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The Sandoz Spill: The Failure of International Law to Protect the Rhine from Pollution

Aaron Schwabach*

INTRODUCTION

The fire at Sandoz Warehouse 956 near Basel, Switzerland, in November 1986 and the subsequent spill of toxic chemicals into the Rhine River had a disastrous impact on the Rhine’s ecology. The accident is widely regarded as Western Europe’s worst environmental disaster in decades.¹

Two treaties govern pollution resulting from incidents such as the Sandoz accident: the Convention Concerning the International Commission for the Protection of the Rhine Against Pollution² and the Convention for the Protection of the Rhine Against Chemical Pollution.³ As the names of the treaties show, their purpose is to protect the Rhine from pollution. The Sandoz spill, and similar accidents of lesser magnitude, demonstrate that the Rhine has not been protected. Despite a treaty provision for arbitration and possible treaty violations by Switzerland, none of the downstream states sought any remedy against Switzerland under international law for damages caused by the Sandoz spill. This Comment discusses the Sandoz accident and its aftermath, explores the reasons for the failure of the Rhine treaty regime, and proposes remedies for the inadequacies of the existing treaties.

Part I describes the causes and effects of the fire, including the ecological and economic damage resulting from the chemical spill, as well as the reactions of the public and the downstream governments to the spill. Part II discusses the principles of international law applicable to transboundary river pollution and describes in detail the treaties governing pollution of the Rhine. Part III discusses the failure of the Rhine treaty regime to protect the river from pollution and its inability to provide an


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* Candidate for J.D. 1989, School of Law (Boalt Hall), University of California at Berkeley; B.A. 1985, Antioch College.
adequate means of compensating victims of transboundary pollution. It also explores the reasons for the failure of downstream states to pursue remedies under either the treaty regime or customary international law, as well as the reasons for the failure of the treaties to prevent this and other grave chemical accidents. Indeed, 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 of 1986.\(^4\)

The Comment concludes by proposing several solutions to these problems. The establishment of a drainage basin administrative authority or a European environmental authority are two possible solutions. Less dramatic but more feasible solutions include onsite inspections of chemical plants, changes in the rulemaking procedure of the International Commission for the Protection of the Rhine Against Pollution, and provisions for sanctions against polluters and for arbitration of international disputes between private parties.

I

THE SANDOZ FIRE AND ITS AFTERMATH

On November 1, 1986, at nineteen minutes after midnight, a Sandoz employee reported a fire in Warehouse 956, at the northwest boundary of the Sandoz works area in Schweizerhalle, near Basel, Switzerland.\(^5\) At the same time, a traffic patrol of the Basel-Land cantonal police noticed flames shooting from the roof of the warehouse and alerted the fire departments at the Schweizerhalle works and at the nearby town of Lies- tal.\(^6\) Within a few minutes the Sandoz fire brigade, along with that of the neighboring township of Muttenz, attempted to extinguish the fire, but it

\(^4\) Rhein-Bericht: Bericht der Bundesregierung über die Verunreinigung des Rheins durch die Brandkatastrophe bei der Sandoz AG/Basel und weitere Chemieunfälle, Umweltbrief No. 34, 70-71 (Feb. 12, 1987) [hereinafter Rhein-Bericht]. The night before the Sandoz fire, Ciba-Geigy, Switzerland’s largest chemical company and Sandoz’s neighbor at Schweizerhalle, see SANDOZ LTD., RAPPORT DES EXPERTS (Oct. 22, 1987) (Station 5), illegally released approximately 400 kilograms of the herbicide Atrazine into the Rhine. Hull, A Proud River Runs Red, TIME, Nov. 24, 1986, at 36, 37. The discharge was discovered only when the river was tested for pollution from the Sandoz accident. \(id\). Although a Swiss water official asserted that the Atrazine did not kill the fish, \(id\), Ciba-Geigy did not report the discharge until days later. \(We Thought We Were Better, THE ECONOMIST, Nov. 29, 1986, at 43.\)

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. Another Chemical Spill Along the Rhine, N.Y. Times, Dec. 3, 1986, at A3, col. 3. In mid-October 1986, the Bayer works at Leverkusen leaked 10 metric tons of a benzene compound into the Rhine. Rhein-Bericht, supra, at 18, 70, 75-77. Numerous lesser accidents occurred during the same period. \(Id\.) at 70-71; see also infra note 249 and accompanying text.

\(^5\) SANDOZ LTD., SCHWEIZERHALLE: THE FIRE ON 1 NOVEMBER 1986 AND ITS AFTERMATH 4, 6 (1987) [hereinafter SCHWEIZERHALLE].

\(^6\) \(Id\.) at 6.
spread rapidly. During the night, fire departments from Basel-Stadt, Birsfelden, Pratteln, and the Basel works of Sandoz and Ciba-Geigy, as well as the Basel-Land fireboat, reinforced the local firefighters. Approximately 160 firefighters from ten fire brigades were ultimately involved. By 5:00 a.m. on November 1, the fire was extinguished.

A. The Environmental Effects of the Sandoz Fire

1. The Contamination of the Rhine

As a result of the fire, large quantities of chemicals ended up in the Rhine. In the process of fighting the fire, firefighters sprayed millions of liters of water on Warehouse 956. The volume of water proved 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 flowed into the Rhine. Between 10,000 and 15,000 cubic meters of water, mixed with insecticides and other chemicals stored in the warehouse, entered the Rhine through the Sandoz sewer system.

At the time of the fire, 1351 metric tons of chemicals were stored in Warehouse 956, including 987 tons of agricultural products and 364 tons of formulation auxiliaries and other chemicals. The agricultural products included many insecticides and other toxic chemicals. The bulk of the toxic chemicals consisted of 859 metric tons of organophosphate insecticides of moderate to high toxicity. Of greater concern were the 11 metric tons of organic mercury compounds stored in the form of aqueous concentrates of ethoxyethyl mercury hydroxide and phenyl mercury acetate. In addition, Warehouse 956 contained 73 metric tons of the dinitrocresol derivative DNOC, an herbicide ordinarily used in amounts of approximately 10 liters per hectare for weed control, which is toxic to humans and fish; 26 metric tons of oxazolidin, a biodegradable fungicide of relatively low toxicity, which is nontoxic to

7. Id.
8. Id.
10. SCHWEIZERHALLE, supra note 5, at 6.
11. Id. at 14.
13. SCHWEIZERHALLE, supra note 5, at 14.
14. Id. at 4.
15. Id. at 5. The latter chemicals were relatively nontoxic. Sandoz Press Conference, supra note 9, at 2-3.
17. Id. at 2. Organophosphate insecticides are toxic to fish, but they are biodegradable and do not become concentrated at any point in the food chain, and they are neither carcinogenic nor teratogenic. Id.
18. Id. at 3. These organic mercury compounds contained approximately 2.6 metric tons of mercury. Id. They are highly toxic, soluble in water, and degrade to mercuric oxide very slowly. Id.
19. Id. at 2.
fish;\textsuperscript{20} and 12 metric tons of the phenylurea derivative Metoxuron, a biodegradable herbicide that is ordinarily used in amounts of two to four kilograms per hectare for weed control, which is of very low toxicity and nontoxic to fish.\textsuperscript{21} There were also 5.6 metric tons of assorted agricultural chemicals of varying degrees of toxicity,\textsuperscript{22} including 1,974 kilograms of the insecticide Endosulfan,\textsuperscript{23} 720 kilograms of the fungicide Zineb,\textsuperscript{24} 2,325 kilograms of the acaricide Tedion,\textsuperscript{25} 158 kilograms of the fungicide Captafol,\textsuperscript{26} 30 kilograms of the rodenticide Scillirosid,\textsuperscript{27} and 450 kilograms of vole bait containing 13 kilograms of zinc phosphide.\textsuperscript{28}

The chemicals that washed into the Rhine at Schweizerhalle formed a red toxic trail 70 kilometers long moving downstream at 3.7 kilometers per hour.\textsuperscript{29} A Sandoz spokesperson initially dismissed the red slick as "a harmless dyestuff,"\textsuperscript{30} but Swiss officials later stated that about 200 kilograms of mercury had washed into the river, along with 30 tons of agricultural chemicals.\textsuperscript{31} A later estimate put the amount of mercury at two tons.\textsuperscript{32} Dutch officials reported that mercury levels in the Rhine at the Dutch-West German border had reached three times their normal levels by Saturday, November 8, a week after the fire.\textsuperscript{33} As the toxic trail passed through the Netherlands, the Dutch authorities closed sluices and floodgates in an effort to allow the chemicals to flow into the North Sea without contaminating the Netherlands' extensive system of inland waterways.\textsuperscript{34} Despite these preventive measures, the Ijssel River in southeastern Holland was contaminated, and birds, fish, and seals in the shallow sea north of Friesland and Groningen were threatened as well.\textsuperscript{35}

\textsuperscript{20} Id.
\textsuperscript{21} Id.
\textsuperscript{22} Id. at 3.
\textsuperscript{23} Sandoz Ltd., Press Release (Nov. 17, 1986).
\textsuperscript{24} Id.
\textsuperscript{25} Id. The Tedion contained 180 kilograms of the active ingredient tetradifon and was responsible for the dioxin scare. Dioxins are a possible product of the combustion of tetradifon. See Sandoz Ltd., Press Release (Nov. 26, 1986).
\textsuperscript{26} Sandoz Ltd., supra note 23.
\textsuperscript{27} Id.
\textsuperscript{28} Id.
\textsuperscript{29} Wir Sollten Aufwachen und Überlegen, DER SPIEGEL, Nov. 17, 1986, at 138.
\textsuperscript{30} Id.
\textsuperscript{31} See Hull, supra note 4, at 37; Netter, Mercury a Key Concern in Rhine Spill, N.Y. Times, Nov. 15, 1986, § 1, at 3, col. 1.
\textsuperscript{32} Hull, supra note 4, at 36, 37.
\textsuperscript{33} Netter, supra note 31, at col. 1.
\textsuperscript{34} Europeans Do It To Each Other, THE ECONOMIST, Nov. 15, 1986, at 43; Dutch Close Canals to Block Rhine Pollution, N.Y. Times, Nov. 10, 1986, at A5, col. 4.
\textsuperscript{35} Hull, supra note 4, at 37. On November 7, 1986, a leak developed in a provisionally installed seal in the drainage system beneath the warehouse, releasing an additional 30 to 60 metric tons of contaminated water into the Rhine. Rest, 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 [Envtl. Liability L.Q.] 59, 60 (1987). According to Sandoz, the contaminated water contained concentrations of approximately 0.025 mg per
2. Effects of the Spill on Rhine Fauna

The spill had a devastating effect on the fauna of the Rhine. In the days following the spill, thousands of dead fish\(^3\) (including 150,000 dead eels\(^3\)), as well as numerous dead waterfowl, washed up along the banks of the Rhine.\(^3\) Police and volunteers carried tons of fish and eels away in buckets.\(^3\) Walter Herrmann, Chief Inspector of the Rhine River Police in central Basel, reported finding a few live, but moribund, fish and eels among the dead ones, “their eyes popped out, gills collapsed and skin covered with wounds and sores.”\(^4\)

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.\(^4\) However, enough of the river’s microbes remained to prevent the river from dying completely.\(^4\) The EAWAG report expressed hope that eventually the Rhine might be repopulated by minute invertebrates, which in turn could eventually support fish life.\(^4\) Although the Rhine had not reached the “turnover” point at which it would lose its self-cleansing capacity, the ecological rejuvenation of the river was set back by many years, perhaps decades.\(^4\)

3. Effects of the Spill on Water Supplies

The Sandoz spill also affected water supplies. All plants in France, the Netherlands, Switzerland, and West Germany processing Rhine water for drinking were shut down.\(^4\) In Strasbourg, France, sheep that drank water from the Rhine died.\(^4\) In West Germany, farmers removed livestock from pastures along the Rhine.\(^4\) Twenty-four thousand resi-
dents of West German towns along the Rhine had to depend on fire trucks for drinking water. The town of Unkel, West Germany, population 4,000, was one of many that had to rely on its volunteer fire department to truck in water. Tourists who had come to Unkel for the annual wine harvest departed en masse. Unkel's best-known resident, former West German chancellor Willy Brandt, responded to the spill by labelling the Sandoz accident "Bhopal am Rhine."

4. Effects of the Accident on the Air

Although the greatest damage was done to the Rhine, initial fears focused on air pollution. The fire released oxides of sulphur, phosphorus, nitrogen, and carbon into the atmosphere, as well as vile-smelling mercaptans. At 3:00 a.m. on November 1, civil defense sirens in Basel sounded and police drove through the city's streets, using loudspeakers to warn the citizens, in German, to keep their windows closed. Many of the city's non-German-speaking residents opened their windows to see what was happening. A malodorous red cloud soon settled over the city, and a sizable portion of the population suffered respiratory and gastrointestinal irritation. Three asthma sufferers required hospitalization. A working group commissioned by the cantonal government of Basel-land and Basel Stadt reported a very low level of effects from the airborne pollution caused by the fire.

5. Cause of the Fire

The fire apparently resulted from a packing procedure used by Sandoz. On May 29, 1987, the Scientific Branch of the Zurich City Police, which had been asked to investigate the fire, submitted its conclusion that the most probable cause of the fire was the ignition of packets of the pigment Prussian blue during the shrinkwrapping procedure used at Warehouse 956. The Magistrate's office summarized the report of the Scientific Branch:

48. Lewis, supra note 45, at col. 3.
49. Id. at col. 4; see Markham, Rhine Pollution is Tricky Issue in West Germany, N.Y. Times, Dec. 21, 1986, § 1, at 18, col. 1.
52. Netter, supra note 39, at col. 4.
53. SCHWEIZERHALLE, supra note 5, at 10.
55. Watson, supra note 50, at 58, 59.
56. SCHWEIZERHALLE, supra note 5, at 11-12.
57. Id. at 11.
58. Id. at 11-12.
59. Id. at 8.
60. Id.
In shrinkwrapping, the palette stacked with paper sacks containing Prussian blue is covered with a plastic sheet which is then shrunk by passing a blowtorch back and forth over the plastic at a distance of ca. 30 cm. If the flame remains aimed at the same spot even for only a short time, there is a possibility of the plastic being perforated and the Prussian blue igniting. . . . Prussian blue has the property of igniting readily, after which a flameless, smokeless and slowly progressing glowing can be observed. [Tests have shown that] a palette of sacks containing Prussian blue brought to glowing continues to glow smokelessly for hours without giving off a burning smell. . . . Glowing for over 12 hours until the outbreak of an open fire is therefore quite conceivable.61

Safety inspections prior to the accident failed to reveal the apparent dangers. On October 28, 1986, four days before the fire, Hans Waeckerlig, an independent expert from the Fire Prevention Service for Industry, inspected Warehouse 956 and found all in order.62 However, a risk report compiled in 1981 by Sandoz’s insurer, the Zurich Insurance Company, had pointed out several hazards.63 While admitting that discussions took place in the summer of 1981 between the Zurich Insurance Company and Sandoz,64 Sandoz vehemently denies that it ever saw the risk report.65 West Germany’s Green Party claims that the Zurich Insurance Company refused to accept Sandoz’s liability coverage.66 Sandoz, however, claims that the Zurich Insurance Company was willing to renew its third party liability coverage of Sandoz, and that Sandoz’s decision to switch to another insurance company, Gerling, “was based entirely on conditions of premium.”67

Sandoz officials insist that arson still cannot completely be ruled out as a possible cause of the fire.68 Shortly after the fire, an anonymous caller claimed that the fire had been set by the Red Army Faction, a West German terrorist organization. The Swiss magistrate investigating the fire doubted the caller’s claim.69 Nevertheless, with the possibility of arson or sabotage in mind, Sandoz has installed alarms, concertina wire,
and patrols by armed guards at various Sandoz facilities worldwide.\textsuperscript{70}

6. **Cleanup and Provisions for the Prevention of Future Accidents**

As a result of the accident, several hundred kilograms of insecticides settled into the riverbed just downstream from Warehouse 956. Red dye, mixed with the chemicals, helped lead to the discovery of the riverbed deposit.\textsuperscript{71} To prevent the chemicals from washing further downstream, a Basel firm began suction dredging of the river bottom. Later, a Dutch specialist firm was brought in to complete the task.\textsuperscript{72} Thousands of square meters of the river bottom behind the Birsfelden electric plant were removed by divers using suction equipment to remove the top layer of silt.\textsuperscript{73} By December 19, 1986, over 1,000 kilograms of chemicals, mostly insecticides, had been removed from the bed of the Rhine.\textsuperscript{74}

The site of the fire was also heavily contaminated with toxic chemicals. Several tons of insecticides and approximately 100 kilograms of mercury were absorbed by about 40,000 cubic meters of earth.\textsuperscript{75} To prevent rainwater from seeping through the earth and polluting the groundwater, workers immediately covered the site with a layer of asphalt, sank two shafts to a depth of 90 meters to reduce the level of groundwater beneath the site, and drilled additional holes to pump out tainted water and to determine the magnitude of the contamination.\textsuperscript{76} Sandoz retained experts to discover feasible methods of decontaminating and rehabilitating the Schweizerhalle site.\textsuperscript{77}

Disposal of the waste from the site presented an additional problem. Sandoz employees spent 16,000 worker-days examining the debris and packing it in suitable containers and storing it until Sandoz settled on a disposal plan.\textsuperscript{78} A total of 2,695 metric tons of contaminated substances were sorted and stored in 250 dump truck bodies, 17 railway cars, and over 6,000 storage drums for later disposal.\textsuperscript{79} On June 24, 1987, the Environmental Protection and Energy Department of the canton of Basel-Land approved the disposal of approximately 150 tons of contaminated bricks in the cantonal refuse dump at Elbisgraben.\textsuperscript{80} At the end of July, 1987, approximately 450 tons of previously decontaminated scrap metal

\textsuperscript{70} Schweizerhalle, supra note 5, at 32.
\textsuperscript{71} Sandoz Press Conference, supra note 9, at 12.
\textsuperscript{72} Schweizerhalle, supra note 5, at 23.
\textsuperscript{73} The low level of the Rhine at the time made dredging easier. Id.; Rhine Cleanup Begins, N.Y. Times, Nov. 19, 1986, at A10, col. 4 (photograph with caption).
\textsuperscript{74} Schweizerhalle, supra note 5, at 23.
\textsuperscript{75} Id. at 14.
\textsuperscript{76} Id. at 22-23.
\textsuperscript{77} Id. at 23.
\textsuperscript{78} Id. at 19-20.
\textsuperscript{79} Id. at 20; Sandoz Ltd., supra note 44, at 2.
\textsuperscript{80} Schweizerhalle, supra note 5, at 20.
were melted down at the Von Roll metal works in the canton of Ticino.  

Sandoz has taken measures designed to prevent the recurrence of such accidents. The company has undertaken the construction of two catch basins for runoff water, with a combined capacity of 17,500 cubic meters, for future firefighting at Schweizerhalle. When completed, the larger of the facilities will also be available to the neighboring Ciba-Geigy and Saürefabrik works if needed. In the interim, a system of mobile pump stations has been set up. Sandoz has installed new fire prevention and detection mechanisms and now distributes weekly copies of its chemical inventory to local fire departments. Sandoz has discontinued both the manufacture of all of mercury-containing products and the storage of products containing phosgene at Schweizerhalle.

B. Reactions to the Spill

1. Local Reaction

The reaction of those living near the Rhine was vehement, if not violent. On Sunday, November 9, 1986, Sandoz safety director Hans Winkler and officials of the cantonal government of Basel-Stadt held a panel discussion in Basel. Protesters pelted the Sandoz director with dead eels and bottles of river water. One protester spat in Mr. Winkler’s face, whereupon Mr. Winkler fled, remarking “[t]he verbal abuse I can take, and the eels I can take, but when somebody spits in my face, I say enough, and leave the room.”

In Basel’s Marktplatz, demonstrators carried banners reading “Heute Fische, Morgen Wir.” More than 10,000 people marched through the streets of Basel to protest the damage to the Rhine. Some 200 mourners held a funeral march for “Fluvius Rhinus,” and protesters smashed windows in various locations throughout the city. Wall

81. Id.
82. Id. at 29.
83. Id.
84. Id.
85. Id. at 27. For a more detailed description, see Sandoz Ltd., Schweizerhalle: Conclusions and Measures 4 (Feb. 5, 1987).
86. Sandoz Ltd., supra note 44, at 2; Sandoz Ltd., supra note 85, at 5.
87. Sandoz Ltd., supra note 44, at 1.
88. Id. In addition, security measures at Sandoz facilities have been enhanced. See supra text accompanying note 70.
89. Netter, supra note 39, at col. 3.
90. Id. at col. 6.
91. Id.
93. Lewis, supra note 45, at A6, col. 3.
graffiti and the media began referring to Basel as "Chernobâle." On a wall poster in Basel, a skeletal figure in a gas mask announced "Guten Morgen, Basel." On November 5, 1986, Sandoz Chairman Marc Moret apologized for the harm caused by the fire and stated that Sandoz would bear the costs of the damage. Sandoz held a press conference at the Schweizerhalle works on November 13, 1986. Hans Winkler, presumably recovered from his previous encounter with the public, admitted that Sandoz had underestimated the warehousing risks, particularly the problem of disposing of water used for extinguishing fires.

2. International Reaction

International criticism of Switzerland and Sandoz focused on the fact that Switzerland delayed more than twenty-four hours before notifying the downstream countries of the spill. The Dutch Minister for Transport and Public Works, Neelie Smit-Kroes, stated that "[t]he Swiss have treated us in a beastly manner." The Swiss insisted that the delay in relaying the information resulted from a misunderstanding. Ms. Smit-Kroes responded: "It was not a misunderstanding.... It was a big mistake. We find it unacceptable that an alert system does not work." In West Germany, Green Party environmental expert Hans-Werner Mackvitz announced, "[t]he Rhine is dead. Long live the chemical industry!" A Green Party mock tribunal found the chemical industry guilty of murder. In France, Minister of the Environment Alain Carignon accused Switzerland and Sandoz of failing to notify the downstream countries in good time and announced that France would seek compensation from Switzerland and Sandoz. Mr. Carignon stated, "[a] civilized society like our own—or, presumably, the Swiss—should inform its population of the risks."

Swiss President and Interior Minister Alphons Egli met with the

96. Id. "Bâle" is the French name for Basel; hence, "Chernobâle."
97. "Good Morning, Basel." The Price of Pollution, supra note 66, at 80 (picture accompanying article).
98. SCHWEIZERHALLE, supra note 5, at 18.
99. Id.
100. Hull, supra note 4, at 37; Rest, supra note 35, at 61.
101. Id., supra note 4, at 37.
102. Id.
103. Watson, supra note 50, at 59.
104. Markham, supra note 49, at col. 4.
105. Id. The increased attention to environmental issues brought about by the Sandoz spill helped the Green Party increase its share of the popular vote in the January 1987 national election to 8.3%, up from 5.6% in 1982. Tagliabue, The Rhine Struggles to Survive. N.Y. Times, Feb. 15, 1987, § 3, at 4, col. 3.
106. Lewis, supra note 45, at A1, col. 3, A6, col. 3.
107. Watson, supra note 50, at 59.
environmental ministers of France, Luxembourg, the Netherlands, and West Germany in Zurich on November 12, 1986. Under pressure from the other governments, Switzerland announced that it would reconsider its decision not to adopt the Seveso Directive, a set of rules for the management of toxic chemicals adopted by the European Community in 1982. Switzerland also agreed to make a "rapid and fair" settlement for damages caused by the accident. On December 2, 1986, President Egli announced that Switzerland would tighten controls on the chemical industry, stating that the Sandoz accident had "destroyed in one night" Switzerland's reputation for advanced environmental policies.

3. Claims for Compensation

Sandoz received, and paid, substantial claims for damages. As of September 1987, Sandoz had been presented with 962 claims for compensation, amounting to about 100 million Swiss francs; by December 1987, 450 of these claims had been settled. For instance, the Alsatian Fishing Associations received approximately 2.2 million West German marks. The Bonn municipal waterworks received 200,000 West German marks, and the Köln waterworks received 155,000 West German marks.

Sandoz also agreed to pay 46 million French francs for damage caused on French territory as a result of the fire. Of this amount, 11 million francs are to be paid to ALSARHIN, an Alsatian organization seeking compensation for victims of Rhine pollution. The amount also includes 11 million francs already paid to fisheries associations and individuals not belonging to ALSARHIN. In addition, 7 million francs will be paid to the French government and various public institutions for expenses already incurred, and 17 million francs will be spent on programs.
to study and restore the ecosystem of the Rhine.  

Sandoz has pledged to organize and finance a campaign to clean up chemical damage to the Rhine, and to this end has appointed an Expert Commission composed of academicians Werner Stumm of Switzerland, Günter Buhse of West Germany, and Paul Mandel of France to study proposed projects for rehabilitation of the Rhine ecology and to administer a fund of 10 million Swiss francs to finance such projects.

II  
INTERNATIONAL LAW RELATING TO THE SANDOZ SPILL

Both customary international law and a treaty regime govern accidents such as that at the Sandoz plant. Unfortunately, customary international law in this area is informed by conflicting theories and approaches. Further, the treaty regime, while apparently solid, is plagued by structural and substantive weaknesses. This Part will examine the contents of the applicable customary international law and the relevant treaties.

A. Customary International Law of Transboundary River Pollution

Customary international law has its sources in state practice, in the general principles of law that are recognized by civilized nations, and in judicial decisions and the teachings of respected jurists. Examination of the relevant materials from each of these sources reveals a lack of consensus on the law governing pollution of transboundary rivers. There are four major legal approaches to transboundary river pollution, each of which depends on a different conception of sovereignty. The four approaches are: (1) absolute territorial sovereignty, (2) absolute territorial integrity, (3) limited territorial sovereignty, and (4) the community theory.

I. Absolute Territorial Sovereignty: The Harmon Doctrine

The absolute territorial sovereignty theory 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 or co-riparian states. Grotius expressed the theory of absolute territorial sovereignty more than three
centuries ago when he stated, "a river, viewed as a stream, is the property of the people through whose territory it flows, or the ruler under whose sway that people is. . . . to them all things produced in the river belong."121

A more recent manifestation of this theory is the Harmon Doctrine. In 1895, in response to Mexico's protest of the United States' diversion of 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."122 The Harmon Doctrine has since become synonymous with the theory of absolute territorial sovereignty.

The absolute territorial sovereignty theory is naturally more appealing to upstream states than to downstream states. The appeal of the theory is somewhat diminished, however, by the fact that most countries are both upper and lower riparians.123 West Germany and Switzerland, for example, are both upper and lower riparians with regard to the Rhine; the Rhine forms the greater part of the border between the two countries, with each country contributing a portion of the waters of the river.124 Similarly, the Rio Grande constitutes the border between Mexico and the United States for much of its length, and the two countries are both upper and lower riparians on the river.125

The Harmon Doctrine has been almost universally denounced.126 Although no state formally adheres to the theory of absolute territorial sovereignty with regard to transboundary rivers, an argument can be made that many states continue to base their practice on such a theory, dumping wastes without regard for the welfare of downstream states.127

2. Absolute Territorial Integrity

The absolute territorial integrity theory holds that a downstream riparian 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.128 The theory is the inverse of the absolute territorial sovereignty theory and, as such, appeals to downstream states. The same

123. Utton, supra note 119, at 155-56.
125. Mexico actually contributes a greater portion of the river's waters, so Attorney General Harmon's nationalism perhaps was ill-advised. Utton, supra note 119, at 156.
127. For a detailed argument to this effect, see Teclaff & Teclaff, Transboundary Toxic Pollution and the Drainage Basin Concept, 25 NAT. RESOURCES J. 589 (1985).
128. Utton, supra note 119, at 155.
weakness that plagues the first theory, though, also applies to the second—namely, most states are both upstream and downstream states.

3. **Limited Territorial Sovereignty**

The limited territorial sovereignty theory holds that a state may make use of the waters flowing through its territory to the extent that such use does not interfere with reasonable use of waters by the downstream states.\(^{129}\) Decisions of international and domestic tribunals, as well as pronouncements of private and public international bodies, support this approach to transboundary river pollution.

The *Trail Smelter Arbitration* best expresses the principle that a state has responsibility for environmental damage extending beyond its territorial limits.\(^{130}\) The arbitral tribunal stated that, under principles of international law,

> 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 person therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.\(^ {131}\)

The *Corfu Channel Case*, although it did not concern pollution, also supports the general principle of limited territorial sovereignty.\(^ {132}\) The International Court of Justice held in that case that it is "every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States."\(^ {133}\)

The *Lac Lanoux Arbitration*\(^ {134}\) also applied this principle. In that case Spain objected to French hydroelectric plants on the Carol River. France proposed to divert the waters of the Carol, which flows across the

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129. *Id.* Rest makes the observation that limited territorial sovereignty and limited territorial integrity are corresponding concepts. Rest, *supra* note 35, at 61. Basically, they amount to the same thing, with the emphasis on sovereignty or integrity varying depending on whether one is in the position of upper or lower riparian.


> Although they occurred in a case far removed from the problem of environmental damage, some of the comments of the International Court of Justice in the *Corfu Channel case* (1949) can be interpreted as an important judicial affirmation of state responsibility from which one today can infer the obligation of each state not to allow the nationals of other states to suffer pollution damage that might reasonably be prevented and the liability of providing appropriate compensation to the injured party when that obligation is violated.


border into Spain, in order to generate electricity. Water equal in quantity and quality would be returned to the Carol before it entered Spain. The arbitral tribunal stated:

When one examines whether France, either during the discussion or in her proposals, has given sufficient consideration to Spanish interests, it must be stressed how closely linked together are the obligation to take into consideration, in the course of negotiations, adverse interests and the obligation to give a reasonable place to these interests in the solution finally adopted.135

In other words, the upstream state has an obligation to take into account, in good faith, the interests of the downstream riparians as well as its own interests. In the Lac Lanoux Arbitration, however, the arbitral tribunal went on to deny the Spanish claim because there was no diminution in either the quantity or the quality of the water delivered to Spain.136

The limited territorial sovereignty theory can also be thought of as an international law analogue of the Roman law maxim sic utere tuo ut alienum non laedas137 applied in Rylands v. Fletcher138 and its progeny.

National and international tribunals have also applied the concept of limited territorial sovereignty. In 1938, the Italian Corte de cassazione asserted, in dicta, that:

international law recognizes the right of every riparian state to enjoy, as a participant of a kind of partnership created by the river, all the advantages deriving from it. A State cannot disregard the international duty not to impede or to destroy the opportunity of the other States to avail themselves of the flow of water for their own national needs.139

Public and private international organizations have also embraced the limited territorial sovereignty approach. Principle 21 of the United Nations' Stockholm Declaration on the Human Environment140 provides that states have the "sovereign right to exploit their own resources pursuant to their own environmental policies,"141 but along with this right comes the "responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond the limit of national jurisdiction."142

The Helsinki Rules143 promulgated by the International Law Asso-

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135. Id. at 317.
136. See id. at 315-17.
137. "Use your own property in such a manner as not to injure that of another." BLACK'S LAW DICTIONARY 1238 (5th ed. 1979).
141. Id. principle 21.
142. Id.
143. Helsinki Rules on the Uses of the Waters of International Rivers, in 1966 REPORT OF
Ciation also assume limited territorial sovereignty. Article IV of the Helsinki Rules states that "[e]ach basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin."  

Articles X and XI of the Helsinki Rules specifically address transboundary 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."  

Article XI provides that a polluting state shall not only be required to cease the polluting activity but must also compensate the injured state.

The limited territorial sovereignty theory is thus the basis for the rules of international law most frequently applied to the pollution of transboundary rivers.

4. **The Community Theory**

The community theory holds 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 drainage basin jointly, and share the benefits derived therefrom.

In its judgment with respect to the territorial jurisdiction of the International Commission of the River Oder, the Permanent Court of International Justice went beyond the limited territorial sovereignty theory and expressed some elements of the community theory, stating that the community of interest in a navigable river becomes the basis of a common legal right, the essential features of which are the perfect equality of all riparian States in the user [sic] of the whole course of the river and the exclusion of any preferential privilege of any one riparian State in relation to the others.

Although the community theory is a favorite of legal theorists, it does not yet enjoy widespread acceptance in the practice of states. The community theory is perhaps better thought of as a goal or an ideal toward which international law strives rather than as a rule of practice.

**B. Treaties Governing Pollution of the Rhine**

In addition to customary international law, several treaties govern
the pollution of the Rhine. Some of these date back to the last century, but the most important are two modern treaties: the Berne Convention and the Rhine Chemical Convention.

1. Historical Treaties

The Rhine's problems did not begin with the Sandoz accident. Rhine pollution has been a problem at least since 1834, when Coleridge first asked, "what power divine/ Shall henceforth wash the river Rhine?" As early as 1868, the various riparian states of the Rhine agreed by treaty to certain restrictions on the transport of toxic substances on the river. Packages containing arsenic and other toxic materials were required to bear the warning "poison" in French and German, in clearly legible black oil paint. All boats carrying shipments of over 5,000 kilograms of toxic substances in addition to other merchandise were required to have separate, waterproof compartments for the storage of the toxic substances, and the boat operator was required, before departure, to certify to the port police that the compartments destined to receive the toxic substances were indeed secure and waterproof. The port police were given authority to prescribe the manner of loading smaller shipments, with the requirement that toxic substances be kept separate from foodstuffs.

Prohibition of pollution of the Rhine from land-based sources dates back at least 120 years to an 1869 fisheries treaty between Switzerland and the Grand Duchy of Baden, which forbade the discharge of industrial wastes into the Rhine or its tributaries between Konstanz and Ba-

150. The poem has been quoted frequently in connection with the Sandoz accident. See, e.g., Europeans Do It To Each Other, supra note 34, at 43. The poem in its entirety reads:

In Köhn, a town of monks and bones,
And pavements fang'd with murderous stones
And rags, and hags, and hideous wenches;
I counted two and seventy stenches,
All well defined, and several stinks!
Ye Nymphs that reign o'er sewers and sinks,
The river Rhine, it is well known,
Doth wash your city of Cologne;
But tell me, Nymphs, what power divine
Shall henceforth wash the river Rhine?


152. Id. § 23.

153. Id. § 24.

154. Id.
Despite these early efforts, however, the condition of the Rhine continued to worsen.

2. The Berne Convention

In 1946, the Netherlands delegation to the Central Commission for the Navigation of the Rhine drew attention to the serious problems resulting from the growing pollution of the waters of the Rhine and suggested that the matter be examined at an international conference.

A conference was held, as a result of which the Convention concerning the Commission for the Protection of the Rhine Against Pollution (the Berne Convention) was signed in Berne on April 29, 1963, by Switzerland, West Germany, the Netherlands, France, and Luxembourg, and entered into force in 1965. The Convention set up the International Commission for the Protection of the Rhine Against Pollution (International Commission) and gave the Commission three tasks. First, the Commission must make all essential inquiries to determine the nature, origin, and scope of the pollution of the Rhine. Second, having identified sources of pollution, the Commission must recommend to the Contracting Parties appropriate measures for protection of the Rhine. Finally, the Commission must lay the groundwork for any future agreements between the Contracting Parties concerning the protection of the Rhine.

In performing these functions, the International Commission collaborates with other international entities formed for the protection of the Rhine basin, including the International Commission for the Protection of Lake Constance Against Pollution, the International Commission for the Protection of the Moselle, and the International Commission for the Protection of the Waters of the Saar. The Commission also issues

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155. Convention Concerning Fishing in the Rhine Between Constance and Basel, Dec. 9, 1869, Switzerland-Grand Duchy of Baden, 140 Parry's T.S. 137.
156. See generally Van der Veen, Facts and Figures on Rhine Pollution, 9 INT'L BUS. LAW. 41 (1981) (graphs showing increasing pollutant levels over time).
157. See infra note 260 and accompanying text.
159. Berne Convention, supra note 2.
161. Berne Convention, supra note 2, art. 2.
162. Id.
163. Id.
164. Id. art. 10; see also Kiss, supra note 160, at 621.
an annual report to the Contracting Parties.\textsuperscript{165}

The rulemaking procedures of the Berne Convention are hardly conducive to decisive action. Decisions under the Berne Convention require unanimity among the Contracting Parties.\textsuperscript{166} Each delegation has one vote,\textsuperscript{167} with the provision that the European Community can cast a number of votes equal to the number of European Community members who are Contracting Parties; the European Community may not vote in cases where its member states vote, and vice versa.\textsuperscript{168} In other words, the European Community may vote as a bloc, with Switzerland the only country outside that bloc.

A single negative vote, or the abstention of more than one party,\textsuperscript{169} negates unanimity and thus prevents the adoption of a resolution.\textsuperscript{170} Switzerland, therefore, has effective veto power over any European Community proposal.

3. \textit{The Rhine Chemical Convention}

Despite the Berne Convention and other efforts, pollution in the Rhine has increased. Chloride content is one example. As late as 1880, the chloride concentration of the Rhine was only 20 milligrams per liter.\textsuperscript{171} During the next century, the chloride level rose steadily.\textsuperscript{172} In 1979 the average chloride content at the Dutch-West German border was 167 milligrams per liter, with a maximum level of 273 milligrams per liter.\textsuperscript{173}

The concentration of other pollutants has also increased considerably.\textsuperscript{174} In 1951 the nitrate concentration of the Rhine was just over 4 milligrams per liter; by 1974, the concentration had reached 12 milligrams per liter; and by 1978 it was 18 milligrams per liter.\textsuperscript{175} Similarly, the orthophosphate concentration of the Rhine was under 0.1 milligrams per liter in 1951; by 1974 it was nearly 1.0 milligrams per liter; and by

\begin{footnotes}
\footnotetext[165]{Berne Convention, supra note 2, art. 11; see also Kiss, supra note 160, at 621.}
\footnotetext[166]{Berne Convention, supra note 2, art. 6.}
\footnotetext[167]{Id.}
\footnotetext[168]{Additional Agreement, supra note 160, art. 2.}
\footnotetext[169]{Note, however, that when the European Community member states do not vote because the European Community is voting, or vice versa, such non-votes are not counted as abstentions.}
\footnotetext[170]{Berne Convention, supra note 2, art. 6.}
\footnotetext[171]{Van der Veen, supra note 156, at 44. The natural chloride content of the Rhine is estimated at 10 mg/l. Id.}
\footnotetext[172]{Id. at 45, fig. 3.}
\footnotetext[173]{Id. at 44. Since 1974 the level of chloride in the Rhine has somewhat stabilized. Id.}
\footnotetext[174]{In recent years, mercury levels have been an exception to the general trend. In 1973 the average concentration of mercury in the Rhine was 1.1 micrograms per liter. Id. By 1979 the mercury level had dropped to 0.3 micrograms per liter, id., although the river's mercury level has since increased as a result of the Sandoz accident.}
\footnotetext[175]{Id. at 46, fig. 4. The years chosen had approximately equal water flow.}
\end{footnotes}
1978 it had surpassed 1.2 milligrams per liter.\(^\text{176}\) The extent of the problem is shown by the fact that during 1979 the Rhine carried 30 million metric tons of waterborne pollutants, equal to about one-quarter of the amount of materials carried on the Rhine by surface shipping that year.\(^\text{177}\)

In the summer of 1971, the middle course of the Rhine was entirely without oxygen in an area over 100 kilometers long, a situation that ultimately prompted European governments to take action.\(^\text{178}\) On March 22, 1972, the European Community requested that the parties to the Berne Convention design an emergency program for decontaminating the Rhine.\(^\text{179}\) On June 20, 1975, the European Parliament passed a resolution calling on those countries that were both parties to the Berne Convention and members of the European Community to agree on "immediate, practical and coordinated measures to avoid the impending disaster."\(^\text{180}\) Finally, a conference called by the Netherlands between ministers of parties to the Berne Convention led to the adoption of the Convention on The Protection of the Rhine Against Chemical Pollution (Rhine Chemical Convention).\(^\text{181}\)

\textit{a. General Provisions of the Rhine Chemical Convention}

The Rhine Chemical Convention amends and modifies the Berne Convention by placing additional responsibilities on the International Commission and the Contracting Parties. Article I of the Convention sets two goals for improving the water quality of the Rhine: elimination of pollution of the Rhine by certain highly dangerous substances, enumerated in the "black list" of Annex I, and reduction of pollution of the Rhine by substances listed in the "grey list" of Annex II.\(^\text{182}\) Among the

\(^{176}\text{Id. fig. 5.}\)
\(^{177}\text{Id. at 42.}\)
\(^{178}\text{Van der Veen, supra note 156, at 43.}\)
\(^{179}\text{Bouchez, supra note 158, at 55.}\)
\(^{181}\text{Also enacted was the Convention on the Protection of the Rhine Against Pollution by Chlorides. This Convention was intended to deal with the problem of the French potassium mines in Alsace. See generally Bouchez, supra note 158, at 56-57. The Convention provides that France will discharge wastes from the potassium mines into the Alsatian subsoil rather than into the Rhine. Convention Relative à la Protection du Rhin Contre la Pollution par les Chlorures, Dec. 3, 1976, art. 2, 16 I.L.M. 226, reprinted in 2 ENVTL. POLICY & L. 182 (1976). Chloride pollution from the Alsatian potassium mines is one of the Rhine's longest-running environmental problems. The problem is discussed in detail in Kiss, supra note 160, at 629-33.}\)
\(^{182}\text{Rhine Chemical Convention, supra note 3, art. 1. The black and grey lists of the Convention correspond to the black and grey lists drawn up by the Council of the European Communities. Council Directive of 4 May 1976 on Pollution Caused By Certain Dangerous Substances Discharged Into the Aquatic Environment of the Community, 19 O.J. EUR. COMM. (No. L 129) 23 (1976).}\)
chemicals listed in Annex I are "organophosphoric compounds" and "mercury and mercury compounds." Chemicals in both of these categories were released into the Rhine by the Sandoz accident. Annex II contains a general category of "Biocides and their derivatives not appearing in Annex I." This latter category includes most of the other chemicals released into the Rhine by the Sandoz fire.

The bulk of the Convention's provisions deal with deliberate discharges of pollutants. Paragraph 3 of article I acknowledges that the Convention's provisions "are but a first step to achieve the objective... in paragraph 1," that is, the elimination of pollution of the Rhine by Annex I substances and the reduction of pollution of the Rhine by Annex II substances. The preamble states that "international action for the protection of the Rhine waters against chemical pollution must be viewed in conjunction with other efforts made to protect...the Rhine, in particular those efforts to conclude conventions against pollution by chlorides and thermal pollution."

The limits for discharges of Annex I substances are set by an international body, rather than a national one, albeit by the unanimous agreement of the Contracting Parties. As part of the "first step," the governments of the Contracting Parties to the Convention compile an inventory of discharges of substances mentioned in Annex I and communicate the contents thereof to the International Commission. The inventories must be updated at least every three years. Prior authorization must be obtained from the component government entity for any discharges of Annex I substances into the surface waters of the Rhine basin. This authorization fixes the emission standards, including norms and time limits governing such discharges, that cannot exceed the limit values agreed upon by the parties to the Convention.

In contrast, national authorities set the limits for discharges of Annex II substances after mutual consultation within the International Commission. The International Commission can compare programs

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183. Rhine Chemical Convention, supra note 3, Annex I.
184. See supra notes 17-18, 31-33 and accompanying text.
185. Rhine Chemical Convention, supra note 3, Annex II.
186. See supra text accompanying notes 19-28.
187. Rhine Chemical Convention, supra note 3, art. 1.
188. Id. preamble. As of 1985, a treaty governing thermal pollution of the Rhine had not yet been concluded. Kiss, supra note 160, at 623.
189. Rhine Chemical Convention, supra note 3, art. 2.
190. Id.
191. Id.
192. Id. art. 3.
193. Id.
194. Id. art. 5. The government concerned must place a time limit on existing discharges, after which discharges must meet the emission standards. Id. art. 3.
195. Id. art. 6.
196. Id.
in order to ensure that their aims and means coincide,197 but does not have the express power to set limits for Annex II substances as it does for Annex I substances. The International Commission can, however, "present proposals on achieving . . . common objectives of reducing the pollution of the waters of the Rhine" to be adopted by unanimous agreement of the Contracting Parties.198

The Convention contains only minimal provisions regulating accidental discharges, although such discharges are a major source of harm to the Rhine.199 To prevent accidental discharges, article 7 of the Convention provides that "[t]he Contracting Parties will take all the legislative and regulatory measures guaranteeing that the storage of Annex I and II substances shall be done in such a way that there is no danger of pollution for the waters of the Rhine."200

Finally, the Contracting Parties assume the duty of monitoring discharges201 and installing monitoring instruments along the Rhine to measure the concentrations of Annex I and II substances in the river water.202 The parties are to report the results of such monitoring to the International Commission annually,203 in addition to reporting to the International Commission on "data obtained in the application of this Convention."204

b. International Alarm Plan Rhine

Article 11 of the Rhine Chemical Convention also provides for the establishment of an international warning system to handle pollution emergencies. The article provides:

When a Government Party to this 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 procedure to be established by the International Commission.205

To implement article 11 the International Commission set up a network of warning stations known as the International Alarm Plan Rhine.206 Development of the network took place in stages. Initially, the International Commission set up a temporary warning and alarm system in con-

197. Id.
198. Id.
199. See supra note 4.
200. Rhine Chemical Convention, supra note 3, art. 7.
201. Id. art. 8.
202. Id. art. 10.
203. Id. art. 8.
204. Id. art. 12.
205. Id. art. 11.
206. Rest, supra note 35, at 59.
juncture with the International Commissions for the Saar and the Moselle.\textsuperscript{207} Tests of the alarm system, however, revealed a need for improvement.\textsuperscript{208} The system was rebuilt and became operational in 1982.\textsuperscript{209} It now consists of a network of six warning centers on the Rhine and two on the Moselle.\textsuperscript{210} In the event of an accident, local and regional authorities forward information to the warning centers, which then transmit messages to the warning centers and local authorities downstream.\textsuperscript{211}

c. Rulemaking Powers

Under both the Berne Convention and the Rhine Chemical Convention, the International Commission's rulemaking function is purely advisory. The Commission may make recommendations and suggestions, but may not make binding substantive rules, with the exception of setting limit values for the discharge of Annex I substances.\textsuperscript{212} Any decisions must be made by unanimous consent of the Contracting Parties.\textsuperscript{213}

The Convention does, however, place certain binding obligations on the Contracting Parties. It requires them to monitor discharges\textsuperscript{214} and to set up water quality testing stations.\textsuperscript{215} Of greater 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 seriously threaten the quality of Rhine water.\textsuperscript{216} As noted earlier, Switzerland delayed more than twenty-four hours before notifying the downstream states of the danger to the Rhine.\textsuperscript{217}

d. Dispute Resolution

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.\textsuperscript{218} Annex B states that the Arbitral Tribunal shall consist of one arbitrator from each of the states involved, with a third, neutral arbitrator chosen by mutual consent of the first two arbitrators. This neutral arbitrator becomes Chief Arbitrator of the Tri-

\textsuperscript{207} Kiss, supra note 160, at 624.
\textsuperscript{208} Id.
\textsuperscript{209} Id. at 624-25.
\textsuperscript{210} Id. The two centers on the Moselle will transmit warning messages when there is a danger that an accident on the Moselle will have a significant effect on the Rhine. Id. at 625.
\textsuperscript{211} Id.
\textsuperscript{212} See Rhine Chemical Convention, supra note 3, arts. 3, 5, 7, 12-14.
\textsuperscript{213} Id. art 14.
\textsuperscript{214} Id. art. 8.
\textsuperscript{215} Id. art. 10.
\textsuperscript{216} Id. art. 11; see supra note 205 and accompanying text.
\textsuperscript{217} See supra notes 100-03 and accompanying text.
\textsuperscript{218} Rhine Chemical Convention, supra note 3, art. 15.
Upon failure of one of the parties to appoint an arbitrator, the other party may apply to the President of the European Court of Human Rights, who then appoints the Chief Arbitrator of the Tribunal. If within two months after this appointment the other party still fails to appoint an arbitrator, the President of the European Court of Human Rights then appoints an arbitrator for the party.220

III
THE SANDOZ SPILL UNDER INTERNATIONAL LAW: THE FAILURE OF THE RHINE TREATY REGIME AND POSSIBLE SOLUTIONS

The effects of the Sandoz spill were devastating. The occurrence of this and similar accidents demonstrates the weakness of customary international law and, more significantly, the shortcomings of the Rhine treaty regime. The ways in which existing law failed to protect the Rhine, set forth below, illustrate the need for new mechanisms to prevent these disasters in the future.

A. Failure of the International Warning and Alarm Plan Rhine

Although the downstream states accused Switzerland of deliberately concealing information,221 Switzerland's delay of more than twenty-four hours before notifying the downstream states resulted as much from poor planning as from deliberate secretiveness. Incompatibility between the various alarm systems delayed the response to the crisis.222 For example, the Swiss authorities did not know, at first, which French and West German officials to contact.223

Although some of the environmental damage caused by the Sandoz spill might not have occurred had adequate warnings been given, the greater part of the damage was inevitable once the chemicals had entered the river. The contamination of the Ijssel River and Holland's northern waterways224 probably could have been avoided if the Dutch authorities had been given an additional twenty-four hours in which to respond to the crisis. On the other hand, the fish and eels of the Rhine would have died regardless of when the warning was given, as there was no practical way either to remove the fish from the path of the chemical slick or to prevent the chemicals from moving downstream with the current. The

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219. Id. Annex B.
220. Id.
221. Hull, supra note 4, at 37; Lewis, supra note 45, at col. 4; see supra notes 100-03 and accompanying text. For a detailed report on the warning actions taken by the Swiss authorities under the plan, see Rhein-Bericht, supra note 4, at 25-40.
222. Tolba, supra note 54, at col. 3.
223. Id.
224. See supra note 35 and accompanying text.
most serious possible consequence of the delay, loss of human life, did not occur, as water drawn from the Rhine for drinking is constantly monitored in accordance with article 10 of the Rhine Chemical Convention. It was sheer fortuity, however, that no one drank from or swam in the river and suffered the fate of the unfortunate French sheep who drank from the Rhine at Strasbourg.

B. Violation of the Rhine Chemical Convention

The greater part of the environmental damage resulting from the Sandoz spill was caused not by the delay in warning downstream states but by the failure of various safety systems designed to prevent the entry of chemicals into the river in the event of a fire. But for the lack of adequate catch basins for runoff water from firefighting, the absence of a fire alarm and sprinkler system at Warehouse 956, and the faulty installation of the drainage seal, the catastrophe might have been averted.

Sandoz insists that it broke no laws in storing the chemicals in Warehouse 956 despite the absence of catch basins for runoff water. This assertion appears to be true. If so, Switzerland, which otherwise has an excellent record in the area of environmental legislation, failed to fulfill its obligation under article 7 of the Rhine Chemical Convention to ensure by all necessary legislative and administrative measures that the storage of hazardous substances did not endanger the Rhine.

Even assuming that Switzerland did not violate its duty under article 7 to protect the Rhine through legislation, there remains the question of whether Switzerland failed to take adequate administrative measures to protect the river, as is also required by article 7. Warehouse 956

225. Markham, supra note 49, at col. 1.
226. Tagliabue, supra note 105, at col. 6.
227. Rhine Chemical Convention, supra note 3, art. 10.
228. See supra text accompanying note 46.
229. See supra text accompanying note 12.
230. Rest, supra note 35, at 59; Watson, supra note 50, at 59.
231. See supra text accompanying note 35.
232. Hull, supra note 4, at 37.
233. Watson, supra note 50, at 59.
234. Rhine Chemical Convention, supra note 3, art. 7. Although neither the Swiss government nor the governments of the downstream states have taken any legal actions against Sandoz, private individuals have brought a criminal charge against an unknown party or parties and the public prosecutor has commenced an investigation. See Letter from M. Henrich, Sandoz Legal Department, to Aaron Schwabach (June 7, 1988). Under Swiss law, no information about the criminal proceeding can be released until its completion. See id.
235. Rest, supra note 35, at 60. Rest states:

since the responsible authorities were aware of the danger of the substances being stored and must have known about the lacking safety precautions ever since the Risk Report issued by the Zurich Insurance Company in 1981, they were obligated to take even better monitoring and control measures . . . . This failure to take control meas-
was built in 1968 to store machinery. In 1979, after inspection, it was approved for use as a storage warehouse for chemicals with an ignition point in excess of twenty-one degrees Celsius. Before its use as a chemical warehouse was approved, the building was inspected by the Basel-Land Office for Trade and Industry, the Swiss Federal Labor Inspectorate, the Basel-Land Cantonal Building Insurance Company, and SUVA, the Swiss Accident Insurance Company.

There is no evidence of corruption or misconduct on the part of the inspecting officials; the permit was apparently granted in accordance with the standard administrative procedure for such matters. However, that a standard administrative practice allowed a permit to be granted in such a manner as to pose a grave danger of pollution to the Rhine is evidence of Switzerland's failure to fulfill its obligation under article 7. Swiss law should have instructed the inspecting authorities to deny the permit. In addition, Switzerland failed to protect the Rhine through administrative regulation. Given that Swiss law allowed the granting of the permit, the inspecting authorities should have refused the permit on the ground that storage of chemicals in Warehouse 956 posed a danger to the Rhine. Finally, the failure to revoke the permit in light of the Zurich Insurance Company report shows administrative negligence.

If article 7 is given its broadest construction, it creates an affirmative duty on the part of the Swiss administrative authorities to carry out inspections and otherwise police waterfront warehouses to ensure that no danger to the Rhine exists. Under this interpretation of the Convention, Switzerland's failure to fulfill its administrative obligations under article 7 was extended from the time the permit was granted, in 1979, to the time of the fire.

Id. at 60-61 (footnote omitted).

236. Sandoz Press Conference, supra note 9, at 10.
237. Id.
238. SCHWEIZERHALLE, supra note 5, at 4.
239. Rest, supra note 35, at 60.
240. See Rhine Chemical Convention, supra note 3, art. 7 ("The Contracting Parties will take all the legislative and regulatory measures guaranteeing that the storage of Annex I and II substances shall be done in such a way that there is no danger of pollution.") (emphasis added).
241. An alternative approach is that the Swiss probably violated customary international law. Under the limited territorial sovereignty approach to transboundary pollution, Switzerland violated its duty not to interfere with the reasonable use of the waters of the Rhine by the lower riparians. See supra notes 129-46 and accompanying text. The same is true under either the community theory or the absolute territorial integrity theory. See supra notes 128, 147-49 and accompanying text. The lower riparians suffered significant harm as a result of Switzerland's violation of its duty. The fishing industry was virtually wiped out. See supra text accompanying note 41. Alternate sources of drinking water had to be obtained, and the value of the river for recreational use and as a magnet for tourism was decreased. See supra text accompanying notes 45-51.
C. Why The Downstream States Failed to Pursue International Law Remedies

Immediately after the spill, the environment ministers of France and West Germany announced their intentions to seek compensation, not only from Sandoz, but from Switzerland as well.242 While neither the Berne Convention nor the Rhine Chemical Convention provides a specific remedy for victims of transboundary pollution, the latter provides an arbitration procedure for resolution of disputes between the Contracting Parties.

To date, however, none of the downstream states has pursued a claim against Switzerland.243 This reluctance results from a variety of factors, including Sandoz’s willingness to compensate the injured parties, political opportunism, and an awareness on the part of the downstream states that their own hands are not entirely clean in the matter of Rhine pollution.

1. Political Opportunism

The lower riparian states are, like Switzerland, heavily industrialized, especially the Netherlands and West Germany. Industry has a significant voice in the governments of each of the riparian states of the Rhine, generally through conservative political parties such as the West German Christian Democrats or the Swiss Radical Democrats. Mindful of their industrial constituencies, these parties have generally opposed stricter controls on industry, including pollution controls.244

Polluting industries have reason to be wary of their governments pursuing an international law remedy against Switzerland. Such efforts might focus unwelcome public attention on domestic polluters and might be accompanied by a demand for stricter domestic pollution controls.

The left-of-center political parties, such as West Germany’s Social Democrats, have also failed to address environmental concerns. The Social Democrats are supported by industrial workers who see stricter controls on industry as a threat to their jobs.245 Following the Sandoz spill, the Social Democrats announced that they would not make an issue of the incident in the January 1987 elections.246 Harald Schäfer, an environmental spokesman for the Social Democrats, summed up the party’s

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242. Lewis, supra note 45, at A1, col. 3, A6, col. 3; see supra text accompanying notes 106-07.
243. Rest, supra note 35, at 62; Letter from M. Henrich, supra note 234.
244. Note, however, that it was Chancellor Helmut Kohl, a Christian Democrat, who created West Germany's environmental ministry. Watson, supra note 50, at 58. The Christian Democratic government has also stepped up prosecution of toxic dumpers. See Tagliabue, supra note 105, at col. 6.
245. Watson, supra note 50, at 60.
246. Id. at 58.
dilemma: "We can’t pull out of the industrial society . . . . We don’t want to." Parties at both ends of the political spectrum, therefore, recognize the importance of industry to their nation’s economies and are anxious to avoid driving industry, and jobs, overseas.

2. Unclean Hands

As noted above, internal political difficulties are one reason why the downstream states failed to pursue international legal remedies against Switzerland. External political difficulties also exist. For example, in recent years West Germany has been responsible for at least as many toxic spills as Switzerland. Countries may be reluctant to drag the issue of Rhine pollution into court for fear of encountering international criticism of their own pollution. In addition, the fact that the downstream countries are themselves polluters would make it difficult to determine what part of the environmental damage was caused by Switzerland and what part was caused by the other riparians.

Only the Netherlands, as the lowermost riparian state, can make the claim that it suffers from transboundary pollution of the Rhine while not causing any such harm to the other riparian states. In light of the country’s geographical position, it is scarcely surprising that the Dutch have taken a leading role in efforts to protect the river. Most of the diplomatic and legal initiatives that led to the adoption of the Rhine pollution treaties were proposed by the Netherlands.

3. Willingness of Sandoz to Compensate

Had Sandoz been less willing to compensate the injured parties, those parties would have applied pressure on the governments of downstream states in order to obtain some form of redress. Such pressure

247. Id.
248. The reluctance of political parties in West Germany, for instance, to take a stand on environmental issues has contributed to the growth of the environmentalist Green Party. See supra note 105. Paradoxically, victories for the Green Party in West Germany have often strengthened the conservative Christian Democrats; the Greens draw support away from the Social Democratic party. Unlike the Christian Democrats, however, in the wake of the Chernobyl and Sandoz disasters, many other major European political parties have adopted environmental programs to forestall the growth of independent Green parties.

249. The West German chemical company BASF dumped large amounts of toxic chemicals into the Rhine during 1986. Rhein-Bericht, supra note 4, at 18, 70-71, 73-74, 79, 85. Two metric tons of weedkiller leaked into the Rhine from the BASF works on November 21, 1986. Id. at 18, 70, 79-80. Earlier, in June 1986, BASF had discharged 10 metric tons of 1, 2 dichloroethane into the Rhine, followed by 200-300 kilograms of the same substance on August 20. Id. at 70, 73-74.

250. Cf. Missouri v. Illinois, 200 U.S. 496 (1906) (refusal to grant Missouri’s request for an injunction to prevent Chicago from dumping sewage into the Missouri River, on the ground that Missouri also dumped sewage into the river, and Missouri had failed to show that it was Chicago’s sewage, rather than Missouri’s, which had caused the pollution damage).

251. See Bouchez, supra note 158, at 55-56.
might have taken the form of demanding that those governments undertake legal action against Switzerland for its failure to fulfill its obligations under the Rhine treaties. Sandoz's willingness to pay compensation, however, made any legal action for damages unnecessary.

D. Why the Treaties Failed

1. The Berne Convention

The Berne Convention is purely institutional in nature; it lacks rulemaking powers and enforcement mechanisms. The Convention places no specific obligation on the Contracting Parties apart from their mutual agreement to cooperate in the International Commission, to monitor discharges, and to set up water quality testing stations. Under the Convention, the International Commission is powerless to set pollution control standards or to resolve disputes that may arise regarding pollution of the Rhine. The three tasks that the Convention sets for the International Commission are investigative rather than preventive in nature. The findings and proclamations of the International Commission are not binding.

2. The Rhine Chemical Convention

Arguably, Switzerland violated articles 7 and 11 of the Rhine Chemical Convention. This failure to comply is of little import, however, when one considers that the Convention provides neither incentives for compliance nor sanctions for noncompliance. The absence of compensation provisions and sanctions is a fundamental weakness of both conventions. 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. Without either a carrot or a stick with which to induce the Contracting Parties to comply, the Convention is little more than a "feel-good" document that allows the Contracting Parties to voice concern over the deteriorating state of the Rhine without having to face the domestic economic and political sacrifices that a genuine commitment to cleaning up the Rhine would require.

252. Kiss, supra note 160, at 621.
254. Kiss, supra note 160, at 622.
255. The tasks are:
   (1) To make all essential inquiries in order to ascertain the nature, origin, and scope of the pollution of the Rhine.
   (2) To recommend to the signatory governments all appropriate measures for the protection of the Rhine.
   (3) To prepare the foundation for future agreements between the signatory governments concerning the protection of the Rhine from pollution.
Berne Convention, supra note 2, art 2; see supra notes 161-63 and accompanying text.
256. See Kiss, supra note 160, at 621-22.
E. Possible Solutions

Ideally, any international scheme for the protection of transboundary rivers should focus on preventing pollution, rather than imposing liability after environmental damage has occurred. Any legal structure designed to protect the Rhine, therefore, should focus on preventing further contamination of the river rather than simply providing a mechanism by which pollution victims may obtain compensation. The creation of new institutions, such as a drainage basin authority or a pan-European environmental authority, would be one possible approach. In addition, the treaty regime could be strengthened considerably by modifying provisions of the existing treaties.

1. New Institutions
a. Drainage Basin Administrative Authority

Other political obstacles aside, the easiest way to control Rhine pollution would be through a Rhine River Authority responsible for administering the entire drainage basin. This drainage basin administrative authority would administer the waters of the Rhine basin as a unit, in accordance with the community theory of transboundary rivers. To avoid the weaknesses that have plagued earlier attempts to protect the Rhine, the Rhine River Authority should be vested with the power to inspect pollution sites and impose sanctions on polluters. In addition to these rulemaking and administrative powers, the Authority should possess some mechanism for resolving disputes arising from the use or misuse of Rhine waters.

Although a drainage basin administrative authority would be the most efficient and effective means of preventing pollution, practical considerations make it unlikely that such an approach will be adopted in the near future. These practical considerations include the reluctance of the riparian states to sacrifice such a large measure of sovereignty, as well as the lack of an existing political infrastructure on which to build such an institution.

International cooperation among the riparian states of the Rhine is possible, however, as shown by the success of the Central Commission for the Navigation of the Rhine. The Navigation Commission, founded in 1815, is an international organization with remarkably broad rulemak-

257. See supra notes 147-49 and accompanying text.
258. See, e.g., Tagliabue, supra note 105, at col. 6 (other riparian states rejected a recommendation by the Netherlands for international inspection of suspected pollution sites, arguing that such inspections would violate national sovereignty).
259. Note that the lower riparians have such a political infrastructure, in the form of the European Community. Switzerland, however, is not a member of the Community. This has complicated the application of existing European Community environmental directives to the Rhine basin. See Europeans Do It to Each Other, supra note 34, at 43.
A Rhine River Authority could be created by integrating the functions of the International Commission for the Protection of the Rhine Against Pollution with the functions of the Navigation Commission. Given the resistance of the riparian states to granting the International Commission the broad rulemaking and enforcement powers of the Navigation Commission, though, it seems likely that they will also resist including control of pollution from land-based sources within the scope of the Navigation Commission's powers. Expanding the Navigation Commission's scope to include control of land-based pollution would have an effect on sovereignty identical to that of giving the International Commission rulemaking and enforcement powers equivalent to those of the Navigation Commission.

There is an additional risk in expanding the scope of the Navigation Commission's duties to include those functions now within the domain of the International Commission. The effectiveness of the Navigation Commission might be decreased, owing to the increase in the complexity and size of the organization's workload. There might also be increased resistance to the Navigation Commission's pronouncements, at least on environmental matters, on the part of the sovereign riparians. To avoid sabotaging a successful existing organization, integrating the functions of the International Commission into the structure of the Navigation Commission must be done cautiously, if it is to be done at all.

A Rhine River Authority is not likely to become a feasible solution soon. For the time being, the prevention of chemical accidents such as the Sandoz spill must take place by building on the existing International Commission framework.

b. European Environmental Authority

A second possible solution to the problem of Rhine pollution is a pan-European environmental authority. An attempt to create a pan-European environmental authority, though, would encounter the same difficulties with sovereignty and lack of infrastructure as an attempt to create a Rhine River Authority, magnified by the greater scope of the project and the greater number of sovereigns involved. Furthermore, even if such an organization could be created, it would be less effective in protecting the Rhine than an authority concerned only with the Rhine. The

various countries would insist on provisions protecting their sovereignty, which would diminish the overall effectiveness of the organization. A regional, more specific organization faces this problem, to a lesser degree, because it involves fewer nations and presents fewer threats to sovereignty.

A pan-European environmental authority would also duplicate some of the functions of existing bureaucratic structures, like the International Commission. The same problem exists with the creation of a regional drainage basin authority, but the problem is smaller in magnitude because of the more limited scope of the project.

In addition, the existence of a pan-European environmental authority with the power to regulate uses of the Rhine presents the possibility of countries outside the Rhine basin making decisions that affect the Rhine. These countries may be influenced by extrinsic political considerations. By contrast, in an organization specific to a given drainage basin, decisions concerning the use of the waters of the drainage basin will be made by representatives of those countries directly affected.

These goals might also be achieved by expanding the European Community environmental authority created by the Seveso Directive.261 The Seveso Directive requires the member states of the European Community to take legislative and administrative measures to prevent environmental damage from industrial accidents.262 Under the Seveso Directive, the Commission of the European Community can bring enforcement actions before the Court of Justice of the European Communities for failure to adopt sufficiently stringent environmental policies. Since 1986, the Commission has brought actions against Belgium, Greece, Ireland, Italy, Luxembourg, and the Netherlands.263

At present, Switzerland is not a member of the European Community,264 and thus is outside the scope of the Seveso Directive.265 Making Switzerland subject to the Seveso Directive, then, would be a step toward a pan-European environmental authority.266

262. Id. arts. 1, 3-4.
263. See Searles, The "Sandoz Incident": Implications for the EC, EUR. ENV'T REV., June 1987, at 19, 22.
264. Europeans Do it to Each Other, supra note 34, at 43.
265. It is ironic that Switzerland is not within the scope of the Seveso Directive, considering that the accident at Seveso, Italy, which inspired the Directive, took place at a chemical plant owned by a Swiss company. See Lewis, supra note 108, at col. 2.
266. Thus far, efforts to persuade Switzerland to accede to the Seveso Directive have been unsuccessful. Searles, supra note 263, at 22.
2. **Modifying Provisions of the Current Regime**

a. **Abolition of the Rhine Chemical Convention’s Unanimity Requirement**

A third possible solution involves a change in the role of the International Commission. The International Commission already has the power to recommend concentration limits for discharges of toxic substances.\(^{267}\) The limit values can only be adopted, however, by unanimous consent of the five Contracting Parties.\(^{268}\) Although the riparian states may perceive the unanimity requirement as necessary to protect their sovereignty, abolishing the unanimity requirement might result in stricter pollution controls.

b. **Onsite Inspections**

A fourth option involves allowing onsite inspections by an international organization to ensure that conditions comply with internationally set standards. States, however, will resist allowing an international organization to set the prescriptive norms an inspection regime requires. In any event, the problem is not so much that states lack strict pollution control laws as that those laws are not adequately enforced.\(^{269}\) Switzerland, for example, already has strict pollution control laws.\(^{270}\) As a first step, the International Commission could carry out onsite inspections at chemical plants to ensure that local pollution control laws are being followed.

Shortly after the Sandoz spill, the Netherlands proposed international inspection of suspected pollution sites. France, Switzerland, and West Germany objected on the grounds that the proposed inspections would violate national sovereignty.\(^{271}\) To lessen the opposition of these three states, inspections could be conducted by a neutral outside party. Experts from a country such as the United States or Canada, with experience in transboundary river pollution and no reason to prefer one of the Rhine riparian states over the others, should therefore examine pollution sites in the Rhine basin.

Neutral party inspection of pollution sites would be a first step in reducing Rhine pollution. Once compliance with local anti-pollution laws has been achieved, the next step would be to use the International Commission to bring about appropriate pollution control laws in the riparian states. The latter task will be simplified if the unanimity require-

\(^{267}\) Rhine Chemical Convention, *supra* note 3, art. 5.
\(^{268}\) Id. arts. 5, 14.
\(^{269}\) See *supra* notes 235-41 and accompanying text (discussing Switzerland’s failure to take administrative measures necessary to protect the Rhine).
\(^{270}\) *We Thought We Were Better*, *supra* note 4, at 43.
\(^{271}\) Tagliabue, *supra* note 105, at col. 6.
c. Liability and Sanctions

Efforts to protect the Rhine will be more successful if they focus on preventing pollution rather than imposing penalties after the fact. Some liability provision is necessary, however, as accidents are bound to occur. In the case of the Sandoz spill, Sandoz voluntarily agreed to compensate the downstream injured parties. Had Sandoz not agreed to pay compensation, it is unclear whether the injured private parties would have had any readily available legal recourse by which compensation might have been obtained.

Reliance on the willingness of the polluter to compensate is not always possible, as is shown by the Chernobyl incident. To ensure that victims of transnational pollution are not deprived of compensation, as well as to provide an additional deterrent to polluters, the Rhine Chemical Convention should be amended to create liability for transboundary pollution of the Rhine.

If penalties for pollution by private parties are imposed on the home states of the parties, the governments of those states will have an incentive to reduce pollution emanating from within their borders. Sanctions against polluting states present an effective method of reducing transboundary pollution, if applied; however, states are disinclined to agree to a treaty provision exposing them to liability.

Alternatively, penalties for transboundary pollution could be applied to the private party causing the pollution. Such a remedy would not expose states directly to liability. To minimize the diminution of sovereignty, private party liability could be limited to the amount of actual damages. Although this limitation would diminish the deterrent

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272. See supra notes 267-68 and accompanying text.
273. See supra notes 112-17 and accompanying text.
274. See generally Rest, supra note 35, at 62-64 (discussing claims by individual injured parties according to international private law and domestic law).
275. As of June 1987, the West German government had paid 291 million West German marks for injuries to German nationals resulting from the Chernobyl incident. Id. at 63 n.66; see supra note 113. See generally Handl, Transboundary Nuclear Accidents: The Post-Chernobyl Multilateral Legislative Agenda, 15 ECOLOGY L.Q. 203, 222-47 (1988).
276. Enterprises owned by the state, however, present a problem. Initially, at least, state-owned enterprises could be exempted from the liability provision. The major chemical companies along the Rhine—Hoechst, Bayer, BASF, Sandoz, Ciba-Geigy, Hoffman-LaRoche—are all privately owned. Likewise, accidental discharges of chemicals by the governments of the Contracting Parties could be exempted.
277. Rest takes the view that the greatest part of the damage caused by the Sandoz spill is in the form of ecological damage to public, or common, property, which is not readily quantifiable. Under this view, a law limiting liability to the amount of quantifiable, demonstrable damage incurred would have a disproportionately small deterrent effect; the liability for pollution would be less than the actual amount of damage caused. Rest, supra note 35, at 64-65.
effect of the penalty, it would make the penalty provision more acceptable to the riparian states.

Sanctions for transboundary pollution of the Rhine will be most appealing to the Netherlands, which, because of its position as the lower-most riparian, will never be in a position to pay damages, only to collect. By the same reasoning Switzerland will have the greatest reason to oppose sanctions, as it is upstream from most of the Rhine and downstream from only a few West German chemical plants, notably at Waldshut.278

Inevitably, disputes will arise between the Contracting Parties. The existing arbitration system is preferable to seeking to resolve disputes in the national courts of the Contracting Parties. For reasons of self-interest, the law of the upper riparian states will tend to take the absolute territorial sovereignty approach, favoring polluters, while the law of the lower riparians will tend toward the absolute territorial integrity approach, favoring pollution victims. If the existing arbitration system is replaced with a treaty provision allowing the litigation of transboundary pollution disputes in national courts, forum-shopping will be rife, with each party seeking to litigate the matter in its own courts.

d. Expansion of the Rhine Chemical Convention’s Arbitration Procedure to Allow Actions Between Private Parties

A final possible solution involves increased arbitration. Currently, states have a forum in which to seek compensation from a recalcitrant polluting state, in the form of the arbitration provision of the Rhine Chemical Convention.279 Private parties, however, have no international forum in which to resolve their transboundary pollution disputes.

Some means is needed to compensate injured private parties in instances where the polluter is unwilling to pay. Differences in national law, as well as possible obstacles to access by foreign litigants, make national courts an imperfect forum in which to litigate such disputes. This problem can be solved within the framework of the Rhine Chemical Convention by expanding its arbitration provision280 to allow private parties of diverse nationality to arbitrate claims arising from transboundary pollution of the Rhine. Amending article 15 and Annex B of the Convention to make the arbitration procedure available to private parties as well as states would be a considerable improvement over the existing arbitration provision.

To reduce the threat to sovereignty, the amendment should allow private parties to bring actions only against other private parties. States would be able to bring actions against other states, as at present, but

278. A map showing the location of chemical plants along the Rhine can be found in Wir Sollten Aufwachen und Überlegen, supra note 29, at 139.
279. Rhine Chemical Convention, supra note 3, art. 15, Annex B.
280. Id.
private parties would not be able to bring actions against states. The same end could be accomplished by setting up a second arbitral process for the determination of claims between private parties of diverse nationality.\textsuperscript{281}

The creation of a second arbitral body, or the expansion of the existing arbitral process to include actions between private parties, would require expansion of the existing dispute resolution infrastructure. This expansion would entail little or no additional expense, however, as Annex B provides that the parties to a dispute shall pay the arbitrators' fees and other costs.\textsuperscript{282}

IV

CONCLUSION

The Sandoz spill had disastrous consequences for the Rhine; the river's ecology barely survived, and it will be years before most forms of river life recover. The spill had serious economic consequences as well. The Sandoz spill was not an isolated event, however; nor did the pollution of the Rhine end with the Sandoz spill. The incident and its aftermath have weakened the international legal structure protecting the Rhine.

Because state practice is the primary basis of international law, the actions of the downstream states following the Sandoz incident have affected the customary international law of transboundary river pollution.\textsuperscript{283} As stated above, there is no consensus as to what principle of international law governs transboundary river pollution, although the weight of authority supports the limited territorial sovereignty theory.\textsuperscript{284}

On the other hand, state practice does not necessarily follow theory. The Teclaffs make a convincing argument that many upper riparians continue to act as though the Harmon Doctrine is the rule governing transboundary river pollution.\textsuperscript{285}

Although the various riparian states of the Rhine may verbally condemn Switzerland's failure to prevent the accident and to warn the downstream states promptly, they have shown a high degree of tolerance

\textsuperscript{281} Obviously, there is no need for an international body to decide claims between parties of the same nationality. Diversity of nationality should be determined in a manner similar to that used to determine diversity of citizenship in U.S. federal courts. \textit{See, e.g.}, 28 U.S.C. § 1332 (1982).

\textsuperscript{282} \textit{See} Rhine Chemical Convention, \textit{supra} note 3, Annex B.

\textsuperscript{283} \textit{See supra} note 118 and accompanying text. \textit{Cf.} Reisman, \textit{International Incidents: Introduction to a New Genre in the Study of International Law}, 10 \textit{Yale J. Int'l L.} 1 (1984) (state actions taken in response to international incidents are the primary source of the normative expectations of other states, and such normative expectations in turn constitute international law).

\textsuperscript{284} \textit{See supra} notes 118-49.

\textsuperscript{285} \textit{See generally} Teclaff & Teclaff, \textit{supra} note 127.
for Switzerland's conduct. In addition, West Germany has failed to prevent the occurrence of similar accidents within its own territory. By failing to call Switzerland to account for its failure to protect the Rhine, the downstream states have created a normative expectation that riparian states will not be held legally culpable for ecological damage to the Rhine, at least in cases where the polluter agrees to pay compensation. This expectation lends weight to the view that the Harmon Doctrine, rather than the limited territorial sovereignty theory, is the rule of customary international law governing pollution of the Rhine.

The purpose of the Rhine Chemical Convention is to protect the Rhine from chemical pollution. The Convention has failed to achieve its purpose; the Rhine has not been protected. Article 7 in particular has been widely disregarded. Apparently, the Contracting Parties are unwilling to enforce the provisions of article 7 or abide by its terms.

The normative impact of state actions is not limited to customary international law; such actions may also affect the way in which the terms of a treaty are interpreted. The failure to use the Rhine Chemical Convention's arbitration provision suggests that the Convention is powerless as a means by which an injured party may seek redress for transboundary environmental harm. Although by article 7 of the Convention the Contracting Parties undertook to take all legislative and administrative measures necessary for the protection of the Rhine, in practice they have continued to pollute the Rhine. This pattern of administrative and governmental action resulted in numerous chemical accidents eventually culminating in the Sandoz spill. The failure of the downstream states to seek arbitration under article 15 of the Convention has created a normative expectation that the arbitration procedure will not be used to enforce article 7.

However, the Convention has not failed entirely. The failure of article 11 is less complete than that of article 7, for the downstream states did demand improvement of the warning system. Evidently, riparian states agree that an improved warning system is desirable. Also, the International Commission has not been entirely discredited. In December 1986, Netherlands Transport Minister Neelie Smit-Kroes organized a meeting of the environmental ministers of France, the Netherlands, Switzerland, and West Germany to devise a program for the rehabilitation of

286. See supra notes 4 and 249.
287. This expectation is to some extent dependent on the ability of the downstream injured parties to obtain compensation from the polluter. For a discussion of the effect of the Sandoz spill on the customary international law of state liability for transboundary environmental damage, see Rest, supra note 35, at 64-65.
288. See supra notes 234-41 and accompanying text.
289. See generally Reisman, supra note 283, at 2-3.
290. See supra note 4.
291. See supra notes 221-23 and accompanying text.
the Rhine ecology. The ministers agreed to ask the Commission for specific proposals.\footnote{292}

To avoid repetition of the Sandoz disaster, changes must be made to bring about increased international cooperation in the management of the river's resources. If the existing treaties are to protect the river effectively, a means must be found to ensure compliance with the treaties' terms. Further, article 7 of the Rhine Chemical Convention is useless without onsite inspections and sanctions for noncompliance to back it up. The International Warning and Alarm Plan Rhine failed to provide timely warning of the accident; it needs to be improved. Finally, administration of the waters of the Rhine basin as a unit provides an ideal solution to the pollution problem; it is an ideal, however, that is not likely to be realized in the near future. Protection of the Rhine must proceed in smaller steps.

As a first step, inspection of pollution sites can be carried out by neutral inspectors chosen so as to be agreeable to all of the Contracting Parties. Eventually, these inspectors might monitor compliance with uniform anti-pollution laws promulgated by the International Commission, but for the present it will be sufficient for the inspectors to ensure compliance with local pollution control laws.

A second step is the imposition of sanctions on polluters. Sovereign states are unlikely to allow the imposition of sanctions on themselves, but might consent to a treaty provision allowing for sanctions against private parties responsible for transboundary pollution of the Rhine.

In addition, some means is needed to compensate injured private parties in instances where the polluter is unwilling to pay. A solution to this problem can be found within the framework of the Rhine Chemical Convention by expanding the arbitration provision of the Convention to allow private parties of diverse nationality to arbitrate claims arising from transboundary pollution of the Rhine.

If there is anything to be gained from the Sandoz disaster, it is a realization that the existing treaty regime is inadequate to protect the Rhine from chemical pollution, and that new measures are urgently needed if the river's ecology is to be saved from complete destruction. The protection of the Rhine will have to proceed incrementally, but the first steps must be taken now.

\footnote{292. Tagliabue, \textit{supra} note 105, at col. 6.}