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Binational Uses of Transboundary Air Resources: The International Entitlement Issue Reconsidered

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INTRODUCTION

International competition for clean air resources has intensified perceptibly over the last few years. A progressive mapping of national ambient air quality[1] and vastly improved monitoring networks and tracing techniques increasingly provide evidence of environmental, public health, and economic implications of foreign-origin air pollutants. Ever more often it is apparent that management of national air quality presupposes effective control of air quality within the international air shed.[2] The international legal challenge posed by this situation is first of all a "constitutional" one, namely, adaptation of decisionmaking processes traditionally steeped in deference to political boundaries of states to the reality of regional, even global, environmental interdependence.[3] However, the

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1. Industrialized countries have increasingly resorted to enactment of certain ambient quality standards as one strategy for managing air quality. For a general discussion of the approach in the United States, *see e.g.*, Lutz, *Managing A Boundless Resource: U.S. Approaches to Transboundary Air Quality Control*, 11 ENV'TL. L. 321 (1981); in West Germany, Currie, *Air Pollution Control in West Germany*, 49 U. CHI. L. REV. 355 (1982); in Japan, J. GRESSER, K. FUJIKARA & A. MORISHIMA, ENVIRONMENTAL LAW IN JAPAN 254-59 (1981). Note also that EEC legislation incorporates ambient air quality standards. *See* Council Directive of 15 July 1980 on Air Quality Limit Values for Sulphur Dioxide and Suspended Particulates, 23 O.J. EUR. COMM. (No. L 228) 30 (1980); Council Directive of 3 December 1982 on a Limit Value for Lead in the Air, 25 O.J. EUR. COMM. (No. L 378) 15 (1982); and Council Directive of 7 March 1985 on Air Quality Standards for Nitrogen Dioxide, 28 O.J. EUR. COMM. (No. L 87) 1 (1985).

2. "International air shed" or "transboundary air resource," as used in this paper, denotes a common air mass above the territory of a limited number of states. It is characterized by a functional interdependence of its uses by sharing states. *See also infra* note 26; and the Swedish government's view of the notion of "shared natural resources," *referred to* in Report of the Executive Director, Co-Operation in the Field of the Environment concerning Natural Resources Shared by Two or More States at 3, para.7, U.N. Doc. UNEP/GC/44, (1985).

3. *See generally* Handl, *Transboundary Air Resources in North America: Prospects for a Comprehensive Management Regime* in TRANSBOUNDARY AIR POLLUTION: INTERNATIONAL LEGAL ASPECTS OF THE COOPERATION OF STATES (C. Flinterman, B. Kwiatkowska & J. Lammers eds. 1986).

question of substantive criteria for the determination of rights and obligations of states with regard to transboundary air resources can hardly be considered negligible. States, directly or indirectly, remain confronted with the issue irrespective of the applicable procedural framework for managing transboundary resources. For as long as economic necessity dictates that air be used as a pollutant dispersion medium, the allocation of shares to the pollution-carrying capacity of a given transboundary air shed will present itself as an important, and thus possibly contentious, international issue.

Despite international progress in defining such substantive criteria, either by way of enactment of specific environmental air quality standards[4] or the adoption of other conduct-related standards bearing on the quality of transboundary air resources,[5] states' entitlements regarding the use of such resources remain largely circumscribed by customary international legal principles. With the increase in states' awareness of and sensitivity to transboundary air pollution, the question as to the contents and the specificity of these principles has acquired corresponding significance.

Opinion on the basic utility of customary international law in resolving transboundary resource issues is not uniform. Some question outright the usefulness of accepted norms of international environmental law. International legal principles applicable to transboundary natural resources developed in response to international conflicts in largely localized contexts. For that reason it is concluded that traditional international law represents an inadequate tool for the resolution of today's long-range transboundary air pollution (LRTAP) problems.[6] . Others, referring to the fact that the concept of "significant harm" plays a central role in the delimitation of states' rights to transboundary natural resources,[7] have criticized the crudeness of the traditional approach which appears to be at odds with the frequently more subtle transboundary resource problems encountered nowadays.[8] Most significantly, perhaps, it has been alleged

4. As to EEC Council Directives specifying ambient air quality values for certain pollutants, see *supra* note 1.

5. *See, e.g.*, 1979 Economic Commission for Europe (ECE) Convention on Long-Range Transboundary Air Pollution, U.N. Doc. ECE/HLM.1/R.1 (1979), *reprinted in* 18 I.L.M. 1442 (1979); and, in particular, the 1985 Protocol thereto on the Reduction of Sulphur Emissions or Their Transboundary Fluxes by at least 30 Per Cent, *done* July 9, 1985. *See also infra* note 204.

6. *See, e.g.*, Wetstone & Rosencranz, *Transboundary Air Pollution: The Search for an International Response*, 8 HARV. ENVT'L. L. REV. 89, 122-123 (1984); *cf. also* Johnstone & Finkle, *Acid Precipitation in North America: The Case for Transboundary Cooperation*, 14 VAND. J. TRANSNAT'L. L. 787, 835 (1981).

7. *See infra* text at notes 39-42.

8. The traditional approach's focus not on transboundary air quality as such, but on "tangible damage" due to transboundary air pollution, fails, so it is claimed, to address the problem of injurious transboundary effects which by themselves might not be considered "significant" but which in the context of an already polluted air shed do entail harmful consequences. *See* Wolfrum, *Die grenzüberschreitende Luftverschmutzung im Schnittpunkt von nationalem Recht und Völkerrecht*, 99

that customary international law does little to foster prevention of injurious transboundary air pollution.[9]

Some of this criticism appears excessive, if not altogether unfounded. Much of it indicates a lack of attention to the procedural implications of the entitlement rule as it has evolved in the practice of states.[10] But whatever its degree of unjustifiability, it helps to convey the idea that today traditional principles for allocating rights and obligations among states constitute less basic normative precepts for, than mere dispositive guides to, the determination of a state's entitlement. This effect is reinforced by a second factor, namely, evidence of a possible trend towards what some have pointedly labelled "relative normativity,"[11] a concept that is epitomized in the notion of "soft law."

There is no denying that in any international context identification of the demarcation line between law and non-law may constitute a challenging task, given the nature of the international law-making process as frequently informal and essentially decentralized.[12] But any conceptualization of the manifold and complex indicia of international law in terms of "hard" vs. "soft" law is inherently problematical. Apart from their basic ambiguity,[13] the notions imply a graduation of normativity which is logically untenable.[14] An alleged norm either constitutes a legal prescription or it does not.[15] Legal norms are carried by expectations of authority and of control.[16] By contrast "soft law," typically exemplified in the ascription of "legal" status to resolutions or decisions of interna-

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DEUTSCHES VERWALTUNGSBLATT 493, 495-96 (1984); and *see generally* Kloepfer, *Grenzüberschreitende Umweltbelastungen als Rechtsproblem, id.* at 245, 255.

9. *See,e.g.*, Wetstone & Rosencranz, *supra* note 6, at 123.

10. For details, see *infra* sections entitled *Mutually Operating Restraints on States' Uses of Transboundary Natural Resources: Some Preliminary Considerations* and *The Threshold Issue.*

11. *See* Weil, *Towards Relative Normativity in International Law?*, 77 AM. J.INT'L. L. 413 (1983); and see further Schwarzenberger, *The Credibility of International Law,* 37 Y.B. WORLD AFF'S. 292 (1983).

12. *See generally,* McDougal & Reisman, *The Prescribing Function in the World Constitutive Process: How International Law Is Made,* 6 YALE J. WORLD ORDER STUD. 249 (1980).

13. Thus as Prof. Reisman has pointed out, so-called "hard law" may well turn out to be ineffective and, vice-versa, so-called "soft law" may display all the characteristics of a legal norm. The "references of these terms are [consequently] as ambiguous as the basic distinction they seek to draw": Reisman, *International Law-Making: A Process in Communication,* ASIL PROC. 101, 102 (1981).

14. *See also* Thürer, *"Soft Law"—Eine Neue Form von Völkerrecht?*, Neue Zürcher Zeitung, July 21-22, 1984, at 31.

15. This is not to deny the very practical import of non-legal international prescriptions as expressions of a political consensus among states. *See* Schreuer, *Die innerstaatliche Anwendung von internationalem "soft law" aus rechtsvergleichender Sicht,* 34 ÖSTERR. ZEITSCHRIFT F. ÖFFENTL. RECHT U. VÖLKERRECHT 243 (1983); and Lang, *Die Verrechtlichung des internationalen Umweltschutzes,* 22 ARCHIV DES VÖLKERRECHTS 283, 303-04 (1984); see further *infra* note 17.

16. *See generally* Reisman, *Law from the Policy Perspective,* in M. MCDOUGAL & M. REISMAN, INTERNATIONAL LAW ESSAYS: A SUPPLEMENT TO INTERNATIONAL LAW IN CONTEMPORARY PERSPECTIVE 1 (1981).

tional organizations, informal international understandings, or certain other international commitments entered into by states,[17] lacks in this respect. It is an over-inclusive concept and thus blurs the crucial characteristics of legal norms. The result is a loss of clarity as to the status of the norm concerned. The concept of "soft law," whether by design[18] or by default, is thus apt to advance legal pretensions.[19] By the same token, the concept tends to undermine the authority of established legal norms. For acceptance of graduated normativity works both ways.

It is this latter impact, indeed potentially intended result, of the use of "soft law"—that is, the relegation of established legal norms to secondary status on a graduated scale of normativity—that is of special concern in the present context. Usage of the notion is likely to promote the idea that even fundamental entitlements are essentially negotiable. Given the generality of many basic international legal principles, their application in a given context presupposes, by necessity, a large measure of cooperation among states concerned to clarify specific legal implications of the basic concept. To that extent entitlements are routinely "negotiable." But any development which fosters the "negotiability" of fundamental allocative premises for each and every case is unsound. Abandonment of well-established legal positions is inefficient, given at least potentially high administrative costs if states were to renegotiate each time what on all accounts should be a well-settled legal issue. More importantly, it causes a decline in the certainty of legal expectations in general, thereby invites the assertion of more extreme claims, and promotes conditions for the emergence of more frequent as well as dangerous international confrontations.

There is substantial evidence of a growing acceptance of the notion of "graduated normativity" in international legal contexts which bear directly on the entitlement issue here under consideration.[20] For example, in obvious analogy to "soft law," some commentators have begun to talk about "soft responsibility" in the sense of a responsibility that ranks lower

17. For an overview, *see, e.g.*, Schachter, *The Twilight Existence of Nonbinding International Agreements*, 71 AM. J. INT'L. L. 296 (1977); Roessler, *Law, De Facto Agreements and Declarations of Principle in International Economic Relations*, 21 GER. Y.B. INT'L. L. 27 (1978); Baxter, *International Law in "Her Infinite Variety,"* 29 INT'L COMP. L. Q. 549 (1980); Bothe, *Legal and Non-Legal Norms—A Meaningful Distinction in International Relations?*, 11 NETH. Y. B. INT'L L. 65 (1980); Mieshler, *Zur Autorität von Beschlüssen internationaler Institutionen*, in AUTORITÄT UND ORDNUNG 35 (C. Schreuer ed. 1979); and Thürer, *supra* note 14.

18. As to "soft law" as the so-called Trojan-horse of international environmentalists, see Lang, *supra* note 15, at 303.

19. In view of the special characteristics of the international lawmaking process, the characterization of a non-legal norm as "legal" (although of the "soft law" variety) by any transnational actor including the scholarly observer may, of course, in itself acquire international legal significance.

20. *See generally* Lang, *supra* note 15.

than "classic responsibility" in terms of its normative contents.[21] A similar tendency seems to permeate some of the work of the International Law Commission. Thus, during the Commission's debates on the topic of "international liability for injurious consequences arising out of acts not prohibited by international law," obligations that engage state responsibility and obligations that arise out of lawful state conduct were referred to as dealing with "different shades of prohibition."[22] And, indeed, the first special rapporteur's draft articles as a whole have been termed a "soft approach" to the liability topic,[23] in apparent allusion to the fact that clearly nontraditional "legal" obligations constitute a major feature of its normative structure.[24]

In these circumstances it appears essential to muster and thereby reaffirm the stock of relevant customary international legal principles. Consequently an attempt shall be made, initially, to outline the basic contours of states' customary international entitlements to the use of transboundary natural resources, and then to examine the relevance of the "traditional" entitlement concept in the context of the LRTAP problem. And finally, to verify whether customary international environmental law has not evolved beyond rudimentary allocative rules to where the legal parameters or, in the words of the late Prof. Quentin-Baxter, the "margins of appreciation"[25] concerning a given use of transboundary air resources, have become more precisely defined.

THE BASIC CONTOURS OF STATE'S CUSTOMARY ENTITLEMENT

Mutually Operating Restraints on States' Uses of Transboundary Natural Resources: Some Preliminary Considerations

Over the last few years the question of a state's entitlement to the use of environmental resources entailing transboundary effects has tended to be analyzed in terms of the legal implications of the notion of "shared

21. *See, e.g.*, Kiss, *L'état du droit de l'environnement en 1981: Problemes et solutions*, 108 J. DROIT INT'L. 499, 518 (1981).

22. *See, e.g.*, Quentin-Baxter, Fourth Report on International Liability for Injurious Consequences Arising out of Acts not prohibited by International Law, U.N. Doc. A/CN.4/373, at 16, para.20 (1983), citing Sir Francis Vallat in the debates of the Commission, U.N. Doc. A/CN.4/SR. 1687, 10 (1982).

23. *See* Quentin-Baxter, himself, *supra* note 22, at 31, para.43.

24. *See, e.g.*, Quentin-Baxter, Fifth Report on International Liability for Injurious Consequences Arising out of Acts not Prohibited by International Law, U.N. Doc. A/CN.4/383/Add.1, at 9-10, para.47 (1984). For a critical review, see Handl, *Liability as an Obligation Established by a Primary Rule of International Law: Some Basic Reflections on the International Law Commission's Work*, 16 NETH. Y.B. INT'L L. 49, 70-76 (1985).

25. Quentin-Baxter, Fourth Report, *supra* note 22, at 28, para.37.

natural resources." Although the concept has never been defined authoritatively,[26] it has figured prominently as the conceptual foundation for the characterization of states' rights and obligations. For example, General Assembly Resolution 3129 (XXVII) on Co-operation in the Field of the Environment Concerning Natural Resources Shared by Two or More States,[27] Article 3 of the Charter of Economic Rights and Duties of States[28] and, above all, UNEP Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilization of Natural Resources Shared by Two or More States,[29] all make the notion the point-of-departure in specifying, in mandatory or recommendatory language, international rights and obligations of states with regard to transnationally perceptible uses of environmental resources.

More recently, however, this use of "shared natural resources" has met with strong reservations. Apart from the fact that the concept is frequently perceived to be at variance with the principle of permanent sovereignty over natural resources,[30] objections to its invocation have been expressed on more fundamental, theoretical grounds. During International Law Commission debates of draft articles on the Law of the Non-Navigational Uses of International Watercourses, some members of the Commission warned against the propensity to view the notion as automatically signalling a specific allocation of rights and obligations in a given situation of internationally interdependent resource uses.[31] The concept's legal connotations were, they implied, insufficently confirmed in state practice to permit an invocation of "shared natural resources" as the conceptual basis for some of the detailed legal conclusions offered by the Commission's special rapporteur on the topic.[32] This criticism proved persuasive

26. Thus during the debates within a UNEP Working Group of Experts no consensus was reached on the definition of "shared natural resources." For example, the proposed definition as "a biogeophysical unity located in the territory of two or more States," proved to be unacceptable. *See* Report of the Intergovernmental Working Group of Experts on Natural Resources Shared by Two or More States on the Work of its Fifth Session Held at Nairobi from January 13, to February 7, 1978, *reprinted in* 17 I.L.M. 1094 (1978).

27. G.A. Res. 3129 (XXVII), 28 U.N. GAOR Supp. (No. 30) at 48, U.N. Doc. A/9030 (1973).

28. G.A. Res. 3281 (XXIX), 29 U.N. GAOR Supp. (No. 31) at 52, U.N. Doc. A/9631 (1974).

29. *Reprinted in* 17 I.L.M. 1097 (1978).

30. *See, e.g.*, statement of the Brazilian delegate during the debates in the General Assembly's Second Committee of the Draft Principles of Conduct in the Field of the Environment for the Guidance of States and Harmonious Utilization of Natural Resources Shared by Two or More States, U.N. Doc. A/C.2/34/SR.57, para.21 (1979); and statement of the Indian representative, *id.* para.32. Note further opposition to the concept in the Sixth Committee, U.N. Doc. A/C.6/38/SR.36, para.79 (1981); and in the International Law Commission's debates of draft articles on the Law of Non-Navigational Uses of International Watercourses [hereinafter cited as ILC debates]: *see, e.g.*, statements of Razafindralambo, 1790th meeting of the ILC, 1 ILC Y.B. 209, para.31 (1983); and of Njenga, 1788th meeting of the ILC, *id.* at 196, para.7.

31. *See* in particular Calero Rodriguez, 1787th meeting of the ILC, ILC debates, *supra* note 30, at 191, para.18.

32. *See id. Cf. also* Jagota, 1790th meeting of the ILC, *id.* at 207, para.16; and Yankov, 1794th meeting, *id.* at 231, para.15. *But note* the strong defense of the concept by Barboza, 1789th meeting of the ILC, *id.* at 201-02, paras.9-12; and McCaffrey, 1792nd meeting of the ILC, *id.* at 220, paras.21-23.

enough to make the rapporteur drop any reference to the concept in his subsequent report.[33]

The concern thus expressed by Commission members over the need to distinguish clearly between established customary international legal norms, and rules of a merely aspirational nature, is in principle understandable.[34] However, the Commission's apparent abandonment of the concept should not distract from the fact that what is said to be the essence of the notion of shared natural resources, namely, the general obligation of states to cooperate in the management of such resources,[35] appears to be well founded in international legal practice.[36] Nor should it be taken to reflect on the existence of certain specific substantive and procedural customary obligations of states regarding uses of natural resources that produce or are likely to produce transboundary effects.

There is no denying that the notion, first implicitly stated by the Permanent Court of International Justice in the *River Oder* case,[37] that interdependence in fact necessarily implies interdependence at law[38] has found general approval in state practice bearing on the utilization of natural resources. Today it is generally accepted that if a utilization of a natural resource in one jurisdiction affects a similar or different utilization in another, states are subject to mutually operating restraints as a matter of customary international law. For the present purposes there is no need to retrace the theoretical foundations of this obligation of restraint.[39]

33. As to the changes in the language of art.6 of the draft articles, see Evensen, Second Report on the Law of the Non-Navigational Uses of International Watercourses, U.N. Doc. A/CN.4/381, 23-24, paras.46-49 (1984).

34. *See also supra* text at notes 11-24.

35. Thus Kiss, *The International Protection of the Environment*, in THE STRUCTURE AND PROCESS OF INTERNATIONAL LAW 1069, 1082-83 (R. Macdonald & D. Johnstone eds. 1983); *see also* Riphagen, *The International Concern for the Environment as Expressed in the Concepts of the "Common Heritage of Mankind" and of "Shared Natural Resources,"* in TRENDS IN ENVIRONMENTAL POLICY AND LAW 343 (M. Bothe ed. 1980).

36. Injurious transboundary effects due to a per se lawful state conduct legally reduces itself to a clash of sovereignties. The source state's claim to the exclusive use of natural resources within its territory is at odds with a similar right asserted by the exposed state, namely, to the unfettered use of natural resources within its own territory. A duty to cooperate in the resolution of this conflict is thus clearly commensurate with the respect states owe each other's territorial sovereignty. Besides, in view of the large degree of cooperation required to give effect to such established customary procedural obligations as of prior information, consultation or negotiation (see *infra* note 45), it would be absurd to deny the existence of a customary legal principle according to which states are obliged to resolve transboundary resource problems cooperatively.

37. 1929 P.C.I.J., ser. A, No.23, at 27.

38. The Court in going "back to the principles of international fluvial law in general and consider[ing] what position was adopted by the Treaty of Versailles in regard to these principles" thus concluded that the "community of interest [of riparian states] in a navigable river becomes the basis of a common legal right. . . ." *Id.* at 26-27. Prof. Schwarzenberger's criticism of the characterization of this dictum as a customary legal principle as an "outstanding . . . lapse from grace," (Schwarzenberger, *supra* note 11, at 294) is unpersuasive in light of the Court's explicit references to general international river law.

39. For a detailed recent exposition of various theoretical bases, *see, e.g.*, J. LAMMERS, POLLUTION OF INTERNATIONAL WATERCOURSES 556-80 (1984); see also Salmon, *La pollution des fleuves et lacs et le droit international, Rapport provisoire*, 58 ANNUAIRE DE L'INSTITUT DE DROIT INTERNATIONAL (pt.I) 193, 201-210 (1979).

Suffice it to say that at the core of it lies the notion of the non-injurious or harmless use of territory.[40] A state's entitlement to the use of a natural resource is circumscribed by the obligation to avoid infliction of harm to other states.[41] There is a general consensus, however, that not any and every transboundary impact is to be avoided. The international legal threshold of impermissible natural resource use will be deemed transgressed only when "serious," "significant," or similarly qualified transboundary effects occur.[42]

The customary entitlement thus characterized remains admittedly ambiguous. Transboundary "injury," without more, is a relative notion.[43] Its vagueness is compounded by the additional qualification of "signifi-

40. As to the notion, see Colliard, *Évolution et aspects actuals du regime juridique des fleuves internationaux*, 125 RECEUIL DES COURS 337, 378 (1968); and Dupuy, *International Liability of States for Damage Caused by Transfrontier Pollution*, in OECD, LEGAL ASPECTS OF TRANSFRONTIER POLLUTION 345, 349 (1977).

41. Thus in the *Corfu Channel* case, for example, the ICJ stated as a principle of international law of general applicability, "every State's obligation not to allow knowingly its territory to be used contrary to the rights of others." 1949 I.C.J. Rep. 4, at 22. *See further* Principle 21 of the Stockholm Declaration, Report of the Stockholm Conference, U.N. Doc. A/CONF.48/14, at 7, *reprinted in* 11 I.L.M. 1416, 1420 (1972), which commits states "to insure that activities within their jurisdiction or control do not cause damage to areas beyond the limits of national jurisdiction"; and the decision in the *Trail Smelter* case, 3 U.N. RIAA 1095, at 1965. Indeed, today in a specific environmental context, this principle must be deemed to be a generally, if not universally, accepted obligation of international law. Note, *e.g.*, its explicit endorsement as expressing a "common conviction," in the preamble to the 1979 ECE Convention on Long-Range Transboundary Air Pollution, *supra* note 5. *See further* Salmon in the debates of the Institute of International Law on the topic of The Pollution of International Rivers and Lakes in International Law, Quatrième séance plénière, 58 ANNUAIRE DE L'INSTITUT DE DROIT INTERNATIONAL (Part II) 104, 108 (1979); and Dupuy, *Limites matérielles des pollutions tolérées*, in RECHTSFRAGEN GRENZÜBERSCHREITENDER UMWELTBELASTUNGEN, FACHTAGUNG SAARBRÜCKEN, 13-15 MAI 1982 at 27, 29 (M. Bothe, M. Prieur & G. Ress eds. 1984).

42. Occasionally, by referring to the language of Principle 21 of the Stockholm Declaration, *supra* note 41, it is claimed that the "transboundary harm" to be avoided is unqualified. *See, e.g.*, Salmon, *La pollution des fleuves et des lacs et le droit international, Rapport définitif*, 58 ANNUAIRE DE L'INSTITUT DE DROIT INTERNATIONAL (pt.I) 330, 344 (1979); and the debates within the General Assembly's 2nd Committee on the proposed draft on Cooperation of States in the Field of the Environment, G.A. Res. 2995 (XXVII), 27 U.N. GAOR, Supp. (No. 30) at 42, U.N. Doc. A/8730 (1972), which refers to "significant [transboundary] harmful effects" and "significant [transboundary] harm" as the outer limit of a state's right to the use of a natural resource. *See, e.g.*, statements of the New Zealand delegate, U.N. Doc. A/C.2/SR.1472, at 15 (1972), expressing concern over the compatibility of the resolution's adoption of "significant harm" as the threshold notion, with the language of Principle 21.

However, there is little room for doubt that the generally accepted threshold implies qualified transboundary harmful effects. For a survey of international case law, state practice, and the pertinent resolutions and work of international organizations as well as international legal writings, *see, e.g.*, Salmon, *Rapport provisoire*, *supra* note 39, at 218-22; and Handl, *Balancing of Interests and International Liability for the Pollution of International Watercourses: Customary Principles of Law Revisited*, 13 CAN. Y.B. INT'L L. 156, 173-74 (1975).

43. *See, e.g.*, Salmon, *supra* note 41, at 110: "La pollution est en effet un problème essentiellement relatif. Ce qui est une pollution pour certain Etats n'en est pas pour d'autres"; and Bourne, *International Law and Pollution of Rivers and Lakes*, 21 U. TORONTO L. J. 193, 194 (1971).

cant."[44] Still, the lack of precision is less significant in practical terms than might be expected at first sight. On the one hand, as already intimated, any state contemplating a potentially transnationally injurious resource use is subject to a range of procedural obligations, such as the duty of prior information, of consultation, etc.[45] They provide a framework for the clarification among the states concerned of the specific allocation of substantive rights and obligations, even when compulsory third-party settlement of disputes has not been prearranged or an ad hoc agreement to this effect eludes the parties.[46] On the other hand, and this is of special interest here, additional substantive criteria which provide a gloss on the basic customary entitlement rule are beginning to emerge from the practice of states and other pertinent evidence of international law.

One facet of the entitlement rule that is being elucidated is the very concept of the threshold of impermissible transboundary harm. It is to this notion which has caused much confusion and remains, of course, the key to any proper characterization of the customary entitlement to the use of transboundary air resources, that we shall turn first.

The Threshold Issue

In the assumed absence of applicable eco-standards which would provide a ready indication of whether certain transboundary environmental effects amount to legally relevant transboundary harm,[47] the question of the outer limit of a state's right to the use of an international air shed turns on the notion of "significant injury." There exists, of course, ex-

44. For sharply critical comments on the complexity and ambiguity of the threshold concept, *see, e.g.*, statement of the New Zealand delegate, *supra* note 42; and statement of Sir Ronald Wilson, in the ILA debates on the so-called (draft) Montreal Rules on Transfrontier Pollution, ILA, REPORT OF THE SIXTIETH CONFERENCE, MONTREAL 178, 179 (1982).

45. Given the limitation of space, it is not possible to analyze the existence of customary procedural obligations encumbent upon states. Nor is such analysis pertinent to the present task. For a discussion see instead, Wildhaber, *Die Öldestillerieanlage Sennwald und das Völkerrecht der grenzuberschreitenden Luftverschmutzung*, 31 ANNUAIRE SUISSE DROIT INTERNATIONAL 97, 107-12 (1975) (on prior information and duty to negotiate); Handl, *The Principle of "Equitable Use" as Applied to Internationally Shared Natural Resources: its Role in Resolving Potential International Disputes over Transfrontier Pollution*, 14 REV. BELGE DE DROIT INTERNATIONAL 40, 55-63 (1978-79) (on prior information and consultations); Wirth, Environmental Impact Assessment for Activities with Extraterritorial Effects, (Nov. 15, 1985) (paper submitted to the Centre for International Legal Studies and Research of the Hague Academy of International Law); and the Report of the ILC on the Work of its Thirty-Second Session, II-2 ILC Y.B. 114-18 (1980) paras.18-36 (on the duty to negotiate).

46. For a discussion, *see* Handl, *The Principle of "Equitable Use,"* *supra* note 45.

47. For a discussion of standards regulating the discharge or the ambient concentration of pollutants, see Contini and Sand, *Methods to Expedite Environmental Protection: International Eco-Standards*, 66 AM. J. INT'L L. 290 (1972); and A. SPRINGER, THE INTERNATIONAL LAW OF POLLUTION 91-101 (1983).

tensive state practice which bears directly on the notion of "significant injury." But the characterization of the threshold impact of transboundary air pollutants has ranged from "injury to health and property"[48] and the destruction or the endangering of forests,[49] to mere "inconvenience or discomfort."[50] Any attempt, therefore, at distilling a single abstract threshold concept of general applicability from state practice is an exercise in futility.[51]

It is, quite simply speaking, "impossible to formulate a general rule of international law fixing a level at which the damages produced by transfrontier pollution can be deemed to be substantial,"[52] hence to have reached the level at which the acting state's claim to the use of the shared air shed is no longer justifiable. This impracticability is, of course, explained by the fact that "significant injury" has traditionally been understood to signal "legally significant injury" rather than a mere factual finding of a not insubstantial transboundary impact. As a term of art, the concept has been taken to suggest injurious transboundary effects due to what, in the circumstances of the case concerned, is unreasonable conduct on the part of the source state.[53] The reasonableness of the source state's conduct, in turn, is determined by way of an analysis in which the injurious transboundary impact of the incriminated conduct is one among

48. Art. IV of the 1909 Boundary Waters Treaty. As to the analogous applicability of the pertinent treaty provisions to transboundary air pollution, see the Joint Statement of the Governments of the United States and Canada of July 26, 1979, in DIGEST OF UNITED STATES PRACTICE IN INTERNATIONAL LAW 1612, 1613 (1979). Note also that the same Joint Statement lists among the principles and practices to be addressed in a bilateral air quality agreement "[p]revention and reduction of transboundary air pollution which results in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and impair or interfere with amenities and other legitimate uses of the environment": *Id.* at 1614.

49. *See Georgia v. Tennessee Copper Company and Ducktown Sulphur, Copper and Iron Company, Limited*, 237 U.S. 230, *cited approvingly* in *Trail Smelter* decision, *supra* note 41, at 1965.

50. *See, e.g.*, the Mexican government's note of protest against transboundary air pollution emanating from the (U.S.) Peyton Packing Company, 6 M. WHITEMAN, DIGEST OF INTERNATIONAL LAW 258 (1968); and West German complaints over nauseating transboundary odors from a chemical factory at Vresova, Czechoslovakia: 96 UMWELT 65 (1983).

51. As to the impracticability of such a search, *see, e.g.*, Ando, *The Law of Pollution Prevention in International Rivers and Lakes*, in THE LEGAL REGIME OF INTERNATIONAL RIVERS AND LAKES 331, 350-51 (R. Zacklin & L. Caflisch eds. 1981); and Handl, *Balancing of Interests*, *supra* note 42, at 173. *Cf.* also Quentin-Baxter, Fourth Report, *supra* note 22, at 26-28, para.37.

52. Rauschning, *Legal Aspects of the Conservation of the Environment*, (Comment to art. 3 of the Montreal Rules) in ILA, SIXTIETH CONFERENCE, *supra* note 44, at 157, 162, para.8.

53. *See, e.g.*, Lipper, *Equitable Utilization*, in THE LAW OF INTERNATIONAL DRAINAGE BASINS 15, 45 (A. Garretson, R. Hayton & C. Olmstead eds. 1967); A. LEVIN, PROTECTION OF THE HUMAN ENVIRONMENT 63 (1977); and Goldie, in D. RAUSCHNING, INTERIM REPORT ON LEGAL ASPECTS OF THE CONSERVATION OF THE ENVIRONMENT, submitted to the ILA Committee at its meeting at Leiden, June 22-25, 1981. *See further* Comment to art. 1 of the Rules on Water Pollution Law in an International Drainage Basin, Report of the ILA Committee on International Water Resources Law, in ILA, SIXTIETH CONFERENCE *supra* note 44, at 531, 537, para.8.

a number of factors to be taken into account.[54] Thus the essence of the process by which the point of "intersection of harm and wrong"[55] is established in a situation in which the parties' rights and obligations are *a priori* indeterminate, has been considered to be a balancing-of-interests of the states concerned.

This conceptualization of the threshold issue is not only inherently reasonable, given the fact that the international dispute concerned involves a clash of basically equally ranking sovereign rights of states,[56] but also well grounded in contemporary international legal practice.[57] Few experts would disagree with this conclusion. Opinion, however, is sharply divided on the normative implications of an affirmative finding as to that key criterion in the multiple-factor analysis, significant transboundary harm. On the one hand, it is increasingly being asserted that any "significant injury" in fact equals "significant injury" at law. In other words, the occurrence of significant, in the sense of not insubstantial, transboundary harm associated with one state's use of an internationally shared natural resource indicates, it is claimed, in and of itself an internationally impermissible use by the source state.[58] On the other hand, there is a strong opposing school of thought which is backed by evidence of past international legal practice,[59] and might derive some support from recent developments within the International Law Commission.[60] The thrust of

54. As to a listing of relevant criteria to be considered in this balancing-of-interests, *see, e.g.*, art. V of the Helsinki Rules, ILA, REPORT OF THE FIFTY-SECOND CONFERENCE, HELSINKI 1966, 488.

55. Quentin-Baxter, Second Report on International Liability for Injurious Consequences Arising Out of Acts not Prohibited by International Law, U.N. Doc. A/CN.4/346/Add.1, at 12, para.59 (1981).

56. I.e., the right to an unfettered use of the environmental resources within national jurisdiction which both polluting and victim states assert.

57. For an overview of pertinent state practice and judicial decisions, see Handl, *Balancing of Interests*, *supra* note 42, at 176-86; *see also* E. KLEIN, UMWELTSCHUTZ IM VÖLKERRECHTLICHEN NACHBARRECHT 208 (1976); and Quentin-Baxter, Fourth Report, *supra* note 22, at 24-28.

58. For details, *see infra* text at notes 86-92.

59. For details, *see infra* notes 85, 87.

60. Reference here is to the approach charted by the late Prof. Quentin-Baxter, the ILC's first special rapporteur, to the topic of "international liability for injurious consequences arising out of acts not prohibited by international law." Not surprisingly, he embraces the principle of equitable utilization, or the "rules of sharing" in relation to internationally competing uses of natural resources, as a fundamental order principle by which states' entitlements are routinely settled. *See* Quentin-Baxter, Third Report on International Liability for Injurious Consequences Arising out of Acts not Prohibited by International Law, Schematic Outline, §§ 5-6, U.N. Doc. A/CN.4/360, at 23, 27-29 (1982). The more remarkable feature of Quentin-Baxter's approach lies in the fact that it envisages the applicability of the principle of balancing-of-interests even with regard to situations in which there is already evidence of significant transboundary harm: *See e.g.*, Quentin-Baxter, Fourth Report, *supra* note 22, at 26, para.36, and 52, para.69, discussing the *Poplar River* case. In other words, there is no suggestion that evidence of "significant harm" is being taken to clarify *eo ipse* the issue of international equity, i.e. to indicate by itself an inequitable use of the shared natural resource. For a review of the diplomatic claims involved in the *Poplar River* dispute, see *infra* text at notes 94-99.

its argument is that a finding of significant transboundary harm alone is not a sufficient indicator that the causal state's conduct is internationally impermissible.[61] For such a judgment to obtain, it must be accompanied by a correspondingly qualified finding at law, by evidence that, factually significant as it may be, the transboundary injury involves an inequitable use of the shared natural resource.

The question raised is, therefore, whether today the outer limit of a state's entitlement should be and, if so, actually is, circumscribed in terms of a not insubstantial transboundary impact to be avoided or, whether such an impact notwithstanding, it can be defined only by reference to additional considerations, in particular the value of the transnationally injurious conduct to the source state. More specifically, the question is whether or not, as a general rule, a victim state might be obliged to tolerate significant environmental degradation due to transboundary air pollution as long as such pollution amounts to the use of an equitable share of the air shed by the source state.

The Issue from a Policy Perspective

The "dual test theory" regarding the international impermissibility of transboundary polluting activities, as reflected in the requirement of not insubstantial harmful effects and inequitable resource use, gives expression to a mix of efficiency and distributional considerations.[62] While the "right mix" of efficiency and distribution is a matter of fundamental importance in any legal system,[63] it need not be of specific concern in the present context.[64] Suffice it to say that the interpretation of the equitable use principle as involving a dual test approach appears fundamentally flawed. For such interpretation may neither serve efficiency in the long run nor be justified on distributional justice grounds.

Perhaps first and foremost "equitable use" implies a call for the maximization of the aggregate utility of the internationally shared natural resource.[65] This objective is realizable only to the extent that a comparative

61. For details on the underlying assumption of the source state's knowledge of, and ability to control, such pollution, see *infra* text at notes 94-99.

62. *See, e.g.*, the listing of criteria in art. V of the Helsinki Rules, *supra* note 54.

63. *See, e.g.*, Calabresi, *About Law and Economics: A Letter To Ronald Dworkin*, 8 HOFSTRA L. REV. 553 (1980); and Dworkin, *Why Efficiency?*, *id.* at 563.

64. For some pertinent thoughts on the issue in an international setting, see Goldie, *Reconciling Values of Distributive Equity and Management Efficiency in the International Commons*, in THE SETTLEMENT OF DISPUTES ON THE NEW NATURAL RESOURCES, 1982 COLLOQUIUM, HAGUE ACADEMY OF INTERNATIONAL LAW 335 (R. Dupuy ed. 1983).

65. *See, e.g.*, Comment (a) to art. IV of the Helsinki Rules, *supra* note 54, at 486, which states: "The idea of equitable sharing is to provide maximum benefit to each . . . State . . . with the minimum detriment to each." *Cf.* further Handl, *The Principle of "Equitable Use,"* *supra* note 45, at 46-47.

judgment on marginal pollution prevention costs vs. marginal pollution costs is reasonably accurate. It is, however, a truism that pollution prevention costs, including so-called opportunity costs, are relatively easily assessable, whereas the same cannot be said of pollution costs. Indeed, the latter are notoriously difficult to gauge accurately. In a legal system which, as a general rule, permits the trade-off of social/economic interests of one state against infliction of significant environmental harm in another, the risk of a miscalculation is thus considerable.

Any deleterious environmental effects are likely to threaten a whole range of values that depend on the preservation of environmental resources, such as wealth, public welfare, and the like. Therefore, a significant deterioration of environmental quality will not only produce significant secondary and tertiary effects, but also effects of a kind that may well be experienced—but not necessarily understood as such—over considerable space and time, given regional and global ecological interdependencies and all too frequently encountered difficulties in reversing environmental harm.[66] This is particularly true of effects produced by air pollutants.[67] In view of the difficulties in appreciating the true repercussions of permitting significant transboundary environmental harm, let alone in putting a value on the latter,[68] the dual test approach thus represents a blueprint for a transboundary resource allocation which more likely than not will turn out to be an inefficient one.

The dual test approach is equally unacceptable from a distributional justice point of view. To be sure, it has been argued—most recently within the International Law Commission[69]—that a delimitation of the international entitlement in the sense of protecting an exposed state against significant environmental injury, or conversely of limiting the polluting state to transboundary effects below the threshold irrespective of poten-

66. The existence of such an "accounting" problem with regard to transboundary pollution effects finds indirect acknowledgement in calls either for a reduction of pollution below the threshold of significant harm to the lowest level reasonably achievable or for avoidance of pollution altogether. *See e.g.*, art. 3(3) of the (draft) Montreal Rules, as proposed by Rauschning, *supra* note 52, at 160; and Recommendation 51(b)(ii) of the Final Documents, Report of the Stockholm Conference, *supra* note 41, at 1443. As to a similar provision in the 1979 ECE Convention on Long-Range Transboundary Air Pollution, *see infra* text at notes 234-42.

67. Thus Klein, a strong defender of the dual test approach in the context of transboundary water pollution, concludes that given the physical characteristics of air, the principle of "equitable apportionment" is altogether inapplicable to the international law of transboundary air pollution. E. KLEIN, *supra* note 57, at 232. However, this is a rather extreme and unpersuasive position in that balancing-of-interests would seem to be an accepted way of allocating international user rights whenever transboundary effects remain below the "significant harm" threshold. *See also infra* section NARROWING THE "MARGINS OF APPRECIATION"?

68. For an indication of the problem, *see, e.g.*, J. SINDEN & A. WORRELL, UNPRICED VALUES: DECISIONS WITHOUT MARKET PRICES (1979).

69. *See* Report of the International Law Commission on the Work of its Thirty-sixth Session, 39 U.N. GAOR Supp. (No. 10) at 230, paras. 338-39, U.N. Doc. A/39/10 (1984).

tially countervailing interests, is inherently unfair. Such a view of the entitlement, it is contended, pits the "haves" against the "have-nots." It is, so it is claimed, antagonistic to the latters' attempts at reaching an adequate measure of industrial and social development by denying them the right to an equitable share of internationally shared natural resources.

There can be little doubt that the narrowing of the North-South gap is at least in principle acknowledged to be a critically important objective of international public policy.[70] To promote this objective, an exceptional derogation from what remains an avowed fundamental tenet of the international legal system, the sovereign equality of states, is certainly conceivable. An international allocation regime that encourages socio-economic advances in developing countries, though perhaps at the cost of significant extraterritorial environmental harm, might accordingly appear justifiable in terms of overall community policy. The non-compensable significant transboundary harm might be deemed a form of payment, or development aid, to the developing polluting state. However, there are important reasons why this view of the entitlement should prove internationally unacceptable.

To begin with, it is disingenuous to emphasize opportunity costs associated with the stricter test without taking into account as well that developing countries are increasingly also the beneficiaries of a narrow reading of polluting states' international entitlements.[71] More importantly, the argument in support of the dual test approach appears inconsistent with international public policy. The very real opportunity costs that might result from a generally narrow definition should not be offset by granting an exceptional transboundary pollution license to any developing country or state with special economic or social needs. Rather, the answer to the problem lies in development assistance that allows would-be polluters to carry out necessary projects without causing significant degradation of the transnational environment. This is the clear implication of the policy guidelines set forth in the Stockholm Declaration on the Human Environment[72] and as reflected in the Recommendations adopted by the

70. For purposes of illustration only, *see generally* the Charter of Economic Rights and Duties of States, *supra* note 28; General Assembly resolution 37/103 on Progressive Development of the Principles and Norms Relating to the New International Economic Order; and Arts. 140, 144 (2), 148, 150, and 152 of the 1982 Law of the Sea (LOS) Convention, U.N. Doc. A/CONF.62/122 (1982), *reprinted in* 21 I.L.M. 1261 (1982). *Cf. also* NORTH-SOUTH: A PROGRAMME FOR SURVIVAL (Brandt Commission Report) (1980); and Brownlie, *Legal Status of Natural Resources in International Law (Some Aspects)*, 162 RECUEIL DES COURS 245 (1979).

71. *Cf., e.g.*, Okidi, *The Prospects for Cooperation among Developing Countries with regard to Controlling Transboundary Air Pollution*, in TRANSBOUNDARY AIR POLLUTION, *supra* note 3.

72. Thus Principle 12 of the Declaration, *supra* note 41, at 1419, stipulates: "Resources should be made available to preserve and improve the environment, taking into account the circumstances and particular requirements of developing countries and any costs which may emanate from their incorporating environmental safeguards into their development planning and the need for making available to them, upon their request, additional international technical and financial assistance for this purpose."

Conference.[73] The essential validity of these guidelines has been repeatedly reaffirmed since,[74] significantly also in the 1982 Nairobi Declaration on the State of the Worldwide Environment.[75] It should be evident, therefore, that while a balancing of interests is by necessity the conceptual basis for any attempt at determining states' rights and obligations with regard to an internationally shared natural resource,[76] this process should not, as a rule, countenance the permissibility of significant transboundary environmental harm. The equitable use principle should be interpreted as automatically indicating an internationally impermissible, because inequitable, resource use by the polluting state whenever significant transboundary environmental harm occurs.[77] This basic entitlement rule should not, however, be considered immutable. Significant transboundary environmental harm ought to give rise only to a presumption of an internationally illegal resource use. However, it should be one which remains open to rebuttal by the polluting state only exceptionally upon demonstration of special circumstances indicating a plausible need for an *ad hoc* adjustment of the basic allocative rule. Measured against the policy objective discussed before, such an understanding of the basic entitlement rule is clearly superior to the "dual test" version. Compared to another similar conceptualization of the entitlement, namely, the so-called "mitigated-no-substantial-harm" principle,[78] the present approach appears

73. *See* Recommendations 103 and 106, *id.* at 1462-63.

74. *See generally* the World Charter for Nature, GA resolution 37/7 of October 28, 1982, in 37 U.N. GAOR Supp. (No.51) at 17, U.N. Doc. A/37/51 (1982); and specifically, the 1982 LOS Convention. Of course, art. 207, para.4 of the LOS Convention, *supra* note 70, makes specific allowance for "the economic capacity of developing States and their need for economic development" as regards standard-setting for marine pollution from land-based sources. To this extent, the Convention adopts indeed a double standard. However, this is an exceptional provision. Attempts by developing countries to obtain agreement on an across-the-board double standard applicable to the interpretation of states' obligation to protect and preserve the marine environment failed. See remarks by J. Schneider, in ASIL, PROCEEDINGS 239, 241 (1980). Key art. 194 thus does not contain any reference to "developing countries," hence does not incorporate a double standard. *Cf. also* arts. 202-03 which call for special technical and financial assistance to developing countries in support of their efforts to protect and preserve the marine environment. Note, moreover, that Paragraph 5 (a) of the Montreal Guidelines for the Protection of the Marine Environment Against Pollution from Land-Based Sources seems to further de-emphasize the status of "developing country" as a factor in construing a state's obligation to set standards for the protection of the marine environment by dropping reference to such status altogether: Final Report of the Working Group of Experts on the Protection of the Marine Environment against Pollution from Land-Based Sources, U.N. Doc. UNEP/WG.120/3, Annex III, at 3 (1985).

75. *See* para.7 of the Declaration, 21 I.L.M. 676 (1982).

76. *See, e.g.*, Quentin-Baxter, Third Report, *supra* note 60, at 6, para.14.

77. In this sense, see in particular McDougal, *excerpted in* Salmon, *Rapport provisoire, supra* note 39, at 223; *cf. also* Handl, *Balancing of Interests, supra* note 42, at 183-84.

78. This conceptualization modifies the here proposed "no-significant harm" approach on the grounds that the latter works too much in favor of the victim state; it recognizes certain "mitigating elements" to restore an allegedly more appropriate balance between victim and source states. *See* J. LAMMERS, *supra* note 39, at 583-84; and Lammers, *"Balancing the Equities" in International Law*, in THE FUTURE OF THE INTERNATIONAL LAW OF THE ENVIRONMENT, 1984 WORKSHOP, HAGUE ACADEMY OF INTERNATIONAL LAW 153, 156 (R. Dupuy ed. 1985).

preferable as well. For in contrast to this alternative, it offers a clear and simple point of departure, the illegality of state conduct resulting in significant transboundary harm. Accordingly, it also puts the burden of proof squarely on the polluting state to establish the justifiability of a more intricate balance of rights and obligations.

Two final points need to be made. First, the proposed test does not imply automatic legalization of transboundary effects below the established threshold. Such effects might be appreciable in the sense of affecting the assimilative capacity of the transboundary environment. To this extent they might curtail or even preempt the victim state's use of the natural resource as a pollutant dispersion medium and thereby become an appreciable economic burden to the affected state. In such a case transboundary effects remain subject to a balancing-of-interests[79] to test the international legitimacy of the source state's causal conduct.[80]

The second point concerns the practicability of the proposed threshold test. In the course of the preparatory work for the Institute of International Law's 1979 resolution on "The Pollution of Rivers and Lakes and International Law,"[81] the above conceptualization of the dividing line between permissibile and impermissible resource use was rejected on the grounds that it was difficult to see by which objective criteria the threshold harm could be delimited.[82] But this objection is based on a too pessimistic view of internationally accepted or acceptable indicia of what might constitute factually "significant" transboundary harm. Transboundary effects involving, for example, radiological, toxic, or otherwise highly dangerous substances, tend to be counted automatically into that category.[83] Besides, the adoption of bilateral and multilateral environmental standards has expanded the realm of international consensus on what represent environmentally significant transboundary effects. It is not surprising, therefore, that the International Law Commission, in its consideration of the Law of the Non-Navigational Uses of International

79. Note that a very similar approach to the entitlement issue appears to have been proposed originally by Prof. Rauschning; see comment (1) to art. 3 of the (draft) Montreal Rules, in Rauschning, *supra* note 52, at 160-61.

80. *See also infra* section NARROWING THE "MARGINS OF APPRECIATION"?

81. Text of the resolution in 58 ANNUAIRE INSTITUT DROIT INTERNATIONAL (Part II) 197 (1979).

82. *See* Salmon, *Rapport définitif, supra* note 42, at 344.

83. Note, *e.g.*, that art. 4 of the Montreal Rules on Transfrontier Pollution, *text in* ILA, SIXTIETH CONFERENCE *supra* note 44, at 2, prohibits any discharge into the environment of "substances generally considered as being highly dangerous to human health"; and see the similar provision contained in art. 2 of the ILA's 1982 Rules on Water Pollution in An International Drainage Basin, *id.* at 538. *See further* Annex I of the 1972 London Convention on the Dumping of Wastes at Sea, 11 I.L.M. 1291, 1310 (1972); and art. 5 of the 1974 Helsinki Convention on the protection of the Marine Environment of the Baltic Sea, *reprinted in* 13 I.L.M. 543, 548 (1974). *Cf. also* para.11 (a) of the World Charter for Nature, *supra* note 74.

Watercourses, should have affirmed the utility of a similar factual threshold concept.[84]

Trends

One of the first commentators to take issue with the then widely accepted dual test approach[85] was Dickstein.[86] In discussing Article X of the Helsinki Rules pursuant to which the infliction of substantial transboundary harm is permissible as long as the source state's injurious activity is consistent with the principle of equitable utilization,[87] he criticizes the Rules' approach to transboundary pollution as "dated and unresponsive because . . . not in line with a contemporary understanding of the nature and extent of the problem's factual parameters."[88] Interestingly, in support of its wording of Article X, the International Law Association had strongly relied on the *Trail Smelter* case[89] even though the latter's precedential value is at best questionable. Certainly the tribunal's overall approach to settling the dispute was one of balancing United States and Canadian interests. To that extent it merely followed instructions laid down in the *compromis*.[90] However, in its crucial dictum on the source state's international legal duty to abate transboundary air pollution,[91] the tribunal omitted any suggestion that an inequitable use of

84. *See, e.g.*, Commentary (10) to draft art. 4 on the Law of the Non-Navigational Uses of International Watercourses, in Report of the International Law Commission on the Work of its Thirty-Second Session, *supra* note 45, at 119. Note also Schwebel, Third Report on the Law of Non-Navigational Uses of International Watercourses, U.N. Doc. A/CN.4/348, at 99, para.141 (1981): "In its use of 'appreciable' the Commission desires to convey as clearly as possible that the effect of harm must have at least an impact of some consequence, for example, for the public health, industry, agriculture or environment in the affected State. . . ." *But* note the criticism of the concept by El Rasheed Mohamed Ahmed, in the ILC debates of Evensen's First Report (*infra* note 115), 1785th meeting of the Commission, I ILC Y.B. 182, para.46 (1983).

85. The dual test approach to determine the international legitimacy of transboundary polluting activities evolved in the context of transboundary water pollution. As to the the International Law Association's Helsinki Rules, *see infra* text at note 87. For a summary reflecting the traditional position, see E. KLEIN, *supra* note 57, at 208: "Verunreinigungen, die ihrer absoluten Grösse nach unwesentlich sind, hat der beeinträchtigte Staat zu dulden. Ein Völkerrechtssatz, wonach jede *wesentliche* grenzüberschreitende Beeinträchtigung . . . verboten ist, existiert nicht."

86. Dickstein, *International Lake and River Pollution Control: Questions of Method*, 12 COL. J. TRANSNAT'L L. 487 (1973).

87. *See* comment (a) to art. X of the Rules, *supra* note 54, at 497-99; and comment (d) to art. XI, *id.* at 503-04. Note also Bourne, *International Law and Pollution of International Rivers and Lakes*, 6 U. B.C. L. REV. 115, 126-27 (1971).

88. Dickstein, *supra* note 86, at 497.

89. *See* comment (a) to art. X, Helsinki Rules, *supra* note 54, at 497-98. Although the decision is not directly mentioned in the context of the discussion of the principle of "equitable utilization" itself, it is clearly implicit that the drafters found the *Trail Smelter* award not to be inconsistent with their view of the principle's overriding function.

90. *See* art. IV of the *compromis*, *supra* note 41, at 1908.

91. *See* the Award, *id.* at 1965-66.

the shared resource established upon a balancing of interests was a prerequisite, additional to a finding of significant transboundary harm, before that state's international responsibility could be said to be engaged.[92] Indeed, in mustering the evidence for that classic passage of its decision, the tribunal quoted from *Georgia v. Tennessee Copper Co.* In that case the U.S. Supreme Court rejected a balancing-of-interests to determine whether Georgia was entitled to relief from out of state air pollution once the injurious transboundary impact had been established as significant.[93]

This finding does not reflect on the fact that the dual test approach has been widely adhered to in the past. But it certainly suggests a less solid foundation of the test in past international legal practice than some might be willing to claim and thus reinforces criticism of its present-day appropriateness. That its support in state practice might be weaker than has been asserted is suggested by one instance of state practice in which the question was addressed in a rather clear manner but which has nevertheless been misread as confirming the justifiability, in terms of an equitable allocation of international user rights, of significant transboundary harm.

The incident in question involved the United States and Canada and concerned the international acceptability of anticipated transboundary air pollution effects associated with the projected coal-fired power plant at Coronach, Sasketchewan (*Poplar River*).[94] The essence of the alleged bilateral understanding on the allocation of rights to the international air shed was summarized by Prof. Quentin-Baxter as requiring the affected U.S. state of Montana to "bear the whole burden of substantial physical transboundary harm."[95] This characterization is misleading, however.[96] For in their discussion of the problem, both sides agreed first, that the "project would be constructed and operated so as to prevent injurious transboundary environmental impacts";[97] and second, that the plant's first power unit would not create any transboundary air pollution problems.[98]

92. *See also* Ballantyne, *International Liability for Acid Rain*, 41 U. TORONTO FAC. L. REV. 63, 66 (1983).

93. Thus the Court noted specifically that "[t]he possible disaster to those outside the State must be accepted as a consequence of . . . [Georgia's] standing upon her extreme rights." *Supra* note 49.

94. For details of the controversy, see J. CARROLL, ENVIRONMENTAL DIPLOMACY 228-33 (1983).

95. Quentin-Baxter, Fourth Report, *supra* note 22, at 52, para.69.

96. Earlier on, it is true, the rapporteur had described the understanding in significantly different terms: "[I]t was not doubted that the Canadian province of Sasketchewan had the right to construct and operate a power-generating station, even though the station would inevitably give rise to a significant degree of transboundary pollution in the neighbouring American state of Montana." *Id.* at 26, para.36. But even this characterization, though not suggestive of inevitable substantial physical transboundary harm, is not entirely correct.

97. Dept. of State Press Release No. 280 of July 13, 1978, *reproduced in* DIGEST OF UNITED STATES PRACTICE IN INTERNATIONAL LAW 1119 (1978).

98. J. CARROLL, *supra* note 94, at 231.

As to the potential transboundary impact of the second unit, the two sides disagreed and no formal understanding was reached as to whether, and if so to what extent, Canada might be entitled to use up prevention of significant deterioration (class II) increments in Montana by operating a second unit.[99]

In other words, the *Poplar River* incident does not suggest that the two states might consider environmentally significant transboundary air pollution as legally permissible provided the polluting activities concerned amount to an equitable use of the shared air shed; nor does it reveal an international consensus as to what constitutes a permissible use of the air shed when effects— though not significantly injurious in an environmental sense—remain nevertheless economically appreciable in terms of their "using up" the air shed's pollution carrying capacity. Indeed, if anything, the diplomatic claims concerning *Poplar River* clearly point to the parties' acceptance of the overriding importance that national environmental resources not be used in a transnationally injurious way.

There is other evidence as well of an at least growing disenchantment with the dual test approach. Given the scarcity of clear-cut instances of state practice, these signs acquire an importance as indicators of the development of the law which normally they might not enjoy. For example, in the course of work within the Institute of International Law on what eventually was to become its 1979 resolution on "The Pollution of Rivers and Lakes and International Law,"[100] concern was expressed over the implications of applying the dual test approach to defining the limits of international entitlements. Several members of the Institute's drafting commission warned against recourse to the principle of equitable utilization (and by necessary implication to its twin concept, the balancing-of-interests) as legitimizing "double pollution."[101] In the end, and despite some pointed interventions during the plenary debates which could have provided the opportunity for a reconsideration of the basic issue,[102] the Institute followed the special rapporteur's proposal and rejected altogether the concept of a threshold harm at law. Instead, it opted for a generic "no pollution" provision[103] and, stressing the relative nature of pollution,

99. *See id.* at 230-31.

100. *See supra* note 81.

101. Although this notion was not clearly elaborated, it must be presumed to refer to *de minimis* pollution as well as pollution beyond the threshold which, under the dual test approach, would be justified provided it is the result of an equitable utilization of the water resources concerned. *See* in particular the positions of Colliard, Seidl-Hohenveldern and Jennings; and *cf.* those of McWhinney and Zourek, all summarized in Salmon, *Rapport provisoire, supra* note 39, at 208.

102. Directly related questions were raised by Reuter, in Quatrième séance plénière, *supra* note 41, at 110; Bastid, *id* at 111; Colliard, *id* at 111-12; and Lalive, *id* at 112.

103. *See* art. II of the resolution, *supra* note 81.

affirmed balancing of interests as essential to determine the existence of transboundary "polluting" effects.[104]

Since adoption of the Helsinki Rules, resistance to the dual test approach has also become discernible within the International Law Association during work bearing on the management of internationally shared natural resources. It is true that its 1972 Articles on Marine Pollution of Continental Origin,[105] the 1980 Articles on the Regulation of the Flow of Water of International Watercourses,[106] as well as the resolutions adopted in 1982, namely on International Water Resources Law,[107] and the Rules of International Law on Transfrontier Pollution,[108] all reflect deference to a dual test conceptualization of the principle of equitable utilization. But these provisions were not adopted without dissent.[109] Indeed, as regards the Montreal Rules on Transfrontier Pollution, the special rapporteur initially proposed a rule on prevention and abatement that incorporated "substantial harm" as a single criterion.[110] This approach was strongly endorsed by at least one member of the drafting committee.[111] Nevertheless, in its final version, Article 3 strongly suggests that the prohibition of state conduct resulting in significant transboundary harm is contingent, after all, on the existence of additional indicia that the resource use is an inequitable one.[112]

Of particular interest to this discussion is the ongoing study by the

104. *See* the second premabular paragraph of the Resolution, *supra* note 81; Salmon, *Rapport définitif, supra* note 42, at 334-35; and Salmon, in Quatrième séance plénière, *supra* note 41, at 110.

105. Art. II in combination with art. III essentially provides for a relative duty to abate pollution causing substantial injury by subjecting the duty which is ostensibly formulated in absolute terms, to a consideration of inter alia the social and economic needs of the polluting state: ILA, REPORT OF THE FIFTY-FIFTH CONFERENCE, NEW YORK 1972, xvii-xviii.

106. *See* art. 6 of the Articles, ILA, REPORT OF THE FIFTY-NINTH CONFERENCE, BELGRADE 1980, 367.

107. Art. 1, in Report of the ILA Committee, *supra* note 53, at 535; and comment (9) to art. 1, *id.* at 538: "The test of unlawful pollution is, therefore, twofold: first, does the polluting activity cause substantial injury; and second, is it consistent with the equitable utilization of the waters of the drainage basin?"

108. *See* art. 3 of the Montreal Rules, *supra* note 83, at 1, 2.

109. Note, *e.g.*, opposition to art. 6 of the 1980 Articles, *supra* note 106, at 367-68; and the objection to art. 1 of the 1982 Water Resources resolution, as noted in the Committee's Report, *supra* note 53, at 536-37, para.6.

110. Thus draft art. 3, para.1, provided that "[n]otwithstanding the rule of Article 5 [on equitable utilization] . . . States . . . [were] in their legitimate activities under an obligation to prevent, abate and control transfrontier pollution to such an extent that no substantial injury is caused in the territory of another State": Rauschning, *supra* note 52, at 160.

111. *See* Lammers, in ILA, FIFTY-NINTH CONFERENCE, *supra* note 106, at 570-71.

112. The "notwithstanding" language of draft art. 3, *supra* note 110, was eventually changed to "without prejudice to the operation of the rules relating to the reasonable and equitable utilisation of shared natural resources. . . .": *supra* note 81, at 2. However, this was a last minute change upon a motion from the Conference floor. Its implications in terms of subordinating the no-substantial-harm provision to the principle of equitable utilization thus may not have been generally appreciated.

International Law Commission of the Law of the Non-Navigational Uses of International Watercourses. In his detailed Third Report on the topic,[113] the Commission's second special rapporteur, Stephen Schwebel, had continued to embrace the traditional approach. The right of a state, he had argued, "to use the water resources of an international watercourse system . . . [was] limited by the duty not to cause appreciable harm to the interests of another system State, except as . . . [might] be allowable under a determination for equitable participation in the international watercourse system involved."[114] However, the first report submitted by his successor, Jens Evensen,[115] signalled a dramatic shift with regard to the method of delimiting a state's entitlement. Certainly the new articles, presented as a tentative draft convention, remained based on the principle of "equitable participation"—the functional equivalent of "equitable utilization"—as a fundamental management tenet applicable to any international watercourse.[116] But Article 9 enjoined "uses or activities with regard to a watercourse system that . . . [might] cause appreciable harm to the rights and interests of other system States,"[117] without there being any conditional linkage to the principle of "equitable participation." "Appreciable harm," moreover, was not to be understood as being synonymous with "inequitable use," but as indicative of a factual state of transboundary affairs.

The "no appreciable harm" provision, thus dissociated from the principle of "equitable use," passed a first scrutiny by the Commission in 1983.[118] Support for draft Article 9 appeared strong and some members specifically emphasized that an equitable use must not cause appreciable transboundary harm.[119] In 1984 the first nine draft articles, including all those of special interest here, were referred to the Commission's Drafting Committee.[120] But this does not necessarily imply that the Commission as a whole is likely to accept the special rapporteur's view on the interrelationship of equitable utilization/participation and a polluting state's obligation to avoid transboundary harm. For during the 1984 debates it

113. Schwebel, Third Report, *supra* note 84.

114. Draft art. B (Responsibility for appreciable harm), *id.* at 104.

115. Evensen, First Report on the Law of the Non-Navigational Uses of International Watercourses, U.N. Doc. A/CN.4/367 (1983).

116. *See* articles 6, 7, and 8, *id.* at 31-35.

117. *Id.* at 37.

118. Thus after discussions of the First Report in the Commission and the General Assembly's Sixth Committee, the special rapporteur submitted a Second Report which was essentially unchanged as regards the provisions of interest in the present context. *See* Evensen, Second Report, *supra* note 33, at 23-30.

119. *See* Report of the International Law Commission on the Work of its Thirty-Fifth Session, II ILC Y.B. pt. 2 at 72, para. 246 (1983).

120. *See* Report of the International Law Commission on the Work of its Thirty-Sixth Session, *supra* note 69, at 208, para.280.

became evident that some Commission members held reservations about Article 9 on exactly the grounds that it appeared to subordinate equitable sharing to the "no appreciable harm" requirement.[121] At the Commission's 1986 session the issue of the dual test approach is thus likely to come to a head.[122] While the outcome of this renewed debate cannot be predicted, it is clear that a significant number of Commission members have become sensitized to the overall detrimental implications of retaining the dual test approach and might now be willing to abandon it.

This step has already been taken by the authors of the new draft Restatement of the Foreign Relations Law of the United States. Section 601 on Protection of the Environment defines the outer limit of a state's right to use its own environmental resources as coinciding with avoidance of significant transnational environmental injury.[123] Comment (c) explains that the threshold concept implies a factual finding but acknowledges a potential relevance of the value of the polluting activity to the source state as an offsetting consideration, albeit only in "special circumstances."[124]

In conclusion it can be said that, as a minimum, an incipient trend towards scuttling the dual test approach is discernible. For the reasons advanced above, this development is eminently sensible. Any infliction of significant transboundary environmentally harmful effects, without more, ought to be considered to reflect an inequitable use of the internationally shared natural resource. Specifically, with regard to transboundary air resources, the rationale for affirming the "significant harm" threshold as the principal outer limit of a state's entitlement is even more persuasive.[125] It can be hoped, therefore, that future state practice will confirm unequivocally that a state's right to use an international air shed ends where another state's environment is significantly harmed by the use. Where transboundary effects do not reach this threshold but are nevertheless appreciable in the sense of affecting the assimilative capacity of the transboundary environment, the polluting activity may yet have to be deemed internationally impermissible if on balance the resource use is

121. *See id.* at 230-31, paras. 338, 340-41.

122. Although the Commission agreed with Stephen McCaffrey, the latest special rapporteur on the topic, to avoid another general debate in plenary session on draft articles 1 to 9, it was noted that no consensus had been reached in 1984 on some of the major issues raised in those articles and that therefore further discussion was needed. Report of the International Law Commission on the Work of its Thirty-Seventh Session, 40 U.N. GAOR Supp. (No. 10) at 176, paras. 285 and 289, U.N. Doc. A/40/10 (1985).

123. ALI, RESTATEMENT, FOREIGN RELATIONS LAW OF THE UNITED STATES 169 (Tent. Draft No. 4, rev. 1983).

124. *Id.* at 171.

125. *See supra* text at notes 67-68.

found to amount to an inequitable one. In such a case considerations other than those related to the transboundary impact will, naturally, continue to play a legitimate role in circumscribing international rights and obligations between source and victim states.

THE NATURE AND SCOPE OF INTERNATIONAL LEGAL PROTECTION AFFORDED TO STATES' ENTITLEMENTS

The issue of the threshold may well be the most complex one that has to be confronted in a case of transboundary pollution in which no *a priori* specific conduct-related norms or environmental quality objectives provide guidance to the determination of states' rights and obligations. Nevertheless, controversy might arise also as to the exact nature and scope of the source state's presumed duty to adjust any conduct that may threaten or actually occasions significant transboundary injury.[126]

The Duty to Prevent Significant Transboundary Harm

A few years ago Professor Kiss, relying principally on the *Trail Smelter* case, ventured the opinion that "[a]s matters . . . [stood] at present, positive international law . . . [could] solve the problem of transboundary air pollution in frontier areas only by applying the rules relating to international liability, that is to say, in cases where damage ha[d] already been done."[127] Unto this day the notion has persisted that the *corpus* of customary international environmental law does not yet include an obligation to prevent such injury.[128] However, in the face of recent evidence to the contrary, this denial is no longer plausible. Not only are there numerous cases in which planned state activity carrying a risk of significant transboundary harm has been modified or abandoned upon diplo-

126. Some questions might arise also with regard to reparation for transboundary harm inflicted. However, for present purposes, i.e., for determining the nature and scope of the entitlement, the issue of reparation *sensu stricto* is of secondary importance relative to the proper characterization of the source state's obligation to adjust its transnationally injurious conduct. For this reason the discussion will henceforth center on the latter to the exclusion of questions regarding in particular the standard of liability for transboundary environmental harm. For a discussion of the liability issue, see generally Quentin-Baxter, Fourth Report, *supra* note 22, at 29-55; and, more specifically, Dupuy, *International Liability for Transfrontier Pollution*, in TRENDS, *supra* note 35, at 363; Gündling, *Verantwortlichkeit der Staaten für grenzüberschreitende Umweltbeeinträchtigungen*, 45 ZEITSCHRIFT F. AUSL. ÖFFENTL. RECHT U. VÖLKERRECHT 265 (1985); Handl, *Liability as an Obligation*, *supra* note 24; and Rest, *Responsibility and Liability for Transboundary Air Pollution Damage*, in TRANSBOUNDARY AIR POLLUTION, *supra* note 3.

127. Kiss, *Efforts to Control Air Pollution at International Levels*, in COUNCIL OF EUROPE, LEGAL ASPECTS OF AIR POLLUTION, Doc. EXP/AIR (72) 11, 45 (1972).

128. *See, e.g.*, Diez, *Probleme des internationalen Nachbarrechts*, 35 ANNUAIRE SUISSE DROIT INTERNATIONAL 9, 20 (1979); Wetstone & Rosencranz, *supra* note 6, at 123 (1984); and Wolfrum, *supra* note 8.

matic intervention by the potentially affected state.[129] There is also widespread recent state practice, reflected in treaties and agreements, which points to a general acceptance of a duty to prevent significant harm as part of present-day customary international law. Most prominent examples in point include[130] the Law of the Sea Convention,[131] and the marine protection agreements adopted under UNEP's regional seas program.[132] The impression of the duty of prevention as an obligation reflective of common legal expectations is reinforced by resolutions of the International Law Association[133] and the Institute of International Law[134] purporting to restate customary international law on the matter. Moreover, the obligation is a keystone in the International Law Commission's draft articles on the topics of international watercourses[135] and liability for lawful conduct.[136] Indeed the duty of prevention presents itself as the very essence of the universally accepted obligation[137] not to cause significant harm to

129. For examples of pertinent state practice involving specifically transboundary air pollution, *see, e.g.*, the *Poplar River* case, *supra* text at notes 94-99; the U.S./Canada dispute over the *Atikokan* power plant, *discussed in* J. CARROLL, *supra* note 94, at 216-23; the U.S./Mexican agreement concerning transboundary pollution from the Nacozari smelter, ENV. REP., CURRENT DEV. (BNA) 2021 (1985); the controversy over the planned oil refinery at Sennwald (Switzerland/Liechtenstein), Wildhaber, *supra* note 45; the understanding reached on the planned fertilizer factory at Ottmarsheim/Alsace (France/West Germany), Grawe, *Probleme des Umweltschutzes im deutsch-französischen Grenzgebiet*, 34 ZEITSCHRIFT F. AUSL. ÖFFENTL. RECHT U. VÖLKERRECHT 299, 314-15 (1974); the discussions of the projected waste incinerator at Hombourg/Alsace, *id.* at 315-16; and the 1986 agreement between France and Luxemburg providing for certain environmental protection guarantees by France in connection with the operation of Cattenom, the French nuclear power plant located close to the French-Luxemburg and French-German borders, *referred to* in Süddeutsche Zeitung, Mar. 15-16, 1986, at 6, col.2. This contrasts, however, with German complaints about alleged unwillingness of the French authorities to address German concerns over the perceived high level of radioactive emissions permitted under the plant's operating license: *see id.* Mar. 21, 1986, at 6, col.3. *See also infra* text at notes 331-33; *see further* cases cited by Rauschning, *supra* note 52, at 165-66.

130. As to recent bilateral agreements specifying an obligation to prevent significant transboundary effects, *see, e.g.*, arts. III and IV of the 1980 Agreement between the United States and Mexico of Cooperation Regarding Pollution of the Marine Environment, 20 I.L.M. 696 (1981); art. 2 of the 1983 Agreement between the United States and Mexico on Cooperation for the Protection and Improvement of the Environment in the Border Area, 22 I.L.M. 1025 (1983); and art. II of the Agreement for Cooperation Relating to the Marine Environment between Canada and Denmark, 23 I.L.M. 269 (1984).

131. *See* arts. 194-96, 107-08, and 210-12 of the Convention, *supra* note 70.

132. *See, e.g.*, arts. 4-8 of the Convention for the Protection of the Mediterranean Sea against Pollution, 15 I.L.M. 290 (1976); arts. 4-10 of the Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, 20 I.L.M. 746 (1981); and arts. 4-9 of the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, 22 I.L.M. 227 (1983).

133. *See* art. 3 of the Montreal Rules, *supra* note 83; and art. 1 of the 1982 Rules on International Water Resources Law, in Report of the Committee, *supra* note 53, at 535.

134. *See* art. III of the Resolution on the Pollution of Rivers and Lakes and International Law, *supra* note 81.

135. *See* art. 9 of the draft articles, in Evensen, Second Report, *supra* note 33, at 29.

136. *See, e.g.*, § 5, para.2 of the Schematic Outline, in Quentin-Baxter, Third Report, *supra* note 60, at 27.

137. *See supra* note 41.

the environment beyond national jurisdiction or control. In these circumstances there would seem to be no denying that an obligation to prevent the occurrence of impermissible transboundary effects exists as a matter of present-day customary international law.[138]

The obligation concerned is one of due diligence.[139] In principle, the source state is consequently obliged to take only those pollution control measures which in the circumstances of the case it can reasonably be expected to adopt.[140] But the notion of "due diligence" is, of course, intrinsically one that varies with the circumstances of the case.[141] The greater the risk[142] of transboundary harm associated with a planned or on-going state conduct, the more stringent will be the requirements concerning preventive measures. Thus when the risk is "significant," not in the sense of the probability of its realization, but of very serious, say, irreversibly harmful consequences, the diligence required of the source state might imply a duty to abstain altogether from the risk-bearing conduct in question.[143] By the same token, on the far end of the scale of probability, where environmental discharges are bound to cause significant harm to the rights of other states, the standard of "reasonable preventive

138. *See also* Kirgis, *Technological Challenge to the Shared Environment: United States Practice*, 66 AM. J. INT'L L. 290, at 294 (1972); Wildhaber, *supra* note 45, at 119; I. POP, VOISINAGE ET BON VOISINAGE EN DROIT INTERNATIONAL 283-84 (1980); and *cf.* Kilian, *Völkerrechtliche Schranken grenzüberschreitender Umweltbelastungen -Diskussionsbericht-*, in RECHTSFRAGEN, *supra* note 41, at 59.

139. *See generally* the ILC's commentary on draft art. 23 of the draft articles on state responsibility, II ILC Y.B. pt.2 at 82, para.4 (1978).

140. *See also* Quentin-Baxter, Third Report, § 5 para.3 of the Schematic Outline, *supra* note 60, at 28.

141. *See, e.g.*, the conclusions of the Institute of International Law as reflected in art. III of its resolution on The Pollution of Rivers and Lakes and International Law, *supra* note 81, at 199; and *cf. generally* Judge Learned Hand's famous formula in United States v. Caroll Towing Co., 159 F.2d 169, at 173 (2d Cir. 1947).

142. Risk is, of course, a composite notion. Thus a "significant risk" might be one which combines a high probability of realization with relatively minor injurious consequences; or vice-versa, a relatively low probability with severe consequences in the event of a realization.

143. Thus various multilateral conventions bearing on the protection of environmental resources show that states have found it convenient to stipulate the ultimate level of due diligence by outlawing typical polluting conduct which carries a significant risk, in terms principally of very serious consequences, for the rights of other states. Note in particular the existence of international instruments on the protection of the marine environment against pollution which blacklist certain hazardous or toxic substances. For examples, see art. IV and Annex I of the 1972 London Convention on the Dumping of Wastes at Sea, *reprinted in* 11 I.L.M. 1291 (1972); art. 4 together with Part I of Annex A of the 1974 Paris Convention on the Prevention of Marine Pollution from Land-Based Sources, *reprinted in* 13 I.L.M. 352 (1974); art. 4 and Annex I of the Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft, *reprinted in* 15 I.L.M. 300, 303-04 (1976); and art. 5 and Annex I of the 1980 Protocol for the Prevention of Pollution of the Mediterranean Sea against Pollution from Land-Based Sources, *reprinted in* 19 I.L.M. 867 (1980). *See also supra* note 83.

For a detailed analysis of that "modified standard of proof approach" first hinted at by Kirgis (*supra* note 138), *see* Handl, *An International Legal Perspective on the Conduct of Abnormally Dangerous Activities in Frontier Areas: The Case of Nuclear Power Plant Siting*, 7 ECOL. L.Q. 1, 30-39 (1978).

measures" will approach such a degree of stringency that continued unmodified engagement in the conduct concerned will be deemed internationally unlawful.

The Duty to Abate Significantly Injurious Transboundary Pollution

A duty to abstain from transnationally injurious conduct would *a fortiori* seem to arise whenever there is already evidence of significant transboundary harm due to existing continuous or, with certainty, periodically recurring transboundary flows of pollutants. Whatever the nature of the obligation at the moment in which the source state must be presumed to become aware of the transboundary problem,[144] the state's failure thereafter to curb the transboundary flow of pollutants renders its injurious conduct intentional, hence internationally wrongful.[145] Certainly, wrongfulness is precluded if the state is entitled to invoke a "state of necessity."[146] However, the parameters for an admissible plea of "necessity" are drawn very restrictively: The infliction of significant transboundary pollution damage would not amount to an internationally wrongful act if this "was *inter alia* the only means of safeguarding an essential interest of the State against a grave and imminent peril."[147] Any indefinite intentional invasion of another state's rights on the grounds of, say, an alleged economic or technical infeasibility of controlling transboundary effluents, could hardly be squared with the "absolutely exceptional nature of the . . . situation" and the "necessarily temporary nature of this 'justification'" which, according to the International Law Commission, are intrinsic characteristics of a valid claim of "necessity."[148] Thus it is not surprising that Lammers should have concluded that "in principle, States do not accept the argument of the technical or socio-economic unfeasibility of pollution prevention or abatement measures as a valid ground to cause new or continue indefinitely existing transfrontier pollution bring-

144. Arguably, at that moment, the state's obligation to abstain might be an obligation established by a "primary," rather than by a "secondary" rule of international law, or rule of state responsibility. As to the nature of the latter, namely as the legal consequence of a violation of a former, i.e. primary obligation, see Report of the ILC on the Work of its Twenty-Fifth Session, II ILC Y.B. 161, 169, para.40 (1973).

145. *See also* Sette-Camara, *Pollution of International Rivers*, 186 RECUEIL DES COURS 117, 174 (1984).

146. *See* art.33 of the ILC's draft articles on state responsibility, II ILC Y.B. pt. 2, at 34 (1980). Apart from consent by the "victim state," a situation which is of no interest here, the only other theoretically conceivable justification of such intentional conduct would lie in the possibility that the source state refuses to curb the transboundary flux of pollutants in retaliation for the former's violation of an international obligation (such as not to cause significant transboundary environmental harm) owed the latter. *See* art.30, "Countermeasures in respect of an internationally wrongful act," *id.* at 33.

147. Art. 33, para. 1(a), *id.* at 34.

148. *See* the Commission's commentary to draft art. 33, *id.* at 39, para.14, discussing the case of *Fur Seal Fisheries off the Russian Coast*.

ing about substantial harm in other States."[149] If continuous, significantly harmful transboundary pollution must therefore be deemed inexcusable,[150] it would seem a fair assumption that the source state is obliged, if so requested,[151] to terminate the transnationally injurious conduct or, rather, change it so as to stop infringing the exposed state's rights. Abatement would be mandatory as a matter of state responsibility. For the duty to abate is, surely, the "first new obligation" to arise out of the source state's breach of its primary obligation to "prevent" significantly injurious transboundary pollution.[152]

Apart from the *Trail Smelter* decision,[153] there is substantial state practice to buttress this conclusion.[154] But while the existence of a duty to abate is generally accepted in the literature,[155] it is not subscribed to universally.[156] Some international lawyers question whether the source state's duty to adjust its conduct is tantamount to abating significantly injurious transnational pollution. They suggest instead that its obligation might be limited to paying damages in exchange for the right to carry on the polluting activity, to mention only the most obvious alternative view of the source state's obligation.[157] For example, McDougal and Schlei conclude that "sound policy decrees that international law should parallel

149. Lammers, *"Balancing the Equities," supra* note 78, at 158. For a discussion of the seemingly contradictory art. 6 of the 1979 ECE Convention, see *infra* text at notes 234-42.

Apart from the exceptional circumstances noted before (*supra* text at notes 146-47), the principle of *ultra posse nemo tenetur* is by definition inapplicable to situations in which the invasion of the victim state's rights is intentional, be that in the context of new or already existing transboundary pollution.

150. Except in the limited circumstances precluding wrongfulness as listed *supra* note 146.

151. Note that in characterizing the legal consequences of an internationally wrongful act, the ILC's special rapporteur on the topic of state responsibility, Prof. Riphagen, is now approaching the issue from the standpoint of the "injured State." Draft article 6, para.1(a) thus emphasizes the injured state's right to require the discontinuation of the wrongful act: Riphagen, Fifth Report on the Content, Forms and Degrees of State Responsibility, U.N. Doc. A/CN.4/380, 6 (1984). An earlier draft art. 4 had stressed the obligation of the state which committed the wrongful act to discontinue it: see Riphagen, Second Report on the Content, Forms and Degrees of State Responsibility, U.N. Doc. A/CN.4/344, 43 (1981). *See generally* 1 OPPENHEIM-LAUTERPACHT, INTERNATIONAL LAW 353 (8th ed. 1955).

152. *See* Riphagen, Second Repport, *supra* note 151, at 15, para. 68. *Cf. also* Graefrath, *Responsibility and Damages Caused: Relationship between Responsibility and Damages,* 185 RECUEIL DES COURS 9, 73 (1984).

153. For details, see *infra* text at notes 165-71.

154. *See, e.g.*, the examples given in Rauschning, *supra* note 52, at 161-62.

155. To this effect, Wildhaber, *supra* note 45, at 118.

156. For example, during the ILC debates on draft article 23 of Evensen's First Report (*supra* note 115), Sir Ian Sinclair asserted that while "existing pollution could not be regarded as an acquired right, . . . it was difficult to see how States could accept an absolute obligation to eliminate existing pollution." 1791st meeting of the ILC, I ILC Y.B. 215, para.25 (1983).

157. A variation on that same fundamental entitlement issue is implied by the suggestion that instead of controlling transboundary pollutants at the source, it would be more efficient for the source state to help "neutralize" them at the transboundary point of impact. For a rejection of this "option" as one to which the source state might be entitled, *see infra* note 249, and text at notes 335-40.

municipal law" in permitting a state to continue to carry on conduct for which it was liable in damages.[158] More recently, during the International Law Association's debates on rules on transfrontier pollution, it was again suggested that in certain circumstances the resolution of a significant transboundary pollution problem might warrant compensation rather than termination of the injurious conduct.[159] In terms of both past trends in decision and basic community policy, the idea of substituting the payment of damages for termination of the injurious conduct as a matter of general international law—as against on the basis of the pollution-exposed state's specific consent[160]—is unpersuasive.[161]

There are weighty arguments against recognition of a source state's right to insist on continuing the transnationally injurious conduct in exchange for payment of damages. First of all, as already explained in greater detail before, the true costs of significant environmental harm are exceedingly difficult, if not impossible, to internalize.[162] Compensatory payments are thus likely to fall short of the actual damage caused.[163] Secondly, acceptance of compensation, even if deemed admissible only in exceptional circumstances, tends to sanction implicitly transboundary pollution and thus to perpetuate the risk of serious misallocations of resources. Perhaps even more importantly, the interest that states have in preserving their environment, in determining what level of pollution to accept in the pursuit of what objectives, would be left unprotected. Protection of this interest, however, lies at the heart of the present transnational legal system, the territorial sovereignty of states, the right to independence, and the principle of self-determination. Needless to say

158. McDougal & Schlei, *The Hydrogen Bomb Tests in Perspective: Lawful Measures for Security*, 64 YALE L.J. 648, 694 (1955).

159. Lammers, statement during the debates of Prof. Rauschning's report, *supra* note 111, at 570. *See also* Dupuy, *International Liability*, *supra* note 126, at 385; and Dupuy & Smets, *Compensation for Damage Due to Transfrontier Pollution*, OECD, COMPENSATION FOR POLLUTION DAMAGE 181, 188 (1981).

160. In certain circumstances it is thus entirely conceivable that the exposed state might value compensation payments higher than the preservation of its environmental resources whose quality declines in consequence of the source state's polluting activities.

161. It should be noted though that McDougal and Schlei advocated such substitution while defending the international legality of nuclear testing on the high seas, notwithstanding inter alia the *accidental* contamination of the Japanese fishing vessel *Fukuryu Maru*, its crew and its catch. To this extent, the intended thrust of their argument is basically acceptable. Because a state's entitlement to be free from accidental harm of foreign origin, when the causal foreign state conduct is internationally lawful, will entail a right to damages but not to an injunction against the injurious conduct. For details, see Handl, *Liability as an Obligation*, *supra* note 24.

162. *See supra* text at notes 66-68.

163. Particularly when transboundary pollution is discovered to have caused irreparable harm, compensation will be "poor consolation" for the damage inflicted. *See* Observations by the Executive Director on the Relationship between General Assembly Resolutions 3129 (XXVIII), Principles 21, 22 and 24 of the Stockholm Declaration, and General Assembly Resolutions 2995 (XXVII) and 2996 (XXVII), U.N. Doc. UNEP/GC/44, at 36, 38, para.79 (1975).

states, as a matter of principle, guard jealously against infractions of this fundamental interest.[164]

As regards past international legal practice bearing specifically on the issue under review, the *Trail Smelter* tribunal, for one, left little doubt that no state had a right to cause serious transboundary harm.[165] It then added that Canada "[a]part from the undertakings in the . . . [*compromis*] had the duty to see to it that its conduct should be in conformity with . . . [its] obligation . . . under international law as herein determined."[166] Still, it has been argued that the tribunal's decision supports the idea of "compensation instead of termination" in cases in which pollution prevention costs and pollution costs are highly disproportionate.[167] It will be recalled that the tribunal did indeed envisage the possibility that future harm might be sustained in the State of Washington despite the control regime that the tribunal saw fit to prescribe for the future operation of the smelter.[168] In this sense the tribunal was, it is true, unwilling to enjoin an undeniably risk-bearing activity. But according to the tribunal, any future transboundary harm was of a low probability since the prescribed regime was expected to "probably result in preventing any damage of a material nature. . . ."[169] In other words, the kind of transboundary injury the tribunal was thus willing to tolerate was not, as has been alleged, "in all probability . . . the result of *continuing* [transboundary] interference,"[170] but of an improbable or merely accidental nature. Under these circumstances it is impossible to find any support in the decision for an acceptance of, as it were, a transboundary pollution easement the very essence of which would seem to be continuity or certain periodical recurrence of the transboundary flow of significantly harmful pollutants.[171]

On the other hand, for such a restriction on the sovereignty of the pollution-exposed state to be a general feature of customary law, there must be evidence of pertinent state practice. But by this standard the "compensation instead of termination" argument fails decisively. To substantiate this, it should suffice to point to two key cases in which the

164. For an invocation of the principle of "environmental self-determination" in the context of transfrontier pollution, *see, e.g.*, the statement of Mr. Ellicott, Counsel for Australia, Oral Pleadings, Request for the Indication of Interim Measures of Protection, I ICJ, NUCLEAR TESTS, PLEADINGS 188; *see further infra* text at notes 173-78.

165. *See supra* note 41.

166. *Id.* at 1966.

167. Lammers, *"Balancing the Equities," supra* note 78, at 161.

168. As to the regime imposed, see Award, *supra* note 41, at 1974-78.

169. *Id.* at 1980.

170. Lammers, *"Balancing the Equities," supra* note 78, at 161.

171. To this effect, *cf. e.g.*, Abendroth, *Servitut*, 3 WÖRTERBUCH DES VÖLKERRECHTS 262 (H.-J. Schlochauer ed. 1962). The author moreover notes that nowadays a servitude could only come into existence through treaty and not through custom. *See also* F. VALI, SERVITUDES OF INTERNATIONAL LAW 309-10 (2nd ed. 1958).

discrepancy between pollution prevention costs to be incurred by the source state and pollution costs, that is, the damage suffered at the transboundary impact area, is said to play a role, namely the United States-Canadian[172] and the British-Norwegian[173] controversies over the effects of transboundary air pollution.[174] As regards the former, it has been said that "Canada has taken the position that the potential availability of compensation in no way offsets absolute prohibition of injurious pollution as set forth unequivocally in the Boundary Waters Treaty."[175] In respect of the latter, Norway is reported to be steadfastly opposed to any compensation schemes under which source states would pay for the damage attributable to foreign-origin acidic pollutants.[176] Its objection is said to be based on the fundamental consideration that any compensation scheme would implicitly sanction continued transboundary pollution.[177]

There appears to be a limited but inconclusive practice among states of accepting payments for damage due to continuous foreign-origin pollution.[178] The general conclusion must therefore be that the source state's obligation is none other than to terminate the transnationally injurious conduct. There are no signs, either, of a shift of the entitlement in the near future. Recent negative reactions in the International Law Commis-

172. *See infra* section entitled LONG-RANGE TRANSBOUNDARY AIR POLLUTION: TOWARDS A SHIFT IN ENTITLEMENT? [hereinafter cited as LONG-RANGE POLLUTION]; and Handl, *Transboundary Air Resources, supra* note 3.

173. *See, e.g., Million-Dollar Problem—Billion-Dollar Solution?*, 268 NATURE 89 (No. 5616, 1977).

174. For a discussion of the LRTAP problem in general, *see infra* section entitled LONG-RANGE POLLUTION, *supra* note 172.

175. Caldwell, *Binational Responsibilities for a Shared Environment*, in CANADA AND THE UNITED STATES: ENDURING FRIENDSHIP, PERSISTENT STRESS 203, 211 (C. Doran & J.Sigler eds. 1985).

176. G. WETSTONE & A. ROSENCRANZ, ACID RAIN IN EUROPE AND NORTH AMERICA: NATIONAL RESPONSES TO AN INTERNATIONAL PROBLEM 62 (1983).

177. *Id.*

178. Thus Czechoslovakia has reportedly paid annual sums to Poland and the GDR in compensation of injury caused to the lower riparians by continuous pollution of the Oder river within Czechoslovakia. *See* Ioanid, *La protection de l'environnement, partie intégrante de la coopération europeéne—état présent, tendances et moyens d'action*, 8 REV. ROUMAINE D'ETUDES INTERNATIONALES 175, 179 (1974). However, the true precedential significance of these cases is difficult to make out given the lack of clarity concerning the parties' own legal characterization of these payments and/or the scarcity of other pertinent information. As to the absence of information that would allow a proper contextual analysis of the payments, see J. FÜLLENBACH, EUROPEAN ENVIRONMENTAL POLICY: EAST AND WEST 42 (1981).

Another incident which has been made out to be a "clear-cut" example "at the international level" of the payment of damages in lieu of termination of the injurious conduct, involves air pollution originating at an aluminium plant located in southwestern Germany and affecting the lower Frickthal area in the neighboring Swiss Canton of Aargau: see Dupuy, *supra* note 126, at 385. However, its relevance as an international legal precedent is already tainted by the fact that the issue was resolved through private arbitration in Switzerland (the polluting plant was Swiss owned). It was never the object of diplomatic representations by either side. *See* Diez, *supra* note 127, at 20; *cf. also* E. KLEIN *supra* note 57, at 220, n.767.

sion,[179] the International Law Association,[180] the Institute of International Law,[181] as well as the lack of general support in the literature,[182] quite apart from the absence of any significant reflection in state practice, all suggest that "compensation instead of termination" is unlikely to become a reality in customary international law.

As regards the time factor concerning compliance with the duty to abate existing transboundary pollution which has been found to be internationally impermissible, it is agreed that, as a general rule, the source state is entitled to a period of grace. For example, the comment on the abatement provision of the Montreal Rules on Transfrontier Pollution notes that the rule "does not expressly allow for a transitional period. . . . However, a short time-lag for the fulfillment of the obligation might be acceptable according to the meaning of 'abatement' as a process."[183] A similar idea has found expression in Article III of the International Law Institute's 1979 resolution.[184] After all, it was acknowledged, *"on doit aussi être realiste et . . . on ne peut demander aux Etats de supprimer du jour au lendemain une pollution existante."*[185]

LONG-RANGE TRANSBOUNDARY AIR POLLUTION: TOWARDS A SHIFT IN THE ENTITLEMENT?

As we have seen, states are under a customary international legal duty to abstain from conduct that causes significant transboundary environmental harm as well as from conduct that carries a significant risk of

179. *See, e.g.*, Evensen, First Report, *supra* note 115, at 61, para.171: "To pollute an international watercourse system so as to cause appreciable harm to other system States cannot acquire the rank of a vested right."

180. *See, e.g.*, Comment to draft art. 3 of the Montreal Rules on Transfrontier Pollution, in Rauschning, *supra* note 52, at 163-64, para. 10-11. Note also comment (e) to art. XI of the Helsinki Rules, *supra* note 54, at 505: "To permit a State to continue to cause injury to another State through such pollution of a drainage basin and merely to pay monetary damages periodically would have the same consequences as a servitude on the territory of a co-basin State. . . . On fundamental principles of justice and the limited authority of international tribunals, injunctive relief . . . would appear appropriate. . . ."

181. Note, for example, the strong criticism of the "polluter-pays principle" by Colliard as suggestive of an entitlement to purchase the right to pollute. Salmon, *Rapport provisoire, supra* note 39, at 260. For this reason, amongst others, the rapporteur decided to omit any reference to the principle in the Institute's 1979 resolution on The Pollution of Rivers and Lakes and International Law: *id.* at 261.

182. For a strongly opposing view, see instead Sette-Camara, *supra* note 145, at 196.

183. Rauschning, *supra* note 52, at 164.

184. "For the purposes of fulfilling their obligation . . . States shall take, and adapt to the circumstances, all measures required to: . . . abate existing pollution within the best possible time limits." Art. III, para.1 of the resolution, *supra* note 81, at 199. Paragraph 2, however, suggests a particularly strict time-table for getting into compliance when ultra-hazardous or otherwise dangerous activities are involved.

185. Salmon, *Rapport provisoire, supra* note 39, at 225, summarizing the position of several of the members of the drafting committee.

such harm. The duty concerned thus encompasses the notion of both abatement and prevention and, in turn, has spawned a set of concomitant procedural obligations whose activation again is tied to "significant harm." Yet, as noted at the outset, some have raised the question of whether the traditional entitlement epitomized in this threshold concept might not break down in face of LRTAP, or undergo a shift.

While it has been implied that there is some indication of a strengthening of a state's entitlement against transboundary environmental interference,[186] the only persuasive evidence of a possible shift signals, indeed, a change in exactly the opposite direction.[187] Today there exist a number of factors whose convergence seems to enhance a polluting state's position relative to that of an exposed state as regards the resolution of international controversies over transnational air pollution. Some factors, extrinsic to transboundary air pollution, have already been noted.[188] Above all, however, there is the fact that air is a pollution transfer medium whose spatial diffuseness and inherent dynamics make it difficult to trace individual transfer events. Air pollutants, in other words, tend to give rise to very special evidentiary problems concerning identification of source and receptor areas and the determination of cause-effect relationships. The problems are particularly evident in the context of allegations of injurious consequences due to LRTAP.

There is no denying that much uncertainty continues to engulf basic elements of the typical case in which the release of air pollutants appears implicated in distant environmental harm. Consider, for example, the case of acid precipitation, the paradigm of long-distance air pollution. For a start, it is impossible to characterize precisely the causal relationship between observable environmental or health effects and given levels of

186. Note in this context Lammers, *First (Preliminary) Report of the ILA Committee on Legal Aspects of Long-Distance Air Pollution*, in ILA, REPORT OF THE SIXTY-FIRST CONFERENCE, PARIS 1984, 377, 386 para.37 (1985), who acclaims "as highly positive from an environmentalist viewpoint" the fact that the 1979 ECE Convention on Long-Range Transboundary Air Pollution does not contain a reference, either express or implicit, to a threshold separating permissible from impermissible transnational pollution effects. Thus he notes *proof* of *substantial* harm is not required in order to be able to invoke the [Convention's] substantive provisions." *Id.* However, the author quickly acknowledges the other side of the coin, i.e., the major qualifications that attach to the obligations activated by the occurrence of "air pollution," unqualified as it is. For a critical view of the Convention's meager abatement provisions, see in particular Kiss, *La convention sur la pollution atmosphérique tranfrontière à long distance*, REV. JURIDIQUE DE L'ENVIRONNEMENT 30, 35 (1981), who notes that while the Convention includes provisions that are formally binding, their normative contents are such that they represent little more than acts of good will. *Cf. also* Rosencranz, *The ECE Convention of 1979 on Long-Range Transboundary Air Pollution*, 75 AM. J. INT'L L. 975, 980-81 (1981).

187. Indeed, given the economic and political stakes in the continued use of environmental pollutant dispersion techniques, any development on the international plane towards a replacement of the traditional environmental give-and-take policy by an entitlement rule that grants a right of protection against any transboundary environmental effects is quite implausible.

188. *See supra* text at notes 11-24.

ambient concentrations or values of deposition of air pollutants concerned.[189] As regards pollutant pathways, the evidentiary problem appears to be of a similar magnitude. Apart from the question of the adequacy of input data, confidence in projecting long-distance concentrations or depositions of air pollutants based on theoretical models is less than complete. Many of the transport, transformation, and deposition processes involved are only partially understood[190] and the testing of important aspects of long-range transport models through field observations is only now being undertaken.[191] In consequence, identification and quantification of the contribution of a specific source to an air pollution problem at a specific distant receptor site[192] is, for the time being at least, extremely difficult if not impossible.[193] Still, this does not imply that our imperfect knowledge poses an insuperable obstacle to linking one state's emissions and another state's damage from acid deposition in a fashion that brings into play the traditional rules of state responsibility. Sulfur emissions, a key element in long distance transboundary air pollution and thus in the acid precipitation problem,[194] illustrate the point. First it should be noted that, while there may be no certainty of proof, today there exists overwhelming circumstantial evidence linking anthropogenic sulfur and sulfur

189. I.e., sulfur dioxide, nitrogen oxides, and their products.

190. For details, *see, e.g.*, UNITED STATES-CANADA, MEMORANDUM OF INTENT ON TRANSBOUNDARY AIR POLLUTION, WORK GROUP 2, ATMOSPHERIC SCIENCES & ANALYSIS, FINAL REPORT 11-6 (1982); NATIONAL RESEARCH COUNCIL, ACID DEPOSITION: ATMOSPHERIC PROCESSES IN EASTERN NORTH AMERICA, A REVIEW OF CURRENT SCIENTIFIC UNDERSTANDING 29-53 (1983); and U.S. Environmental Protection Agency, Interstate Pollution Abatement: Proposed Determination, 49 FED. REG. 34,851, 34,863 (1984) [hereinafter cited as Proposed Determination].

191. As to the importance of empirical validating data, see NATIONAL RESEARCH COUNCIL, *supra* note 190, at 148-54. Note in this context the use of tracer techniques such as CAPTEX (Cross Appalachian Tracer Experiment) and "emission finger printing" which analyzes the chemical composition of air masses and compares them to those characteristic of certain geographical industrial areas. As to CAPTEX, see the 1983 U.S.-Canadian Memorandum of Understanding on the Cross Appalachian Tracer Experiment, *reprinted in* 22 I.L.M. 1017 (1983). While CAPTEX data are presently being evaluated, another major, multilateral model validating exercise is in progress, the so-called International Sulfur Deposition Model Evaluation.

192. By contrast, estimates of the transnational impact of air pollutants based on model projections for distances of up to 50 kms from the source are considered to be reasonably reliable. *See, e.g.*, U.S. Environmental Protection Agency, Approval and Promulgation of Implementation Plans, Ohio Sulfur Dioxide Control Strategy, 46 FED. REG. 8481, 8488 (1984).

193. *See, e.g.*, NATIONAL RESEARCH COUNCIL, *supra* note 190, at 83; U.S. CONGRESS OFFICE OF TECHNOLOGY ASSESSMENT, ACID RAIN AND TRANSPORTED POLLUTANTS, IMPLICATIONS FOR PUBLIC POLICY (1984) [hereinafter cited as OTA 30]; *Acid Rain 1984: Hearings before the Senate Comm. on Env. & Public Works*, 98th Cong., 2nd Sess. 9-68 (1984) (statement of William Ruckelshaus, Administrator, EPA); and Bielke, *Acid Deposition: The Present Situation in Europe* in COMMISSION OF EUROPEAN COMMUNITIES, ACID DEPOSITION: PROCEEDINGS OF THE CEC WORKSHOP ORGANIZED AS PART OF THE CONCERTED ACTION "PHYSIO-CHEMICAL BEHAVIOR OF ATMOSPHERIC POLLUTANTS" 3, 16 (Berlin, Sept. 9, 1982).

194. It may well be that nitrogen oxides are bigger villains than sulfur dioxide. *See, e.g.*, "Stopping Foresticide," The Economist, Nov. 12, 1985, at 18. But at the very least the latter are a significant contributor to the problem.

compounds to serious environmental degradation.[195] There are also grounds for suspecting sulfates as a significant long-term human health risk at relatively low ambient concentrations.[196] Second, and this is the important point, when the source-receptor problem[197] is viewed in terms of the respective national territories involved, it might be diminished significantly enough to allow reasonable estimates of the transboundary flux and impact of pollutants. Thus in contrast to an analysis of the short-term, source-specific transboundary impact of sulfur emissions, the long-term average source-receptor relationship as between large emission areas and large zones of impact of long-distance air pollution can be amenable to useful characterization. Several studies,[198] including the 1982 Final Report of Work Group 2 organized under the United States-Canada Mem-

195. *See, e.g.*, NRC, ATMOSPHERE-BIOSPHERE INTERACTION: TOWARD A BETTER UNDERSTANDING OF THE ECOLOGICAL CONSEQUENCES OF FOSSIL FUEL COMBUSTION 149-82 (1981); U.N. ECONOMIC COMMISSION FOR EUROPE, AIRBORNE SULPHUR, EFFECTS AND CONTROLS, Air Pollution Studies No. 1, viii-xi (1984); U.S.-CANADA, MEMORANDUM OF INTENT ON TRANSBOUNDARY AIR POLLUTION, EXECUTIVE SUMMARIES, WORK GROUP REPORTS, 1-1 to 1-20 (1983); and Report of the Causes and Prevention of Damage to Forests, Waters and Buildings by Air Pollution in the Federal Republic of Germany, submitted to the 1984 Munich Multilateral Conference on the Environment, *reproduced in*, ACID RAIN IN EUROPE, A REPORT ON THE ACID RAIN FACT-FINDING EXCURSION OF THE SUBCOM. ON HEALTH AND THE ENV., House Comm. on Energy and Commerce, 99th Cong., 1st Sess., 25 (1985). *Cf. also* OTA, *supra* note 193, at 9-13. Thus acidification of waters and the attendant destruction of aquatic fauna, as well as the degradation of forest, recreational, crop, and materials resources are linked to sulfur emissions.

196. *See* OTA, *supra* note 193, at 255-59; 1 ACID RAIN, Fourth Report from the Environment Committee, House of Commons xiix (1984). *Contrary*, however, U.N. ECONOMIC COMMISSION FOR EUROPE, *supra* note 195, at 113, which concludes that at low concentrations the causal relationship to mortality and morbidity remains ambiguous.

197. That is the identifiability of the contribution of a given source of pollution to the concentration of pollutants at a specific downwind location and the responsiveness of the latter to emission variations.

198. The OECD-sponsored study on the Long-Range Transport of Pollutants in Europe provided a first detailed glimpse of sulfur transport patterns across Europe and of national import/export ratios for sulfur dioxide and its progenies. *See* OECD PROGRAMME ON LONG RANGE TRANSPORT OF AIR POLLUTANTS, SUMMARY REPORT (1977); and OECD, Transfrontier Pollution Group, a Tentative Analysis of Some Data Concerning Long-Range Transport of Air Pollutants in Europe, OECD Doc. ENV/TFP/78.12 (1978). Since then data bearing on the transboundary flow in Europe have improved in the wake of the setting up of the Co-Operative European Monitoring and Evaluation Programme (EMEP). EMEP was initiated in 1977 for the purpose of providing participating European governments with information on depositions or concentrations of air pollutants as well as on the magnitude and significance of the transboundary pollution phenomenon. For details on EMEP, *see, e.g.*, Smith, *A Review of the European EMEP Programme on the Long-Range Transport of Pollution and Some Ideas on How to Treat Wet Deposition*, in WMO, LONG-RANGE TRANSPORT OF SULPHUR IN THE ATMOSPHERE AND ACID RAIN 17 (1983). European-wide sulfur transfer matrices, i.e. calculations of average long-term contributions by specific emitter countries to sulfur-dioxide and sulfate concentrations and depositions in individual receptor countries are now routinely published by EMEP's Metereological Synthesizing Centre-West (Oslo). *See, e.g.*, Environment—A Decade of Co-Operation within the Economic Commission for Europe, 34 ECON. BULL. FOR EUR. 37 (Pergamon Press 1982). *See* further Eliassen & Saltbones, *Modelling of Long-Range Transport of Sulphur over Europe: A Two-Year Model Run and Some Model Experiments*, 17 ATMOSPHERIC ENVIRONMENT 1457, 1459 (1983); and Johnson, Wolf & Mancuso, *Long-Term Regional Patterns and Transfrontier Exchanges of Airborne Sulfur Pollution in Europe*, 12 ATMOSPHERIC ENVIRONMENT 511, 523 (1978). "On an annual basis for most parts of Europe, the dispersion and transport models used are able to relate

orandum of Intent,[199] reflect or point to the inherent usefulness of presently available modelling techniques for pollutants such as sulfates and their precursors for the purpose of estimating the relative contribution of one region to acid deposition in another.[200] Therefore, as regards sulfur and sulfur compounds it would seem that even long-distance pathways can be estimated with a reasonable degree of assurance,[201] provided the objective is limited to (1) identifying the source of non-local origin pollutants in terms of large emission regions;[202] and (2) describing average, long-term source-receptor relationships.[203] A long-distance transboundary sul-

observed and calculated transport and deposition with an accuracy of a factor of two." *Statement of Wiin-Nielsen, Secretary-General of WMO*, in PROCEEDINGS OF THE 1982 STOCKHOLM CONFERENCE ON ACIDIFICATION OF THE ENVIRONMENT 20 (1982).

199. *Supra* note 190. The Report establishes pollution transfer matrices for major emitter regions and particularly sensitive areas of Eastern North America. *Id.* at 8-6. The matrices concerned cover wet deposition only.

The relevance of these transfer matrices for regulatory purposes appears indirectly confirmed by recent EPA action on the petition of Pennsylvania, New York, and Maine for interstate air pollution abatement pursuant to § 126 of the Clean Air Act. While ultimately the Agency rejected the petition, it did not contest the validity of modelling results derived from the MOI study which suggested a significant contribution by out-of-state regions to air pollution in up-state New York. *See* Proposed Determination, *supra* note 190, at 34,864.

200. *See, e.g.* OTA, *supra* note 193, at 69 and 272. *See also* Fisher, *The Long-Range Transport of Air Pollutants—Some Thoughts on the State of Modelling*, 18 ATMOSPHERIC ENV. 553, 561 (1984); and Samson, *Comments on Environmental Protection Agency Proposed Determination under Section 126 of the Clean Air Act*, in IN THE MATTER OF INTERSTATE AIR POLLUTION ABATEMENT PROCEEDINGS UNDER SECTION 126 OF THE CLEAN AIR ACT, COMMENTS OF NEW YORK STATE ON EPA PROPOSAL TO DENY INTERSTATE AIR POLLUTION PETITION OF NEW YORK STATE, EPA Doc. No. A-81-09, 7-13 (1984) [hereinafter cited as COMMENTS NEW YORK STATE].

201. This is certainly true for ambient concentrations. *See, e.g.*, USES AND LIMITATIONS OF LAGRAGIAN LONG-RANGE TRANSPORT MODELS, A SUMMARY PREPARED BY THE LAGRAGIAN MODELING SUBGROUP AT THE AMERICAN METEREOLOGICAL SOCIETY WORKSHOP ON UNCERTAINTY IN THE LONG-RANGE TRANSPORT MODELING 1 (Sept. 18-21, 1984, Woods Hole, Mass.) (P. Samson ed. 1985). As regards precipitation values, the correlation between projections and empirical field data is somewhat less satisfactory. *See* Eliassen and Saltbones, *supra* note 198, at 1472.

202. It is true that in 1983 the Acid Rain Peer Review Panel of the White House Office of Science and Technology reiterated that "[t]here exist[ed] now no acceptable method for the determination of source/receptor relationships on a scale much smaller than 'eastern North America.'" OFFICE OF SCIENCE AND TECHNOLOGY, EXECUTIVE OFFICE OF THE PRESIDENT, PRESS ADVISORY: INTERIM REPORT FROM OSTP'S ACID RAIN PEER REVIEW PANEL 3 (June 28, 1983). Apart from the fact that such a state of affairs could still provide a sufficient factual basis for credible international legal claims to pollution abatement as, for example, between the United States and Canada (*see infra* text at notes 243-49), others have asserted the feasibility of a much more refined approach. *See, e.g.*, the position taken by New York State as reflected in COMMENTS NEW YORK STATE, *supra* note 200; and in the reply brief of petitioners States of New York, New Jersey and Connecticut in *State of New York et al. v. United States Protection Agency and Lee Thomas*, Civil Action No. 84-1592, 85-1082, (C.A.D.C.) 20-30. *See also infra* note 203.

203. As to the responsiveness of deposition to emission variations, note in particular the recent conclusion "that the overall atmospheric transformation process for sulfur dioxide is effectively linear," a finding that is based on the existence of a strong correlation between changes in sulfate concentrations and changes in emissions in the Western United States. Oppenheimer, Epstein & Yunhke, *Acid Deposition, Smelter Emissions, and the Linearity Issue in the Western United States*, 229 SCIENCE 859, 861 (1985). *Cf. also* NATIONAL RESEARCH COUNCIL *supra* note 190, at 7: "[T]here is no evidence for a strong nonlinearity in the relationships between long-term average emissions and deposition." *See* further OTA, *supra* note 193, at 286-89.

fur control strategy need not be limited to a general roll-back of emissions within an international air shed. In certain geographical settings it should be feasible to gear national emission control steps specifically to the reduction of ambient concentrations and/or precipitation of pollutants within a given receptor country. As a general rule, however, and especially when an air shed is shared by a large number of states which at one and the same time may represent exporters as well as importers of air pollutants of multiple national origin, a general roll-back of emissions may be the only practical way of abating transboundary harm.[204] The transaction costs of a more individualized approach might simply be too high.

However, irrespective of the specific remedy feasible in a particular political-geographical setting, once a transboundary flow of air pollutants and its effects on the exposed state(s) is amenable to reasonable description, the source state's international responsibility might be activated. Thus where a given state's contribution to harmful concentrations or precipitation of sulfur compounds within a receptor state must be deemed to be significant, the source state would be required to take action to reduce to "insignificant" its share of injurious pollutants within the impact state. For this obligation to be incurred there is no need for proof of the exact quantity and quality of the injurious transboundary effects being sustained.

To be sure, the *Trail Smelter* tribunal ostensibly called for clear and convincing evidence of transboundary harm before the source state's international legal duty to abate transnationally effective emissions was deemed to be engaged.[205] But as has been argued persuasively elsewhere, it is most improbable that today this standard would be applicable literally to a situation in which transboundary consequences are "magnified far beyond those considered in that case."[206]

Indeed, given the risk of widespread cumulative and irreversible degradation of the environment in consequence of acid precipitation,[207] it

204. Note in this context the 1985 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution, *supra* note 5, which calls for 30 percent reductions to be achieved by 1993 at the latest, with 1980 levels as the baseline. However, neither the United States nor the United Kingdom has signed the Protocol. *See also* the 1984 Ottawa Declaration on Acid Rain signed by certain European countries and Canada which commits the signatories to very similar reductions, *reprinted in* 23 I.L.M. 662 (1984); the very similar resolution adopted at the 1984 East-West Environment Conference in Munich, N.Y. Times, June 26, 1984, at 5, col.1, German text in 104 UMWELT 44 (1984); and the 60 percent target, to be reached by 1995, for overall emissions from large combustion plants in EEC member states, stipulated in art. 3 of the proposed Council Directive on the Limitation of Emissions of Pollutants into the Air from Large Combustion Plants, EEC Doc. COM (83)704 final, in E.C. OFFICIAL JOURNAL No.C49/3, Feb. 2, 1984.

205. *Supra* note 41, at 1965.

206. Kirgis, *supra* note 138, at 294.

207. As to this risk, see OTA, *supra* note 193, at 33-34; and UNITED STATES-CANADA RESEARCH CONSULTATION GROUP, LRTAP PROBLEM IN NORTH AMERICA: A PRELIMINARY OVERVIEW 25 (1979).

would be totally out of step with basic community policy of protecting environmental resources against exactly this type of threat[208] to follow the *Trail Smelter* decision in the sense of insisting on a precise characterization of the nature and extent of harm allegedly due to LRTAP.[209] Rather today it must be deemed axiomatic that the greater the risk of harm threatened—and potential irreversibility is a major *indicium* thereof—the less demanding will be the evidentiary burden concerning causal linkage and injurious transboundary impact.[210] Under this formula, present scientific/technical ability to characterize the long-range transnational transfers of sulfur compounds, as well as their transboundary impact, appears sufficient in principle to activate the source state's international responsibility. But even if one were to reject this modified burden of proof approach, it is open to question in how many cases of LRTAP "clear and convincing evidence" of one nation's contributions to another nation's environmental problems could plausibly be denied, given the increasingly sophisticated documentation of transboundary fluxes[211] and progressive improvement of our understanding of the environmental, economic, and public health consequences of sulfates.[212]

"Traceability and Redressability" of Transboundary Harm

In evidentiary circumstances of this sort, source states would be under an international legal obligation to take action to abate or control transboundary air pollution. In practice, however, some states have failed to live up to this seemingly inescapable conclusion. An example in point is the United States, which has a long-standing disagreement with Canada over the legal implications of the "acid rain" problem plaguing both

208. *See* in particular Principles 2-6 of the Stockholm Declaration, *supra* note 41, which in one way or another exhort states to avoid activities which prejudice the rights of future generations and, more specifically, enjoin the release of toxic substances that might cause serious or irreversible damage to ecosystems.

209. *See also* Randelzhofer & Simma, *Das Kernkraftwerk an der Grenze*, in FESTSCHRIFT F. FRIEDRICH BERBER 389, 416-17 (1973); Wildhaber, *supra* note 45, at 119; Kiss, *Un cas de pollution internationale: L'affaire des boues rouges*, 102 J. DROIT INTERNATIONAL 207, 235 (1975); and Handl, *An International Legal Perspective*, *supra* note 143, at 32-36.

210. *See also supra* text at note 143.

211. *See supra* note 198. As to North America, note also efforts as part of the U.S. National Acid Precipitation Program, initiated by the Acid Precipitation Act of 1980, 42 U.S.C. § 8901 (1981) and corresponding Canadian research activities administered by the Federal-Provincial Research and Monitoring Coordinating Committee. For an overview of acid precipitation networks within the United States and Canada, including NADP, MAPS 3S and CANSAP, *see* DEPARTMENT OF ENERGY, MORGANTOWN ENERGY TECHNOLOGY CENTER, ACID RAIN: COMMENTARY ON CONTROVERSIAL ISSUES AND OBSERVATIONS ON THE ROLE OF FUEL BURNING, DOE/MC/1917-1168 at 45-49 (1982).

212. *See supra* text at notes 196-97; and *cf.* UNEP, THE STATE OF THE ENVIRONMENT 1983, 16, 18-22.

countries.[213] For some time now it has been evident that perhaps as much as 50 percent of sulfur-dioxide based acid deposition affecting Eastern Canada originates in the United States,[214] and that this transboundary flow of U.S. emissions contributes significantly to widespread damage to aquatic systems and probably to soils, forests, and plants in Canada.[215] The United States, quite apart from any bilateral and multilateral conventional undertakings,[216] would therefore appear to be under a customary international legal duty to take steps to control transnationally harmful sulfur emissions. Yet no measures specifically aimed at reducing the transboundary impact of United States emissions have been taken. Both Carter and Reagan administrations have acknowledged acid precipitation in North America as an important and urgent problem.[217] The latter, however, ever

213. A situation that is somewhat analogous to the United States-Canadian controversy exists between the United Kingdom on the one hand and Norway and Sweden on the other. Despite reasonable indications of significant transboundary environmental degradation in Scandinavia due to British emissions of air pollutants, the British government has been less than forthcoming in committing itself to prompt remedial action. For details see the House of Commons debate on the acid rain report, *supra* note 196, 1331 WEEKLY HANSARD, HOUSE OF COMMONS, PARLIAMENTARY DEBATES, Jan. 11, 1985, at 1011-73; and *infra* text at note 250. *Cf. also* Pallemearts, *Judicial Response Against Foreign Air Polluters: A Case Study of Acid Rain in Europe*, 9 HARV. ENVTL L. REV. 143, 157-58 (1985).

214. *See, e.g.*, 4 BNA, INT'L ENV. REP. 1039 (1981); *Acid Rain, Hearing before the Subcomm. on Arms Control, Oceans, International Operations and Env. of the Senate Comm. on Foreign Rel.*, 97th Cong. 2nd Sess. 16, 22 (1982) (written testimony of Wynn Eakins, Izaak Walton League of America); and Davies, *An Environment Canada Perspective of Acid Rain*, in POLLUTION ACROSS BORDERS: ACID RAIN-ACID DIPLOMACY 50, 52 (J. Carroll ed. 1984).

215. *Cf., e.g.*, UNITED STATES-CANADA, MEMORANDUM OF INTENT, WORK GROUP 1, IMPACT ASSESSMENT, FINAL REPORT (1983).

216. Such as those laid down in the 1980 Memorandum of Intent (MOI) between the United States and Canada concerning Transboundary Air Pollution, *text in* 20 I.L.M. 690 (1980); in the 1979 ECE Convention, *supra* note 41; in art. VI, para.1 (l) of the 1978 Great Lakes Water Quality Agreement, 9257 T.I.A.S. 1383; and in art. IV of the Boundary Water Treaty of 1909 between the United States and Canada, U.S.T.S. No. 548.

As to the Treaty's analogous applicability to transboundary air pollution, see the 1979 Joint Statement on Transboundary Air Quality between the Government of Canada and the Government of the United States, *reprinted in* DIGEST OF UNITED STATES PRACTICE IN INTERNATIONAL LAW 1612 (1979). As regards the MOI, it is true that frequently such documents are characterized as signalling "extra-legal," or "political," commitments. *See, e.g.*, A. VERDROSS & B. SIMMA, UNIVERSELLES VÖLKERRECHT 342-43 (3rd. ed. 1984). However, the question as to whether or not the 1980 MOI can be considered to represent an international legal commitment, cannot be approached from a purely formalistic perspective. The answer depends rather on whether or not the document creates expectations of compliance. Note in this context the Canadian view that "[t]he United States should be reminded periodically that we in Canada feel bound by the Memorandum and we expect a reciprocal commitment from the United States, notwithstanding a change in the Administration." STILL WATERS, *Report of the Subcommittee on Acid Rain of the Standing Committee on Fisheries and Forestry*, 1st Sess., 32nd Parliament, 92 (1981).

217. *See, e.g.*, the Joint United States-Canadian Statement on Transboundary Air Quality,*supra* note 216; the 1980 MOI, *supra* note 216; the Joint Statement on the Environment of President Reagan and Prime Minister Mulroney of March 17, 1985, summarized in 85 DEPT. STATE BULL. No. 2098, at 8 (1985); and, most recently, President Reagan's endorsement of a five-year, $5-billion research program demanded by Canada to reduce acid rain, *referred to* in Int'l Herald Tribune, Mar. 20, 1986, at 3, col.1.

since coming into office in 1981, has consistently taken the position that additional research into the cause and effects of acid precipitation is needed before existing control programs can be expanded.[218]

A critical factor in the U.S. decision against immediate action, despite convincing evidence linking U.S.-origin sulfur emissions to serious environmental harm in Canada, has been concern about the effectiveness of possible emission control strategies. The United States has repeatedly stated its unwillingness to subscribe to any particular control program unless there exist assurances that the remedies, costly as they would be, would be effective.[219] This position is perhaps first and foremost explainable in terms of domestic politics.[220] But, at least incidentally, it raises also the interesting international legal question of whether a state can lawfully refuse to take action to abate significant transnational harm simply on the grounds that scientific uncertainties preclude a precise determination of exactly what measures might provide effective relief. Or to put it differently, the question arises whether, as some would have us believe,[221] under traditional international law establishment of a causal relationship between source and impact states necessarily implies identification of specific sources of emissions and, thereby, implicitly of the

218. Over this reluctance to take specific remedial action as proposed by Canada, formal bilateral negotiations on an air quality agreement broke down in the summer of 1982. *See* Marshall, *Air Pollution Clouds U.S., Canadian Relations*, 217 SCI. 118 (1972). For an authoritative reaffirmation of this position, see in particular President Reagan's 1984 State of the Union address, 20 WEEKLY COMP. PRES DOCS 87, 91 (1984); and the negative White House comments on the significance of the remarks by the President's own special representative on acid rain which indicated the need for immediate remedial action: N.Y. Times, Sept. 18, 1985, at A16, col.2. This has essentially remained the U.S. position despite the President's recent endorsement (*supra* note 217) of a major research effort directed towards emission reductions. Thus it was noted that "nothing that was agreed on will lead to any immediate or even medium-range reduction in acid rain." *Id.*

219. For example, at the 1984 meeting of the U.N. Economic Commission for Europe, the U.S. delegation explained that "[u]ntil scientific evidence was clear and *a corrective strategy could be effectively planned*, the United States had made a policy decision not to expand its current control programme at this time." Statement by the U.S. delegation at the Thirty-Ninth Session of the U.N. Economic Commission for Europe, *paraphrased in* Economic Commission for Europe, Annual Report, U.N. Doc. E/1984/23-E/ECE/1083 (vol.I) 60, para.278 (1984). (emphasis added); see also prepared statement of Kathleen Bennett, Ass't. Adm., EPA, in *Acid Rain, supra* note 214, at 106, 107.

The British government has taken much the same position, arguing that "the Government does not intend to commit the country to expensive emission controls, especially when there is uncertainty about the environmental benefits to be achieved in this country and in continental Europe": DEPARTMENT OF THE ENVIRONMENT, ACID RAIN: THE GOVERNMENT'S REPLY TO THE FOURTH REPORT FROM THE ENVIRONMENT COMMITTEE, Cmnd. 9397, para.3.65 (1984); see also *Defiant Britain Insists on More Proof of Causes of Acid Rain*, The Times, June 26, 1984, at 6, col.1.

220. It is evident that for the U.S. administration the international dimension of the acid deposition problem is overshadowed by its domestic implications, in particular by the question of how to distribute the costs of what control program among which parties. For a Canadian acknowledgement of this reality, *see, e.g.*, statements of McMillan and Munton, in MINUTES OF PROCEEDINGS AND EVIDENCE OF THE SUBCOMMITTEE ON ACID RAIN, House of Commons (Canada) 1st Sess., 35th Parl., 2:36-37 (1983).

221. G. WETSTONE & A. ROSENCRANZ, *supra* note 176, at 158-59.

means of effective corrective action. The problem thus raised is one which analogous to U.S. domestic legal parlance might be characterized as "traceability and redressability" of the alleged transboundary harm.[222]

It is true that in a situation of the sort just described[223] the source state finds itself in something of a dilemma. A major stumbling block to putting into place a transnational pollution control strategy that reduces ambient concentrations or deposition per area unit to a level deemed sufficient to protect the resources at risk[224] is the difficulty of apportioning distant transboundary pollutants to specific national sources of emission. Given this source-receptor relationship problem, any control program carries a risk of being less than fully effective, at least initially. It is a risk which, understandably, source states are reluctant to assume. Yet the question here is whether such reluctance might be justifiable in terms of either international law or policy.

On the one hand, the risk involved represents a potential economic burden that appears to go beyond the pollution prevention costs which the emitter state is clearly required to shoulder under customary international law. On the other hand, it is intrinsic to the process of restoring that basic balance of rights and duties between polluting and victim states which proof of significant transnational harm indicates has been upset. To be sure, a fundamental objective underlying any system of environmental regulation is to maximize efficiency in the use of the natural resource concerned. By implication, this goal must be deemed to be part and parcel of international environmental law as well.[225]

From the viewpoint of efficiency, therefore, a call for a source state's commitment of resources to preserve transboundary environmental quality threatened by its emissions of air pollutants cannot be justified, unless pollution prevention/abatement costs are roughly equal to pollution costs. But state practice demonstrates that this is not the only perspective from which to adjudge the legal implications of transboundary environmental interference.[226] Moreover, even if one were to assume that the narrow efficiency perspective alone were appropriate, which it is not, present indications of the nature and the extent of transboundary harm, in particular the possibility of irreversibility of harm, are such as to suggest an

222. *See State of New York v. Thomas,* Civil Action No. 84-0853, (D.D.C., July 26, 1985).

223. *I.e.,* where there is clear evidence of (1) a long-range transboundary flow of sulfur and sulfur-compounds; (2) the significance of these pollutants in terms of their contribution to local ambient concentrations and depositions; and (3) the significance of the environmental degradation or of the risk of such degradation associated with these foreign-origin pollutants.

224. Note the initial agreement among Canadian and U.S. scientists as to a deposition value of 20 kg/hectare/year for wet sulfates as a desirable target which would protect most endangered aquatic systems: *see* 5 INT'L ENV. REP., CURRENT REP. (BNA) 445 (1982); and the Dutch proposal of a maximum sulfur deposition value of 0.5 g/square meter/year to avoid acidification of the most sensitive soils and waters: PROCEEDINGS, *supra* note 198, at 53-54. *Cf. also* OTA, *supra* note 193, at 289-99.

225. *See, e.g.,* Handl, *The Principle of "Equitable Use," supra* note 45, at 52-54.

226. *See supra* text at notes 118-33.

obligation for the source state to take remedial action. This conclusion would seem to follow logically from the call by many experts, including the U.S. White House Office of Science and Technology Policy,[227] for the immediate adoption of emission controls notwithstanding persistent scientific uncertainties.[228]

There exist therefore sound policy reasons for rejecting the polluting state's claim that deferment of specific abatement measures is justified until improved scientific data guarantee that the strategies under consideration will indeed be cost-effective.[229] To hold otherwise would mean to justify what is an inherently unjustifiable, because inequitable, situation between the two countries concerned. While the polluting state is unwilling to accept the economic risk of an investment decision that might turn out to be ineffective or less than fully effective, it is nevertheless willing to expose the victim state to the certainty of harm associated with an unmitigated transboundary flow of sulfates and precursors.[230]

Given the relative novelty of international concern over LRTAP, it is not surprising that there should be little international legal practice that addresses unequivocally the specific issue here under examination. Contrary to what has been asserted elsewhere, international arbitral decisions offer precious little support for the proposition that under traditional international law victim states are required to link environmental injury to specific identifiable foreign sources.[231] Specifically, the claim that the *Trail Smelter* decision reflects such a requirement[232] simply amounts to

227. *Supra* note 202, at 1; and *Panel Asks Action on Acid Rain Now*, N.Y. Times, Sept. 5, 1984, at 13, col.6. Similarly, President Reagan's special envoy on acid rain, Drew Lewis, has reaffirmed the need for prompt abatement measures: N.Y. Times, Sept. 5, 1985, at A1, col.1.

228. Thus the weight of scientific opinion has centered now for quite a while on the justifiability of abatement measures despite remaining uncertainties: *Report Says Scientists Agree on Need to Act on Acid Rain*, N.Y. Times, Oct. 18, 1985, at A17, col.1. *See also* the 1984 Ottawa Declaration, *supra* note 204; the resolution adopted at the 1984 Munich East-West Environment Conference, *id.;* and the 1985 Sulfur Dioxide Protocol to the 1979 ECE Convention, *supra* note 5; as well as Recommendation 977 (1984) on Air Pollution and Acid Rain of the Parliamentary Assembly of the Council of Europe; and the conclusions of the House of Commons Environment Committee, in ACID RAIN, *supra* note 196, at ixx-ixxi.

229. As an absolute minimum, and apart from the basic duty to cooperate with the victim state on all aspects of the problem, the polluting state is under an obligation to take all those remedial steps that can reasonably be expected to bring about a reduction of the transnational concentration and/or deposition of air pollutants concerned as long as the marginal costs of these measures remain smaller than the estimated marginal benefits resulting from emission reductions. However, in view of the relevance of other pertinent, i.e., non-efficiency related considerations, a state must be presumed to be under an obligation to abate any significantly injurious transboundary effects. *See supra* section *The Threshold Issue*.

230. "Injustice . . . is simply inequalities that are not for the benefit of all": J. RAWLS, A THEORY OF JUSTICE 62 (1971).

231. G. WETSTONE & A. ROSENCRANZ, *supra* note 176, at 158.

232. *Id.* Apart from reading too much into the *Trail Smelter* decision, the authors allude to the existence of additional arbitral precedents for their proposition. However, this reference to "the few existing applications of international environmental law where nations have consented to be bound by the decision of a neutral tribunal" is at best misleading. There are simply no other pertinent decisions of international courts or tribunals.

reading into the judgment a decision on a point of law that was never really before the tribunal. The identity of the emission source was, of course, never in issue.[233]

A review of state practice, by contrast, represents a more profitable line of inquiry. The 1979 ECE Air Pollution Convention[234] defines LRTAP as pollution originating in one state and having adverse effects in another state "at such a distance that it is not generally possible to distinguish the contribution of individual emission sources or groups of sources."[235] It is true that the duty of abatement to which such transboundary air pollution gives rise under the Convention is significantly qualified. The Contracting Parties "shall endeavour to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution."[236] Suggestive as this might be of a functional relationship between the scope of the duty to abate and the ability to identify specific sources within a given emitter state, it is an impression that is not corroborated by an analysis of the Convention as a whole.

The Convention's essential objective is to commit states to take some abatement action even in the absence of traditionally required proof of significant transnational harm.[237] The centrality of this concern emerges inter alia from the preambular reference to the "possibility of adverse effects in the short and long term of air pollution including transboundary air pollution" and the consequent desirability of curbing emissions generally.[238] While this reference is redundant in that the Convention already defines "long-range transboundary air pollution" as causing "adverse effects" within the victim state,[239] it highlights an important point. The Convention's qualified abatement duty is at least partially explained by the difficulty in documenting exactly environmental, economic, and public health implications of air pollution in general, and of long-distance air pollution in particular.[240] The other principal factor accounting for the

233. The tribunal's by now famous "clear and convincing evidence" formula accordingly also referred to the proof of injury rather than to that of the causal connection: *Trail Smalter* decision, *supra* note 41, at 1960.

234. *See supra* note 5.

235. Art. 1, para.(b).

236. Art. 2; *see also* art. 6.

237. To this effect, *see also* Lammers, *First (Preliminary) Report, supra* note 186, at 386 paras. 37-38.

238. *See also* the additional reference in the Convention's preamble to "the need to study the implications of the long-range transport of pollutants. . . ," *supra* note 5.

239. Art. 1, para.(b).

240. *See, e.g.*, the statement by the German representative at the ECE High-Level Meeting in 1979 on the subject of the ECE Convention: "Although there are still considerable gaps of knowledge with regard to cause-effect relationships, we take the concern about air pollution very seriously. There is ample reason to endeavour to reduce air pollution even if cause-effect relationships are yet to be clarified." *Report of the High-Level Meeting within the Framework of the ECE on the Protection of the Environment, Geneva, Nov. 13-15, 1979*, U.N. Doc. ECE/HLM.1/2/Add.1, Annex IV, 34 (1979).

Convention's relative duty is, of course, the frequently arising impossibility of distinguishing between transboundary effects due to emissions from different states.[241] But there is nothing to suggest that impossibility of characterizing the precise causal relationship between individual sources of pollution within one state and distant harm in another is a factor underlying the Conventional provision.

The Convention does not purport to rewrite the principles of state responsibility with regard to the environment beyond national jurisdiction and control.[242] To the extent therefore that the contours of the causal relationship between emissions from a given state as a whole, rather than from individual sources within that state, and another state's environmental harm become firm, the relative abatement duty under the Convention will be superseded by the much more stringent customary legal obligation enshrined in Principle 21. In sum, where a prima facie showing of a quantitatively significant national export of pollutants as well as of the harmful extraterritorial effects of this export can be made, the source state would be under a strict duty to control the transnationally injurious emissions irrespective of whether, generally speaking, there exists certainty as to the effectiveness of available abatement strategies or, more specifically, apportionment of the exported pollutants to individual sources within that state is feasible.

This is exactly the position that Canada has taken in its dispute with the United States over the latter's contribution to Canada's acid precipitation problem. Responding to President Reagan's announcement in his 1984 State of the Union address[243] that the United States would delay further specific abatement measures,[244] the Canadian government protested the decision as "not acceptable"[245] and "inconsistent with the general principles of international law."[246] This sharply critical characterization of the U.S. refusal to take action reflects the Canadian government's view that the damage already caused by inaction is enormous for both countries, has been established by clear and convincing evidence,

241. *Cf., e.g.*, also the statement by the Canadian representative, *id.* at 50.

242. Note only the preambular endorsement of Principle 21 of the Stockholm Declaration, *supra* note 41.

243. *See supra* note 218.

244. The United States has adopted some measures which, although not specifically geared towards bringing it into compliance with U.S. international legal obligations vis-a-vis Canada, might have had the effect of reducing the flow of pollutants into Canada. An example in point is the new EPA stack height regulations which are claimed to reduce sulfur dioxide emissions by as much as 1.7 million tons annually. 50 FED. REG. 27,892 (1985). However, it has been claimed that most if not all of EPA's claimed reductions are imaginary. Comments by Richard Ayres, Chairman of the National Clean Air Coalition, *referred to* in ENV. REP., CURRENT DEV. (BNA) 348 (1985). The regulations are presently being contested in court. N.Y. Times, Aug. 6, 1985, at 16, col.3.

245. Excerpt from the Canadian diplomatic note of Feb. 22, 1984, quoted in Washington Post, Feb. 23, 1984, at A29, col.1.

246. Statement of Ambassador Gotlieb at a news conference after delivery of the note of protest, *quoted in* Los Angeles Times, Feb. 23, 1984, at 11, col.1.

and will grow with each postponement of abatement measures.[247] Direct or persuasive circumstantial evidence linking U.S. emissions to significant harm in Canada was thus deemed sufficient to trigger the source state's international obligation to curtail the transboundary flow of pollutants. In other words, Canada has asserted that despite the absence of assurances that any particular control option would be totally effective in eliminating the problem caused by U.S.-origin pollutants in Canada, let alone the present inability to apportion these pollutants to individual sources within the United States, the U.S. government was under a customary international legal obligation[248] to take some immediate remedial steps.[249]

Outside the North American context, state practice may have been less incisive in the sense of revealing similarly clear legal claims relevant to the question here under review. This is probably explained by the fact that in the European theater the cause-effect relationship issue is in general exacerbated, given the smaller national territories and the larger number of source/victim states involved, as well as more complex atmospheric conditions. Nevertheless, there is some evidence of pertinent diplomatic claims. For example, over the last two years the Nordic countries have filed strong notes of protest with the British government over what they

247. *See* statement of the Canadian Environment Minister Charles Caccia, *cited in* 7 ENV. REP., CURRENT DEV. (BNA) 69 (1984). Although the Mulroney government may have somewhat deemphasized the urgency of the problem, it appears that its basic outlook on the acid rain issue does not otherwise differ significantly from that of previous Canadian administrations.

248. *See, e.g.*, remarks of the former Canadian Minister of External Affairs, Mark MacGuigan, at Conference on Acid Rain at SUNY Buffalo, May 2, 1981, *excerpted in* 9 CANADA WEEKLY 2 (No. 21, 1981).

249. Indeed, the Canadian government has not insisted that any particular control strategy be adopted but has indicated its willingness to negotiate on the issue of abatement measures: *See, e.g,* statement of John Roberts, Env. Minister of Canada, at news conference in Toronto on the release of the Canada/United States Work Group Reports, Feb. 21, 1983.

As to the different issue of the maximum allowable deposition of pollutants, see *supra* note 224. That compliance with such a target figure might be achievable more cost-effectively by controlling pollution at the impact site has been argued by the British Watt committee on energy. This group of independent scientists concluded that "[a] reduction in the amount of sulphuric acid falling on Sweden by one tonne could be achieved by cutting British sulphur emissions by 53 tonnes-or Swedish emissions by two tonnes. It would pay Britain to give Sweden some retrofitting equipment rather than dealing with its own power stations." *Paraphrased in* The Economist, Sept. 8, 1984, at 58. While this proposition may seem to offer an attractive solution to the bilateral dispute over acid deposition between the United Kingdom and Sweden, or perhaps Norway, it would not address the consequences for other European importers of British-origin pollutants, nor would it be a proper response to environmental effects within Britain itself. Even if all these receptor countries were dealt with on the same basis, there is the likelihood that not all detrimental effects of emissions would be internalized. In any event, the costs of compensating for local impacts of distant-origin pollutants by way of paying for the reduction of local emissions might in the end approach a magnitude similar to that of controlling long-distance pollutants at the source of emission. It is for these reasons that controlling long-distance air pollution at the source is an article of faith of the various multilateral agreements dealing with the problem. For a rejection of an analogous approach aimed at merely minimizing local impacts of acifidication by using lime, see statement of Frogn Sellaeg, Norwegian Minister of the Environment, in PROCEEDINGS *supra* note 198, at 55.

perceived to be inadequate British action to control sulfur emissions in face of environmental damage caused in Scandinavia by sulfur compounds originating in the United Kingdom.[250] Similarly, the Swedish government has expressed concern vis-a-vis France over the long-range transport of French sulfur emissions which Sweden claims acidify its lakes and modify soil characteristics,[251] while West Germany has raised the issue of injurious transboundary effects of sulfur-dioxide emissions with Czechoslovakia and the German Democratic Republic.[252] While the exact probative value of these instances of state practice is difficult to determine, there exists other evidence which suggests that from an international legal viewpoint it is irrelevant whether individual sources within a given emitter state are identifiable.

The International Law Association's Montreal Rules of International Law Applicable to Transfrontier Pollution[253] purportedly restate existing rules of international law.[254] Article 3, para. (1) reiterates the traditional entitlement rule, i.e. states' obligation "to prevent, abate and control transfrontier pollution to such an extent that no substantial injury is caused in the territory of another State."[255] This obligation, the rapporteur's comments clearly indicate, covers transboundary air pollution, even long-distance pollution as long as the individual emitter state's contribution to a downwind state's problem is generally distinguishable.[256] In other words, only in those cases where apportionment to the state of origin (rather than to individual sources within an otherwise clearly identified emitter state) would be impractical might a different regime, that is a qualified duty of abatement, apply. This clear stipulation is also the point of de-

250. *See* written answer of the British Secretary of State for the Environment, 1309 WEEKLY HANSARD, HOUSE OF COMMONS, PARLIAMENTARY DEBATES, 30 April, 1984, 39-40; and his written answer of March 12, 1984, 56 HOUSE OF COMMONS, PARLIAMENTARY DEBATES 6th Ser., 25w (1983-84); and the Swedish Prime Minister's criticism of Britain's refusal to join the "30 percent club," i.e. the signatories of the Ottawa and Munich documents (*supra* note 204), at the 33rd annual session of the Nordic Council. The Times, March 5, 1985, at 6, col.7.

251. And note the French government's promise in response to give the problem careful consideration. 5 INT'L ENV. REP., CURRENT REP. (BNA) 185 (1982).

252. For references, *see, e.g.*, UMWELT 26, (1985); and 99 UMWELT 62 (1983). Note also that in response to an inquiry from Sweden, the West German Ministry of Interior in relying on EMEP calculations of the sulfur-dioxide budget as between the FRG and Sweden, provided detailed figures concerning the expected reduction in sulfur depositions in Sweden in consequence of a tightening of West Germany's industrial sulfur emission standards. For details, see 105 UMWELT 9-10 (1984).}

253. *Supra* note 83, at 1.

254. *See* art.1 of the Rules, *id.*; and Comment (1) thereto, in Rauschning, *supra* note 52, at 157, 158.

255. *Supra* note 83, at 2.

256. *See* Comment (4) to art.2, in Rauschning, *supra* note 52, at 159. *See also* Lammers, *First (Preliminary) Report, supra* note 186, at 400, para.98: "In those cases where the contribution of the contributory State(s) is known or can be relatively easily established *and* infliction of (substantial) harm on the victim state *caused* by the contributing State has been proved by the victim State, Article 3 of the 1982 Montreal Rules . . . must be deemed to apply."

parture of the International Law Association's draft rules on long-distance air pollution. A qualified duty of abatement that is essentially identical to the provisions of the 1979 ECE Convention applies only to those cases "where it is generally impossible to distinguish the contributions of particular States of origin."[257]

In light of these findings, it is unnecessary to pursue the question of what exactly a state's refusal to abate transboundary pollution in evidentiary circumtances of the above kind[258] amounts to. That is, whether it is a claim that a violation of a primary obligation[259] to avoid significant transnational environmental harm cannot be found to have occurred until and unless a causal relationship between harm and source of pollutants is established, and that proof of causation is measured in terms of the degree of certainty that control measures will be effective. Or whether, conceivably, it is the claim that while such limited evidence of causation might justify a finding of a violation of a primary obligation, it is insufficient to trigger the source state's all-important secondary obligation, that is, the duty to put an end to the breach of the primary obligation concerned.[260]

LRTAP and the "Victim-Pays Principle

Beyond the question of what evidence will suffice to trigger the customary legal obligation to control transnationally injurious activities,[261] there looms a possibly even larger issue. As some scientific uncertainties are bound to persist in most cases of long-distance transboundary air pollution,[262] allegations of insufficient evidence may not only be introduced to justify denying the existence of circumstancs which would call for legally mandated restraints on the transnationally injurious use of air resources. They might also serve as a subterfuge for disavowing the applicable traditional entitlement rule to the case at hand and, thus, for

257. *Id.* at 399, para.97; and proposed draft art. 3, *id.* at 400, para.99.

258. *See supra* note 223.

259. As to the notions of "primary" and "secondary" obligations, see *supra* note 144.

260. It is probably correct to say that "[i]t does not seem relevant whether one considers this duty as a consequence of the continuing 'validity' or 'force' of the primary obligation, or as a duty which arises as a consequence of the breach. Actually these are, so to speak, the two sides of the same coin": Riphagen, Second Report, *supra* note 151, at 15, para.68. But as the previous discussion shows, a differentiation as to the claims underlying the denial of the existence of such a duty has at least some theoretical relevance.

261. For some thoughts on the burden of proof, *see, e.g.*, Zehetner, *Beweislastprobleme im völkerrechtlichen Nachbarrecht des grenzüberschreitenden Umweltschutzes*, in IUS HUMANITATIS, FESTSCHRIFT F. A. VERDROSS 701 (H. Miehsler et al. eds 1980).

262. Indeed, there may never be a "perfect" scientific answer to help decide whether, and if so, what controls to impose on sulfur and nitrogen-dioxide emissions. To this effect *see, e.g.*, statement of Christopher Bernabo, Executive Director, National Acid Precipitation Program, in testimony before the House Science and Technology Subcomm. on Nat. Resources, Agricultural Research and Environment; *paraphrased in* ENV. REP., CURRENT DEV. (BNA) 2120 (1985).

securing a different allocation of rights and duties between source and impact states.

The plausibility of a shift[263] to a formula according to which the costs of eliminating transnationally harmful emissions of air pollutants would either be shared by both source and impact states or fully borne by the latter[264] becomes more pronounced when some additional factors are taken into account. First, averaged over time, transboundary flows of air pollutants, particularly over long distances, are frequently unidirectional or essentially unidirectional.[265] Sometimes, although the transboundary pollutant flow is bidirectional, the sensitivity of natural resources affected may vary significantly from one country to another. In certain circumstances such a lack of reciprocity as between source and impact states will tend to accentuate the issue of entitlement.[266] Thus, when the source state itself is not exposed to appreciably harmful transboundary air pollution originating in a third state and its relationship to the perhaps distant impact country is characterized by the absence of significant economic, political, or military ties, there exists a constellation of factors in which the basic entitlement rule may prove ineffective and a given victim state's options to secure compliance from the source state appear impaired.[267] Conversely speaking, the incentive for the source state to conform to an entitlement principle that might be considered to substantially benefit the impact state,[268] while imposing a burden on the source state, might be

263. As to the basic entitlement rule, *see supra* text at notes 40-42.

264. For an overview of conceivable international allocation regimes, *see, e.g.*, Note, *Study of Different Cost-Sharing Formulas for Transfrontier Pollution*, in OECD, ECONOMICS OF TRANSFRONTIER POLLUTION 31 (1976); see also, I. VAN LIER, ACID RAIN AND INTERNATIONAL LAW 70-71 (1981); and *infra* text at notes 275-76.

265. On this point and its implications *see, e.g.*, Muraro, *The Economics of Unidirectional Transfrontier Pollution*, in OECD, PROBLEMS IN TRANSFRONTIER POLLUTION 33, 38-42 (1974); and Smets, *Alternative Economic Policies of Unidirectional Transfrontier Pollution*, *id.* at 75.

266. An analogous example in point is the failure of the North Sea riparian states to overcome objections, principally from the United Kingdom, to designate the North Sea as a "special area" under the 1973 MARPOL Convention which would have entailed the prohibition of dumping of chemical and oil wastes from ships in the North Sea. Britain showed little interest in the proposed designation, it was claimed by conference observers, since winds and tides leave the British "mostly unaffected by their own waste" and there is little reverse flow of pollutants. 7 INT'L ENV. REP., CURRENT REP. (BNA) 353-54 (1984).

267. Obviously, to the extent that other states have a legal interest in the source state's abidance by the international entitlement rule, even a transboundary air pollution problem that is inherently bilateral in nature from an ecological perspective has multilateral, political implications. Any victim state is thus likely to seek to utilize multilateral fora to pressure the source state into compliance. However, it is safe to assume that, generally speaking, this diplomatic strategy is likely to be less effective than a victim state's potential ability to manipulate directly a web of interdependencies.

268. Frequently the benefits accruing to the source state itself from a reduction of transnationally injurious emissions may be underestimated. For example, abating sulfur emissions would not only benefit the downwind state(s) but also bestow environmental benefits on the source state itself. *See, e.g.*, Systems Applications Inc., Visibility and Other Air Quality Benefits of Sulfur Dioxide Controls in the Eastern United States, Report SYSAPP-83-248, Jan. 6, 1984, *reviewed in* Hawkins, *Benefits of Acid Rain Controls*, 26 ENVIRONMENT 2 (No. 3, 1984).

sufficiently reduced to prompt the latter to question the appropriateness of the allocative rule itself.[269]

Second, present debates on domestic long-range transboundary air pollution within the United States seem to focus not so much on whether but on how the expenses of a national acid deposition control strategy ought to be shared as between source and impact regions.[270] There exist obviously significant differences between this intranational situation and the typical international transboundary air pollution case.[271] Nevertheless, it would be wrong to assume that acceptance on a domestic level of some cost-sharing formula might not influence the perception of what constitutes the proper allocative rule in the seemingly analogous international context.[272] Third, and most importantly, there is a significant body of state practice which appears to testify to increasing acceptability of payments by the victim to the source state as a general way of securing the elimination or reduction to the level of insignificant impact, of injurious transnational effects.[273]

The relevance of these phenomena in advancing an understanding of the entitlement rule applicable to significantly harmful LRTAP, that differs from the traditional one, should not be overestimated.[274] At the same time

269. *Cf.* Davies, *supra* note 214, at 55, who points to the fact that costs would be paid in one jurisdiction while benefits would be received in another, as a major incentive for U.S. procrastination with regard to transnationally effective curtailment of pollutant emissions.

270. *See, e.g.*, statement by the Administrator of the EPA that some kind of cost-sharing will be essential: *Clean Air Act Reauthorization, (Part 3) Hearings Before the Subcomm. on Health and Env. of the House Comm. on Energy and Commerce*, 98th Cong., 2nd Sess. 49 (March 29, 1984) and, more recently, the statement by Sen. Lugar that acid rain is a national problem calling for a national solution, thus, also, national cost-sharing. 16 ENV. REP., CURRENT DEV. (BNA) 1229, 1230 (1985). Or note the acceptance by governors of Northeastern states of the limited cost-sharing approach proposed in H.R. 3400; and *cf. Acid Rain Control (Part 1), Hearings before the Subcomm. on Health and the Env. of the House Comm. on Energy & Commerce*, 98th Cong., 1st & 2nd Sess. 61, 63 (1984) (testimony of Robert Abrams, Att. Gen. of New York). By contrast, S. 52, a bill introduced by Sen. Stafford, embraces the polluter-pays principle. But it remains to be seen whether the latter philosophy will indeed prevail over strong sentiments favouring cost-sharing. As to Canada, note the agreement in principle between federal and provincial governments to share the costs of sulfur dioxide cut-backs which signals at least a partial and indirect acceptance of the so-called victim-pays principle: see 8 INT'L ENV. REP., CURRENT REP. (BNA) 37-38 (1985). For a summation of the debates in the United States, see Rhodes, *Superfunding Acid Rain Controls: Who Will Bear the Costs?*, 26 ENVIRONMENT 25 (No. 6, 1984).

271. The most important one is, of course, the fact that national societies are sufficiently well integrated politically, economically and socially to make cost-sharing a persuasive argument. By contrast, on the international level, as a general rule, there exists no corresponding degree of integration among sovereign states; hence "international solidarity" in sharing the burden of controlling transboundary air pollution may be invokable as a legally mandated principle only in exceptional circumstances. As to the latter, see *infra* text at notes 275-76.

272. *Cf.* also Smets, *A Propos d'un eventuel principe pollueur-payeur en matière de pollution transfrontière*, 9 ENVT'L POL'Y & L. 40, 42 (1982): "Les paiements d'un pays exposé à un pays d'origine pourraient être plus facilement acceptés par un pays exposé si celui-ci pratiquait lui-même au plan interne des transfers financiers. . . ."

273. For a critical evaluation, see *infra* text at notes 276-88.

274. Note, for example, that at the seven nation economic summit held in Bonn, May 2-4, 1985,

it should be evident that the allocative rule is at least potentially a matter of controversy in such cases. The question thus arises whether cost-sharing is a proper, or indeed necessary, feature of the resolution of international conflicts over such long-distance effects; and to what extent, if at all, international practice suggests that a corresponding entitlement shift is presently in the making.

There is no denying that in certain circumstances cost-sharing may fulfill a proper function in the settlement of transnational pollution disputes. Cases involving transboundary effects in which rights and obligations of states remain ill defined and clarification of states' specific entitlements thus may be subject to negotiations among the parties concerned[275] provide an illustration in point. Similarly, where the victim state seeks a reduction of residual transboundary pollution, that is of injurious effects that do not amount to "significant harm," an understanding as to cost-sharing might constitute a legally defensible precondition for the polluting state's willingness to accede to the victim state's request.[276] This bench-mark function of "significant harm" is specifically emphasized in various OECD documents[277] and is reflected in the work

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the participants committed themselves to "develop and apply the 'polluter pays' principle more widely." Joint Declaration, *reprinted in* New York Times, May 5, 1985, § 1, at 16; note further the call by the Secretary-General of OECD at the June 1985 meeting of environment ministers for full application, by member states, of the polluter-pays principle and its extension to cover the oceans and atmosphere. The Times, June 19, 1985, at 5, col. 2; and most recently, its affirmation in the revised EEC Treaty as a basic principle guiding environmental policies in the European Community: Süddeutsche Zeitung, Feb. 14, 1986, at 1, col.2.

275. *See supra* text at notes 24-25. *Cf. also* Report of the Secretariat, *Possible Role of International Financial Transfers in Preventing and Controlling Transfrontier Pollution*, in OECD, TRANSFRONTIER POLLUTION AND THE ROLE OF STATES 36, 50 (1981); and Dupuy, *La réparation des dommages causés aux nouvelles resources naturelles*, in THE SETTLEMENT OF DISPUTES *supra* note 64, at 439-40.

276. In such a situation payments to the polluting state should not be viewed as an application of the victim-pays principle, but as Smets pertinently remarks, "comme la mise en oevre de la notion 'utilisateur payeur' ou 'bénéficiaire payeur'": *supra* note 272, at 44.

277. Thus the so-called Principle of International Solidarity which has been adopted by the OECD as a principle to guide member states in their environmental policies and which is frequently invoked as a justification of cost-sharing, is expressly characterized as being applicable "[w]ithout prejudice to . . . [states'] rights and obligations under international law and in accordance with their responsibility under Principle 21 of the Stockholm Declaration": Annex, Title B to OECD Council Recommendation on Principles Concerning Transfrontier Pollution, OECD Doc. C(74) 224, *text in* 14 I.L.M. 242 (1974). Note also the Annex to OECD Council Recommendation Concerning Certain Financial Aspects of Action by Public Authorities to Prevent and Control Oil Spills, OECD Doc. C(81) 32 (Final). Although, it is recommended that, as between polluting and pollution-exposed states, the costs of any spontaneous action taken by the latter to prevent or control an oil spill ought to be fully borne by the acting state(s), this recommendation is subject to a disclaimer to the effect that the rights of countries to claim reimbursement under inter alia general international law would not be affected.

As to the proviso that the international acceptability of cost-sharing is premised on the fact that the countries concerned "respect existing rights and fulfill their obligations in relation to transfrontier pollution," see Report of the Secretariat, *supra* note 275, at 41. *Cf. also* Smets, *supra* note 272, at 41.

of the International Law Commission[278] as well as of the International Law Association.[279] Of course, in neither type of case will the traditional obligation be activated.[280] Indeed, the fact that these types of cases are specifically set apart, and distinguished from those situations in which substantial harm is clearly proved to have occurred, only underlines the importance of the threshold concept. There are, admittedly, additional exceptional circumstances, to be discussed below, in which cost-sharing can be defended as a reasonable accommodation between victim and polluting states. But there are no valid policy reasons for an across the board adjustment of the traditional, customary, allocation of states' rights and obligations with regard to the international air shed when transboundary harm is substantial and attributable to pollution from an identifiable source state.

Insofar as a cost-sharing approach has been deemed appropriate internationally,[281] it has been advocated on the grounds that it could bring about a greater degree of fairness and/or efficiency in the utilizaton of the common air shed as between polluting and victim states.[282] The fairness argument can be said to rest on two independent considerations.

278. *See* art. 23, para.2 of the draft articles on the Non-Navigational Uses of International Watercourses, in Evensen, Second Report, *supra* note 33, at 51; and art. 10, para.4 of the draft articles submitted by the previous rapporteur, in Schwebel, Third Report, *supra* note 84, at 221 (1981); and see further Quentin-Baxter, Fourth Report, *supra* note 22, at 52, para.69, who implies that cost-sharing or the "victim-pays-principle" is applicable only where the basic presumption that the source state should repair all substantial transboundary harm is modified or cancelled.

279. Thus in his comments to art. 3 of the Montreal Rules on Transfrontier Pollution, Prof. Rauschning notes that in cases of transboundary pollution not amounting to "substantial harm," the victim state cannot invoke art. 3 to secure abatement. The conflict of interests would have to be resolved on the basis of the "equitable use" principle which is defined in terms of inter alia "the practicability of compensation to one or more sharing States as a means of adjusting conflicts among utilizations": Statement during Working Session, ILA, SIXTIETH CONFERENCE, *supra* note 44, at 178; *see also* statement of Prof. Chahan,.Working Session, *id.* at 551. *See* further draft articles 5 and 6—eventually dropped from the final version of the Rules: Rauschning, *supra* note 52, at 168-71.

280. A financial transfer from victim to polluting state may indeed be unobjectionable in a situation in which it is unclear whether the latter's emissions cause "substantial harm" to the former. For unless specific conduct-related norms have been violated, it is first and foremost evidence of such harm from which it can be inferred that the affected state's international rights have been infringed. To be sure, a finding that a state's transboundary emissions of air pollutants amount to an inequitable use of the common natural resource would equally trigger the polluting state's international abatement duty. But such a finding is bound to occur infrequently; the concept's inherent ambiguity virtually necessitates third-party decisionmaking which in turn states, in general, are reluctant to submit to whenever important national interests are deemed to be at stake.

281. As to the fact that this approach constitutes an exceptional, treaty-based phenomenon in international relations and thus does not involve state practice that might readily evolve into a customary legal standard, *cf.* Report of the Secretariat, *supra* note 275, at 58, para.43.

282. *See, e.g., id.* at 51: "IFT [International financial transfers] can enable transfrontier pollution to be controlled more cheaply, more equitably and/or more thoroughly." *Cf. also* Quentin-Baxter, Fourth Report, *supra* note 22, at 52, para.69; and Lyle, *International Liability and Primary Rules of Obligation: An Application to Acid Rain in the United States and Canada*, 13 GA. J. INT'L L. & COMP. L. 111, 130 (1983).

First, there is the claim that cost-sharing may be appropriate in view of the evidentiary problems typical of cause-effect relationships in cases involving long-distance air pollution.[283] But as already indicated where, by contrast, the source state's contribution to a down-wind air pollution problem is reasonably identifiable, there is no room for a supplementary fairness argument. Any recourse to a version of the "victim-pays principle" as a corrective, as it were, to the traditional entitlement rule would be unjustified, notwithstanding the possibility that individual sources of emissions within that state might be indistinguishable. Second, the fact that under the traditional entitlement rule the costs of pollution control measures would accrue to the polluting state while, barring special circumstances, the benefits would be reaped principally by the downwind state, might bestow the appearance of legitimacy on cost-sharing.[284] But this argument regarding divergence of the costs and benefits is equally unpersuasive. The objective underlying cost-sharing, namely to maintain a fair balance of rights and obligations among the states concerned,[285] would be turned upside down if the principle were applied to cases involving significant transnational harm,[286] for the existence of such harm constitutes prima facie evidence of an imbalance of the equities to the detriment of the victim state. Cost-sharing consequently would merely substitute one form of indirect environmental subsidy for a direct monetary one[287] and formalize an *a priori* unfair situation.

The second basic contention, namely that a cost-sharing approach might enhance efficiency in the aggregate resource use, runs afoul of the fact that failure to internalize the transnational costs of the polluting activity ultimately must bring about an internationally inefficient allocation of resources. Eventually, cost-sharing would result in a distortion of the conditions under which nationally produced goods and services compete in the international market place. Therefore, when significant harm is the result of air pollutants which are traceable to a specific distant state,[288]

283. As to this functional relationship between evidence and cost-sharing, *see. e.g.*, OTA, *supra* note 193, at 18.

284. This impression might be reinforced in those cases in which costs to be incurred are very high or where there exists a particularly sharp discrepancy between relatively low but still significant pollution costs and high pollution prevention costs.

285. *Cf.* Report of the Secretariat, *supra* note 275, at 50-51, para. 22.

286. Note, for example, that the International Law Association's rules on the Regulation of the Flow of Water of International Watercourses clearly reject the idea that under customary international law a basin state might be required to share the costs of a regulation merely on the grounds that it derived a benefit from measures taken by another state. See art. 4 and comment (2) to art. 4, ILA, FIFTY-NINTH CONFERENCE, *supra* note 106, at 366. It would follow that where a regulation is undertaken to stop an unlawful infliction of significant transboundary harm, cost-sharing could *a fortiori* not be insisted on as a customary international legal right.

287. *See* Rhodes, *supra* note 270.

288. As to the applicable evidentiary standard, see *supra* text at notes 205-10.

fairness and overall efficiency in the long run are best served by placing the full costs of abatement measures on the source state.

Nevertheless, occasionally states have resolved transboundary pollution problems involving "significant transnational harm" attributable to an identifiable source state by way of cost-sharing. But most of these instances[289] involve circumstances which call into doubt that the particular case concerned amounts to a valid precedent pointing towards a shift in the customary entitlement. Consider, for example, the perhaps best known case of an application of the victim-pays-principle, the 1976 Convention on the Protection of the Rhine against Pollution by Chlorides.[290] Under the provisions of this agreement the principal victim of the pollution of the river, the Netherlands, bears 34 percent of the costs of the pollution prevention measures to be taken by the principal polluter, France.[291] However, and apart from proving unpopular in France,[292] the Convention has been controversial in Holland where serious doubts have been expressed as to its compatibility with Article 92 of the Treaty of Rome.[293] More importantly, the Dutch government itself has emphatically asserted that it "in no way consider[ed this agreement] . . . as a precedent."[294] In an international legal proceeding pursuant to customary international law, France would, so it has been claimed, be obliged to reduce the salinity of the waters of the Rhine "without there being any necessity for the Dutch government to contribute to its financing."[295] This certainly reflects the traditional legal position. That the Netherlands, nevertheless, agreed to what is thus an unorthodox approach to resolving the pollution problem is, of course, explained by the fact that both principal victim and source states are members of the EEC as well as closely associated otherwise. As such they are partners in an economically, if not politically, highly integrated regional group of states and thus subject to mutually operative political restraints uncharacteristic of a state's "normal" inter-

289. For some examples, *see, e.g.*, Report of the Secretariat, *supra* note 275, at 59-60.

290. Text in 16 I.L.M. 265 (1977).

291. Art. 7 of the Convention. The Federal Republic of Germany pays 30 percent, Switzerland 6 percent, and France the remainder.

292. Thus after long delays in ratifying the Convention, France has recently experienced difficulties in complying with it as a result of renewed protests of environmentalists, local government officials and unionists against the proposed alternative salt disposal method, namely underground injection. *See* 7 INT'L ENV. REP., CURRENT REP. (BNA), 355-56 (1984).

293. *See id.* at 384; and Rest, *Pollution du Rhin. La portée du droit international dans l'affaire de la pollution du Rhin*, ENVT'L L. & POL'Y 37, 39 (No. 12, 1984). Art. 92 prohibits generally the granting of aid by a member state which distorts or threatens to distort competition and thus affects trade between members of the EEC.

294. Statement of the Dutch Minister of Foreign Affairs in the *Staten-Generaal, cited* in Lammers, *International Cooperation for the Protection of the Waters of the Rhine Basin Against Pollution*, 5 NETH. Y.B. INT'L L. 59, 85 (1974).

295. Lammers, *New International Legal Developments Concerning the Pollution of the Rhine*, 27 NETH. INT'L L. REV. 171, 180 (1980).

national relations. In short, it must be evident that the 1976 Chloride Convention is hardly an instance of state practice from which generally valid inferences as to cost-sharing might be possible.[296]

The "special international relationship" factor is also very much in evidence in the West German government's reported willingness to assist financially the German Democratic Republic in meeting its international legal obligation not to cause substantially injurious transboundary pollution. For example, the Federal Republic, the lower riparian, has committed itself to defray 50 percent of the costs of measures to be taken by the GDR, the upper riparian, to reduce the salinity of the waters of the Werra river.[297] But "intra-German" relations, as the term already implies, connotes at least in West Germany, a very special international relationship. Therefore, cost-sharing as between the two German states again represents an unrepresentative instance of state practice.[298]

Finally, there is a category of cases involving international financial transfers from victim to source states in which yet again exceptional circumstances account for the phenomenon. The international payments made amount to development aid given by a developed, victim country to a developing, source state. Principles 9 and 12 of the 1972 Stockholm Declaration on the Human Environment clearly encourage such aid as appropriate, provided the injurious transboundary effects are the result of conditions of underdevelopment prevailing in the polluting country.[299] Similarly, OECD documents on the implementation of the polluter-pays principle recognize the legitimacy of financial assistance to the polluter to abate environmentally injurious emissions, if unaided internalization of the costs would jeopardize social and economic policy objectives of

296. The difficulty of categorizing correctly instances of international cost-sharing as relevant from an international legal viewpoint in the sense of being reflective of the parties' expectations about a generally appropriate allocation of international rights and obligations, is evident also in such seemingly straightforward cases as, for example, the 1980 Agreement between Switzerland, the Canton of Geneva and France on the Reduction of Phosphates in the Waters of Lake Geneva. The agreement provides for the Swiss parties to contribute financially to the operation of French treatment plants: Text in 26 INTERNATIONAL PROTECTION OF THE ENVIRONMENT 84 (B. Rüster & B. Simma eds. 1981). But it is an agreement on cost-sharing that must be seen in the context of a wider cooperation between France and Switzerland, particularly within the framework of the International Commission for the Protection of the Waters of Lake Geneva, to prevent the pollution of the lake. *See e.g.* the 1962 Convention entre le Conseil fédéral suisse et la Gouvernement de la Republique francaise concernant la protéction des eaux du lac Leman contre la pollution, (Swiss) RECUEIL OFFICIÈL DES LOIS ET ORDINANCES 1963, 961. For this reason the 1980 Agreement's true precedential significance remains unclear.

297. *See* 107 UMWELT 70 (1984). On the problem of the salinity of the Weser/Werra river, *see generally* J. FULLENBACH, *supra* note 178, at 140-42.

298. Note, moreover, the reply of the Federal Minister of the Interior, to a question in parliament, which affirmed that the FRG continued to seek a reduction in accordance with the polluter-pays-principle of injurious environmental effects within the FRG caused by pollutant emissions in the GDR: 89 UMWELT 40 (1982).

299. *See* Stockholm Declaration, *supra* note 41, at 1418-19.

a country.[300] Obviously, any eventual cost-sharing between developing and developed countries is an exception to the rule,[301] the rule being that the source state has to bear the costs of reducing transboundary pollution to where it causes less than significant harm in the exposed state(s).[302]

In sum, therefore, there is no evidence of a trend in state practice of a general shift in the customary entitlement rule away from its basic "polluter-pays" philosophy to a "victim-pays" orientation. Nor should such a trend be expected to develop. There are no valid reasons that would support a basic general redefinition of states' rights and obligations in cases of mutually interfering utilizations of the common air shed. On the other hand, in cases of LRTAP in which causal relationships remain indeterminate,[303] any international financial transfers effected could hardly be considered expressive of the "victim-pays" principle as defined at the outset.[304] The allocative "principle," if it could be called that, would be more properly described as "international solidarity."[305]

NARROWING THE "MARGINS OF APPRECIATION"?

The question that arises finally is whether, and if so, to what extent additional substantive parameters which might elucidate a state's customary international entitlement can be said to have emerged from the practice of states or to be inferable from other indicia of international law. The question is relevant to those cases in which an entitlement issue may not

300. *See* Note on the Implementation of the Polluter-Pays Principle, OECD Doc. ENV(73) 32 (Final), *id.* at 241; and *cf.* OECD Council Recommendation on the Implementation of the Polluter-Pays Principle, OECD Doc. C(74) 223, *reproduced in* 14 I.L.M. 234 (1975). Although these documents address only the application of the principle to pollution within an OECD country, their basic rationale with regard to cost-sharing should be analogously applicable internationally to transboundary pollution. In this respect, *cf.* in particular Smets, *supra* note 272.

301. Note in this context the resolution of the "border sanitation" problem faced by San Diego as a result of the transboundary flow of large quantities of untreated sewage from Tijuana, Mexico. A cost-sharing approach had been proposed in U.S. Senate bill S.2587 despite misgivings over the fact that the U.S. was to pay for Mexico's compliance with its obligations vis-a-vis the United States. *See Possible Amendments to the Federal Water Pollution Control Act, Hearings before the Subcom. on Water Resources of the House Comm. on Public Works & Transportation,* 98th Cong., 1st Sess., 459 and 468 (1983). The countries have now agreed that Mexico build on its own, without U.S. financial participation, a treatment plant in Mexico. For details see INTERNATIONAL BOUNDARY AND WATER COMMISSION, UNITED STATES AND MEXICO, UNITED STATES SECTION, ENVIRONMENTAL ASSESSMENT: PROPOSED RECOMMENDATIONS TO THE TWO GOVERNMENTS FOR FIRST STAGE AND DISPOSAL FACILITIES FOR SOLUTION OF THE BORDER SANITATION PROBLEM AT TIJUANA, B.C. & SAN DIEGO, CA., April 1985; and New York Times, Mar. 14, 1985, at 4, col.1. Note, however, that San Diego, as other U.S. cities, has allowed its sister city on the Mexican side of the border to connect with its own municipal sewer system on an "emergency" basis: New York Times, Aug. 24, 1979, at A14, col.4.

302. *See also* J. LAMMERS, *supra* note 39, at 374: "[T]here is no indication whatsoever . . . that the obligation(s) which general international law imposes . . . [on polluting states] is in any way subject to the willingness of the victim State to contribute financially to the costs of measures taken by the . . . [former] to prevent or abate . . . [transboundary pollution]."

303. *See supra* note 204.

304. *See supra* text at notes 263-64.

305. *See also* Smets, *supra* note 272.

be amenable to a decision on the basis of a simple transboundary occurrence of the threshold harm[306] and instead requires a recourse to balancing-of-interests. It thus remains to be seen whether criteria underlying the notion of "equitable use," or practical methods for ensuring an equitable result in a particular situation, have not evolved into customary international legal standards.

Only recently in the *Gulf of Maine* case, in a context not unlike the present one, namely the international allocation of maritime space, the ICJ characterized a quest of this kind as inherently unproductive. International customary law, it noted, could not "be expected to specify the equitable criteria to be applied or the practical, often technical, methods to be used for attaining that objective. . . ."[307] But in contrast to this barrenness of customary international law on the issue of maritime boundaries, a search for equivalent "criteria" or "methods" circumscribing further a state's entitlement to an international air shed is not entirely useless. Certainly, some "principles" which may have been propagated or envisaged as general standards of international behaviour have failed to attract sufficient quantitative and qualitative support in state practice to qualify as an embodiment of customary international law.[308] Others had always been intended as mere policy guidelines and have remained in that nature.[309] Nevertheless, there is also evidence that some parameters

306. Assuming that the traditional "dual test" approach gives way to a single test of the source state's conduct. *See supra* section *The Threshold Issue*.

307. *Delimitation of the Maritime Boundary in the Gulf of Maine Area*, Judgment, [1984] ICJ Reports 246, 290 para. 81.

308. An example in point is the so-called 50 percent/boundary line impact rule. According to this rule, states would be restricted in their use of a shared air shed insofar as their activities may not result in using up more than 50 percent of the (nationally applicable) pollutant loading capacity at the boundary line. Studies of the practicality of this rule were carried out by the Environment Directorate of the OECD. Note also that in the past it was the policy of U.S. EPA to apply this rule in analogous interstate air pollution cases: 43 Fed. Reg. 26,402 (1978).

309. A case in point is the so-called "stand-still" principle which directs states to avoid any increase in transfrontier pollution. *See, e.g.*, OECD Council Recommendation on Principles Concerning Transfrontier Pollution, OECD Doc. C(74) 224, Annex, Title B (3), *text in* OECD, NON-DISCRIMINATION IN RELATION TO TRANSFRONTIER POLLUTION 30, 33 (1978); and Report by the Secretariat, *Study of Policies to Limit and Reduce Transfrontier Pollution*, in OECD, TRANSFRONTIER POLLUTION AND THE ROLE OF STATES 61, 64 para.8 (1981). *See further* art. 2 of the 1979 ECE Convention, *supra* note 5; and art. 3(2) of the Montreal Rules, *supra* note 83, at 2. Only art. III, para.1 of the Institute of International Law's resolution on "The Pollution of Rivers and Lakes and International Law," *supra* note 81, is couched in unqualified mandatory language. However, this is understandable since the Institute rejected the concept of a threshold harm, adopted a generic "no pollution" provision, and defined "pollution" as affecting other states' "legitimate uses of such waters, thereby causing injury": *see supra* text at notes 102-04.

In any event, in that the stand-still principle purports to cover situations in which the transboundary polluting effects would remain below the threshold harm, it cannot be said to further circumscribe the traditional entitlement; it would clearly impose a new and much more stringent obligation on the source state. Note, however, that at times and apparently irrespective of whether or not national emissions already exceed the threshold level, source states have provided assurances that proposed new sources of emissions would not cause any overall increase in transboundary pollution. *See, e.g.*, Dutch assurances vis-a-vis West Germany concerning the transboundary impact potential of the power plant at Boggum, the Netherlands, *paraphrased in* 102 UMWELT 46 (1984).

of equitable use, with regard to whose relevance in the abstract there exists a large measure of international agreement,[310] may have indeed developed into, or are in the process of becoming, proper legal rules or principles, that is, parameters of general applicability.[311]

An example in point is the principle of non-discrimination which refers to an obligation of states to ensure that national sources of emissions which cause or are likely to cause transboundary environmental effects be subject to the same controls as would sources which affect exclusively the national environment. One of its earliest applications to air pollution is Council of Europe recommendation (71)5 on Air Pollution in Frontier Areas.[312] Since then the principle has found incorporation in both multilateral as well as bilateral agreements, such as the 1974 Nordic Environmental Protection Convention,[313] the 1979 ECE Convention,[314] and the 1980 Memorandum of Intent between Canada and the United States.[315] It is part of UNEP Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilization of Natural Resources Shared by Two or More States,[316] and has been promoted in relevant OECD Council recommendations[317] as well as a proposed draft Convention between France and the Federal Republic of Germany to Limit and Avoid Transboundary Environmental Pollution.[318] Notwithstanding the lack of widespread and consistent state practice specifically espousing the principle and the recommendatory nature of the just referred to resolutions, "non-discrimination" appears to qualify as a basic legal notion and thus to provide a welcome gloss on the concept

310. For reflections of this consensus, *see, e.g.*, Art. V of the Helsinki Rules, *supra* note 54; § 6 of the Schematic Outline, Quentin-Baxter, Third Report, *supra* note 60, at 28-29; and art. 8 of the draft articles on the Law of the Non-Navigational Uses of International Watercourses, Evensen, Second Report, *supra* note 33, at 26-28, para. 55.

311. For a general denial of the existence of such criteria, see, however, Kloepfer, *supra* note 8.

312. 19 EUR. Y.B. 263 (1971).

313. Art. 2, *text in* 13 I.L.M. 591 (1974).

314. It can fairly be said that "non-discrimination" is a fundamental inspiring principle for arts. 2-6 of the Convention, *supra* note 41.

315. It is implicit in paragraph 2(b) of the MOI, *supra* note 216.

316. Principle 13 of the Principles, *supra* note 29. In General Assembly res. 34/186, the Principles were taken note of and recommended to States as guidelines and recommendations in the formulation of bilateral or multilateral conventions regarding the use of shared natural resources: 34 U.N. GAOR SUPP. (No.46) at 128, U.N. Doc. A/34/46 (1979).

317. Note, in particular, its incorporation in binding form in art. I(ii) of the recent OECD Council Decision—Recommendation on Exports of Hazardous Wastes from the OECD Area, OECD Doc. C(86)64 (Final). Note further Title C, para. 4(a-c) of Annex to OECD Council Recommendation on Principles Concerning Transfrontier Pollution, *supra* note 309, at 33-34; and Recommendation of the Council for the Implementation of a Regime of Equal Right of Access and Non-Discrimination in Relation to Transfrontier Pollution, OECD Doc. C(77)28, Annex, Title A, *id.* at 9-10.

318. Art. 5, para. 1 and 3 of the draft Convention proposed by the German and French Environmental Law Societies; *text in* GESELLSCHAFT F. UMWELTRECHT, DOKUMENTATION ZUR 9 WISSENSCHAFTL. FACHTAGUNG, BERLIN 1985, 129 (1986).

of "reasonable use" of an international air shed. For the principle presents itself simply as an outgrowth, a specification of an acknowledged general customary obligation of source states, namely the obligation to attempt in good faith to reconcile their own interests with those of the actual or potential victim states.[319] By necessary implication "non-discrimination" is one of the constituent elements of that obligation.[320]

Much less persuasive is the argument that environmental standards prevailing in a transboundary impact area constitute a *datum* which source states must abide by as a matter of principle in controlling transnationally effective pollutants, even though, and this is the basic premise of this inquiry, the transboundary impact remains below the threshold harm. The argument is of relevance in those cases in which different land-use practices, different environmental sensitivity, or simply different socio-economic priorities account for differing environmental standards as between source and victim states. The claim that a source state is invariably bound to respect a stricter foreign standard is as ill-conceived as it is unpersuasive to suggest that the source state could disregard it completely. While an assertion of the latter kind would be incompatible with the principle of good neighbourliness,[321] a claim of the former kind would bestow a right on the downwind state to influence to an unjustifiable degree economic activity in the source state. The latter's use of its own environment would be degraded to a function of the impact state's unilateral environmental standard setting.[322] Such a situation is, however, hardly consistent with Principle 21 of the Stockholm Declaration which expressly recognizes states' "sovereign right to exploit their own resources pursuant to their own environmental policies"[323] subject only to the requirement of avoiding significant transboundary harm.

What state practice there is is inconsistent as regards the relevance of stricter standards in the impact area as circumscribing further the source state's entitlement. Overall, however, states seem to reject a downwind state's stricter standards as legally significant in this sense. One incident in which the issue was raised is the United States-Canadian dispute over the coal-fired Poplar River power plant.[324] Justification for the United

319. *See e.g.* the decision in the *Lake Lanoux* case, 12 U.N. RIAA 283, at 308, para.13; and the decision of the ICJ in the analogous *Fisheries Jurisdiction* case, (U.K. v. Iceland) Judgment of July 25 1974, [1974] ICJ Rep. 3, at 30, paras.71-72.

320. The concept's clarity and solid legal foundation, however, provide no assurance that it might be easily applied in any and every context. Consider, for example, the question of the consistency of a source state's tall stack policy with the principle of nondiscrimination.

321. *See, e.g.*, I.POP, *supra* note 138, at 331; Beyerlin, *Neighbour States*, in 10 ENCYC. OF PUB. INT'L. L. (R. Bernhardt ed. 1986); and *supra* text at note 319. *See* further H. THALMANN, GRUNDPRINZIPIEN DES MODERNEN ZWISCHENSTAATLICHEN NACHBARRECHTS (1951).

322. *See* Smets, *supra* note 272, at 42.

323. *Supra* note 41.

324. *See supra* text at note 94.

States' demand that the Canadian power station be equipped with scrubbers to reduce sulfur dioxide emissions rested primarily on the argument that otherwise federal and state standards bearing on air quality would be violated.[325] In response the Canadian side simply "reiterated the intent . . . to take fully into account U.S. concerns . . . and repeated assurances that . . . the project [was] . . . being carried out in full accord with Canada's international obligations."[326] While this Canadian undertaking is inconclusive as to the issue here under consideration, the position taken by Canada in another transboundary air pollution dispute with the United States is highly instructive. In this controversy involving the *Atikokan* power station in Sasketchewan, Canada, the United States had expressed concern that sulfur emissions from the plant would violate limitations on air quality deterioration in the Boundary Waters Canoe Area, a mandatory Class I area under the U.S. Clean Air Act[327] and located in neighbouring Minnesota. The U.S. State Department asked first for a referral of the question to the International Joint Commission, then for a reduction of sulfur-dioxide emissions by 50 percent.[328] But it was turned down by Canada on both occasions. As regards the second United States demand, Canada maintained that absent any evidence of potential transboundary injury, Canadian deference to United States air quality legislation in the sense of curbing transboundary air pollution to avoid a mere violation of foreign air quality standards would exceed the customary international legal obligation encumbent on a source state.[329]

The precedential value of this United States-Canadian practice is admittedly limited, for the respective claims have to be seen in the context of the major bilateral environmental issue, acid rain. Thus governmental postures with regard to *Poplar River* and *Atikokan* may well have been hostage to the larger interest at stake, the struggle for a comprehensive bilateral air pollution treaty. But even taking this into account, it would be difficult to make the case that stricter foreign standards protecting transboundary impact zones of a special nature, or environmental needs, impose a restraint on the source state as a matter of general principle.[330] Practice is too limited, and inconsistent at that, to allow a different conclusion.

325. Letter from T.L. Thoem, EPA, Region VIII(Denver), to Karl Jonietz, U.S. Department of State, January 15, 1978, *cited id.* 230.

326. Dept. of State Press Release, *supra* note 97.

327. *See* 8 ENV. REP., CURRENT DEV. (BNA) 512-13 (1977); and J.CARROLL, *supra* note 94, at 216-23. As to the applicable U.S. standards, see Clean Air Act, §§ 162(a) and 163(b)(1), 42 U.S.C. §§ 7472(a) and 7473(b)(1) (Supp. I 1977).

328. *See* J. CARROLL, *supra* note 94, at 220.

329. Canadian *aide memoire* (Mar. 20, 1978) (summarized in *id.*).

330. Note, however, the U.S. expression of concern over potential transboundary effects of proposed logging operations in the Kishinea Creek area of British Columbia, immediately north of

Exceptionally, it is true, authorities of other source states have subjected transboundary polluters to the same, that is, more stringent, foreign emission standards applicable in the transboundary zone of impact. A pertinent illustration is the licensing by French authorities of the Delco-Rémy battery factory located in Lorraine, only a few kilometers from the border with the German State of the Saar.[331] On the other hand, authorities of the same country have refused to consider stricter foreign standards as legally significant in the sense of requiring a correspondingly strict limit on pollutant emissions when licensing nuclear power facilities in border areas. Thus in the case of the French border plant Cattenom, the government of the German State of the Saar vainly opposed issuance of an operating license that is said to provide for a maximum allowable limit for environmental releases of radioactivity which is five times higher than the equivalent one under German law. The Saar government has now promised to take the authorities before the Tribunal Administratif de Strasbourg,[332] but the outcome of the suit is at best an open question.[333]

In sum, it appears impossible to avoid a balancing of individual interests or, conversely speaking, to invoke a broad general standard of evaluation of states' claims in a situation in which the impact state's environmental protection standards are more stringent than those of the source state. The issue of differing environmental standards along an international boundary simply calls for an individualized approach.[334]

There are, however, two additional evaluation standards which, if not already part of present-day international law, seem at least to be well on

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the international boundary and the (U.S.) Glacier National Park. The United States warned that the threat to aquatic resources of the Park, and accessibility to the area as a result of logging operations, with associated increased pressure on the local environment from hunting, fishing and related human encroachment, "could seriously and irreversibly alter the character of Glacier National Park and could infringe upon treaty and other rights of the United States under international law. . .": *Aide memoire* of the Department of State to the Canadian Embassy, dated March 2, 1978, *excerpted in* DIGEST OF UNITED STATES PRACTICE IN INTERNATIONAL LAW 1120, 1121 (1978).

331. For details, see 3 INT'L ENV. REP., CURRENT REP. (BNA) 403 (1980); Caty, *Panique a Sarreguemines,* REV. JURIDIQUE DE L'ENVIRONNEMENT 103 (1982); and Kromarek, *Un exemple de coopération transfrontière: l'usine Delco-Rémy à Sarreguemines,* in RECHTSFRAGEN, *supra* note 41, at 153.

332. Süddeutsche Zeitung, Apr. 30-May 1, 1986, at 5, col.4.

333. In its decision of July 27, 1983, in *Province of North Holland et al. v. French Republic* (concerning the pollution of the Rhine by chlorides by the Mines Domaniales de Potasse d'Alsace [MDPA]), TA 227/81-232/81, 700/81 and 1197/81, which was recently affirmed in part by the Conseil d'Etat (reference thereto in NRC Handelsblad, Apr. 21, 1986 at 3, col. 1) the tribunal declared MDPA's dumping licenses void on the grounds of inter alia the French authorities' omission to consider the potential transboundary consequences before granting the authorization. The court might thus be deemed sympathetic to the German claim. However, in matters concerning the national nuclear energy program, French authorities in general have intervened only in a limited and restrained fashion.

334. *Cf. e.g.,* art. 11, para.1 of the EEC ambient air quality directives, *supra* note 1, which calls upon member states to enter into consultations as regards ambient air quality standards in border areas.

their way to becoming so. The first is the maxim that pollutants be controlled at the source. Reference has already been made to the rejection by Norway of controlling the symptoms of LRTAP in the impact state rather than the cause in the source state.[335] The 1979 ECE Convention, as well as the related 1985 Protocol,[336] reflect this view as a basic philosophy. The obligation to control pollutants at the source has been specifically emphasized in the 1982 World Charter for Nature[337] as a principle which "shall be reflected in the law and practice of each State, as well as at the international level."[338] It has been affirmed by the Parliamentary Assembly of the Council of Europe in its 1984 recommendation on air pollution and acid rain,[339] and has been incorporated in the 1986 amendments to the EEC Treaty as a basic principle guiding environmental policies in the European Community.[340]

The second principle involved concerns the application of the best avaliable technology (BAT) to control transnationally effective air pollutants. Seemingly, any transboundary pollution caused by antiquated technology might be considered internationally impermissible.[341] Reference to BAT as a necessary emission control strategy can be found in several documents bearing on transboundary air pollution, such as the 1979 ECE Convention,[342] the 1984 Ottawa Declaration on Acid Rain,[343] and the Declaration of the Munich East-West Environment Conference of the same year,[344] as well as the World Charter for Nature,[345] and OECD Council Recommendations.[346] But BAT may not be the best control strategy in each and every case in terms of cost-effectiveness. Therefore, for BAT to be a generally applicable condition for a source state's equitable utilization of an international air shed, it must allow for this eventuality.

Indeed, most of the just referred to stipulations of BAT[347] are subject to the qualification that use of such technology be "economically feasible." The notion of what is "economically feasible" or "economically reasonable," however, is not necessarily the obvious escape-hatch that

335. *See supra* note 249.
336. As to both, see *supra* note 5.
337. Para. 12(a) of the Charter, *supra* note 74.
338. *Id.* at para. 14.
339. Para. 7 of the Recommendation, *supra* note 228.
340. *See supra* note 274.
341. *See* Dupuy, *supra* note 41 at 33.
342. Art. 6 of the Convention, *supra* note 5.
343. Preamble of the Declaration, *supra* note 204.
344. Preamble and para. 7 of the Declaration, *id.*
345. Para. 11 of the Charter, *supra* note 74.
346. *See, e.g.*, OECD Council recommendation on Measures Required for Further Air Pollution Control, OECD Doc. C(74)219, *text in* 1 INTERNATIONAL PROTECTION OF THE ENVIRONMENT 304 (B. Rüster & B. Simma eds. 1975).
347. A notable exception is the obligation to apply BAT as incorporated in the World Charter for Nature, *supra* note 74.

significantly undermines the normative contents of the principle, for the notion is amenable to a qualified objective characterization. For example, in the 1984 Treaty between the Netherlands and the Federal Republic of Germany on Cooperation in the Ems-Dollart and Neighbouring Areas, the contracting parties undertake to prevent emissions in their respective territories covered by the Treaty, provided this can be done on the basis of available technical means and without incurrence of unreasonable costs.[348] The Final Protocol to the Treaty then contains a legal definition of "unreasonable costs" of available technical means: the absence of a reasonable relationship between pollution prevention costs and pollution costs,[349] and the absence of any avoidable significant future impact of pollution on the ecological system affected.[350]

The principle that source states apply BAT, subject to a reservation concerning cost-effectiveness, is thus of a potential general applicability, therefore of an intrinsically norm-creating character. Given the merits of BAT and the already existing and increasing[351] support for its application as legally required state conduct, it seems only a matter of time before there will be incontrovertible evidence of the existence of a corresponding customary legal obligation.

CONCLUSION

The preceding analysis confirms that customary international law offers a number of concrete legal standards by which states' claims to the use of an international air shed can be evaluated. The fundamental entitlement rule, namely the obligation of states to avoid any use that entails significant transboundary harm, should presently be interpreted to mean that any such harm will *eo ipse* render the source state's conduct internationally impermissible. Such a "single," factual threshold test is practicable,[352] overwhelmingly desirable from a community policy viewpoint,[353] and supported by an at least incipient trend in internationally relevant practice.[354] Any transboundary effects which do not exceed this threshold, but might nevertheless be appreciable in using up pollution carrying capacity of the air shed, remain subject to the traditional multiple-factor test, the

348. Art. 25, para 1 of the Treaty, *text in* KONINKRIJK DER NEDERLANDEN, TRACTATENBLAD 1984, 118.

349. This is in apparent reference to situations in which pollution prevention costs significantly exceed pollution costs.

350. Para. 10 of the Final Protocol, *supra* note 48.

351. *See, e.g.*, Art.3, para.2 of the ILA draft articles on LRTAP, in Lammers, *First (Preliminary) Report, supra* note 186, at 400.

352. *See supra* text at notes 81-84.

353. *See supra* text at notes 62-75.

354. *See supra* text at notes 85-124.

balancing of states' interests to determine the legitimacy of the use involved.

This basic entitlement rule, which is supported by a number of procedural obligations not specifically the focus of this inquiry, has found expression in two central substantive obligations encumbent on the source state: the duty to prevent significant transboundary injury and the duty to abate conduct causing such harm. The latter is an absolute obligation or, in other words, the source state has no right to insist on payment of damages in lieu of abatement.[355] Neither is a source state entitled to refuse abatement action on the grounds that, as a result of scientific-technical uncertainties, it is impossible to determine the most cost-effective abatement strategy, provided there is reasonable evidence implicating its emissions as causing significant harm in the victim state.[356] Specifically, there is no need to identify individual emission sources within a given source state, or their individual contributions to the transboundary pollution problem, before the state's obligation to abate can be said to arise.

There is no denying that the problem of LRTAP poses a special challenge to the international legal system, as new avenues of international cooperation have to be explored. However, it is also evident that the "challenge" is likely to be of a temporary nature. As the ability to characterize source-receptor and cause-effect relationships improves, the problem of LRTAP will progressively come within the ambit of traditional legal parameters. As individual source states' contributions to a particular impact state's problem can be identified, their responsibility in terms of individually required abatement measures will be equally definable. Although at present allocation of such specific responsibility is, in general, not yet feasible, in most cases of LRTAP the international causal relationship aspects are sufficiently well understood to require the source state to participate in good faith in international efforts to reduce the severity and magnitude of the problem. In any event, there is no basis for the argument that LRTAP, in particular, warrants a shift in the traditional entitlement rule, to a form of the "victim-pays principle."[357]

Finally, it is apparent that the notion of "equitable use" has found further specification in a limited number of general principles which already reflect or are in the process of becoming part of customary international law.[358] The emergence of such principles as additional evaluation parameters for the legitimacy of a state's use of transboundary air resources clearly constitutes progress. In certain circumstances, the in-

355. *See supra* section *The Duty to Abate Significantly Injurious Transboundary Pollution.*
356. *See supra* text at notes 220-60.
357. *See supra* section *LRTAP and the "Victim-Pays-Principle."*
358. *See supra* section NARROWING THE "MARGINS OF APPRECIATION"?

tricate balancing-of-interests test might be reduced to what could be a relatively straightforward verification of facts.[359]

In conclusion it must be reiterated that to dismiss the relevance of customary legal principles to the solution of today's transboundary air pollution problems, as some have done, is to be naive. Certainly, as a yardstick for permissible resource use, customary legal principles will increasingly give way to refined parameters of international regimes which states will seek to establish for managing air quality of international air sheds. But it will be customary international legal principles and rules which will principally shape the parties' respective starting positions and guide the states in their negotiations. Customary law evolves continously as a result of state practice, including treaty practice. To that extent it will always remain a factor of fundamental influence on states in their quest to find individualized solutions to the common problem of transboundary air pollution.

359. As, for example, in the application of the non-discrimination principle.