The 1986 Sandoz chemical spill in Switzerland resulted in the worst pollution of the Rhine River in decades and caused major damage in three other countries through which the Rhine flows. After reviewing the various aspects in which international law was at the time inadequate to deal with the Sandoz accident and its environmental consequences, the author examines the recent treaties, conventions and declarations by which international law pertaining to transboundary waterway pollution has been significantly strengthened and elaborated. She finds that the responsibility of states for prevention, information exchange, notification, and assistance in mitigating damages is now firmly established as part of international customary law. The author notes further, however, that governments and international legal scholars have so far stopped short of tackling the matter of liability in regard to transboundary environmental damages, apparently preferring to leave those touchy issues to domestic legal systems.

* I would like to thank Rotary International for funding my LL.M. in International Legal Studies at Golden Gate University in San Francisco. I am indebted to Prof. Armin Rosencranz for helpful discussion and critical comments to the manuscript.
I. INTRODUCTION

Pollution respects no jurisdictional boundaries. Water carries dangerous substances from one nation to another. Such transfrontier pollution\(^1\) can arise from a single accident in one state that harms the environments of other states. Traditionally, international law has imposed few, if any, obligations upon states in the wake of non-natural environmental disasters.\(^2\) In one environmental catastrophe, the 1986 Sandoz spill in Switzerland, the offending state was not held liable for failing to protect, assist, or otherwise notify any of its neighbouring states.

This article begins in Part II with a description of the Sandoz accident and its aftermath, including the various damages from the chemical spill, as well as criminal proceedings and private settlements. Part III discusses the principles of international law applicable to transboundary river pollution and the treaties governing pollution of the Rhine in relation to the Sandoz fire. Part IV examines the failure of the treaties governing the pollution of the Rhine and explores why the downstream states did not pursue remedies. Finally, Part V presents an overview of legislative measures resulting from the Sandoz spill, as well as of the standard of liability under customary international law and treaties. This article concludes with a discussion of new treaties, declarations and draft codes.

II. THE SANDOZ FIRE AND ITS AFTERMATH

On the night of November 1, 1986, fire broke out at an agrochemical warehouse at the Sandoz site in Muttenz in the

---

1. One commentator defines transfrontier pollution as those "disturbances that originate in one country, are transmitted through a shared natural resource and take effect in another." Stephen C. McCaffrey, Pollution of Shared Natural Resources: Legal and Trade Implications, AMERICAN SOCIETY OF INTERNATIONAL LAW-PROCEEDINGS OF THE 71ST ANNUAL MEETING 56 (1977). In this paper the terms "transfrontier", "transboundary" and "transnational" are used interchangeably.

Schweizerhalle industrial area near Basel, Switzerland. The fire spread rapidly and approximately 160 fire-fighters were involved. They extinguished the fire five hours later.

The subsequent spill of toxic chemicals into the Rhine River had a disastrous impact on the Rhine’s ecology. The accident was Western Europe’s worst environmental disaster in decades. To get an impression of the qualification “worst environmental disaster,” one has to compare the Sandoz spill with other discharges into the Rhine in the same year. A total of fifteen accidental releases of significant amounts of toxic substances into the Rhine were recorded at Swiss and West German chemical plants between June and December 1986:

- In mid-October 1986, the Bayer works at Leverkusen leaked 10 metric tons of a benzene compound into the Rhine.

- The night before the Sandoz fire, Ciba Geigy, Switzerland’s largest chemical company and Sandoz’s neighbour at Schweizerhalle, illegally released approximately 400 kilograms of the herbicide Atrazine into the Rhine. The discharge was discovered only when the river was tested for pollution from the Sandoz accident. Ciba-Geigy did not report the discharge until days later.

- In another accident on December 2, 1986, 2.7 metric tons of polyvinyl chloride leaked into the Rhine from the Lonza chemical factory in Waldshut, West Germany, when an employee accidentally left a valve open.

---

3. Sandoz, Safety and Environmental Protection at Sandoz Ten Years After Schweizerhalle (October 1996), at 7.
7. Schwabach, supra note 5, at 40.
Numerous lesser accidents occurred during the same period.\textsuperscript{8}

\textbf{A. THE CONTAMINATION OF THE RHINE}

Not only did the fire lead to a chemical catastrophe, but the fire-fighting operations did so as well. In the process of fighting the fire, fire-fighters sprayed millions of liters of water on the warehouse. The volume of water was too great for existing catch basins; because of the lack of adequate runoff collection pools, a large part of the water used in fighting the fire carried insecticides into the Rhine. Due to a leak in a drainage seal beneath the warehouse, another 60 metric tons of contaminated water reached the Rhine six days after the fire.\textsuperscript{9} Some 1351 metric tons of chemicals having different levels of toxicity and biodegradability had been stored in the warehouse.\textsuperscript{10}

The chemicals that washed into the Rhine at Schweizerhalle formed a red toxic trail 70 kilometers long moving downstream through four countries into the North Sea.\textsuperscript{11} All in all, thirty tons of agricultural chemicals (in particular about 10 metric tons of phosphoric acid esters and about 0.15 metric tons of mercury) mixed with approximately 10,000 to 15,000 cubic meters of water entered the Rhine through the Sandoz sewer network.\textsuperscript{12}

In the days following the spill, thousands of dead fish and numerous dead waterfowl washed up along the banks of the Rhine.\textsuperscript{13} On December 12, 1986, the Swiss Federal Institute for Water Resources and Water Pollution Control (EAWAG) reported that the fish population of the Rhine had been almost entirely wiped out, as had the smaller organisms on which the fish fed.\textsuperscript{14} Despite the contamination, the river was able to

\textsuperscript{8} Id. at 40.
\textsuperscript{9} Id. at 36.
\textsuperscript{10} Id. at 36.
\textsuperscript{11} \textit{Wir sollten Aufwachen und Ueberlegen}, DER SPIEGEL, No. 47/1986, at 138.
\textsuperscript{12} SANDOZ, supra note 3, at 8.
\textsuperscript{13} Hull, \textit{A Proud River Runs Red}, TIME, Nov. 24, 1986, at 36.
\textsuperscript{14} SANDOZ, supra note 3, at 8.
regenerate itself through bacterial self-purification. Life in the
Rhine recovered very fast — contrary to the predictions of
many experts — thanks to the fact that the microbiology of the
river remained intact; in particular, small forms of life quickly
repopulated the Rhine.\textsuperscript{15}

B. EFFECTS OF THE SPILL ON WATER SUPPLIES

The Sandoz spill also affected water supplies. As a
precautionary measure, the Rhine was not used as a source of
drinking water for 18 days.\textsuperscript{16} All plants in Switzerland, West
Germany, France, and the Netherlands processing Rhine water
for drinking were shut down.\textsuperscript{17}

C. CRIMINAL PROCEEDINGS

The Arlesheim district magistrate's office initiated criminal
proceedings against seven Sandoz employees. The main
charges were qualified negligence in causing a fire, negligent
exposure to hazardous gases, negligent pollution of drinking
water, negligent violation of environmental protection, animal
protection and water pollution legislation, as well as
manslaughter and negligent bodily harm.\textsuperscript{18}

In 1992 the Basel-Land authorities stayed the main points of
the proceedings “mainly on account of the lack of sufficient
proof of the cause of the fire and of the blame attaching to the
accused under criminal law.”\textsuperscript{19} The following main reasons
were given for staying the proceedings.\textsuperscript{20}

\textsuperscript{15} Id. at 8; O.Klaffke & A.Abbott, Sandoz-funded Research from Rhine Spill Suggests Blockages are Worse than Toxins, NATURE, Oct. 1992, at 568.
\textsuperscript{16} SANDOZ, supra note 3, at 8.
\textsuperscript{17} Huge Lewis, Huge Chemical Spill in The Rhine Creates Havoc in Four Countries, N. Y. TIMES, Nov. 11, 1986, at A 1, col. 3.
\textsuperscript{18} SANDOZ, supra note 3, at 10-11.
\textsuperscript{20} SANDOZ, supra note 3, at 11.
- Lack of sufficient proof of the cause of the fire. The expert report of the Scientific Branch of the Zurich City Police claimed that the fire had most likely been caused by the shrink-wrapping of foil around pallets of Prussian blue.\textsuperscript{21} However, other reports stated that the conflagration could just as easily have been caused by the self-ignition of an incorrectly stored propane gas bottle or by arson.

- No blame was assessed under criminal law. The safety arrangements of the warehouse were found to have constituted a permissible risk and, in the view of experts, was state-of-the-art at the time.

- With regard to the one case of manslaughter and the 21 cases of negligent bodily harm, expert opinions and reports denied any causal connection with the fire.

The only convictions came in June 1992, when only the head of the plant safety unit and the head of the plant’s fire brigade were convicted for violation of the water pollution legislation. As part of the clean-up operations which took place on November 1, they were found guilty of having overflushed the scene of the accident during clearance work, which caused additional pollution of the Rhine. Following an appeal by the two convicted persons, the court lowered the fines on May 14, 1993 from 3,500 to 500 Swiss francs and from 2,000 to 200 Swiss francs respectively. An appeal against the judgment was withdrawn on December 17, 1993 because of the strain associated with further proceedings.\textsuperscript{22}

\textsuperscript{21} \textit{Id.} at 11. Safety inspections prior to the accident failed to reveal the apparent dangers. Four days before the fire, on October 28, 1986, an independent expert from the Fire Prevention Service for Industry inspected the warehouse and found all in order. However, a risk report compiled in 1981 by Sandoz’s insurer, the Zurcher Insurance Company, had pointed out several hazards. See Sandoz Press Conference of November 21, 1986, at 11.

\textsuperscript{22} Sandoz, supra note 3, at 11.
D. DAMAGES PAID TO THIRD PARTIES

Sandoz received, and paid, substantial claims for damages. The specific amount of international compensation was settled privately and paid without judicial action. Over 1,100 claims for damages poured in from Switzerland, France, Germany and Holland. One year after the fire, 70% of the claims had already been settled. This figure rose to 93.5% by June 1989. Today all claims have been settled.

Damage payments amounted to 42 million Swiss francs, with Switzerland accounting for 6.1 million, France for 7.7 million, Germany for 12.8 million and Holland for 1.6 million. A further 13.8 million Swiss francs were paid by the insurers for various items. Sandoz also set up a voluntary fund, which paid close to one million Swiss francs in hardship cases even absent a legal basis. The claims against Sandoz were covered almost entirely by liability insurance.

E. SANDOZ RHINE FUND FOR THE ECOLOGICAL RECOVERY OF THE RHINE

Sandoz spent 10 million Swiss francs to set up the “Rhine fund” as an apology. The Fund supported 36 scientific projects on the Rhine's eco-system in Switzerland, Germany, France and Holland between 1987 and 1992. The intention was to provide a more accurate picture for the future and the study of proposed projects for rehabilitating the Rhine ecology. One funded project revealed that the river’s ecosystem recovered within three years from the Sandoz pollution:

23. Private plaintiffs suing Sandoz in a civil court in Switzerland gave up after they were denied access to the documents from the Sandoz spill because they contained protected company secrets. For more details: Kleine Fische, DER SPIEGEL, No. 44 /1988, at 198.
24. SANDOZ, supra note 3, at 14.
25. Id.
26. Id.
27. Id.
29. Id.
Researchers found that the colloidal nature of the Rhine's water protected it from the full impact of the poison. The high levels of inorganic particles in the Rhine, constant throughout the year, adsorbed much of the poison, limiting its effective concentration. ... In addition, studies of micro-invertebrate populations, indicators of the ability of a river to support life, showed the river's natural ability to recover, provided that it had not been unnaturally engineered. The poison destroyed populations of the micro-invertebrates downstream from Basel, but within three years their densities and varieties had returned to pre-accident levels. Conversely, micro-invertebrates failed to return upstream from Basel, an area unaffected by the Sandoz poisoning but obstructed by technical barriers.\textsuperscript{30}

III. INTERNATIONAL LAW RELATING TO THE SANDOZ SPILL

Accidents such as that at the Sandoz plant are governed by customary international law and a treaty regime.\textsuperscript{31} In general, public international law addresses the relationship between its subjects (i.e. States and intergovernmental agencies). A State should be held responsible for polluting activities that occur within its borders, even if the polluters are private persons or non-state agencies. However, if both the polluter and the victim of the pollution are private persons, state liability can be imposed only if the case is brought at the international (i.e.

\textsuperscript{30} Id.

\textsuperscript{31} For an overview of possible claims by individual injured parties according to international private law and domestic law, see Alfred Rest, \textit{The Sandoz Blaze and the Pollution of the Rhine in Regard to Public International Law, Private International Law and National Liability Issues}, 1 MILIEU AANSPRAKELIJKHEID 59, 62-63 (1987).
inter-State) level. The State where the victim resides must file a claim on behalf of the victim through diplomatic channels.\textsuperscript{32}

Liability actions between states pursuant to public international law can arise from violation of territory, state property, or national sovereign right of use and enjoyment of property. To make clear the basis for such an action, it is necessary to examine the potentially applicable international law.

\section*{A. Customary International Law of Transboundary River Pollution}

In constructing a regime of state liability for transnational pollution, legal authorities have chosen customary international law as the primary source for liability standards. International legal analysts have located evidence of customary international law in state practice, in the general principles of law that are recognized by civilized nations, and in judicial decisions and the writings of respected jurists.\textsuperscript{33} The relevant materials from each of these sources reveal a lack of consensus on the law governing pollution of transfrontier rivers.

Under classical principles of international law, the obligation to prevent transnational pollution falls solely upon the State. In their efforts to deal with pollution committed by private parties, international legal analysts have developed the doctrine of state responsibility, which attributes activities of private citizens to States. The four approaches employed are: limited territorial sovereignty, absolute territorial sovereignty, absolute territorial integrity, and the community theory.

\footnotesize{\textsuperscript{32} For further details and conditions (prerequisites that the claimant possesses the nationality of the State filing the claim and that all local remedies must be exhausted), see Alexander C. Kiss, \textit{The Effect of a License on the Liability of Dischargers of Harmful Substances under International Law}, in \textit{Transboundary Pollution and Liability: The Case of the River Rhine} 61, 62-63 (J.M. van Dunne ed., 1991) [hereinafter van Dunne].}

\footnotesize{\textsuperscript{33} Statute of the International Court of Justice, art. 38, 1978 I.C.J. ACTS & DOCS. 77.}
The *limited territorial sovereignty* principle points out that a State has an affirmative obligation not to allow major pollution to cross its borders.\(^3^4\) This is supported by decisions of international tribunals,\(^3^5\) as well as pronouncements of private and public international bodies.\(^3^6\) It is also reinforced in Principle 21 of the Stockholm Declaration on the Human Environment of June 1972:  \(^3^7\) "States have... the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."

Article IV of the Helsinki Rules\(^3^8\) also assumes limited territorial sovereignty. Articles X and XI of the Helsinki Rules specifically address transfrontier river pollution. Article X prohibits "any new form of water pollution or any increase in the degree of existing water pollution in an international drainage basin which would cause substantial injury in the territory of a co-basin State."\(^3^9\) Article XI provides that a polluting state shall not only be required to cease the polluting activity but also to compensate the injured state.\(^4^0\)

The principle of *limited territorial sovereignty*, requiring States to prevent harmful transnational pollution, is now generally considered a customary rule of law. It is the international law analogue of the maxim *sic utere tuo ut alienum non laedas*,


\(^{35}\) See, e.g., *Trail Smelter Arbitration*, 3 R.I.A.A. 1911 (1941): "...no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence." *Corfu Channel Case*, 1949 I.C.J. 4, 21; *Lake Lanoux Arbitration (Affaire du Lac Lanoux)*, 12 R.I.A.A. 281 (1957).

\(^{36}\) Lammers, * supra* note 34, at 570.


\(^{39}\) Id. art. X.

\(^{40}\) Id. art. XI.
which forms the actual core of the international neighbour law.\textsuperscript{41}

The \textit{absolute territorial sovereignty} theory is more appealing to upstream states than to downstream states. It holds that a riparian state is free to do as it chooses with the water within its territory, without regard for the effects on the downstream states.\textsuperscript{42} A manifestation of this theory is the Harmon Doctrine. In 1895, in response to Mexico's protest of the United States' diversion of the water from the Rio Grande, then Attorney General Judson Harmon stated that "the rules, principles, and precedents of international law impose no liability or obligation upon the United States."\textsuperscript{43} The Harmon Doctrine has since become synonymous with the theory of absolute territorial sovereignty. Although the Harmon Doctrine has been almost universally denounced,\textsuperscript{44} many states continue to base their practice unofficially on such a theory, dumping wastes without regard for the welfare of downstream states.\textsuperscript{45}

The principle of \textit{absolute territorial integrity} declares that a downstream state may demand the continuation of the full flow of the river from an upper riparian state, free from any diminution in quantity or quality.\textsuperscript{46} The theory is the inverse of the absolute territorial sovereignty theory and, as such, appeals to downstream states.

Representing the most drastic view, the \textit{community theory} demands that the water of a drainage basin should be managed as a unit, without regard to national territorial boundaries. The various co-riparians should manage and develop the

\textsuperscript{41} LAMMERS, supra note 34, at 570. This principle dictates "that one should use his own property in such a manner as not to injure that of another." BLACK'S LAW DICTIONARY 1380 (6th ed. 1990).

\textsuperscript{42} Id. at 557.

\textsuperscript{43} Treaty of Guadeloupe Hidalgo - International Law, 21 Op. ATTY GEN. 274, 283 (1895).

\textsuperscript{44} Sharon Williams, Public International Law Governing Transboundary Pollution, 13 U. QUEENSLAND L.J. 112, 125 (1984).


\textsuperscript{46} LAMMERS, supra note 34, at 562.
drainage basin jointly, and share the benefits derived therefrom.\textsuperscript{47} The community theory does not yet enjoy widespread acceptance in the practice of States\textsuperscript{48} and is perhaps better thought of as an ideal toward which international lawstrives.

B. TREATIES GOVERNING THE POLLUTION OF THE RHINE

In addition to customary international law, several treaties govern the pollution of the Rhine. Some date back to the last century,\textsuperscript{49} but the most important ones are modern: the 1963 Convention Concerning the International Commission for the Protection of the Rhine Against Pollution (Berne Convention)\textsuperscript{50} and the 1976 Convention on the Protection of the Rhine Against Chemical Pollution (Rhine Chemical Convention).\textsuperscript{51} As the names of these treaties suggest, their purpose is to protect the Rhine from pollution.

1. The Berne Convention

The Berne Convention was signed in Berne on 29 April 1963, by Switzerland, West Germany, France, Luxembourg, and the Netherlands. It entered into force in 1965.\textsuperscript{52} The Convention set up the International Commission for the Protection of the Rhine Against Pollution to address the serious problems resulting from the river’s increasing pollution.

\textsuperscript{47} Id. at 558.
\textsuperscript{49} See Aaron Schwabach, The Sandoz Spill: The Failure of International Law to Protect the Rhine from Pollution, 16 ECOLOGY L.Q. 443, 459 (1989).
\textsuperscript{51} Convention on the Protection of the Rhine Against Chemical Pollution, 16 I.L.M. 242 (1977) was concluded at Bonn, 3 December 1976, entered into force, 1 February 1979 (hereinafter the Rhine Chemical Convention).
\textsuperscript{52} The EEC became a party to the Berne Convention by Additional Agreement of 3 December 1976, 1977 O.J. EUR. COMM. (L 240) 87.
2. The Rhine Chemical Convention

Despite the Berne Convention and other efforts, pollution of the Rhine continued. The Netherlands called a conference of ministers of the Berne Convention signatories, which led to the adoption in 1976 of the Convention on the Protection of the Rhine Against Chemical Pollution, and resulted in expansion of the Commission's powers. 53

The Rhine Chemical Convention amended and modified the Berne Convention by placing additional responsibilities on the International Commission and the Contracting Parties. 54 The Berne Convention had contained only minimal provisions regulating accidental discharges, despite the fact that such discharges were a major source of harm to the Rhine. To prevent accidental discharges, article 7 of the Rhine Chemical Convention provided that "the Contracting Parties will take all the legislative and regulatory measures guaranteeing that the storage of Annex I (black list) and II (grey list) substances shall be done in such a way that there is no danger of pollution for the waters of the Rhine." The appended black and grey lists described certain families and groups of substances which, due to their toxicity, persistence and bio-accumulation, were especially perilous.

Article 11 of the Rhine Chemical Convention provides for the establishment of an international warning system to handle pollution emergencies. This article specifies that when a Government Party to the Convention notes a sudden and sizable increase in Annex I and II substances in the waters of the Rhine or has knowledge of an accident that may result in seriously endangering the quality of those waters, it will inform without delay the International Commission and the Contracting Parties likely to be affected according to a

53. The riparian States of the Rhine also concluded, together with the Rhine Chemical Convention, the Convention for the Protection of the Rhine River Against Pollution by Chlorides, 16 I.L.M. 265 (1977). This Convention was intended to deal with the problem of the French potassium mines in Alsace. It does not apply to the Sandoz spill.
54. For a detailed overview of the Convention see Lammers, supra note 34, at 188-189.
procedure to be established by the International Commission. To implement article 11, the International Commission set up a network of warning stations known as the International Alarm Plan Rhine.\textsuperscript{55} Of significance in the context of the Sandoz spill is the obligation to inform the International Commission and the Contracting Parties without delay of any accident which could threaten the quality of Rhine water.

The Rhine Chemical Convention provides an arbitration procedure for the resolution of disputes between the Contracting Parties. Article 15 of the Rhine Chemical Convention provides that any dispute between the Contracting Parties concerning the interpretation or implementation of the Convention that cannot be settled by negotiation shall be submitted to arbitration. Annex B states the conditions for the composition of the Arbitral Tribunal.

C. LIABILITY CLAIMS BY PRIVATE VICTIMS FOR DAMAGE CAUSED BY TRANSNATIONAL POLLUTION

There are no internationally uniform laws providing for liability of private parties for damage resulting from pollution of international watercourses or stagnant inshore waters.\textsuperscript{56} In regard to this issue the international conventions concentrate on prevention and elimination of environmental damage.\textsuperscript{57}

A State that fails to fulfill a duty under a convention may be held liable. However, private parties have no remedies under these conventions against foreign countries, and must, therefore, rely on domestic liability laws.

\textsuperscript{55} Rest, supra note 31, at 59.
\textsuperscript{56} Kurt Siehr et al., Pollution Transfrontière/Grenzüberschreitende Verschmutzung: Tschernobyl/Schweizerhalle, Beihefte zur Zeitschrift für Schweizerisches Recht 55, 72-73 (Heft 9, 1989).
\textsuperscript{57} See Jutta Brunnée & Stephen J. Toope, Environmental Security and Freshwater Resources: Ecosystem Regime Building, 91 AM.J.INT'L L. 26, 40 (1997) (criticizing the lack of the older generation of freshwater agreements to ensure environmental security due to their narrow focus).
IV. THE FAILURE OF THE RHINE TREATY REGIME

The States through or along which the Rhine flows might have filed a claim for compensation against Switzerland pursuant to the Rhine Chemical Convention. But liability would presuppose that the harm was caused by some state agency's wrongful conduct, which in turn could be attributed to the government, i.e. the State, itself.

In general, the State is not held responsible for the conduct of its nationals. It is, however, considered directly liable for its organs, which could have, but did not, prevent damages caused by a private person.

A. OBLIGATIONS OF SWITZERLAND UNDER THE CHEMICAL CONVENTION

Since the Sandoz accident was rendered possible by both the improper storage of the chemicals and, especially, by inadequate safety precautions such as failure to provide sprinkler systems and catch basins for runoff water from fire fighting, it is evident that article 7 of the Rhine Chemical Convention was violated.

Although improper, the storage of the chemicals in the warehouse seemed to be in accordance to Swiss law. This could therefore be contrary to Switzerland's obligation under article 7 of the Rhine Chemical Convention to ensure by all necessary legislative and administrative measures that the storage of hazardous substances not endanger the Rhine. We might tend to conclude from this that Switzerland violated its obligation to cooperate. However, Switzerland had adopted strict pollution-control laws like the Environmental Protection Act in 1983 and the Water Pollution Act of 1971, which do not address transnational pollution. Under international law, a State

58. Art. 36 Water Pollution Act (Gewässerschutzgesetz vom 6.10.1971) provides for strict liability for water pollution. Liability exists for direct and indirect discharges. See Juergen Salzwedel, Der Einfluss der Genehmigungen auf die Haftung von Einleitern gefährlicher Stoffe nach deutschem, französischem und schweizerischem Recht, in van Dunne, supra note 32, at 37, 38.
permitting or licensing activities which result in harm to the environment of other States is liable for the damage, notwithstanding its own legislative efforts to prevent injuries.\textsuperscript{59}

At issue could also be possible administrative misconduct by Swiss authorities in granting a wrongful license for storing the dangerous chemicals as set forth in article 7 of the Rhine Chemical Convention.\textsuperscript{60} The warehouse in which the chemicals were stored was built in 1968 to store machinery. In 1979, after inspection, it was approved for use as a storage warehouse for chemicals.\textsuperscript{61} Swiss law should have instructed the inspecting authorities to deny the permit on the ground that storage of chemicals in the warehouse posed a danger to the Rhine. Additionally, since the responsible authorities must have known about the inadequate safety precautions ever since the Risk Report issued by a Swiss insurer in 1981,\textsuperscript{62} they were obligated to take stronger monitoring and control measures.

A violation of article 11 of the Rhine Chemical Convention can be seen in the delayed information provided to the public. Article 11 of the Convention sets up the International Warning and Alarm Plan Rhine to provide warning to downstream countries in the event of a chemical accident. Investigations revealed that Switzerland’s delay of more than twenty-four hours before notifying the downstream states\textsuperscript{63} resulted as much from poor planning\textsuperscript{64} as from failure of the article 11 warning system.

Both violations of the agreement can be classified as offenses against public international law, e.g. as an international tort, with the resulting duty to pay compensation for damages.

\textsuperscript{59} Kiss, supra note 32, at 61.
\textsuperscript{60} Rest, supra note 31, at 60.
\textsuperscript{61} DER SPIEGEL, supra note 4, at 161; Schwabach, supra note 5, at 36.
\textsuperscript{63} SANDOZ, supra note 3, at 17.
\textsuperscript{64} Id. at 17. The risks involved in storing large quantities of chemicals were underestimated. Also, the full scale of the problem presented by large quantities of polluted fire-fighting water was not recognized by experts prior to the Schweizerhalle fire.
consistent with the U.N. International Law Commission's general principles on State Responsibility. Thus Switzerland could be held responsible even without an express, contractually agreed upon liability.

B. REMEDIES PROVIDED BY THE RHINE TREATY REGIME AND BEHAVIOUR OF THE VICTIMS

While neither the Berne Convention nor the Rhine Chemical Convention provide a specific remedy for victims of transboundary pollution, the latter provides an arbitration procedure for resolution of disputes between the Contracting Parties. Several factors may have contributed to the injured states' decisions not to hold Switzerland responsible. First, all of the states along the Rhine had worse environmental records than Switzerland, so an "unclean hands" idea may have influenced their decision. Second, the Sandoz Company paid a number of claims to parties injured by the spill, providing redress that Switzerland could have faced had Sandoz not agreed to pay. Third, states may not have wanted to pursue claims against Switzerland because legal action might have generated stricter, more costly environmental regulations for their own industries. In addition, the fact that downstream countries are themselves polluters could have made it difficult to determine what part of the environmental damage was

65. Art. 1 of the II.C Draft Articles on State responsibility regulates the responsibility of a State for its internationally wrongful acts as follows: "Every internationally wrongful act of a State entails the international responsibility of that State." II.C. Draft Articles on State Responsibility, II YEARBOOK OF THE INTERNATIONAL LAW COMMISSION 1980, Part 2, at 30. The precise definition of 'wrongful act' is given by art. 3 as follows: "There is an internationally wrongful act of a State when: (a) conduct consisting of an action or omission is attributable to the State under international law; and (b) that conduct constitutes a breach of an international obligation of the State." Id.


68. Id. at 467.

69. "Polluting industries have reason to be wary of their governments pursuing an international remedy against Switzerland. Such efforts might focus unwelcome public attention on domestic polluters and could be accompanied by a demand for stricter domestic pollution controls." Id. at 469.
caused by Switzerland, and what part by the other riparian states.

C. ACHIEVEMENT OF THE PURPOSE OF THE RHINE TREATIES

Apart from the possible legal actions against Switzerland, why did the Rhine Treaties not achieve their purpose of protecting the Rhine against the introduction of hazardous chemicals? The Berne Convention is purely institutional in nature; it lacks rule-making powers and enforcement mechanisms. Arguably, Switzerland violated articles 7 and 11 of the Rhine Chemical Convention. These failures have little significance when one considers that the Convention provides neither incentives for compliance nor sanctions for non-compliance.\(^{70}\) The absence of compensation provisions and sanctions is a fundamental weakness of both conventions.\(^{71}\) Sanctions on states provide an incentive for states to enact and enforce stricter anti-pollution laws; sanctions on private parties provide an incentive for private parties to comply with anti-pollution laws and to take additional measures to reduce pollution.

D. LIABILITY AND COMPENSATIONS UNDER THE RHINE CHEMICAL CONVENTION

The Chemical Convention itself contains no explicit determination for liability or compensation for damages. This is hardly surprising since the primary preventive objective of the Convention was to establish a framework\(^{72}\) for the protection of the Rhine against the introduction of hazardous chemicals. Therefore, had Sandoz not agreed to compensate the downstream injured parties, it is unclear whether those parties

\(^{70}\) Schwabach, supra note 5, at 39.

\(^{71}\) But see Brunnée & Toope, supra note 57, at 46, who prefer to focus upon implementation through positive measures rather than sanctions for transboundary water regimes.

\(^{72}\) Lammers, supra note 34, at 188.
would have had any readily available legal recourse for compensation.\textsuperscript{73}

Reliance on the willingness of the polluter to compensate is not always possible. To ensure the compensation of victims of transnational pollution, as well as to provide an additional deterrent to polluters, Professor Aaron Schwabach\textsuperscript{74} recommends that the Rhine Chemical Convention be amended to create liability for transfrontier pollution of the Rhine. In his view, applied sanctions against polluting states represent an effective method of reducing transboundary pollution. But he also acknowledges the small chance of getting states to agree to a treaty provision exposing them to liability.\textsuperscript{75}

The Rhine Chemical Convention itself is presumably not the proper context for this proposal, because, as mentioned above, its purpose was solely to establish a framework for the protection of the Rhine against the introduction of hazardous chemicals.\textsuperscript{76}

E. INCREASED ARBITRATION TO ALLOW ACTIONS BETWEEN PRIVATE PARTIES

States have a forum in which to seek compensation from a polluting state, in the form of the arbitration provision of the Rhine Chemical Convention.\textsuperscript{77} Private parties lack an international forum in which to resolve their transboundary pollution disputes. In instances where the polluter is unwilling to pay, as has been the case in other environmental disasters, private injured parties need a vehicle for requesting compensation. National courts are an imperfect forum in which to litigate such disputes because of the differences in national law, as well as possible obstacles to foreign litigants' access to domestic courts.

\textsuperscript{73} Rest, supra note 31, at 62-64 (discussing claims by individual injured parties according to international private law and domestic law).
\textsuperscript{74} Schwabach, supra note 49, at 476.
\textsuperscript{75} Id. at 476.
\textsuperscript{76} See Lammers, supra note 34, at 188.
\textsuperscript{77} Rhine Chemical Convention, supra note 51, art. 15, Annex B.
The existing treaty regime could be revised to function more effectively. A provision could be added to article 15 and Annex B of the Convention to open its arbitration provision to actions by private parties of diverse nationality.\textsuperscript{78} Such an expansion of the arbitration provision would provide pollution victims with a forum in which to sue polluters other than the polluters' national courts. That would, of course, require that the member states' courts honor the arbitral tribunal's decisions.\textsuperscript{79}

However, this proposal to amend the treaty would provide a remedy only to injured private parties of the contracting states. It would not help parties of non-contracting states and would therefore leave them vulnerable to the polluter's willingness to pay. Additionally, the fees and other costs for the arbitration proceedings provided for in the Rhine Chemical Convention must be paid by the parties to the dispute.\textsuperscript{80} This obligation to carry the costs of the arbitration process could exceed the injured party's costs in seeking a remedy in a national court proceeding and might therefore deter the use of arbitration.

Schwabach, the initiator of this proposal,\textsuperscript{81} suggests that the threat to sovereignty be reduced by allowing actions of private parties only against other private parties. This limitation of the proposal could also be accomplished by setting up a second arbitral process for the adjudication of claims between private parties of diverse nationality. However, either of the two modifications would require an expansion of the existing dispute resolution infrastructure.

V. LEGISLATIVE MEASURES, DRAFT CODES AND DECLARATIONS FOLLOWING THE SANDOZ FIRE

The lessons learned from the Schweizerhalle fire led the authorities and expert bodies at regional, Swiss federal, and

\textsuperscript{78} Schwabach, \textit{supra} note 5, at 40.
\textsuperscript{79} \textit{Id.} at 40.
\textsuperscript{80} See Rhine Chemical Convention, \textit{supra} note 51, Annex B which provides that the parties shall pay the arbitrator's fees and other costs.
\textsuperscript{81} Schwabach, \textit{supra} note 49, at 477.
international levels to introduce a series of regulations, measures and new, more effective safety installations.

A. SWISS REGULATIONS

In 1988 and 1989 the Cantons of Basel-Stadt and Basel-Land set up safety inspectorates and risk assessment commissions.\(^{82}\) On the federal level, the lessons of Schweizerhalle led to the Ordinance on Incidents of February 1991. This ordinance formed part of the Environment Act (Art. 10, Disaster Control).\(^{83}\) The lessons of Schweizerhalle regarding the risks of storing chemicals led to the 1988 guidelines on fire protection for stocks of hazardous materials.\(^{84}\) The information and communications system for hazardous and environmentally relevant substances — i.e. the central chemicals database for Switzerland — was installed at the National Alarm Centre.\(^{85}\)

B. REGULATIONS AT THE INTERNATIONAL LEVEL

Internationally, due to the failed system provided for by article 11 of the Chemical Convention, the aftermath of Schweizerhalle led to the setting up of the “Rhine” international warning and alarm service, called “Rhine Alarm,” with eight main alarm centers in Switzerland, Germany, France and the Netherlands.\(^{86}\)

Additionally, a revision of the European Union directive “Control of Major Accident Hazards involving Dangerous Substances” — the so-called Seveso Directive\(^{87}\) — was initiated. The definitive version has not yet been passed. It is expected to cover storage and transport as well as production of toxic

\(^{82}\) Sandoz, supra note 3, at 18.
\(^{83}\) Id.
\(^{84}\) Id.
\(^{85}\) Id.
\(^{86}\) Sandoz, supra note 3, at 19.
\(^{87}\) The directive is named after Seveso, Italy, where a plant owned by the Swiss chemical company Hoffman-La Roche leaked dioxins in 1976.
chemicals. As a result of the Sandoz disaster, the government of Switzerland promised to reconsider its decision not to adopt the Seveso Directive.

In order to implement precautionary measures at the international level, the environmental ministers of the riparian states of the Rhine adopted resolutions on November 12, 1986 in Zurich and on December 19, 1986 in Rotterdam to improve provisions for incidents occurring in the catchment basin of the Rhine, and to compensate for resulting damages.

1. The International Law Commission's (ILC) Draft Articles and the Rio Declaration on State Responsibility for International Disasters

Two of the most influential documents that have addressed the issue of state responsibility for international disasters since the Sandoz incident have been the ILC's Draft Articles on the Law of the Non-Navigational Use of International Watercourses and the Rio Declaration on Environment and Development, issued at the United Nations Conference on Environment and Development (UNCED) in 1992.

Neither the Draft Articles nor the Rio Declaration can be characterized as binding, customary law. They are, rather, characterized as "soft law", i.e., recommendations or advisory statements that express what the drafters of the documents believe the law should be. Nevertheless, in the opinion of some legal scholars, certain principles contained in the Draft

---

88. Sandoz, supra note 3, at 19.
89. Schwabach, supra note 5, at 40.
90. See Rhein-Bericht, Bericht der Bundesregierung über die Verunreinigung des Rheins durch die Brandkatastrophe bei der Sandoz AG/Basel und weitere Chemieunfaelle, Umweltbrief No. 34, Feb. 12, 1987, at 73.

\subsection*{a. The ILC Draft Articles}

The ILC's most recent set of Draft Articles was submitted to the General Assembly in 1994.\footnote{For a detailed discussion of the changes that were made in the most recent ILC Draft Articles compared to the ones that preceded them, see McCaffrey, supra note 1.} The Swiss Government has been invited several times to submit written comments and observations on them.\footnote{For Switzerland's most recent comments see A/51/275 Draft Articles on Law of Non-Navigational Uses of International Watercourses, posted on-line by the United Nations Department for Policy Coordination and Sustainable Development (DPCSD), <http://www.un.org/plweb-cgi/iopcode.p> (6 August 1996).} These Articles deal specifically with the law of international watercourses.

Articles 27 and 28 focus specifically on a state's responsibility for disasters occurring within its borders which might affect neighboring states. Article 27, entitled "Prevention and mitigation of harmful conditions," requires states to prevent or mitigate conditions of a disaster which might affect any other state. Article 28, entitled "Emergency situations," requires states to notify other states of an emergency originating within its territory; to prevent, mitigate and eliminate any harmful effects of an emergency; and to develop contingency plans for responding to emergencies.

Besides the notification requirement, the ILC Draft Articles articulate several other duties for states. They prescribe an affirmative duty on the part of a state within whose territory an emergency originates to "immediately take all practicable measures necessitated by the circumstances to prevent, mitigate, and eliminate harmful effects of the emergency."\footnote{ILC Draft Articles, supra note 91, art. 28.} This duty to prevent and mitigate the damage of a disaster is not included in the Rio provisions. It has, however, been
incorporated into a number of treaties and conventions since the catastrophe of 1986.\textsuperscript{98}

b. The Rio Declaration

The Rio Declaration responds directly to a number of problems that arose in the Sandoz disaster. Principle 18 requires states to "immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States."\textsuperscript{99} Principle 19 demands that "States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith."\textsuperscript{100}

In contrast to the nascent status of international law regarding state responsibility for international disasters in 1986, the ILC Draft Articles and the Rio Declaration explicitly articulate a course of conduct for states in the event of an international disaster. Both documents expressly mandate a duty of notification. It is therefore beyond reasonable dispute that the duty to notify potentially affected states of a transnational disasters has now reached the level of customary international law.\textsuperscript{101}

2. Current State Responsibility Standards Applied to Sandoz: Would They Make a Difference?

By applying the customary international law principles of 1997 to the Sandoz disaster of 1986, one can demonstrate both the progress and stagnation of international law in the area of transboundary disaster standards. If the Sandoz scenario were to repeat itself today, the duties incumbent upon Switzerland in the wake of the spill would be much more clearly defined. Recalling the facts of the Sandoz accident, the Swiss

\textsuperscript{98} Wirth, supra note 93, at 638.
\textsuperscript{99} Rio Declaration, supra note 92, Principle 18.
\textsuperscript{100} Id. Principle 19.
\textsuperscript{101} See, e.g., Wirth, supra note 93, at 637.
government failed to notify its neighboring Rhine states of the spill for over 24 hours, and this failure to notify precluded European governments from pursuing preventive measures which could have potentially reduced the scope of damages. Eleven years later, according to the ILC Draft Articles, Switzerland would be under an immediate duty to "notify other potentially affected States and competent international organizations of any emergency originating within its territory."\(^\text{102}\) Additionally, it would be obligated to "immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate harmful effects of the emergency."\(^\text{103}\)

Switzerland has entered into several conventions and treaties which have been established since the Sandoz accident, and these instrumentalities would also play a part in determining what duties Switzerland would owe its neighboring states. For example, the Convention on Transboundary Effects of Industrial Accidents, signed by 24 European states, Canada and the United States in 1992, includes a lengthy list of obligations for states in the event of an industrial accident.\(^\text{104}\) Among these obligations are principles of prevention,\(^\text{105}\) information exchange,\(^\text{106}\) notification,\(^\text{107}\) and assistance.\(^\text{108}\)

3. The Standard of Liability Under Customary International Law and Treaties

No cases have to date been instituted on the basis of liability laid down by customary international law.\(^\text{109}\) In the wake of the Sandoz disaster, one of the concerns was how, and under what

\(^{102}\) ILC Draft Articles, supra note 91, art. 28.
\(^{103}\) Id. art. 27.
\(^{105}\) Id. art. 3, para. 3.
\(^{106}\) Id. art. 9, para. 3.
\(^{107}\) Id. art. 10, para. 2.
\(^{108}\) Id. art. 12, para. 1.
\(^{109}\) Rest, supra note 31, at 61, 62. In the Sandoz case the enforceability of the claim could have been a problem, because it depended on Switzerland's submission to the jurisdiction of the international court. However, the Swiss government has only offered its good offices as a means of reaching a peaceful settlement of disputes.
standard of liability, damages could be recovered against Switzerland. No claims were brought because, at least in part, injured states did not believe they could recover any damages against the offending state. And eleven years later, while international law concerning environmental disasters has progressed rapidly in areas such as notification, co-operation, and mitigation of damages, it has remained static in the area of liability for transboundary damages.

Even the Rio Declaration and the ILC Draft Articles avoid prescribing any specific standard of liability for transboundary harm. The Convention on Transboundary Effects of Industrial Accidents side-stepped the issue when it stated in article 13 that "The Parties shall support appropriate international efforts to elaborate rules, criteria and procedures in the field of responsibility and liability."

While sources of international law remain vague as to the appropriate standards that should be applied in the event of a violation, damages have in fact been recovered in the past in cases of transboundary harm. In other words, the scant attention given to the issues of liability and compensation in international conventions and treaties does not preclude an injured state from recovering an award for damages. Rather, it suggests that legal scholars and governments are hesitant to commit to any uniform standards for recovery, and are leaving it to courts and governing bodies to determine for themselves what standards of liability should be appropriate in each individual case.


111. For the issue of the application of strict liability versus negligence standard, see McClatchey, supra note 110, at 675.
4. U.N. Draft Code of Conduct on Transnational Corporations\textsuperscript{112}

Based on the idea that regulating the responsibility of transnational corporations (TNCs) would help to preserve the environment, a Working Group was convened in January 1977. It completed a draft text of the U.N. Code on Transnational Corporations in May 1982.\textsuperscript{113} 

The fact that TNCs have multiple production facilities means that they can evade state power and the constraints of national regulatory schemes by moving their operations among their different facilities around the world. This led to the concern that TNCs were free to promote their economic interests at the cost of the environment. The U.N. Draft Code therefore addresses the responsibility of TNCs for the protection of the environment in three sections.\textsuperscript{114} These obligations of TNCs


\textsuperscript{113} This intergovernmental Working Group on a Code of Conduct was established at the second session of the United Nations Commission on Transnational Corporations, held at Lima in 1976.

\textsuperscript{114} The U.N. Draft Code, supra note 112, provides:

Section 43: Transnational corporations shall carry out their activities in accordance with national laws, regulations, established administrative practices and policies relating to the preservation of the environment of the countries in which they operate and with due regard to relevant international standards. Transnational operations should, in performing their activities, take steps to protect the environment and where damaged to rehabilitate it and should make efforts to develop and apply technologies for this purpose.

Section 44: Transnational corporations shall, in respect of the products, processes and services they have introduced or propose to introduce in any country, supply to the competent authorities of that country on request or on a regular basis, as specified by these authorities, all relevant information concerning:

Characteristics of these products, processes and other activities including experimental uses and related aspects which may harm the environment and the measures and costs necessary to avoid or at least to mitigate their harmful effects; Prohibitions, restrictions, warnings and other public regulatory measures imposed in other countries on grounds of protection of the environment on these products, processes and services.

Section 45: Transnational corporations should be responsive to requests from Governments of the countries in which they operate
according to the U.N. Draft Code would apply to all subsidiaries of any TNC. The main reason for this broad application of the U.N. Draft Code is that a TNC often operates through its subsidiaries, which are controlled from one decision-making center.\textsuperscript{115} Although accidents of the last decade, like the Bhopal disaster, showed the need for such global regulation, the U.N. Draft Code was never adopted. Sandoz would have qualified as a TNC and could have been required to comply with the U.N. Draft Code of Conduct for Transnational Corporations. Adoption of the U.N. Draft Code before the Sandoz fire would have forced Sandoz to pursue a more advanced information policy, especially in regard to the type of chemicals that were being stored. Like many international codes, however, the U.N. Draft Code would presumably have been unable to enforce compliance by the TNCs. Therefore, the enforcement of the code would have been left to the various domestic laws and courts.

VI. CONCLUSION

If there is anything to be learned from the Sandoz disaster, it is that the existing treaty regime is inadequate to protect the Rhine from chemical pollution and new efforts are urgently needed.

In the Sandoz spill, the injured countries waived their right to call Switzerland to account. This was due in part to the deficiencies that existed both in international law regarding state responsibility and in treaties governing the Rhine, particularly in their lack of enforcement mechanisms. Additionally, Sandoz’s willingness to pay for the damage it caused also contributed to the passive behavior of the downstream states. If Sandoz had been less willing to pay, the governments of the downstream states might have been forced

\textsuperscript{115} For more details see Armin Rosencranz, \textit{Bhopal, Transnational Corporations, and Hazardous Technologies}, 17 AMBIO 337 (1988).
to vindicate their injured citizens by taking actions *parens patriae* against Switzerland.

Sandoz' efforts to clean up the site of the spill and prevent any repetition as well as its compensation of the injured parties and its discontinuance of mercury-containing products, were exemplary. The chemical company may have been motivated more by concern for its public image than by altruism. Nevertheless, if concern for public opinion leads to more responsible corporate conduct, it should be encouraged.

The Sandoz accident served to kick-start a campaign within the international community to establish more clearly defined procedures and standards to govern state responsibility in the event of international disasters. Since 1986, customary international law principles in the area of transboundary disasters have made significant progress in areas such as notification, co-operation, and mitigation of damage, but in the area of liability for transboundary harm, they have unfortunately remained static.

Strict and effective regulations to prevent transboundary harm need to be developed so that liability will not arise as an issue. At the same time, further elaboration of the liability area seems necessary to provide the victims of disasters with a fair bargaining position against polluters.