit Values.[80] Although these guidelines contain no emission standards, they set out specific quality aims for the attainment of clean air. They are notable because, together with the new Transboundary Air Pollution Convention of 1983, they could in due course, become a legal basis for the development of a transnational clean air policy, if the members of the world community decided to align themselves in *concerted* environmental action.

In the final analysis, substantial financial incentives must be provided by government if any "unified" environmental action is to be possible for the European Communities.[81] It has been suggested that the Commission of The European Communities remains the most competent of all the intergovernmental organizations to locate and match financial resources with available levels of competence in order to accomplish the enormous environmental goals of the 1980's and beyond.[82] This is the case because the Commission of the European Communities is the only organization where no bifurcated, truncated decisionmaking processes exist.[83] Indeed, the Communities have centralized all environmental decisional authority in one group and have

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78. *Id.* at 44-45. The six environmental problems for which the Councils of Representatives and Coordination Centers are responsible are: (1) socio-economic, legal and educational concerns; (2) environmental health; (3) eco-systems and landscapes; (4) air pollution prevention; (5) meteorological aspects of air pollution and (6) solid waste disposal. *Id.* See also Turner, *ECETOC and the Control of Hazardous Chemicals*, 4 INDUS. & ENV'T 15 (1981), where the work of the European Chemical Industry and Ecology and Toxicology Centre (ECETOC) in assisting the West European chemical industry in attempting to resolve issues arising from the potential or actual toxic effects of its products on humans and the environment, is analyzed.

79. N. HETZEL, *supra* note 65, at 78.

80. Council of European Communities Directive on Air Quality Limit Values and Guide Values for Sulphur Dioxide and Suspended Particulates, O.J. EUR. COMM. (No. L 229)(1980), *amended by* 81/857/EEC, *reprinted in* 141 INT'L ENV'T R. 1301.

81. N. HETZEL, *supra* note 65, at 324.

82. *Id.*

83. *Id.* at 43.

given that group sole authority to perform those functions with which it is charged.[84]

IV. THE WEST GERMAN EFFORT AND EXPERIENCE

The world community has been showing definite interest in mounting offensives designed to correct past environmental degradation since the 1972 United Nations Conference on the Environment held in Stockholm, Sweden.[85] Rather than analyze the work of the member-states of the United Nations regarding this matter,[86] which would far exceed the scope of this article, one state—the Federal Republic of Germany—will be studied as a paradigm of what all states are encountering as they seek to grapple with the effects of acidification.[87]

The July 13, 1983, edition of *The International Herald Tribune* carried the alarming news that the Bavarian Forest, long a valuable German economic resource, was being ravaged by acid rain.[88] *Wald-*

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84. For a review of the work of the Community in various environmental areas, see *Europaisches Parliament, Generalsekretariat,* EUROPA HEUTE, 1980-81, at 4.514/4.51. For a compilation of the environmental laws, see ENCYCLOPEDIA OF EUROPEAN COMMUNITY LAW BII (1983). *See also* THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE MEMBER STATES OF THE EUROPEAN COMMUNITIES: A COMPARATIVE STUDY (J. McLaughlin ed. 1976); E. GRABITZ & C. SASSE, COMPETENCE OF THE EUROPEAN COMMUNITIES FOR ENVIRONMENTAL POLICY (1977).

85. *See* Smith, *Toward an International Standard of Environment,* 2 PEPPERDINE L. REV. 28 (1974) (including 1972 Declaration of the United Nations Conference on the Human Environment). *See generally* UNEP/GC.11/4, *supra* note 9; The State of the World Environment 1972-1982, Report of the Executive Director, UNEP/GC(SSC)/INF.2, UNEP/GC.10/3, Jan. 29, 1982; Review of Major Achievements in the Implementation of the Action Plan for the Human Environment, UNEP/GC(SSC)/INF.1, UNEP/GC.10/INF.1, Jan. 26, 1982; RAPID ASSESSMENT OF SOURCES OF AIR, WATER AND LAND POLLUTION (World Health Org. Offset Pub. No. 62, 1982); TRENDS IN ENVIRONMENTAL POLICY AND LAW, International Union for Conservation of Nature & Natural Resources (IUC), Environmental Policy & Law Paper Ser.: No. 15 (1981); ASPEN INSTITUTE, AIR POLLUTION CONTROL: NATIONAL AND INTERNATIONAL PERSPECTIVES (1980); ENVIRONMENTAL POLICIES IN DEVELOPING COUNTRIES (R. Gour-Tanguay ed. 1977); S. ERCMAN, EUROPEAN ENVIRONMENTAL LAW (1977); B. LAUSCHE, UNEP ENVIRONMENTAL LAW—IN DEPTH REVIEW (1981); THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE MEMBER STATES OF THE EUROPEAN COMMUNITIES (J. McLaughlin ed. 1976); Carter, *Historic Cities in Eastern Europe: Problems of Industrialization, Pollution & Conservation,* 6 MAZINGIRA 62 (1982); Mercier, *The International Programme on Chemical Safety,* 4 INDUS. & ENV'T 1, 7 (1981); Szekely, *The Chemcial Industry and Its Impact on the Latin American Environment,* 7 MAZINGIRA 26 (1983).

86. G. WETSTONE & A. ROSENCRANZ, *supra* note 1.

87. *See generally* H. STEIGER & O. KIMMINICH, THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE FEDERAL REPUBLIC OF GERMANY (J. McLaughlin ed. 1976).

88. Fitchett, *Concern Grows in West Germany as Acid Rain Devastates Forests,*

sterben, or forest death, is a European-wide epidemic causing damage from Scandinavia to the Alps.[89] It is feared that as much as one-third of all the forest in southwest Germany is doomed.[90] Formerly complacent and officially skeptical (along with England, France and the United States) about the scientific source and responsibility for acid rain pollution, nonetheless it appears that largely due to the public outcry and demands of the press, the German government will begin to impose more rigid pollution standards for coal-burning industries, particularly power plants, and introduce lead-free gasoline to reduce sulfur and nitrogen emissions.[91]

A. The Work of the Environmental Council

The Council of Environmental Advisors Report on Forest Damage and Air Pollution, issued March 1983,[92] was a major impetus for the Government's passage of the Ordinance for Large Furnaces.[93] The report also serves as a revised analysis and blueprint for the future environmental action in the Republic.[94]

As for the forests in the Federal Republic of Germany, the Federal Emissions Protection Law has stated its clean air policy to be the elimination of the causes of damage presently affecting the forests and the prevention of future damages.[95] In order to protect the forest from the ravages of air pollution, the Law states and develops the principle of prevention (*Vorsorgepolitik*) which is designed to achieve a general reduction of the emission at its source.[96] Thus, by applying available control techniques, pollutant emissions are to be reduced to the extent that damages (e.g., to the forests) never in fact occur.[97] In order to

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Int'l Herald Tribune, July 13, 1983, at 6, col. 1. Some 100 year old pines have died within six weeks. About 8% of the entire Bavarian forest died in 1982. *Id.* In 1982, it was reported that 7.7% of the forest area in the Federal Republic of Germany was damaged by a disease which was caused by the deposition and accumulation of air pollutants. 20 U.N. CHRON. 40 (1983). *See also* Boffey, *Trees in Black Forest Showing Swift Decline*, N.Y. Times, Nov. 6, 1983, § 1, at 1, col. 1.

89. UNEP/GC.11/4, *supra* note 9, at 18-30.

90. Int'l Herald Tribune, Jul. 13, 1983, at 6, col. 1.

91. *Id.*

92. THE COUNCIL OF ENVTL. ADVISORS, SUMMARY OF THE REPORT ON FOREST DAMAGE AND AIR POLLUTION (Mar. 1983) [hereinafter cited as FOREST DAMAGE REPORT].

93. *Dreizehnte Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes (Verordnung über Grobfeuerungsanlagen)*-13, *BImSch V-vom Juni* 1983 (BGBl. I S. 719) [hereinafter cited as *Dreizehnte*].

94. *Id.*

95. FOREST DAMAGE REPORT, *supra* note 92, ¶ 88, at 35.

96. *Id.* ¶ 90, at 36.

97. *Id.*

achieve this goal or meet this standard, as the case may be, the operators of all pertinent facilities are directed to apply those remedial measures consistent with the current state of technology (*Stand der Technik*) which seek to achieve the reduction.[98] This must be done regardless of the difficulty or impossibility of verification that the particular emission(s) would lead to forest damages or potential danger.[99] A reduction in emissions can be set and demanded even if objective indicators merely point to the fact that the pollutants in question may independently, or interacting with other factors, cause damage; in other words, identifying potential hazards is sufficient.[100]

The reduction of sulfur dioxide emissions and other air pollutants have been popularized by current levels of concern regarding acid rain. As a result of this new level of discussion and awareness, impressions have arisen which have led to the conclusion that corrective actions are based on the need to eliminate the causes of the damage, without any recognition of the principle of prevention.[101] Accordingly, the Council of Environmental Advisors viewed the Ordinance for Large Furnaces "as a kind of therapeutic reaction to the challenge, with which environmental policy sees itself faced in connection with the new forest damage."[102] The value of the Ordinance lies in its imposition of an emission-limit value of 400 mg/m^3 sulfur dioxide on all newly licensed plants from thermal furnace power plants through the process of flue gas desulfurization.[103] In principle, this limitation requirement also applies to existing plants.[104]

The Environmental Council drew three basic conclusions regarding forest acidification: (1) flue gas desulfurization should be regarded as particularly important in maintaining a long-standing policy goal of reduction of pollutants consistent with the prevention principle; (2) the cleaning, refitting or closing down of existing plants are viewed correctly as the most decisive measures for achieving a reduction of pollutant loads advanced by long-distance transport and (3) the reduction of nitrogen oxide emissions from motor vehicles must be intensified since these emissions, through long-distance transportation, influence

98. *Id.*

99. *Id.* ¶¶ 90-91, at 36-37. The prevention principle does not apply only to situations concerned with the abatement of unknown cause-effect relations. It is also relevant to reducing known damage causes affecting areas at considerable distance from sources of emission as well as to the prevention of new types of pollution impact. *Id.*

100. *Id.* ¶ 92, at 37.

101. *Id.* ¶ 94, at 38.

102. *Id.* at 39.

103. *Id.*

104. *Id.* ¶ 111, at 47.

forest damage and act as acidifiers and give rise to the formation of photochemical oxidants.[105]

Calling for more causal research in order to determine the factors causing damage to the forests, the Council lauded the provisions of the Ordinance for Large Furnaces which concretized, by the introduction of limit values, the heretofore general obligations to reduce nitrogen oxide emissions "as far as possible."[106] These limitations hopefully will be met in new plants which will be advantaged by current technological methods. Already, a number of existing facilities are meeting the limit values.[107] To achieve a modicum of success with the regulation and reduction of the nitrogen oxides, the Council noted the present insufficiency of the monitoring systems. The Ordinance for Large Furnaces will strengthen the system here by its prescription of the continuous recordation of emission concentrations for plants exceeding 400 MW thermal furnace power.[108]

While the "closing down regulation" (*Absterbeordnung*) for existing plants is of vital significance to the achievement of the preventive aim, the Council nonetheless recognized that not only must a number of legal questions be answered regarding the application of the regulation but that, in reality, if economic development reaches a level of stagnation and the labor market continues to be strained, liberal use of exemptions will be the course that is followed together with generous licensing practices.[109] In order to mitigate the consequences of these "realities," the Council suggests the imposition of a compensatory tax on sulfur dioxide for plants which are unable, with or without exemption, to meet emission reduction limit deadlines imposed by the Large Furnace Ordinance.[110]

Finally, the Council called for full cooperation with Germany's

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105. *Id.* ¶ 105, at 43.

106. *Id.* ¶ 114, at 48. The program for administration structured by the Large Furnaces Ordinance gives major coal and oil field facilities the option of either retiring within five years or installing controls necessary to reduce their SO_2 emissions to 400 milligrams per cubic meter (mg/m^3) within ten years. Provision is also made for the allowance of exceptions to the time frames when the reasons therefor are not traceable to the operator's fault. *Dreizehnte, supra* note 93, §§ 2, 3, 20 & 36. Since the large older plants contribute most to the sulfur dioxide pollution problems of West Germany, the Ordinance has a particular direction. It is, in fact, estimated that this program of administration under the Ordinance will reduce SO_2 emissions in West Germany from the 1982 level of 3.5 million metric tons annually by fully one-third, to a total of 2.3 million tons by 1995. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 85.

107. FOREST DAMAGE REPORT, *supra* note 92, ¶ 114, at 48.

108. *Id.*

109. *Id.* ¶ 126, at 55.

110. *Id.*

emitting neighbors in attempting to find a scientific explanation for the forest damages and seeking to reduce the pollutants which give rise to air pollution.[111] The need for regional agreements was recognized together with the efforts of the Transboundary Air Pollution Convention of 1979 and the Sulphur Dioxide Guidelines issued by the Council of the European Community of 1980 as beginning the establishment of legal frameworks for positive action.[112]

In retrospect, it can be seen that regardless of the solid work of the Council of Environmental Advisors in its Report of Forest Damage and Air Pollution and the passage of the New Large Furnaces Ordinance, so long as the individual states of the Federal Republic of Germany adhere to policies of individual sovereignty at the cost of developing and administering a truly strong national air pollution program, significant and prompt action is not forthcoming. To achieve an unqualified success, if indeed any state can truly claim such in this environmental area, a strong and unyielding enforcement program must be in effect. Given the vagaries of present-day economic policies, perhaps all that can be said of Germany and of the United States is that both are making an effort to start correcting a serious environmental problem. The record of success or failure will be determined very quickly.

B. The German National Policy

The overall environmental policy of Germany is based upon three complementary principles: (1) the precautionary principle, which acknowledges that managerial policies at the environmental level must not be limited to the prevention of danger and repair of damages, but must also address preventive precautions which assure protection before damage occurs; (2) the "polluter pays" principle, which states that the polluter must pay all costs associated with the prevention and elimination of offsetting environmental impacts and (3) the cooperation principle, which recognizes that environmental policy can only be regarded as positive and enduring when it produces a spirit of close cooperation between the federal, state and community administrations.[113]

The Federal Government's Environmental Program of 1971 endeavors to reduce motor vehicle emissions step-wise to one-tenth of the

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111. *Id.* ¶ 134, at 59.

112. *Id.*

113. von Lersner, *Clean Air Strategy in the Federal Republic of Germany*, in AIR POLLUTION CONTROL: NATIONAL AND INTERNATIONAL PERSPECTIVES, *supra* note 85, at 28. *See generally* Gundling, *Public Participation in Environmental Decision-Making*, in TRENDS IN ENVIRONMENTAL POLICY AND LAW, *supra* note 85, at 131.

average 1969 levels; its long-range target is a ninety percent reduction in pollutant emissions.[114] Built upon the Federal Emissions Control Act and Section Six of the Road Traffic Law (*Strassenverkehrsgesetz*), the Program is implemented by amendments to the Road Traffic Licensing Order (*Strassenverkehrs-Zulassungs-Ordnung*) and several guidelines of the Economic Community. The Federal Government is entitled not only to test motor vehicles in order to ensure against their harmful effects on the environment, but also to regulate their design, equipment and operation.[115]

C. *Further Difficulties With Implementation*

The Federal Emission Protection Law (FEPA) was passed in West Germany in 1974[116] and is the central mechanism through which the control of air pollution is attempted. Combining a variety of mechanisms which make use of technologically viable pollution control devices, impose limits on the sulfur content of fuel, utilize tall smokestack techniques for dispersion and even promote the retirement of heavily polluting older facilities,[117] the law is supplemented by copious regulations and guidelines which amount to a rather complex system for pollution control.[118]

As a federal state, the German Federal Republic assigns and divides levels of responsibility for air pollution control between the Federal Government and the eleven states (*Laender*) which comprise the Republic.[119] While the Federal Government's main purpose is to enact necessary legislation, the role or duty of the states is to enforce those laws. Jointly, the two divisional groups seek to implement the Emis-

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114. von Lersner, *supra* note 113, at 29.

115. *Id.* The Lead in Petrol Act (*Benzinbleigesetz*) of August 1971, which regulates the amount of lead in petroleum products, is another environmental control mechanism. *Id.*

116. *Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen. Gerausche, Erschütterungen und ähnlichen Vorgängen (Bundes-Imm-BlmSchG), vom 15. März, 1974,* (BGB). I S.721, ber. S. 1193.

117. *Id.*

118. Currie, *Air Pollution Control in West Germany,* 49 U. CHI. L. REV. 355 (1982). For a detailed comparison of the striking similarities between West German and United States air pollution laws, see *id.* at 391-93. While little dissatisfaction can be found with the adequacy of the West German air pollution laws, it is noted that they are not being enforced adequately—essentially because of insufficient personnel and equipment. *Id.* at 393.

119. Rehbinder, *Implementation of Air Pollution Control Programs under The Law of the Federal Republic of Germany,* in AIR POLLUTION CONTROL: NATIONAL AND INTERNATIONAL PERSPECTIVES, *supra* note 85, at 31.

sions Act.[120] Apart from this structured partnership, as a practical matter, FEPA's enforcement is a matter for the states.[121]

Since no formal federal control mechanisms exist in order to force uniform implementation, the states are at liberty to organize and administer pollution control implementation plans, grant permits to polluters and act in any way they may choose.[122] As might be expected, the quality and efficiency of implementation systems vary from state to state.[123] For example, in the state of North-Rhine Westphalia, where ninety-five percent of the heaviest sulfur dioxide areas in West Germany are to be found, a strong specialized air pollution control authority exists.[124] There, the State relies heavily upon the central government to assist in such local decisions as permit granting, etc.[125]

The implementation of FEPA in Bavaria is left to the local authorities, who—lacking in technical expertise—defer to their state environmental agency for general supervisory assistance in the decision-making process.[126] The role of local governments in maintaining and administering air pollution control programs varies from state to state. The remaining nine states, however, fall between the models of North-Rhine Westphalia and Bavaria.[127]

The present West German sulfur dioxide emissions total approximately 3.5 million metric tons annually.[128] Most come from power plants which are coal-fired or those industries which burn oil and coal.[129] Interestingly, these aggregate emission figures have remained fairly constant in recent years.[130] Thus, in spite of greatly increased production, the stability of total emissions indicates that definite air quality improvement in those areas most heavily polluted has been achieved.[131] Presuming no dramatic shift in the air pollution control policies of the Republic, stability, if not improvement, will be recorded over the next decade for the control of new sources of pollution.[132]

Recent air pollution control technology has failed to be utilized to

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120. *Id.*
121. *Id.*
122. *Id.*
123. *Id.*
124. *Id.*
125. *Id.*
126. *Id.*
127. *Id.*
128. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 80.
129. *Id.*
130. *Id.*
131. Rehbinder, *supra* note 119.
132. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 81.

its fullest extent in FEPA's implementation.[133] For, in addition to its general mandate to curb air pollution, the legislation is designed to control emissions and promote planning to the extent possible under the so-called "principle of precaution."[134] Recent studies show considerable irregularity in application here.[135] Specifically, in addition to failing to force utilization of modern control technologies, a number of air pollution control authorities exercise little real influence on those decisions pertaining to the location of polluting industries, or the inspection and monitoring of those industrial activities once they are initially approved.[136]

While some signs of stability, if not progress, have been recorded in regard to the emissions of sulfur dioxide, nitrogen oxide emissions have increased over the past decade by a staggering figure of eighty-five percent, generating a current total approximately 3.1 million metric tons per year.[137] About forty percent of all nitrogen oxide emissions come from automobiles, with the remaining forty-five percent coming from stationary sources.[138] Absent stricter emission control requirements for new cars established and promoted by the European Economic Community, nitrogen oxides will continue to increase and bring deleterious effects to the environment and, of course, enhance the continuous effects of acid deposition.[139]

V. Liability for Transboundary Pollution

Two years before the United Nations Conference on the Environment occurred and the Declaration on the Human Environment was issued, the International Court of Justice in its Namibia Advisory Opinion of 1970 stated concisely that "physical control of a territory, and not sovereignty or legitimacy of title, is the basis of State liability for acts affecting other States."[140] At the conclusion of the Stockholm Conference on the Environment sponsored by the United Nations, a Declaration on the Human Environment was promulgated and contained a most important acknowledgment. Principle 21 states:

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133. Rehbinder, *supra* note 119, at 32.

134. *Id.*

135. *Id.*

136. *Id.*

137. G. Wetstone & A. Rosencranz, *supra* note 1, at 81.

138. *Id.*

139. *Id.*

140. Legal Consequence for States of the Continued Presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 276 (1970), 1971 I.C.J. 16, 54, ¶ 118 (advisory opinion).

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond the limits of national jurisdiction.[141]

While it has been posited that a general application of this Principle leads to the recognition of state liability for transnational pollution—regardless of precautions which may have been taken by the state in order to avoid pollution damage—in actual practice such is not the case.[142]

In those cases of parallel or concurrent jurisdiction, the decisive issue to be resolved would arguably be which state was in the stronger position to prevent the conduct or event which gave rise to the pollution.[143] When such jurisdictional relation exists over a private action which has, in turn, resulted in pollution, the issue becomes, again, which state exercised or should have exercised dominant control over the injurious conduct or activity that caused the international pollution.[144] Thus, dominant control rests in the state that has the "closer causal relationship to the activity."[145] The primary concern for international environmental lawmaking is whether a mere occurrence of pollution damage triggers liability for the controlling state or—coordinate with the "duty concept" of Principle 21 of the Stockholm Conference Declaration—whether the additional element of fault must be linked to the action in order to impose international liability. Presently, the fault principle has been recognized as the standard for imposing liability for transnational pollution;[146] although some have perceived the beginnings of a possible trend toward the imposition of strict liability in international law under certain situations.[147] Still, neither present in-

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141. Smith, *Toward an International Standard of Environment*, 2 PEPPERDINE L. REV. 28, 50 (1974). *See generally* R. FALK, THE ENDANGERED PLANET (1972); W. GORMLEY, HUMAN RIGHTS AND ENVIRONMENT: THE NEED FOR INTERNATIONAL COOPERATION (1976).

142. *See* Dupuy, *International Liability of States for Damages Caused by Transfrontier Pollution*, in OECD, LEGAL ASPECTS OF TRANSFRONTIER POLLUTION 345, 357 (1977). *See also* Brounlie, *A Survey of International Customary Rules of Environmental Protection*, 13 NAT. RESOURCES J. 179 (1973); F. VANLIER, *supra* note 67.

143. Handl, *State Liability for Accidental Transnational Environmental Damage By Private Persons*, 74 AM. J. INT'L L. 525, 531 (1980).

144. *Id.* at 535.

145. *Id.*

146. *Id.* at 537.

147. *Id.*

ternational case law nor actual practice recognizes the imposition of strict liability for occurrences of transnational pollution.[148]

In general, the creation of a transnational risk is not the only major factor for determining a state's international liability, but it is fundamental to a finding of its direct liability.[149] To suggest a blanket imposition of liability, then, for state action which is of an abnormally dangerous nature or is ultrahazardous would pose difficulties.[150] Absent a previous determination of the hazardous nature of a transnational activity, any transnational damage arising therefrom would not give rise to an imposition of strict liability.[151] Yet, "if the accidental damage is substantial or severe, this quality in itself is likely to amount to persuasive evidence of the incriminated private activity's exceptionally dangerous nature."[152]

Unsettled controversy surrounds the issue whether a controlling state is liable for clear ultrahazardous actions of a purely private nature.[153] The sounder view is that it may very well be. An exceptionally dangerous private activity is more likely than not to be subject to strict administrative licensing. If such an activity, duly licensed and/or impliedly supervised by the state, results in transnational damage, it is proper to impose liability on the state.[154]

> Making the creation of significant transnational risk internationally permissible would seem to imply as a precondition that the controlling state be strictly liable in the event of transnational injury. After all, as the state must be presumed to benefit from the hazardous activity, it should also be directly accountable for any associated transnational costs.[155]

It is fair to conclude that given the lack of scientific consensus regarding the causal links of acidification and ability to assess, with

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148. *Id.* at 539. *See generally* Bilkder, *The Role of Unilateral State Action in Preventing International Environmental Injury*, 14 VAND. J. TRANSNAT'L L. 51 (1981).

149. *Id.* at 554. *See* F. VANLIER, *supra* note 67, at 125.

150. Handl, *supra* note 143, at 555.

151. *Id.*

152. *Id. See generally* Dupuy, *International Liability for Transfrontier Pollution*, in OECD, LEGAL ASPECTS OF TRANSFRONTIER POLLUTION, *supra* note 142, at 363; Lummert, *Changes in Civil Liability Concepts*, in TRENDS IN ENVIRONMENTAL POLICY AND LAW, *supra* note 85, at 235.

153. Jenks, *Liability for Ultra-Hazardous Activities in International Law*, 117 RECUEIL DES COURS 99, 178 (1966 I). *See generally* P. MCNAMARA, THE AVAILABILITY OF CIVIL REMEDIES TO PROTECT PERSONS AND PROPERTY FROM TRANSFRONTIER POLLUTION INJURY (1981).

154. Handl, *supra* note 143, at 558.

155. *Id.* at 559.

clarity and precision, the sources of particular pollution, international legal practice and decisional law will not show or display a spirit of adaptivity to vexatious problems of transnational pollution. Traditional, evidentiary proof of tortious conduct must be reinterpreted and, if necessary, relaxed in order to accommodate the recognition and the imposition of liability for the pollution of transfrontier boundaries.

A. The Impotence of the United Nations

Because the General Assembly of the United Nations lacks legislative powers, their resolutions or declarations are binding neither on the member-states nor in international law at large.[156] Although recommendations passed by the General Assembly embrace and affect varying aspects of international law, they remain only recommendations which the states are totally free to accept, implement, oppose or disregard.[157]

The traditional viewpoint regarding the development of customary law is that it is created "by uniformities in the actual conduct of states if such conduct is accompanied by the conviction that it is required by international law."[158] A declaration is, according to another viewpoint, a recommendation and may, by customary adherence by a state, become recognized by and through state practice, as imposing rules which become binding.[159] Of vital significance is the reality that a resolution or declaration, though passed by two-thirds of the membership of the United Nations, but without the support of market economy states on those matters of interest to them, cannot be recognized as either a definitive or authoritative pronouncement on the content of the international law.[160] Given this basic "impotency" of the United Nations, there appears to be a common understanding and indeed a rather pervasive cynicism among the diplomats and representatives of the Assembly that a goodly number of the declarations made will never, in practice, be implemented.[161]

As previously observed, Principle 21 of The Stockholm Declaration of 1972 charts a duality of right and responsibility for the members of the United Nations: a sovereign right to exploit individual resources and a responsibility to prevent injury in the acts of

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156. Schwebel, *The Effect of Resolutions of the U.N. General Assembly on Customary International Law*, 73 AM. SOC. INT'L L. PROC. 300 (1979).

157. *Id.* at 302.

158. *Id.* at 303.

159. *Id.* at 304.

160. *Id.* at 305.

161. Kirkpatrick, *Global Paternalism*, REG. MAG. 17, 19 (Jan.-Feb. 1983).

exploitation.[162] Viewed as the keystone to the Stockholm initiative,[163] the Declaration's non-acceptance by the Soviet Union and its Eastern European allies[164] means that regardless of the nobility of purpose and style of the Declaration, it remains a shallow call to environmental action and one that is unheeded by a significant number of major transnational polluters.[165]

B. A Domestic Response: The United States

In 1981, the National Academy of Science determined that a fifty percent reduction in acid rain would prevent damage in sensitive freshwater areas, but no conclusions were made regarding the level of emissions control needed to reduce acid rain by that amount.[166] A 1983 report of the Academy found a direct link between the sulfur dioxide generated from industrial smokestacks and the death of aquatic life in various lakes and streams of the United States and Canada.[167] In fact, a one-to-one relationship between sulfur dioxide emissions and the phenomenon of acid rain was discovered.[168] The Reagan administration has adopted a cautious approach calling for more detailed study of the causes and specific effects of acid rain before new expensive curbs on sulfur dioxide emissions are imposed.[169] Some environmentalists assert

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162. Smith, *supra* note 141, at 50.

163. *Id.* at 28. *See* Smith, *Stockholm, Summer of '72: An Affair to Remember*, 58 A.B.A.J. 1194 (1972).

164. *See* Smith, *supra* note 141.

165. *See* d'Arge & Kneese, *State Liability for International Environment Degradation: An Economic Perspective*, 20 NAT. RESOURCES J. 427, 432 (1980). As early as 1935, in the now famous Trail Smelter Case (U.S. v. Canada), it was determined that a State owes at all times a definite duty to act in such a way so as to protect other states against injurious acts by individuals from within its own jurisdiction. 3 U.N. REP. INT'L ARB. AWARDS 1905, 1963 (1935).

Principle 22 of the Stockholm Declaration states that: "States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage by activities within the jurisdiction or control of such states to areas beyond their jurisdiction." IN DEFENCE OF THE EARTH, *supra* note 58, at 47. While the Declaration does not mention explicitly air pollution, Principle 6 does in fact provide that: "The discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render themselves harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems." *Id.* at 44.

166. NATIONAL ACADEMY OF SCIENCE, ATMOSPHERE-BIOSPHERE INTERACTIONS: TOWARD A BETTER UNDERSTANDING OF THE ECOLOGICAL CONSEQUENCES OF FOSSIL FUEL COMBUSTION (1981).

167. NATIONAL ACADEMY OF SCIENCE, ACID DEPOSITION-ATMOSPHERE PROCESS IN EASTERN NORTH AMERICA, A REVIEW OF CURRENT SCIENTIFIC UNDERSTANDING (1983).

168. *Id.*

169. ENVTL. QUALITY 1982—13th ANNUAL REPORT OF THE COUNCIL ON ENVTL. QUALITY

that the time to act is now, before the problem is exacerbated by imposing immediate control at the source.[170]

Presently, major pockets of pollution that exist primarily in and around large urban and industrialized areas are advanced by power plants and industrial processes burning fossil fuels, as well as emissions of sulfur and nitrogen compounds from vehicles and homes.[171] In Europe, more than twenty nations are not only linked closely in a geographic and economic sense, but also share a common airshed.[172] Yet, this linkage does not promote complementary environmental management techniques and processes. Indeed, in matters of pollution control, policies among the nation-states differ dramatically.[173]

In the United States, the major program for air quality management for "existing" pollution sources (those having been built before the enactment of the 1970 Clean Air Act Amendments)[174] is keyed to the National Ambient Air Quality Standards (NAAQS).[175] These standards set the maximum permissible concentrations of major conventional or nontoxic air pollutants established by the United States Environmental Protection Agency (EPA).[176] They are achieved supposedly through state designed pollution control requirements. Major new sources (since 1970) must meet more stringent pollution control procedures through attainment of the EPA's New Source Performance Standards.[177] The Federal Prevention of Significant Deterioration program is designed to protect the nation's clean air regions by seeking to limit air quality degradation in pristine areas.[178] Additionally, the Clean Air Act itself contains specific provisions pertinent to the regulation of emissions from motor vehicles.[179]

State Implementation Plans are the focal point mechanism for both attaining and maintaining air quality standards under the Clean

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(1983). *See also* THE ACIDIC DEPOSITION PHENOMENON AND ITS EFFECTS, CRITICAL ASSESSMENT REV. PAPERS, Pub. Rev. Draft, Vols. 1,2 EPA-800/8-83-016A, EPA-800/8-83-016B (May 1983); Peterson, *Acid Rain Tied Directly to Emissions*, Wash. Post, June 30, 1983, at 1, col. 4.

170. Peterson, *supra* note 169.

171. The State of the Environment: Selected Topics 1983, *supra* note 85, at 18; *Acid Rain-Action: Taken or Planned*, 20 U.N. CHRON. 38 (May 1983).

172. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 50.

173. *Id.*

174. 42 U.S.C. §§ 7402, 7410 (Supp. 1982).

175. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 97. *See also* W. RODGERS, JR., HANDBOOK ON ENVIRONMENTAL LAW (1977).

176. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 97.

177. *Id.*

178. *Id.*

179. 42 U.S.C. §§ 7402, 7410 (Supp. 1982).

Air Act.[180] These plans, however, focus on instate control sources. Consequently, where pollution is transported outside state boundaries, it largely escapes regulatory control.[181] In an attempt to deal with this problem, sections 126 and 110(a)(2)(E) of the Clean Air Act were amended in 1977,[182] to empower the EPA to disapprove any state plan which allows pollution which would prevent the attainment of ambient standards in another state or interfere with the regulation of the Prevention of Significant Deterioration program.[183] A state receiving air pollution from another state may, under section 126, petition the EPA for a determination that actions of the exporting state have been or are presently preventing the attainment of the petitioner's ambient standards and are in direct violation of section 110(a)(2)(E).[184] The exporting state then, in theory, will be directed to change its implementation plan in order to correct the matter. But, because of the difficulties in demonstrating with accuracy the amount of air pollution attributable to a neighboring state or states, these provisions have been without any real or valued effect.[185]

Section 115 of the Clean Air Act has an intriguing, yet untested mechanism where the Administrator of the EPA may require states to revise their air quality plans in order to eliminate those emissions which "cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare in a foreign country."[186] A slow and imprecise process has left this provision largely impotent, although current interest is being revived in strengthening and even testing the mechanism in light of current concerns with acid rain.[187]

In addition to allowing the EPA Administrator to set federal emission standards for new sources,[188] the Clean Air Act also grants him

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180. 42 U.S.C. §§ 7401, 7402, 7601 (Supp. 1982).

181. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 101. *See* W. RODGERS, *supra* note 175, at § 3.8.

182. 42 U.S.C. §§ 7426, 7410(a)(2)(E) (1977) (corresponds to Clean Air Act amendments of Aug. 7, 1977, 91 Stat. 685).

183. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 101-02.

184. 42 U.S.C. § 7410(a)(2)(E) (1977). *See* G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 102.

185. 42 U.S.C. § 7410(a)(2)(E) (1977) states that the plan must contain "adequate provisions (i) prohibiting any stationary source within the State from emitting any air pollutant in amounts which will (I) prevent attainment or maintenance by any other State of any such national primary or secondary ambient air quality standard. . . ." *See* G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 102. *See also* 40 C.F.R. § 51.21(c) (1983).

186. 42 U.S.C. § 7415 (1977).

187. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 103.

188. 42 U.S.C. § 7411 (1976 & Supp. V 1981).

full authority to set standards controlling new as well as existing hazardous sources of air pollution.[189] Defined as an "air pollutant to which no ambient air quality standard is applicable and which in the judgment of the Administrator may cause, or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness,"[190] a "hazardous pollutant" could have very broad implications and include almost anything. Both the legislative history and EPA administrative interpretations, however, construe this provision quite narrowly.[191] Under the Act, in setting and implementing standards, the Administrator is charged with making his judgments so that "an ample margin of safety to protect the public health" is maintained.[192] An industrial activity which jeopardized public health and which was, in theory, allowable under the federal common law of nuisance, would not, in reality, be curtailed or discontinued unless a ready alternative to the "hazard" existed.[193]

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189. 42 U.S.C. § 7412 (1976 & Supp. V 1981).

190. *Id.*

191. W. RODGERS, *supra* note 174, at 277-79.

192. 42 U.S.C. § 7412 (Supp. 1982). *See* W. RODGERS, *supra* note 174, at 277.

193. W. RODGERS, *supra* note 175, at 150. The common law doctrine of nuisance protects one's interest in the use and enjoyment of his real property—as well as his ownership rights to reasonable comfort and convenience. Nuisance has been defined as "an offensive, annoying, unpleasant, obnoxious thing or practice; a cause or source of annoyance, especially continuing or repeated invasions or disturbance of another's right." Renken v. Harvey Aluminum, 226 F. Supp. 169, 175 (D. Ore. 1963). *See also* Borland v. Sanders Lead Co., 369 So.2d 523 (Ala. 1979); W. PROSSER, HANDBOOK OF THE LAW OF TORTS § 89, at 591 (1971).

An action for trespass to realty is tied to the recognition that the owner of such property enjoys exclusive possessory interest in his land against any physical entry upon it. *Id.* § 13, at 67-68. Indirect invasions of particulate and imparticulate matter have been recognized as actionable in trespass. Reynolds Metals Co. v. Lampert, 316 F.2d 273, 275 (9th Cir. 1963). *See also* Boomer v. Atlantic Cement Co., 26 N.Y.2d 219, 309 N.Y.S.2d 312, 257 N.E.2d 870 (1970).

Nuisance and trespass are not mutually exclusive torts. Fairview Farms Inc. v. Reynolds Metals Co., 176 F. Supp. 178, 185 (D. Ore. 1959). Consequently, a continuing trespass is not precluded from also being a nuisance. *Renken*, 226 F. Supp. at 169. Acid precipitation could be classified easily as a private or public nuisance and/or a continuing trespass, depending upon the particular facts of the case.

Although direct evidence linking individual sources of pollution to exact points of precipitation is lacking, there is overwhelming circumstantial evidence which connects power plant emissions with consequent acidification. In any tort action, however, it is not necessary to have ". . . a conclusive demonstration that plaintiff's injury was caused by defendant's conduct." WIGMORE, EVIDENCE § 2498, at 419. The evidence need only be sufficient to link plaintiff's injuries to defendant's actions through appropriate standards. *Id.* Most courts would allow the available evidence to be presented leaving the trier of fact to determine whether the preponderance of the evidence was sufficient to prove the cause of action. PROSSER, *supra*, § 38, at 208 (1971).

The Restatement of Torts (Second), enumerates six factors which should be evaluated in determining whether an activity is abnormally dangerous or, as here, hazardous:

> (a) Whether the activity involves a high degree of risk of some harm to the person, land or chattels of others;
>
> (b) Whether the gravity of harm which may result from it is likely to be great;
>
> (c) Whether the risk cannot be eliminated by the exercise of reasonable care;
>
> (d) Whether the activity is not a matter of common usage;
>
> (e) Whether the activity is inappropriate to the place where it is carried on; and
>
> (f) The value of the activity to the community.[194]

The Restatement is trying to effect a coalescence, if not merger, between strict liability and nuisance. One commentator has in fact suggested that clause (d) "is discriminatory by throwing the strict liability book at the little fellows who handle society's dirty work (like crop dusting, fumigating, and the disposal of hazardous wastes), while forgiving the bigger offenders who distribute their toxic substances in pursuit of occupations commonly undertaken."[195]

The imposition of strict liability upon high risk or health endangering activities could be determined better by reference to such factors as who is, in an economic sense, best able to insure against the risk's occurrence, allocate costs and either actually reduce or give adequate warnings against the specific known dangers.[196] It has been stated very simply that when a technology gets "out of hand" this is basis enough for imposing liability.[197]

While courts have, generally, given evidence of their unflagging support of the Restatement's posture, the better approach to meeting and resolving the issue of strict liability for abnormally dangerous activities in environmental cases is to provide a clear legislative design for the imposition of strict liability.[198] Absent this action, the area will remain subject to unmeasured fluidity if not obfuscation.

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194. RESTATEMENT (SECOND) OF TORTS § 520 (Tent. Draft No. 10, 1974).

195. W. RODGERS, *supra* note 175, at 161.

196. *Id.*

197. *Id.* at 162.

198. *Id.* at 163.

1. Interstate Domestic Actions

The Supreme Court of the United States in *Illinois v. Milwaukee*,[199] concluded that it had original federal question jurisdiction to decide claims asserted by the State of Illinois against several municipalities in Wisconsin for interstate water pollution and that the claims were actionable.[200] The source of the federal common law of interstate pollution remains unclear, as does the ultimate scope of its application. Obviously, it must give way when pertinent federal statutes are in place and controlling. The extent to which state remedies for a given environmental offense can exist coequally with the federal common law of interstate pollution or, in the alternative, are preempted thereby, has yet to be charted with unquestioned definity.[201]

Judicial reasoning in *Milwaukee*[202] suggests that in fashioning a federal common law nuisance right, the Court drew upon broad congressional mandates and previously decided cases concerning interstate air pollution,[203] as well as water allocation cases where the moving party, a state, was capable of invoking the Court's original jurisdiction.[204] Many of the unresolved questions of *Milwaukee*[205] regarding the extent of the federal common law of nuisance and the rights of a private citizen to sue were answered in *Middlesex County Sewage Authority v. National Sea Clammers*[206] and *City of Milwaukee v. Illinois*,[207] and will be analyzed subsequently.[208]

While acid rain is properly regarded as a form of air pollution, the most significant injury from it results on the surface—especially to bodies of water—thus making it a form of water pollution. No present federal legislation takes adequate account of the fact that one material may be responsible for two forms of pollution. Courts may find, however, that the characteristics of acid precipitation tend to place it within the coverage provided by existing legislation, thereby limiting somewhat a plaintiff's remedy.

Federal common law arose and was positioned when there was a

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199. 406 U.S. 91 (1972).

200. *Id.*

201. W. RODGERS, *supra* note 175, at 153. *See generally* W. PROSSER, LAW OF TORTS 541-70 (1955).

202. 406 U.S. at 91.

203. *See, e.g.*, Georgia v. Tennessee Cooper Co., 206 U.S. 230 (1907); Texas v. Pankey, 441 F.2d 236 (10th Cir. 1971).

204. *See, e.g.*, Missouri v. Illinois, 200 U.S. 496, 519-20 (1906) (Holmes, J.).

205. 406 U.S. at 91.

206. 453 U.S. 1 (1981).

207. 451 U.S. 304 (1981).

208. *See infra* notes 223-34.

conflict between federal interests and state law, and no applicable congressional legislation was in existence.[209] Thus, the federal courts developed and shaped a federal common law in order to promote and advance those policies of the Federal Government which necessitated a uniform scheme for protection and enforcement.[210] Accordingly, federal common law is applied by the courts when there are environmental disputes of an interstate nature.[211] Since acid rain is considered a national problem, and inasmuch as state regulation is nonexistent or inadequate,[212] the courts may well view it strictly as a problem of federal dimension.

If any piece of current legislation were to be broadly construed as encompassing a focus for dealing with issues of acidification, it would be the Federal Water Pollution Control Act[213] (FWPCA) or the Clean Air Act[214](CAA). Although the FWPCA may not be fully controlling or directional, the citizen suit provisions[215] of this legislation are similar to those of the Clean Air Act.[216] Interestingly, two recent United States Supreme Court decisions have limited the remedies available under the FWPCA[217] and Congress is presently considering a number of proposed amendments to the Clean Air Act which specifically seek to control and resolve the problems of acid rain.[218] Such congressional activity is obviously viewed as a signal that present legislative enactments are deficient in their coverage of this current ecological challenge. The citizen suit provisions of the FWPCA and the CAA are almost identical—each allowing any citizen or person with an adversely affected interest, to sue[219] under any other statute or the common law. Therefore, these provisions set out express remedies in order to enforce compliance with the standards set in the FWPCA and the CCA.[220]

The courts evaluate all factors in their efforts to determine whether an implied right to provide a private remedy exists within a

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209. City of Milwaukee v. Illinois, 451 U.S. at 309.

210. *Id.*

211. *Id.*

212. New England Legal Foundation v. Castle, 475 F. Supp. 425, 433 (D. Conn. 1979).

213. 33 U.S.C. §§ 1251-1376 (Supp. II 1978).

214. 42 U.S.C. §§ 7401-7642 (Supp. I 1977).

215. 33 U.S.C. § 1365 (Supp. II 1978).

216. 42 U.S.C. § 7604 (Supp. I 1977).

217. Middlesex County Sewage Auth. v. National Sea Clammers Ass'n, 453 U.S. 1 (1981); City of Milwaukee v. Illinois, 451 U.S. 304 (1981).

218. *See infra* notes 257-59.

219. 33 U.S.C. § 1365 (Supp. II 1978); 42 U.S.C. § 7604 (Supp. I 1977). *See also* 40 C.F.R. § 54.3 (1983) (establishing contents of notice to be given to the Administrator in citizen suits).

220. *Id.*

statute. Indeed, the United States Supreme Court has determined that there are four criteria which must be met if an implied right is to be conferred under a given statute.[221]

> First, is the plaintiff one of the class for whose special benefit the statute was enacted . . . that is, does the statute create a federal right in favor of the plaintiff? Second, is there any indication of legislative intent, explicit or implicit, either to create such a remedy or to deny one? . . . Third, is it consistent with the underlying purposes of the legislative scheme to imply such a remedy for the plaintiff? . . . And finally, is the cause of action one traditionally relegated to state law in an area basically the concern of the States, so that it would be inappropriate to infer a cause of action based solely on federal law?[222]

In *Middlesex County Sewage Authority v. National Sea Clammers*,[223] the Supreme Court analyzed the "citizen suits" provision of the FWPCA and determined that the Act did not provide any implied right of action.[224] The Court found that the Act contained ". . . elaborate provisions . . . authorizing enforcement suits by government officials and private citizens. . . ."[225] There was no finding of congressional intent to imply any other remedies for private citizens "suing under the Act."[226] "In the absence of strong indicia of a contrary congressional intent it must be concluded that Congress provided precisely the remedies it considered appropriate."[227]

The plaintiffs in *Middlesex* also attempted to sue under the "any other relief" provision of FWPCA[228] by using the federal common law of nuisance. It was held that the FWPCA totally preempted the federal common law of nuisance in the area of water pollution and provided the basis for all possible federal relief.[229] The Court expanded its consideration of this point in *City of Milwaukee v. Illinois*[230] where it stated that while other remedies were available to plaintiffs in similar

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221. Cort v. Ash, 422 U.S. 66 (1975).
222. *Id.*
223. 453 U.S. 1 (1981).
224. *Id.* at 11-21.
225. *Id.* at 13.
226. *Id.* at 14-15.
227. *Id.* at 15.
228. 33 U.S.C. § 1365(e) (Supp. II 1978).
229. Middlesex County Sewage Auth. v. National Sea Clammers Ass'n, 453 U.S. 1, 21-22 (1981).
230. 451 U.S. 304 (1981).

environmental cases, they could not be based upon the FWPCA or upon federal law grounds.[231]

The Court's determination that there are no implied remedies in the citizen suit provisions of the FWPCA and no federal common law of nuisance regarding water pollution, places the success of a potential plaintiff's nuisance action for acid rain injury in jeopardy. Because of the strong similarity between the citizen suit provisions of the Clean Air Act and the FWPCA, it is logical to assume that suits brought under the CAA or under a theory of nuisance may well be rejected based upon the precedent of *Middlesex*. It is rather obvious that the Supreme Court is limiting the types of actions available to plaintiffs who wish to pursue remedies in the federal courts. It could be argued, nonetheless, that if an acid rain issue is not covered by legislation, plaintiffs should not be limited to the express remedies provided by the Clean Air Act, nor should they be precluded from using nuisance or trespass theories upon which to base their claims. Obviously, if Congress does in fact amend the Clean Air Act to include acid rain provisions, then any plaintiff in a federal court would be limited to those express remedies.

The express remedies available under the Clean Air Act allow the private citizen to entertain suit in order to seek enforcement of any emission limitation standard against the polluter, the Administrator of the United States Environmental Protection Agency, or a state agency.[232] Once a court grants relief, the defendant must meet the emission standards provided by the state and there is no provision for civil penalties or damage awards. Civil penalties cannot be assessed against the defendant even if this remedy is provided by state law.[233] The plaintiff suing under the Clean Air Act may only seek injunctive relief in order to have state emission standards enforced.[234] If the courts extend the principle that no state civil penalties can be added to the remedies provided by the Clean Air Act, then a plaintiff suing under the Act may not be able to assess personal damages as part of his state-given relief.

Establishing jurisdiction will be no difficult task for the acid rain plaintiff. Selecting a forum that is favorable to him may, however, prove more difficult. An action could be maintained in a federal court based upon diversity of citizenship if defendant's sources of pollution are located in another state.[235] Any action based upon a federal com-

231. *Id.* at 329.
232. 42 U.S.C. § 7604 (Supp. I 1977).
233. Illinois v. Commonwealth Edison Co., 490 F. Supp. 1145 (N.D. Ill. 1980).
234. *Id.* at 1151.
235. 28 U.S.C. § 1332 (1976).

mon law claim would have jurisdiction in the federal district court.[236] Jurisdictional claims in federal court based on diversity would be tied to the substantive law of the state where the claim arose.[237] If an action is based upon the citizen suit provision of the Clean Air Act, the jurisdiction is determined to be where the prohibited activity occurred.[238]

Venue under the Clean Air Act is limited to the district where the polluting source is located[239]—perhaps limiting the plaintiff to the substantive law of that particular state. Diversity cases in federal court may be brought only where all plaintiffs or all defendants reside, or where the claim arose.[240] If the claim is not based upon diversity (e.g., federal common law), it must be pursued where all defendants reside or the place where the claim arose—except if another law applies.[241]

Any action which contains elements of diversity may also be brought in a state court[242]—which thereby enables a court to use its long-arm statutes to assert jurisdiction. These statutes may be applied if they do not violate the Due Process Clause of the United States Constitution.[243] An acid rain plaintiff would not be able to obtain jurisdiction in a state other than where either all the plaintiffs or all the defendants reside.[244] The Due Process Clause also ". . . does not contemplate that a state may make binding a judgment *in personam* against an individual or corporate defendant with which the state has no contacts, ties, or relations."[245]

The "purposeful availment" test requires that the defendant seek the benefits and protections of the forum state.[246] It might be exceedingly difficult for an acid rain plaintiff to meet this test since out-of-state electric utilities generally provide electricity, as well as most of their business, in those states in which they are located. It does not appear, however, at this time that the Supreme Court is making this test a rigidly enforceable one.[247] Although not requiring willful action,

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236. New England Legal Found. v. Castle, 475 F. Supp. 425, 440 (D. Conn. 1979).

237. Erie Railroad Co. v. Tompkins, 304 U.S. 64, 78 (1938).

238. 42 U.S.C. § 7604(c)(1) (Supp. III 1979).

239. *Id.*

240. 28 U.S.C. § 1319 (1976).

241. *Id.*

242. *See, e.g.*, Mosby v. Manhattan Oil Co., 52 F.2d 364, 365 (8th Cir. 1931).

243. U.S. CONST. amend. V.

244. *See* Black v. Oberle Rentals, Inc. 55 A.D.2d 398, 285 N.Y.S.2d 226 (1967). *See also* Fisher, *The Availability of Private Remedies for Acid Rain Damage*, 9 ECOLOGY L. Q. 429, 445 n.114 (1981).

245. International Shoe Co. v. Washington, 236 U.S. 310, 317 (1945).

246. Shaffer v. Heitner, 433 U.S. 186, 216 (1977). *See* Hanson v. Denckla, 357 U.S. 235, 253 (1958).

247. Fisher, *supra* note 244, at 440.

the test is met if the nonresident has "actual knowledge or constructive knowledge of the in-forum effects of its conduct."[248] Once a circumstantial link is established by the plaintiff, it is taken to be sufficient notice if the defendant continues to emit pollutants.[249] While this circumstantial link could be demonstrated with relative ease, defendant "sulfur and nitrogen dioxide polluters" have failed to acknowledge their fault. While it is recognized that states can exercise jurisdiction over a defendant who causes an effect in the forum state by an act done elsewhere, thereby establishing a cause of action,[250] this will be denied where the nature of the effects and the defendant's relationship to the state make the jurisdiction unreasonable.[251]

Current standing requirements for the maintenance of environmental damage suits—as embodied in *Duke Power Company v. Carolina Environmental Study Group*[252]—present yet another obstacle for the putative acid rain litigant. In *Duke*, the Supreme Court determined that one could obtain standing if he had sustained an injury in fact, and there was a causal link established between the asserted injury and the conduct of which was complained.[253] While the first part of this test requires the moving party to have a personal stake in the outcome,[254] with specific, concrete facts showing individual injury,[255] the second prong requires that the causal link be fairly traceable.[256] Standing may be denied a plaintiff who cannot show a substantial likelihood that the relief requested will prevent or eliminate the injury. Not only would an acid rain plaintiff have difficulty—given the uncertainty of scientific proof—establishing a specific injury with a traceable causal link between that injury and the conduct complained of, but the likelihood of any permanent relief being granted, which would either prevent or eliminate the injury, is rather remote due to the current state of the economy.

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248. *Id.* at 441.

249. *Id.*

250. Kulko v. California Superior Ct., 436 U.S. 84, 96 (1978).

251. *Id.*

252. 438 U.S. 59, 72-74 (1978).

253. *Id.* at 72.

254. Baker v. Carr, 369 U.S. 186, 204 (1962).

255. Warth v. Seldin, 422 U.S. 490, 501 (1975).

256. Arlington Heights v. Metropolitan Housing Development Corp., 429 U.S. 252, 261 (1977).

2. Legislative Initiatives from Congress

A number of congressional initiatives have been advanced during the 98th Session of the United States Congress. Both in the Senate[257] and in the House[258] the basic approach of the proposals is to promote and develop control strategies in the thirty-one states and the District of Columbia designated as acid deposition import regions. The bills require these states to reduce their annual sulfur dioxide emissions to a

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257. S. 145 was sponsored by Senator Mitchell to amend the Clean Air Act to better protect against interstate transportation of pollutants and to control existing and new sources of acid deposition. S. 145, 98th Cong., 1st Sess. (1983). S. 454, sponsored by Senator Byrd, would structure an Acidic Deposition Mitigation Research Act in order to provide an accelerated study of both causes and effects of acidic deposition during a five year period of time; as well as to provide grants for mitigation at sites where there are harmful effects on ecosystems resulting from high acidity. S. 454, 98th Cong., 1st Sess. (1983).

S. 766, sponsored by Senator Randolph, would amend the Clean Air Act and create the Acidic Deposition Study and Sulfur Emission Limitation Act which would, in turn, provide for acceleration of the study of the causes and effects of acidic deposition during a five year period. S. 766, 98th Cong., 1st Sess. (1983). The Act would also limit the increase in sulfur dioxide emissions during that period and provide grants for mitigation at those sites where there are harmful effects on ecosystems resulting from high acidity. *Id.*

Senator Stafford sponsored S. 768 to amend the Clean Air Act. S. 768, 98th Cong., 1st Sess. (1983). S. 769, also sponsored by the Senator, would add the Acid Deposition and Sulfur Loadings Reduction Act. S. 769, 98th Cong., 1st Sess. (1983). S. 877, sponsored by Senator Hollings, entitled the Acid Deposition Reporting Act of 1983 is designed to coordinate efforts by the National Weather Service and NOAA to report routinely on the levels of acid content found in precipitation and dry deposition throughout the United States. S. 877, 98th Cong., 1st Sess. (1983).

Senator John Danforth introduced S. 2594 which presented a rather creative Trust Fund approach to resolving problems of acidification. S. 2594, 97th Cong., 2nd Sess. (1982). Although the proposal died, it would have required the creation of an Acid Deposition Reduction Fund from which grants would be made to assist utility companies in meeting particular emission reduction requirements. *Id.* The Trust Fund was to have been maintained by assessing acid deposition reduction fees to every utility selling electricity. *Id.* Based upon a rate established by kilowatt hours and paid to the United States Treasury, the Secretary of Treasury would have thereupon been placed in the role of trustee of the fund—reporting directly to Congress about the Fund's growth. *Id.*

258. H.R. 2794, 98th Cong., 1st Sess. (1983), sponsored by Mr. St. Germain would amend the Clean Air Act by an Acid Deposition Control Act which would mandate state control strategies for reducing acid depositions by reducing sulfur dioxide emissions; H.R. 3251, 98th Cong., 1st Sess. (1983), sponsored by Mr. D'Amours, would control acid precipitation mitigation areas where control strategies for reduction are mandated with strict frames for compliance; and H.R. 3400, 98th Cong., 1st Sess. (1983), sponsored by Messrs. Sikorski, Waxman and Gregg, is a bill to amend the Clean Air Act by a National Acid Deposition Control Act.

particular level,[259] and set a time period for major stationary source subjects to be in compliance with emission limitations.[260]

The National Acid Deposition Control Act of 1983 (H.R. 3400), was introduced on June 23, 1983, to amend the Clean Air Act in order to control particular sources of sulfur dioxides and nitrogen oxides and thereby reduce acid deposition. This Act merits particular analysis since it is the most comprehensive and most equitably balanced of all the proposals. Under its Acid Rain Control Program,[261] a fourteen million ton reduction in emissions of sulfur dioxide and nitrogen oxides would be required by setting in place, first, federally mandated emission limitations for the largest sources of sulfur dioxide. By 1990, the fifty largest emitters among those power plants which burn medium or high sulfur coal would have to install scrubbers which would reduce sulfur dioxide emissions by approximately seven million tons.[262] Presently, scrubbers are required of all new plants; many existing plants have them as well.[263] The importance of the scrubbers is that their use would mean, in actuality, that the utilities would have no incentive to switch to low sulfur coals. This, in turn, would result in maintaining, in large part, the current levels of employment in the high-sulfur coal mining industry. In fact, the employment levels could be increased with anticipated growth over the years in the generation of electricity.

Second, under this proposed legislation, the states would have until 1993 to develop strategies designated to reduce sulfur dioxide emissions by ten million tons below the levels of 1980. Each would be assigned a certain required share of reductions in proportion to its present emissions and would be allowed to take credit for the reductions achieved by the federally mandated program.[264]

Third, under a nation-wide plan designed to finance pollution control equipment, a fee of one mill, or one-tenth of a cent, would be levied on either the generation or the import of a kilowatt hour of most electrical energy until 1993.[265] The importance of this measure is that for the average family using each month some five hundred hours of electricity, approximately only fifty cents extra would be added to their bill. Thus, this national fund would pay ninety percent of the capital

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259. See, e.g., H.R. 2794, *supra* note 258, § 183(a)(1), where the level is set at a "reduction in annual sulfur dioxide emissions equal to that fraction of 10,000,000 tons which is the ratio of all the actual utility emissions in such State in excess of 1.2 pounds of sulfur dioxide per million British thermal units." *Id.*

260. *See, e.g.*, H.R. 3251, *supra* note 258, § 183, where 1993 is set as the control year deadline.

261. H.R. 3400, *supra* note 258, § 181.

262. *Id.* § 185(c)(1)(B).

263. 40 C.F.R. § 60.40 (1982). *See generally* W. RODGERS, *supra* note 175, at 258.

264. *See supra* note 260, § 191.

265. *Id.*

costs of installing either scrubbers or other control equipment required by utilities to reduce their emissions.[266]

The fourth element of the Acid Rain Control Program would be the tightening of the new source performance standards for nitrogen oxide emissions from new power plants. It has been projected that by 1993 this, in turn, would reduce nitrogen oxide emissions by about one and one-half million tons.[267] Finally, in addition to toughening the standards for new power plants, beginning with the 1986 models, new light and heavy-duty trucks would be required to meet tighter standards for nitrogen oxide emissions.[268] The light-duty truck levels would then be comparable to those presently being achieved by new cars. And, for the first time, heavy-duty trucks would be required to reduce nitrogen oxides. By 1993, it is estimated that these standards would reduce nitrogen oxide emissions by two and one-half million tons.[269]

3. Obstacles to Enactment

The scientific inability to determine accurately the specific contributions of one area of the country's pollution to another's environmental damage creates an almost insurmountable obstacle to many current legislative efforts to prioritize the significance of midwestern emissions of sulfur to correlative acid rainfalls in sensitive areas of the Northeast.[270] Because of the complex changes pollutants undergo in the air, it is recognized that a reduction in emissions might well not benefit all states equally; practically speaking, fall-out might decrease unevenly from place to place. Yet there is agreement over the conclusion that total fall-out over a whole continent, for example Europe or North America, would be reduced approximately in direct proportion to the reductions in the amounts of sulfur and nitrogen emitted there.[271]

It was determined by The Congressional Research Service that in the United States, if passed into legislation, Senator Stafford's bill

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266. *Id.* § 196.

267. *Id.* tit. II, § 201.

268. H.R. 3400, *supra* note 258, tit. II.

269. *Id.* Press Conference interview with Congressmen Henry A. Waxman and Gerry Sikorski (June 23, 1983). The Press Conference concerned the Introduction of the National Acid Deposition Control Act of 1983, together with a Summary of the Proposed Legislation, issued by the Congressmen. *Id. See generally* Kock, *Government Financial Incentives for the Protection of the Environment,* in TRENDS IN ENVIRONMENTAL POLICY AND LAW, *supra* note 85, at 61.

270. *See* Barringer, *Drifting Air Pollution Beginning to Pit States Against Their Neighbors,* Wash. Post, Oct. 24, 1983, at A9, col. 1; Gorham, *What to Do About Acid Rain,* 85 TECHNOLOGY REV. 58, 68 (1982).

271. 20 U.N. CHRON. 38, 39 (1983).

would reduce Indiana coal production by fifty percent and thereby add ten percent to the unemployment rate in the major coal producing counties in Indiana.[272] Indeed, in both Senator Stafford's and Senator Mitchell's acidification legislative proposals more than half of all emission reductions would be mandated to come from the Midwest, while reductions up to a maximum of only five percent would be required of New York and the New England region.[273]

The American Public Power Association (APPA) is endeavoring to seek what it terms an "equitable" acid rain control solution.[274] Under this approach, legislative proposals would be required to meet "reasonable standards of effectiveness, economy and equity."[275] More specifically, the Association has asserted that acidification control legislation should incorporate provisions for: acceleration of acid rain research; mid-course corrections; an equitable distribution of requirements among all emitters of acid rain precursors; specific dollar amounts allocated to meet the most cost-effective emission reduction measures; recognized flexibility in choosing strategies for reduction of emissions; mitigation measures, such as lake liming; a definable limit placed on national expenditures devoted to resolving problems of acidification; credit for the use of energy-efficient or non-fossil fuel and an allowance for alternative technological solutions whereby purchases of known benefits and expenditures would be granted.[276]

The legislative proposal which best serves the needs of the Association is that which was introduced by Representative Henry Waxman. The APPA, however, has championed a tax on "Btu's" or emissions which conforms to present scientific uncertainties in the field, rather than Congressman Waxman's proposal for a 1 mill/kilowatt hour fee on electricity generation.[277] The APPA would, furthermore prefer to see the adoption of an approach wherein all stationary sources of sulfur emissions are dealt with—thus extending costs and control requirements to include other industrial sectors—and not merely the utility sector.[278]

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272. Senator Dick Lugar, Newsletter 2 (Aug. 1983). *See also Acid Rain Erodes Business Profits Too*, 30 BIOSCIENCE 787 (1982).

273. *Acid Rain Erodes Business Profits Too, supra* note 272, at 789.

274. *Inside E.P.A.*, 4 WEEKLY REP. 1, 11 (No. 29, July 22, 1983).

275. *Id.*

276. *Id.*

277. *Id.*

278. *Id.*

4. Caution

The cautious pace at which the Reagan administration is proceeding in structuring an effective response to the problems of acidification is tied to economic considerations. The Administration is trying to reduce the major air pollution concerns through enforcement of the Clean Air Act,[279] and the achievement of a stronger scientific understanding and broader acceptance of the causes and effects of acid rain, so that eventual regulatory actions which may be taken will yield observable and enduring environmental effects and not play havoc with the country's economic base.[280]

It is obvious from previous analysis that scientific disagreements and uncertainties would impose, if acted upon before resolution at least by consensus agreement, major economic burdens upon the industrial complex which sustains the very spirit of capitalism and which, in turn, has nurtured the American economy to its greatness over the years. The uncertainties regarding the extent to which reductions in sulfur dioxide emissions will lead to reductions in sulfur acid deposited downwind make it exceedingly difficult, if not impossible, to create a legislative control scheme and impose stringent regulations utilizing a standard of equity recognized by all the affected states.[281] Measured, cautious progress rather than precipitious actions should be the watchword.

5. Costs

Perhaps the single inhibiting factor to public acceptance of acid rain legislation is not the uncertainty over its proven causes and effects, but rather, the costs of such programs of containment. The Edison Electric Institute, a trade association for the power industry, asserted that legislative programs pending before the Congress designed to reduce acid rain would bring huge increases in the electric bills of all consumers.[282]

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279. Presently, the Clean Air Act controls 301 precursor pollutants—among them, sulfur dioxide, nitrogen dioxide and ozone. A fifteen percent reduction in sulfur dioxide emissions from power plants has been achieved since the mid 1970's, even though the generation of electricity increased by almost sixty percent during the same period. ENVIRONMENTAL QUALITY 1982—13th ANNUAL REPORT OF THE COUNCIL ON ENVIRONMENTAL QUALITY 216 (1983).

280. *Id.* The recent National Academy of Science Report on Acidification is, of course, a major achievement. Total acceptance and agreement upon its findings have yet to be recorded. NATIONAL ACADEMY OF SCIENCE, *supra* note 167.

281. ENVTL. QUALITY, *supra* note 279, at 215.

282. Hamilton, *Acid Rain Cleanup Cost Debated*, Wash. Post, June 29, 1983, at F3, col. 1. Midwestern power industries predict rate increases of up to 50 percent in some

There are two kinds of sulfur contained in coal: pyrite (iron sulfur) and organic sulfur.[283] If after first crushing and grinding, coal is then washed, a percentage of the pyrite sulfur will be removed from it. Use of this mechanical process is estimated to cost approximately $1.00 to $6.00 per ton of coal.[284] On an average basis, this process will remove anywhere from fifty to ninety percent of the pyrite from some coals.[285] While the chemical methods are regarded as more effective, they have not been fully developed yet and are considerably more expensive. They can remove both organic sulfur and pyrite. Elimination of from ninety to ninety-five percent of the pyrite and half the organic sulphur would cost anywhere from $20.00 to $30.00 per ton of coal.[286] The extra costs associated with coal washing range from less than $1.00 to approximately $3.00 per megawatt/hour which, practically, adds between one and six percent to the costs of electricity.[287] For chemical desulfurization, the costs would be more: about $8.00 to $12.00 per megawatt/hour which would, in turn, add from between fifteen and twenty-five percent to electricity costs.[288]

The Organization for Economic Co-operation and Development (OECD) estimates—conservatively—that the average costs to stop a ton of sulfur from being released into the air is $800.00.[289] The cost of removing each ton of sulfur from oil ranges from $1,000.00 to $2,200.00.[290] If the annual sulfur emissions in northwestern and southern European countries were cut by about half (or approximately 5.9 million tons) within the next ten to twenty-five years, by seeking only to control those emissions from conventional power stations, it would cost the countries about ten percent of the total cost of producing their electricity.[291]

The costs of maintaining and advancing comprehensive acid rain research are of some dimension as well. For the fiscal year 1980, the United States spent more than $11 million dollars on acid rain research; in fiscal 1981, $13 million; in fiscal 1982, $17.5 million; in fiscal 1983, $22.3 million and in fiscal 1984, $27.6 million.[292] The Interagency

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areas if federal legislative proposals are passed. *Id. See also* Peterson, *Acid Rain Tied Directly to Emissions*, Wash. Post, June 30, 1983, at 1, col. 4.

283. UNEP/GC.11/4, *supra* note 9, at 23-25; U.N. CHRON., *supra* note 49, at 41.
284. UNEP/GC.11/4, *supra* note 9, at 23-25.
285. *Id.*
286. *Id.*
287. *Id.*
288. *Id.*
289. U.N. CHRON., *supra* note 49, at 41.
290. *Id.*
291. *Id.*
292. ENVTL. QUALITY 1982, *supra* note 279, at 216-17.

Task Force on Acid Precipation charged with coordinating the federal research program, and established by the Acid Precipitation Act of 1980, reports that the budgetary expenditures for acid rain research have increased over 150 percent since the creation of the Task Force.[293] This shows with clarity the commitment of the Reagan administration to seek adequate scientific data before effective regulatory action is to be designed.[294]

6. A Joint Canadian Effort

It has been estimated that some fifty thousand lakes in the United States and Canada will have—if present acidification trends continue—no fish within fifteen years.[295] In 1909, the United States–Canada International Joint Commission began its work on dealing with transboundary water problems and today continues to monitor closely and assist in discerning bilaterally effective solutions to pollution issues.[296]

United States-Canadian efforts to come to grips with the issue of preserving transboundary air resources commenced with a "Bilateral Research Consultation Group on the Long-Range Transport of Air Pollutants," established in 1978.[297] From the work initiative of the Group came a "Joint Statement on Transboundary Air Quality" in 1979, expressing a determination either to reduce or prevent transboundary air pollution, and in 1980, a more expansive "Memorandum of Intent Concerning Transboundary Air Pollution."[298] Specific policies and strategies were set forth as needed within this document in order to be responsive to the various problems of transboundary pollution.[299] Not surprising, however, is the fact that disagreement exists between Canada and the United States regarding the extent to which all necessary actions needed to reduce transfrontier pollution must be taken.[300] The

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293. *Id.*

294. *Id.*

295. Clapham, *supra* note 31, at 11.

296. *See* Waters Boundary Treaty, Jan. 11, 1909, United States–Great Britain, 36 Stat. 2448, T.S. No. 548. The Treaty created the International Joint Commission (IJC). *Id.* art. VII. The Treaty allows the IJC to address "any other questions or matters of difference" between the countries. *Id.* art. IV. *See also Beyond the Bargaining Table: Canada's Use of Section 115 of the United States Clean Air Act to Prevent Acid Rain*, 16 CORNELL INT'L L. J. 193, 200-02 (1983); L. BLOOMFIELD & G. FITZGERALD, BOUNDARY WATER PROBLEMS OF CANADA AND THE UNITED STATES (1918-1958) (1958).

297. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 124. *See also* J. CARROLL, ACID RAIN: AN ISSUE IN CANADIAN AMERICAN RELATIONS (1982).

298. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 125.

299. *Id.*

300. *Id.*

exact status of the commitments made in the Memorandum remains unclear since the document has neither force nor effect as a treaty and, instead, relies solely upon mutual good-will or comity in order to effect its purposes.[301]

On June 16, 1983, a concurrent resolution was introduced into Congress by Representative Corcoran "expressing the sense of the Congress that the United States and Canada should enter into formal treaty negotiations with the objective of resolving the issue of acidic deposition."[302] Perhaps the residue of good will between the two countries will be the modus operandi for researching a successful resolution of this current problem.

VI. CONCLUSIONS

In order to reduce the transboundary flow of sulfur pollution, optimum ceilings for total atmospheric loadings need to be established and methods found to achieve these reductions in emissions without the expenditure of unrealistic costs. Of course, the critical factor to achievement of these positions is a realistic determination of the amount of damages which could be avoided by various degrees of

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301. *Id.* at 126. *See* Gwertzman, *Canadians Sign Pact with U.S. on Great Lakes,* N.Y. Times, Oct. 17, 1983, at A1, col. 5. The agreement is designed to further efforts to cleanse the Great Lakes of phosphorous pollutants by about fifteen percent and is entitled, An Agreement Amending the Agreement of November 22, 1978, on Great Lakes Water Quality with Supplement to Annex 3, signed October 16, 1983. *See generally* Marshall, *Air Pollution Clouds United States-Canada Relations,* 217 SCI. 1118 (1982).

302. A liaison committee between The National Conference of Commissioners on Uniform State Laws and The Uniform Law Conference of Canada has sought to advance a proposal designed to establish concrete guidelines for litigating acid rain suits, which states, in pertinent part: "An action or other proceeding for injury or threatened injury to property or person in a reciprocating jurisdiction caused by pollution originating, or that may originate, in this jurisdiction, may be brought in this jurisdiction." *Uniform Transboundary Pollution Reciprocal Access Act (Proposal by Amax Environmental Services, Inc., at 2),* 1983 A.B.A. SEC. NAT'L RES. L. (Attachment). As submitted, the proposal would enable a court to exercise jurisdiction in the state where the pollution originates while the law of the state where the pollution occurred would be controlling. "Actions brought under the Act would be controlled by the law of the jurisdiction in which the pollution originated, excluding the choice of law rules. A person whose injury occurred outside of the jurisdiction would have the same rights as a person whose injuries occurred within the jurisdiction." *Id.* Thus, a claim for damage caused by acid rain which took place in State A could be entertained in State B; State A's substantive law would be available. *Id.*

The American Bar Association's Section on Natural Resource Law has criticized this proposal on the grounds that its adoption and implementation would jeopardize judicial efforts to seek a standard of uniformity in environmental decisionmaking and bring a dimension of confusion to industrial planning. *Resolution on Proposed Uniform Transboundary Pollution Reciprocal Access Act,* 1983 A.B.A. SEC. NAT'L RES. L. 2-3.

abatement. Scientific uncertainty concerning the full etiology of the phenomenon of acid precipation prevent conclusive action from being taken.[303]

No doubt, the most efficient manner to control pollution is to use fuels low in sulfur.[304] This procedure will not be feasible much longer, as the world supply of such fuels is limited.[305] A solution with a more permanent effect is to be found by the use of alternative sources of energy to fossil fuels development and utilization of energy conservation directives; the use of the best available technology to reduce sulfur and nitrogen oxide emissions which, at the same time, is economically feasible and a heretofore unprecedented level of public education, understanding and commitment to environmental protection.[306]

Scrubbers will, no doubt, continue to be used widely. Yet, the state of the art is such that the new precombustion cleaning and coal burning technologies will—of necessity—have to be developed together with ways of controlling nitrogen oxide emissions. While a number of such technological advances are well under development if not, indeed, close to commercialization, actual clean air legislation seldom delineates a clear and unambiguous strategy for technological development. The only way in which new technologies of this sophistication and dimension can be commercially successful is for a market to exist for them at the time of their ultimate perfection.

> Because of the role of government in determining the favoured means of air pollution control, policy has a greater influence on the structure of the market than would otherwise be the case. Decisions which mandate one approach may close the options for other approaches that might have been preferable in the long run. On the other hand, keeping options open means higher emissions in the interim, with all of the downwind damage this can cause.[307]

Corporate decisions regarding the utilization or non-utilization of environmentally sound techniques designed to remove sulfur from coal before it is burned depend, in the final analysis, upon market mechanisms as well as a balancing of the costs and benefits of various op-

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303. Rosencranz, *International Perspectives on the Long-Range Transport of Sulfur Oxides*, in AIR POLLUTION CONTROL: NATIONAL AND INTERNATIONAL PERSPECTIVES, *supra* note 85, at 81-83. *See generally* G. WETSTONE & A. ROSENCRANZ, *supra* note 1.

304. U.N. CHRON., *supra* note 49, at 41.

305. *Id.*

306. *See* The State of the World Environment 1972-1973, Report of the Executive Director, *supra* note 85, at 27, 28.

307. Clapham, *supra* note 31, at 19.

tions, government regulations, their own physical plant and relative economic positions if one action is pursued over another.[308]

The prospects for transnational action regarding abatement or containment of transboundary air pollution of acid-forming pollutants look bleak. No presently existing set of international principles or set of customary practices exist which can compel remedial action for acid depositions.[309] Until a fair degree of consensus in the scientific community is established which substantiates the fact that sulfate causes serious problems of human health and significant economic effect, the problem of acid deposition will not be viewed seriously by the public. Thus, no popular coercion will be exerted on public officials to take whatever remedial action is necessary to resolve the issue.[310] Lacking verifiable scientific proof of causation, the polluting states will continue to demand *real* proof of damage, not circumstantial evidence, together with identification of specific sources before admitting to liability.[311]

National legislative responses such as those under present consideration in the United States Congress, together with the recently enacted Furnance Legislation in the Republic of West Germany are significant precursors to coordinated legal responses to issues of acidification. The Transboundary Air Pollution Convention is, of course, to be recognized as well, even though its passage is more symbolic than constructive or implemental. From actions of this consequence may come the establishment of legal norms with sanctions for the violation thereof. The courts interpreting legislation and the members of the legal profession practicing thereunder each have a blueprint for action. Transnationally, with a legislative framework such as The Transboundary Air Pollution Convention—weak though it may be—interpretative mechanisms are thus in place for custom and usage to develop and support an eventual theory of recognized legal liability for violation of transboundary air pollution rights.

Ideally, law and science should march together in charting new developmental areas; but, given the imprecision of science in the particular areas of concern, the law should assume a position of activity and become the major force of direction, and not a mere reactive mechanism to change. If present legislative control schemes are, over the course of time, proven by science to be either too weak or oppressive, amendatory mechanisms may be initiated. The important point is to formulate a new beginning now, before all such action is for naught.

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308. *Id.* at 18.
309. G. WETSTONE & A. ROSENCRANZ, *supra* note 1, at 89.
310. *Id.* at 85.
311. *Id.*

The fundamental factor in determining the extent to which a nation-state observes international law and, specifically environmental laws, is its rather pragmatic determination of the cost and advantage of applying such law.[312] Nations negotiate and undertake lawmaking directed by a vector of competing forces and interests. While obviously drawn together due to association by common fears, values and interests; they are divided by suspicion, nationalism, acquisitiveness, fear, pride, aggression and ignorance of the others' motives.[313]

Changing circumstances dictate the actual level of response the law takes in order to be reflective of the social order. Although such a response does not guarantee harmony, it is a more realistic gauge of individual interests.[314] Only when the world community realizes that the benefits of coming to grips with—if not resolving—the problems of acidification far outweigh the costs and, furthermore, are consistent with a notion of a developed, humane society, will definitive action be the order of the transnational day.

312. G. SMITH, RESTRICTING THE CONCEPT OF FREE SEAS: MARITIME LAW RE-EVALUATED 119 (1980).

313. *Id.*

314. *Id.* at 120.