Paper Trails: Global Environmental Regulation of the Pulp and Paper Industry

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Introduction

Recent debates about globalization have revealed conflicting views about the implications of international trade for the environment. Some fear that individual jurisdictions will compete in a “race to the bottom,” relaxing their environmental standards to attract footloose investment, while others anticipate a “race to the top” as governments seek to impress voters with ever more stringent environmental standards than their neighbours. Although scholars have developed formal models to explain these dynamics (Markusen, Morey et al. 1995, for instance), there have been few detailed comparative case studies examining the influence of international forces on domestic environmental regulation in practice.

This paper seeks to fill that gap through examination of the domestic and international determinants of environmental standards for the pulp and paper industry in five countries – Canada, the United States, Sweden, Australia, and Indonesia. The pulp and paper industry provides a valuable lens through which to explore the implications of economic interdependence for environmental regulation because it is an industry characterized by high levels of international trade, with production in both industrialized and, increasingly, developing countries, as well as capital mobility. In the absence of international environmental agreements concerning pulp mill effluents, the pulp and paper industry also provides a “pure” test of the race-to-the-bottom and race-to-the-top arguments noted above.

The theoretical framework of the paper situates domestic institutions, ideas, and interest group politics within a global context. In particular, the paper explores how the sharing of ideas within trans-national networks among environmentalists, scientists, bureaucrats, and firms influenced the balance of domestic political factors, creating both upward and downward pressures on national environmental standards. The case studies demonstrate, first, that domestic standards have neither converged at the top nor the bottom, as the unique political and institutional context within each country has limited the impacts of intergovernmental competition.

Second, although both upward and downward international pressures are evident, it is the upward pressures that, for the most part, have prevailed with respect to regulation of pulp mill effluents. This has been the result of two mechanisms. First, international dissemination of ideas in the form of research on environmental impacts of pulp mills and information on available control technologies created upward pressure on each of the countries studied. Environmentalists were extremely effective at coordinating their efforts internationally, and especially in sharing information about environmental impacts, to mobilize public concern in each country, in effect using trans-national
dissemination of ideas to shift the balance of domestic interests in favour of stricter regulation. In response, bureaucrats drew on contacts with their counterparts in other countries in developing standards based on "best available technology" world-wide.

While the first mechanism turns on political, rather than economic, globalization, the second represents a unique combination of the two. The trans-national network of environmental groups played a central role in generating consumer demand for "chlorine-free" paper, particularly in countries that are not major pulp producers, which in turn created market pressure for improved environmental performance around the world. In effect, environmentalists were able to bypass the state and turn economic globalization to their advantage. However, several important caveats to this last conclusion -- concerning the confluence of circumstances that fostered environmentalists' success in this case -- are considered in the conclusion.

Ideas, Interests, and Institutions in an International Context

Elsewhere, I have examined environmental regulation of the pulp and paper industry in Canada, the United States, and Sweden in terms of the interplay of domestic ideas (especially causal knowledge), competition among organized interests, and political institutions (Harrison 2002). As Heclo (1994) has argued, “understanding is best advanced, not by giving priority to one or another type of variable, but by concentration on the interrelationships of ideas, interests, and institutions. The ‘action,’ so to speak, is at the intersection.” This paper builds on that previous work by extending the analysis to two additional countries, Australia and Indonesia, and by examining more closely the impact of trans-national networks on domestic policy choices.

The case studies presented here offer a nested analysis of domestic interests, ideas, and institutions within an international context. I begin with the premise that since policymaking occurs at the domestic level, the immediate influences on policy decisions will be domestic as well. The question is thus how external factors influence domestic ideas, interests, and institutions. In the absence of institutional constraints in the form of international environmental agreements, which were not relevant in this case, the remainder of this section and the analysis of the case studies that follow will focus on international influences on domestic policy choices in two ways: impacts on the domestic balance of ideas and interests via trans-national dissemination of ideas and impacts on domestic interests via international markets.

Transfer of Ideas: Political Globalization

Goldstein and Keohane (1993) distinguish between ideas in the form of worldviews, principled beliefs, and causal beliefs. In light of the significant body of research on the environmental impacts of the pulp and paper industry that was concurrently emerging as various jurisdictions were developing their regulatory standards, the analysis here focuses on causal beliefs/knowledge. Those who have studied the cross-national transfer of ideas have tended to focus on different networks...
within which the transfer occurs as well as different mechanisms of impact of those ideas on domestic politics.

Among students of international environmental policy, Haas (1989, 1992) has arguably placed the greatest emphasis on causal beliefs in arguing that trans-national scientific communities that share values, causal beliefs, and policy prescriptions can play a critical role in promoting international convergence, even when state interests substantially diverge. I have argued elsewhere (Harrison 2002) that although scientists’ shared causal beliefs both about the environmental impacts of pulp mills and the technologies available to mitigate those impacts had a significant impact on environmental standards in each of Canada, the US, and Sweden, those countries’ standards nonetheless did not converge. Rather, policymakers in different jurisdictions responded to shared knowledge differently in light of the unique political contexts within which they made their decisions. Ideas that reinforced a country’s policy trajectory were more likely to be influential, as were ideas that advanced the cause of dominant domestic interests. In this paper, I extend that analysis by looking more closely at the various mechanisms of trans-national transmission of causal knowledge and their interplay with domestic institutions and interests.

The substantial literature on what has variously been referred to as policy learning, lesson drawing, and emulation tends to focus on trans-national ties among politicians or bureaucrats who share information about how to accomplish policy objectives (Hall 1989; Rose 1991; Bennett and Howlett 1992). As in the case of epistemic communities, the trans-national transfer of ideas tends to have a direct impact by shaping the ideas of policymakers.

However, there is also increasing attention to the role of networks among non-governmental actors in creating pressure for emulation (Hoberg 1991; Bernstein and Cashore 2000). A potential difference there lies in the fact that non-governmental actors often must use information to create political pressure for new policy objectives in the first place, rather than merely providing “how to” pointers for bureaucrats already committed to those objectives. Ideas in that case have an impact via the political expression of interests. As Keck and Sikkink (1998) note, transfer of ideas via non-governmental networks can inform domestic actors of what they have at stake in an issue and thus shift the balance of domestic interests.

At the limit, trans-national NGO campaigns seek to influence citizens in their capacity as consumers rather than voters. Market-based campaigns bypass the state altogether in an effort to transform the material interests of target actors in other countries (Keck and Sikkink 1998; Bernstein and Cashore 2000; Wapner 1995; Cashore, Auld et al. 2004). Whatever the transmission mechanism – between scientists, bureaucrats, non-governmental actors, or via markets – to the extent that the ideas being transmitted follow from contemporary research, which tends to identify new environmental problems and to develop new technologies to address those problems, one would expect the trans-national dissemination of ideas to create upward pressure on domestic environmental standards.
Domestic Interests and Economic Globalization

In considering trans-national influences on domestic interests, the literature on international trade and the environment is especially relevant. Self-interested domestic producers can have two kinds of trans-national relationships: those with foreign investors and/or lenders, and those with foreign customers. The interests of domestic producers turn on whether the goods and return on investment they have to offer are more or less attractive than those offered by their competitors in other countries. The critical question is what effect these international market relationships will have on firms’ attitudes and policymakers’ willingness to adopt environmental regulations.

In debates about the implications of international trade for the environment, optimist and pessimist camps have emerged offering contradictory positions on three distinct issues. The first concerns the implications of trade-induced economic growth. While pessimists argue that pressure to produce on a global scale will exacerbate unsustainable exploitation of resources (the “scale effect”), optimists emphasize that trade generates wealth and wealthier people can better afford and also are more inclined to demand a higher level of environmental protection (the “technique effect”).

A second area of difference concerns the comparative advantages offered by developing and industrialized countries in international trade. Pessimists argue that, in the context of free trade, the lax environmental standards that tend to prevail in developing countries will prompt a migration of dirty industries to these “pollution havens.” Countering the implicit assumption that developing countries’ comparative advantage lies in their lax environmental standards, optimists emphasize other factor endowments, such as access to capital. Since dirty industries tend to be the most capital intensive (Mani et al, 1997), they predict a migration of polluting firms to wealthy countries. While both camps anticipate a “composition effect,” they disagree as to its direction.

Finally, the third area of difference concerns whether and how policymakers adjust their environmental policies in response to their comparative advantages and disadvantages. Pessimists fear that international trade at best will chill any inclination to strengthen standards and at worst provoke a “race to the bottom” as individual jurisdictions compete for foot-loose investment by relaxing their environmental standards. The existence of pollution havens, or for that matter any variation in standards, will, they argue, undermine the resolve of even those countries initially inclined to adopt stringent environmental regulations. The prospect that policymakers will relax environmental standards in order to attract investment is particularly problematic in undemocratic regimes, where the choice to pursue investment regardless of the environmental consequences may reflect the desire of political and economic elites to line their own pockets rather than responsiveness to public preferences.

In response, optimists argue that there is little evidence to support the race to the bottom hypothesis. As Vogel (1999) has argued, “International trade as a proportion of
GNP has significantly increased in every industrial nation since the late 1960s, yet during this same period, environmental regulations have become progressively stricter in all industrialized nations and a number of industrializing ones as well. One reason hypothesized is that most industries’ expenditures on environmental protection represent too small a fraction of total costs (typically 2-3%) to warrant migration (WTO 1999) and thus to provoke a policy response. Vogel has gone a step further, however, and argued that under certain conditions international trade may even prompt a “race to the top” with respect to product standards. He has labelled the spillover of strict product standards from a wealthy and thus green jurisdiction to other jurisdictions the “California effect.” Vogel argues that this effect can occur when foreign products respond to the “lure of green markets” by reformulating their own products, and in turn lobby their home jurisdictions for more stringent standards as a way to gain an advantage over domestic competitors. Although Vogel refers to the California effect as a race to the top, it is, more accurately, a pull from the top, since it does not involve jurisdictions engaging in an bidding war to set higher standards.

While this dynamic is plausible with respect to product standards, Vogel is less sanguine about the prospects for interjurisdictional spillover of discharge standards, since producers in countries with low environmental standards can access markets of wealthy, green countries whether or not they clean up their production processes. However, even then a related dynamic could emerge to the extent that stringent process standards provide reassurance to individual jurisdictions that are merely reluctant to “go it alone” lest they lose investment, rather than actively seeking to undercut each other as a means to gain investment (Harrison 1996). Moreover, as noted above, environmentalists’ efforts to mobilize green consumers via international market campaigns could prompt a non-governmental version of the California effect by making access to green markets conditional on clean production processes, regardless of governmental standards.

What does the evidence say about these competing theories? Antweiler, Copeland, and Taylor (2001) statistically analysed relationships between environmental quality (sulphur dioxide levels in air), trade patterns, and national economic and political characteristics. The authors found evidence of both the scale effect feared by pessimists and the countervailing technique effect emphasized by optimists. With respect to the composition effect, they found a net migration of dirty industry to jurisdictions that are more open to international trade, suggesting that the factor endowment hypothesis outweighs the lure of pollution havens. Overall, the authors found that the technique effect significantly outweighed both the scale and composition effects and thus, for most countries, free trade was good for the environment, though they emphasize that the marginal effect of trade per se relative to domestic factors was quite small. While Antweiler et al’s analysis represents an important step forward in statistically unpacking various concurrent effects, it nonetheless leaves important questions unanswered. The authors analyse only urban air quality, yet one might question whether such a strong technique effect would be observed with respect to pollutants that have a more global impact (like CO2) or with respect to resource depletion, which tends to be be manifest in less visible rural areas and thus less likely to yield political pressure. Industries that rely heavily on natural resources may also exhibit a very different composition effect.
Second, although the authors confirmed that the technique effect was not evidence in communist countries, they did not explore other political obstacles to (or opportunities for) translating trade-generated wealth into pressure for environmental regulation.

In summary, the foregoing anticipates upward pressure on environmental standards as a result of transfer of knowledge via trans-national networks of bureaucrats, scientists, and non-governmental organizations. The impact of trans-national market relationships on domestic interests, and thus environmental standards, is less clear, as arguments for both upward and downward pressure have been advanced.

**Why pulp and paper?**

The pulp and paper industry offers a valuable lens through which to explore these questions for several reasons. First, the fact that many countries throughout the world engaged in development of new standards or revision of existing ones for this industry at about the same time offers an attractive opportunity for comparative analysis. The common impetus was an announcement by the US Environmental Protection Agency (EPA) in late 1987 that dioxins had been detected in various paper products and in fish caught downstream from pulp mills. In light of the dioxin’s popular reputation as “the most toxic substance known to humankind,” EPA’s announcement reverberated around the world. Regulators’ attention soon extended beyond chlorinated dioxins to a host of chlorinated substances found in the effluent of pulp mills that use chlorine bleaching (typically measured collectively by the adsorbable organic halogen or “AOX” test).

The Kraft sector has come to dominate the pulp and paper industry worldwide because it yields relatively long fibres, and thus strong paper products. The Kraft process is also attractive because it can be employed with both hardwoods and more resinous softwoods, an advantage since the latter have longer fibres and thus produce particularly strong paper products. However, the tradeoff is that the resulting pulp is brown in colour, particularly so when produced with softwood, and thus requires bleaching for many applications. Kraft mills have traditionally used chlorine gas as a bleaching agent, but that in turn produces chlorinated contaminants, including dioxins, in wastewater effluents. Both because it has been the focus of governmental and NGO attention in recent years, and because it dominates pulp and paper production globally, this paper focuses exclusively on the bleached Kraft sector, with particular attention to AOX standards.

A second advantage of the pulp and paper industry as a comparative case study of economic globalization is that it is a truly global industry, characterized by high levels of international trade in raw materials (wood chips), intermediate products (market pulp), final products (various grades of paper and cardboard) and, increasingly, waste paper as well. World trade in pulp increased by a factor of five from the 1950s to the 1990s (Lohmann 1996) as import tariffs gradually declined. As indicated by Table 1, among the countries studied, the Canadian, Swedish, and Indonesian industries were highly export-oriented at the end of the last decade. However, while that had long been the case in Canada and Sweden, it represented a quite dramatic change in Indonesia, which increased its Kraft production by a factor of 50 and exports by a factor of 85 from 1987 to
It is also noteworthy that producers in these countries are shipping to quite different markets: Canada exports kraft pulp and (non-kraft) newsprint primarily to the US, Sweden ships Kraft pulp and paper primarily to Western Europe, while Indonesia exports primarily to Asia. In contrast to these export-oriented industries, the US industry, though accounting for 30% of global production, exists primarily to serve its own domestic market. In fact, the US is a net importer of pulp and paper, led by newsprint and pulp from Canada. The fifth country included in the study, Australia, imports 85% of the value of its domestic pulp and paper sales, contributing a trade deficit of over AUS$2 billion.

A third factor of interest concerns the expansion of the industry to the developing world in the last 10 to 15 years. Investment in the pulp and paper industry is highly cyclical since cycles in the economy tend to have an exaggerated impact on the demand for and prices of paper products. A major cycle of investment in pulp and paper capacity occurred in the late 1980s and early 1990s. That period happened to coincide not only with rising cost of virgin fibre in the traditional producer countries (Canada, Sweden, and the US), but also with aggressive efforts by some developing countries to court investment by the forest industry. Thus, although some new mills and expansions of existing mills were undertaken in Scandinavia and North America during this period, a more dramatic expansion of production occurred in developing countries such as Brazil, Thailand, and Indonesia. The emergence of competition from Asian and South American countries, which might be expected to have weaker environmental standards, is of particular interest in this study, since it could create downward pressure on environmental standards in industrialized countries.

The foregoing discussion serves to justify the choice of national case studies for this project. Canada, Sweden, and the United States are the three leading producers of Kraft pulp and paper products, though their global dominance is diminishing. Two countries seeking to establish a foothold in the global market were also studied: Australia, an industrialized country eager to overcome a politically salient trade imbalance in forest products, and Indonesia, a developing country aggressively promoting investment in the pulp and paper industry to complement plywood exports. In addition to documentary research, unstructured interviews were conducted with government officials, environmentalists, and industry representatives in each country.

Sweden

The pulp and paper industry is a significant employer in Sweden, with roughly 30,000 workers (down from 40,000 in the late 1980s). This accounts for almost 4% of manufacturing employment, the highest contribution among the countries studied. Although only 22 of 46 mills are Kraft mills, they account for 63% of domestic pulp production. Swedish pulp and paper mill discharges are regulated under the Environmental Protection Act. Permit conditions for individual mills are set by the national Environmental Franchise Board on a case-by-case basis via a quasi-judicial process. In issuing permits, the Board entertains proposals from the Swedish EPA, as well as submissions and testimony from industry, environmentalists, and others.
The presence of PCBs and other persistent chlorinated organics in the Baltic was a prominent issue on the Swedish environmental agenda well before the US EPA’s dioxin announcement. Regulatory interest in chlorinated discharges from the pulp and paper industry thus emerged earlier in Sweden than in Canada and the United States. In 1982, the Swedish EPA launched its Environment/Cellulose I project to investigate the ecological impacts of effluents of pulp mills using chlorine bleaching. The Swedish scientists documented extensive impacts of one particular mill in the Gulf of Bothnia, including gross deformities and effects on sex characteristics and reproduction of fish as far as 50 km from the mill. Because the effects were correlated with concentrations of chlorinated compounds in the effluent as both declined with distance from the mill, the Swedish research team tentatively concluded that the observed effects were caused by chlorinated compounds (Södergren 1989, pp. 81, 91). The research team presented their findings in a series of public meetings throughout Sweden, where graphic images of deformed fish had a profound impact.

In response to the Environment/Cellulose findings, the Swedish EPA began to seek limits on chlorinated organic discharges in mills’ permits in the late 1980s, just before the US EPA’s dioxin announcement focused attention on the industry world-wide. In 1987 the Swedish EPA issued an Action Plan for Marine Pollution, which stated that all mills using chlorine bleaching should have initiated measures to reduce discharges to roughly 2.0 kg/ADt AOX by 1992 (Lagergren 1996). The Action Plan adopted a long-term goal of total elimination of chlorinated discharges. The EPA’s targets were subsequently reinforced by the 1988 Swedish Government Bill on Environmental Policy, which, while non-binding, offered authoritative guidance to the Franchise Board.

Environmental regulation was facilitated by a period of technological innovation in the industry during the late 1980s. Within a year of the US EPA’s dioxin announcement in September 1987, researchers at both the Swedish industry-funded STFI laboratory and the Canadian industry-funded Paprican laboratories determined that production of dioxins and furans could be dramatically reduced through substitution of ClO2 for chlorine gas (Cl2) in the bleaching process. Non-detectable levels of dioxins could be achieved with as low as 40% ClO2 substitution (Thompson and Graham 1997). The North American and Scandinavian industries alike responded to a combination of threatened regulation and consumer pressure with a voluntary commitment to reduce dioxin discharges to non-detectable levels. However, in response to emerging market-pressure for “chlorine-free” paper, in late 1989 a Swedish mill went one step further and for the first time produced market quality pulp using 100% ClO2 substitution. In 1990, another Swedish mill was the first to produce bleached Kraft pulp without using any chlorinated bleaching agents at all. This lead to a distinction between elementally chlorine free or “ECF” pulp, which is produced with ClO2, and totally chlorine free or “TCF” pulp, which is bleached with chemicals such as oxygen, ozone, and peroxide.

In response to these technological developments, in 1990 the Swedish EPA tightened its AOX targets to 1 kg/ADt by 1995 and 0.5 kg/ADt by 2000 for mills pulping softwood, and 0.5 kg/ADt by 1995 and 0.3 kg/ADt by 2000 for mills using hardwood (Simons
Consulting Group 1994, Appendix 2, p. 49). In practice, permit conditions varied between mills, reflecting the state of technological advances as well as case-by-case consideration of environmental impacts and economic achievability. However, the Franchise Board tended to adhere to the Swedish EPA’s long-term goals when permits came up for renewal during this period (Auer 1998).15

In any case, the Swedish industry soon outperformed its regulatory limits in response to demand from German consumers for “chlorine free” paper. By 1994, all Swedish Kraft mills had installed oxygen delignification, and all had either fully substituted ClO₂ for chlorine gas (ECF bleaching) or, in the case of three mills, eliminated chlorine use completely (TCF bleaching). Average AOX discharges had fallen from 3.5 kg/ADt in 1988 to 0.4 kg/ADt in 1993 (Lagergren 1996). Industry officials claim to have further reduced AOX discharges to an average of 0.1 kg/ADt by 1995, well below government targets for the year 2000 (Confidential interview).

Domestic Ideas, Interests, and Institutions

Despite the economic significance, and thus political influence, of the pulp and paper industry in Sweden, emerging causal knowledge from the Swedish Environment/Cellulose study placed the issue of chlorinated discharges from Kraft mills at the top of the country’s environmental agenda. The research also coincided with growing public concern for the environment in the late 1980s in Sweden as in other industrialized countries. Moreover, the impact of the pulp and paper research on the public was greatly amplified by Swedish environmental groups’ efforts to publicize the Environment/Cellulose findings.

Greenpeace Sweden’s staff attended the early public meetings at which Environment/Cellulose researchers presented their work. They then used individual mills’ licensing hearings as a forum to present arguments predicated heavily on the Environment/Cellulose research. The leading Swedish environmental group, SNF, further enhanced the impact of the Environment/Cellulose findings (and EPA’s dioxin discovery) on Swedish consumers through an innovative strategy of separating “chlorine free” and chlorine-bleached paper products on the shelves of one particular grocery store chain. The market pressure induced by the environmental movement, both within Sweden and especially in foreign markets (discussed below), soon eliminated opposition to the Swedish EPA’s stringent AOX limits from the politically influential pulp and paper industry.

Two domestic institutional factors were relevant in the Swedish case: the Swedish EPA’s historical precautionary approach to the pulp and paper industry (Auer 1998), and the case-by-case nature of Swedish regulation. Since the 1970s, Swedish regulators had pressed the pulp and paper industry to adopt internal process changes rather than the end-of-pipe treatment common in North America. As a result, Swedish Kraft mills pioneered oxygen delignification technology (sometimes known as oxygen bleaching) as early as the 1970s in order to reduce discharges of conventional pollutants, including colour and BOD. Conveniently for the Swedish industry, oxygen delignification also reduces
generation of chlorinated compounds. It was thus easier for Swedish regulators to shift their focus to chlorinated discharges in the 1980s, since Swedish mills had lower AOX levels to start with than their competitors in North America. Moreover, the leading technology available to reduce AOX was sold primarily by Swedish firms.

Sweden’s case-by-case approach to permitting also arguably facilitated the Swedish government’s tighter AOX standards. Rather than setting a uniform standard that would apply simultaneously to all mills (as regulators in the other countries examined did), the Swedish EPA could gradually raise its expectations with each successive permitting hearing. This incremental strategy fortuitously coincided with a period of rapid technological change in the industry in the late 1980s, as 10 of 15 Kraft mills’ permits came up for renewal between 1987 and 1990 (Auer 1998).

Cross-border Influences

While there were clearly strong domestic forces prompting strict regulation of the industry in Sweden, trans-national ties among environmentalists also were critical in creating the market conditions that overcame industry opposition to stringent AOX standards and subsequently spurred Swedish mills to exceed regulators’ expectations. In response to the emerging Environment/Cellulose I studies in Sweden, Greenpeace International decided in 1986 to launch an international pulp and paper campaign. Greenpeace’s international network was significant in all 5 countries studied. For a period of about 5 years beginning in 1987, the Greenpeace pulp and paper campaign employed full-time staff in several countries. Greenpeace recognized the value of new technologies in maintaining an effective communications network, and thus ensured that the campaign staff were provided with laptop computers and email soon after they became available.

Within Sweden, Greenpeace not only helped to disseminate the Swedish Environment/Cellulose research, but also widely publicized the US EPA’s dioxin discovery. More importantly, however, Greenpeace Sweden worked in concert with Greenpeace Germany to stimulate demand for chlorine-free products in Europe, which was the destination for most Swedish pulp production. The campaign had considerable impact when it published a glossy parody of the German newsmagazine, Der Spiegel, on TCF paper at a time when the industry was still arguing that TCF paper was not of high enough quality to satisfy consumers. The campaign was particularly successful in Germany, which purchases 30% of Swedish pulp product. By 1993, 60% of the German market and 15% of European market for chemical pulp was TCF (Smith 1997, 139).

Trans-national market ties thus created upward pressure on the Swedish pulp and paper industry. Although the Swedish industry initially sought to discredit the Environment/Cellulose studies and opposed introduction of AOX limits in their permits, by the late 1980s the industry had established a competitive advantage in European markets based on its ability to produce “chlorine free” paper. As a result, Swedish companies not only relaxed their opposition to the stringent Swedish effluent limits, they
embraced them because they buttressed the industry’s environmental reputation in Europe.

Canada

As in Sweden, the pulp and paper industry is also one of the leading manufacturing sectors in Canada. Although the fraction of manufacturing employment provided by the sector has fallen from roughly 4% to 3%, it remains a powerful political influence, not least because of the many “mill towns” dependent on that employment. Pulp and paper is also Canada’s largest export sector, with exports of over $35 billion in 2000.16 There are some 150 pulp and paper mills located in 9 provinces, including 47 Kraft mills, which account for roughly half of total pulp production in Canada.17

The impact in Canada of EPA’s dioxin announcement was compounded by several domestic factors, not least of which was a dramatic surge in public attention to the environment in the late 1980s (as in Sweden). Attention to pulp mills in particular was heightened by the leak, also in the fall of 1987, of a federal government study that reported that the vast majority of Canadian mills were still failing to comply with federal standards established in 1971 (Sinclair 1988). A concurrent expansion of the pulp and paper sector, with several new mills proposed in the province of Alberta, also occasioned public debate about the risks associated with pulp mills using chlorine bleaching (Harrison 1996, 146). Finally, attention to the pulp mill issue coincided with the passage of a new federal environmental statute, the Canadian Environmental Protection Act (CEPA) in 1987. Dioxins and “Effluents from Pulp Mills using Bleaching” were two of the 44 classes of substances on the first CEPA “Priority Substances List” slated for evaluation and, if necessary, regulation.

The assessment of polychlorinated dioxins (and the related furans) was the first CEPA assessment to be completed (Government of Canada 1990). The federal government concluded in 1990 that both were toxic as defined in the Act, and proposed regulations requiring that the pulp and paper industry reduce dioxins and furans to non-detectable levels, which were subsequently finalized in 1992. Those regulations were consistent with the voluntary commitment already offered by members of the Canadian Pulp and Paper Association. Although the government had indicated its intention to propose an AOX limit of 1.5 kg/ADt (air-dried metric tonne of pulp) in its discussions with provincial governments (Harrison 1996), in response to research conducted at the government’s National Water Research Institute (NWRI), Environment Canada subsequently made an abrupt turnaround in 1991 and decided not to regulate AOX at all.

Researchers at NWRI launched their research program on the environmental impacts of bleached pulp mill effluents in 1990 in response to controversy surrounding the proposed Al-Pac Kraft mill in Alberta. They quickly found effects analogous to those observed by the Swedes. However, in a significant departure from the Swedish findings, they found that the observed effects were not correlated with AOX levels in either the effluent or the receiving environment. The CEPA “Assessment of Effluents from Pulp Mills Using Bleaching,” which was published in December 1991, concluded that pulp
mill effluents were toxic to the aquatic ecosystem. However, the report made a subtle but critical point that “AOX values .. give no indication of effluent composition nor of its potential toxicity, persistence, or fate” (Government of Canada 1991, 38).

The absence of a correlation between AOX and environmental impacts clearly demonstrated that AOX is a flawed regulatory parameter. However, that finding alone need not have deflected attention away from chlorinated organic compounds, since the problem could simply have been that the aggregate test, AOX, fails to distinguish between more and less toxic chlorinated substances. However, between the time the CEPA report was written and when it was actually released in late 1991, NWRI scientists observed the same sublethal effects in fish collected downstream from mills that did not use any chlorine at all (Carey, Hodson et al. 1993). The Canadian researchers thus concluded that something other than chlorinated compounds was the problem -- as one government scientist put it “the basic message is good news; that is, it’s not chlorine. The bad new is, it’s the wood” (Van Nijnatten, Leiss et al. 1997, 18). Canadian researchers argued that the correlation between the concentration of chlorinated substances in the receiving environment and environmental effects observed by their Swedish colleagues was a spurious one (i.e., since other toxic substances in the effluent were also being diluted with distance), which had deflected attention from non-chlorinated compounds in the effluent. The federal government thus announced that it would not regulate AOX, though the measures mills were mandated to take to reduce dioxin and furan discharges to non-detectable levels in practice were expected to have the effect of reducing AOX below 2.5 kg/ADt.

Although this paper focuses on regulatory decisions by national governments, it is significant that four Canadian provinces have chosen to regulate AOX with varying degrees of stringency. AOX standards were phased in over time in Ontario and Quebec, which both now have AOX standards at 0.8 kg/ADt. Alberta has set standards on a case by case basis, with more demanding limits at the lower level, as task facilitated by the construction of new “greenfield mills” in that province. At the limit, British Columbia established a schedule of increasingly demanding AOX standards for the industry culminating in a requirement of zero chlorinated discharge by the end of 2002, the most stringent AOX regulation in the world. However, as the deadline approached and it was clear that no other jurisdiction would follow suit the provincial government retreated, replacing the regulation with an AOX standard of 0.6 kg/ADt, not coincidentally equivalent to the by-then finalized US standard (discussed below).18

Domestic Ideas, Interests, and Institutions

As in Sweden, causal knowledge that emerged from Canadian government research on the environmental effects of pulp mill effluents had a clear impact on the resulting regulatory standards. However, it is noteworthy that the ideas embraced by the two governments very different ones: the Swedish government relied on the tentative conclusions from its own research in electing to pursue low AOX levels, while in response to its own researchers the Canadian government elected not to regulate AOX at
In response to the Environment/Cellulose project findings, the Swedish government was forced to stake out its regulatory position first, at a time when the environment was at its zenith in public opinion polls. And by the time Canadian research emerged questioning the validity of that regulatory strategy, which could conceivably have prompted Sweden to retreat from objectives that were still many years off, the Swedish industry was solidly behind Sweden's low AOX standard. Ideas wet the Swedish regulatory process in motion, but the trajectory was cemented by the evolving interests of the regulated industry. In contrast, not only did Canada have the benefit of both the Swedish and Canadian research when it made its decision, but by the time the Canadian federal government was finalizing its standards in late 1991, the environment had fallen in the polls, the economy had taken a turn for the worse, and opposition to AOX regulation from the economically significant pulp and paper industry was thus more influential. In contrast to their Swedish competitors, Canadian mills typically had not installed oxygen delignification. (In contrast to US mills, mills in both Canada and Sweden typically did not have secondary effluent treatment). They thus faced much larger investments to reduce their AOX levels. Moreover, with the exception of some BC mills with significant exports to Europe, Canadian mills were not facing the same degree of consumer pressure to reduce their chlorinated discharges. Without questioning the validity of the Canadian research, one can see why NWRI's conclusions would be more readily embraced in such a political environment.

Canada's decision not to regulate AOX was also consistent with the institutional context. Environment Canada regulates water pollution under two main statutes, the Fisheries Act and the Canadian Environmental Protection Act (CEPA), both of which focus on environmental impacts (as opposed to mandating deployment of "best available technology" regardless of environmental conditions). Under the Fisheries Act, the federal government must be able to document harm to fish to justify regulations predicated on its constitutional authority concerning fisheries. Although CEPA’s basis on the federal government’s criminal law power is considerably broader, the statute’s drafters nonetheless sought to rationalize federal action using a definition of toxicity that emphasizes harm to the environment or human health. While the definition of toxicity in CEPA does still give the government considerable discretion, particularly since a finding of toxicity only requires that a substance “may” have adverse impacts on the environment or human health at levels at which it is present, the language of the statute nonetheless framed policy discourse in a way that gave greater weight to NWRI’s findings questioning the environmental relevance of AOX.

Cross-Border Influences

Among the five countries studied in this project, Canada was the least influenced by transboundary factors in setting its effluent standards. Not coincidentally, it is also one of the two countries (along with Indonesia) that have the weakest national AOX standards. However, that is not to say that Canada was impervious to international pressures. In
particular, the information pipeline among national Greenpeace affiliates in Canada, Sweden, and the United States was critical in placing the issue of pulp mill pollution on the North American agenda in the first place (Harrison and Hoberg 1991). A Canadian Greenpeace campaigner explained, “working for Greenpeace, I can know 24 hours after something happens in Sweden. The Ministry of Environment doesn’t have anyone in Sweden,” an observation confirmed by a federal official who recalled, “We were caught flat-footed because Greenpeace was so organized” (Confidential interviews).

It is noteworthy that the US EPA released its dioxin findings several years after the agency first discovered that dioxins were discharged by pulp mills. EPA and the US paper industry had even undertaken a joint study of the extent of the problem which, in a departure from the usual openness of the US regulatory system, was not made public. Canadian government and industry officials were informed of the US findings, but took no action, choosing instead to wait for the results of the US studies (Confidential interviews). However, in 1987, an anonymously sent envelope of leaked EPA documents concerning the dioxin findings arrived in Greenpeace's Vancouver office, which passed it on to colleagues in Oregon who wrote a report linking dioxins to the pulp and paper industry (Van Strum and Merrell 1987). It was only after that report was released by Greenpeace in August 1987 that the US EPA called a press conference in September of the same year to announce its discovery.

The US EPA announcement, while receiving some press coverage in Canada, did not prompt the Canadian federal and provincial governments to take immediate action. However, Greenpeace Canada activists collected sediment samples near a Vancouver Island pulp mill, sent them to a lab in Sweden for dioxin analyses, and called their own press conference in January 1988 to reveal, not surprisingly, the presence of dioxins in the vicinity of Canadian mills as well. At that point, the federal government made analysis of its own samples collected in the vicinity of Canadian bleached Kraft mills a top priority, which subsequently led to extensive fisheries closures and a commitment to develop new standards for the industry.

Greenpeace Canada staff also played a role in disseminating the Swedish Environment/Cellulose research findings to North America. Greenpeace’s American-born pulp and paper campaigner based in Sweden summarized the emerging Swedish studies in English in a widely distributed paper co-authored with the international director of the pulp and paper campaign, a German national based in Canada.19

As anticipated, the export-oriented Canadian industry made arguments about the potential impact of stringent provincial AOX standards on their international competitiveness. Moreover, in the wake of NWRI's research findings, they were actively supported by the federal government, which sent the director of the NWRI project across Canada as well as to Europe to present the results of NWRI's research. Federal government officials sought both to defend the industry against what they perceived to be misguided provincial regulations and to defend the industry's reputation with European consumers intent on buying chlorine-free paper (Harrison 2002).
The United States

The US pulp and paper industry is the largest producer in the world, accounting for roughly one third of global production (IIED, 1997). However, the industry accounts for a lower fraction of manufacturing jobs in the US than in Canada and the US. Although only 120 of the 550 pulp and paper mills in the US are Kraft mills (86 of which employ bleaching), they account for over 80% of domestic pulp production (US Environmental Protection Agency 1995).

Mills’ discharges are regulated under the Clean Water Act, which takes a two pronged approach. First, the Act requires that EPA and the States (acting as implementing agents) set water quality objectives for toxic substances and regulate sources as necessary to achieve them. Although in theory this would be expected to be the most demanding approach given EPA’s very low objective for dioxin, in practice once mills with relative ease reduced their discharges below the detection limit for dioxin, which was well above the water quality criterion, they could not hold legally accountable to do more. The attention of regulators, the industry, and the environmental community thus focused on the second track, which requires that EPA set uniform technology-based emission standards for comparable sources. Those standards must them be incorporated (typically by State governments) in individual facilities’ permits. Standards for toxic pollutants are set to reflect performance of the “best available technology economically achievable” for each sector.

Within months of its dioxin announcement, EPA agreed in July 1988 in a consent decree reached with several environmental groups that had sued the agency that it would consider regulating dioxin discharges from pulp mills (Environment Reporter, 1988). In 1992, EPA merged development of air, water, and sludge regulations for the pulp and paper industry in what thereafter became known as the “cluster rule.” The agency published draft regulations for public comment in December 1993. Among other requirements, an AOX limit of 0.156 kg/ADt was proposed for Kraft mills, which was considered achievable with complete substitution of ClO2 for chlorine gas plus oxygen delignification and/or extended delignification. The US pulp and paper industry strongly opposed the proposal, arguing that the cost of complying with the proposed AOX limit in particular would put mills out of business.

In July 1996, EPA published a new proposal soliciting public comment on two options. “Option A” assumed complete substitution of ClO2 but no oxygen delignification, a level of stringency consistent with the position of the American Forest and Paper Association. The original proposal was relegated to Option B. In November 1997, EPA announced its widely anticipated decision in favour of Option A. The final rule was considerably less stringent, and thus by EPA's estimate over $1 billion less expensive for the industry, than the original proposal. It is striking that EPA determined that Option B was not "economically achievable," even though one third of US Kraft mills had already installed oxygen delignification and all Swedish Kraft mills had equivalent technology in place -- and 11 of 15 more advanced technology -- as early as 1994 (Radian Corporation 1994).
US mills now face discharge standards (among other requirements) for dioxins and AOX. Existing Kraft mills discharging directly to the environment face a monthly average AOX limit of 0.623 kg/ADt, while new mills must install oxygen delignification to achieve 0.272 kg/ADt.24 Not surprisingly, EPA’s decision was challenged in court from both sides: a coalition of US environmental and native groups argued that the standard for best available technology was set too low, while an industry lobby, the Alliance for Environmental Technology, argued that the bar was too high. In the end, the Court deferred to EPA, and neither side appealed to the Supreme Court.25

Domestic Ideas, Institutions, and Interests

Although causal knowledge in the form of EPA’s own dioxin discovery set the US regulatory process in motion, the US EPA largely disregarded subsequent research that raised questions about the environmental significance of AOX as a regulatory parameter. The irrelevance of the causal knowledge produced by the Canadian NWRI research can be seen as a function of the distinctive US institutional context, and in particular the wording of the Clean Water Act, which directed EPA to focus exclusively on the availability of control technology in setting standards for the industry. Thus, while conceding that “AOX concentrations … do not provide information on the potential toxicity of the effluent” (US Environmental Protection Agency 1998), the agency nonetheless elected to regulate AOX as an indicator of whether a mill had installed the desired control technology. In response, US environmentalists and industry alike focused on the availability and economic viability of alternative technologies.26

US environmentalists and the industry were relatively balanced politically. The US environmental movement is well organized and armed with a resource unparalleled in the other countries studied of nondiscretionary statutes that invite litigation by public interest groups. Indeed, it was the existence of nondiscretionary regulatory duties for EPA under the Clean Water Act that enabled environmental groups to place development of new standards for the paper industry on EPA’s agenda in the first place. However, environmentalists’ demands for TCF at best and advanced ECF (“Option B”) at worst met by strong industry opposition.

With only 10% of its production exported, the US industry is more insulated from global market forces than its Canadian, Swedish, and Indonesian counterparts (Norberg-Bohm 1998). While US consumers showed some interest in dioxin-free paper products, such as disposable diapers and coffee filters, no significant demand emerged for chlorine-free paper products, whether ECF or TCF. Although some individual mills responded to particular customer demands, as a whole the industry maintained a united front in opposition to TCF requirements.

In opposing stringent AOX standards, the US industry offered the traditional, and politically powerful, argument that the costs of compliance would result in a significant loss of domestic jobs. The American Forest and Paper Association commissioned an economic study that predicted that Option B would result in the closure of 33 mills and a
loss of 21,500 jobs (Everett and SRI International 1994). The US industry was particularly effective in mobilizing its employees in opposition to the proposal rule. The United Paperworkers International Union and the Association of Western Pulp and Paper Workers, which together represent over 300,000 members, formed the Pulp and Paperworkers’ Resource Council to oppose environmental restrictions on logging and pulp mill operations. The Council organized very effective letter writing campaigns to EPA, the White House, and Members of Congress. EPA alone received more than 2700 comments from workers and residents of pulp mill communities. Similar letters to Congress in turn generated hundreds of letters from members of Congress to EPA. The industry calculated that Congressional letters might carry greater weight in light of the Small Business Regulation Reform Act, which authorized a Congressional veto of EPA regulations within 30 days. Although environmental groups also generated letters with their own “Action Alerts,” they had greater difficulty mobilizing concern about distant rural mills among their largely urban memberships. A senior agency official explained that while the Agency does not make regulatory decisions “based on public opinion polls” – not least because such a blatantly political decision would not survive the inevitable legal challenge that greets virtually all major EPA rules -- such a show of concern does prompt decisionmakers to weigh compliance costs with particular care. When EPA’s own economic model predicted not only multiple mill closures but also failure of a major firm should oxygen delignification be required (thus doubling compliance costs), that played a significant role in the decision to select Option A (confidential interviews).

Cross-Border Influences

In light of the particular wording of the Clean Water Act (and the absence of international market pressures on the US industry), the transboundary networks that had the greatest impact in the US case were those among bureaucrats and environmentalists used to transmit information about the global state of control technology for the industry. Although Greenpeace’s international pulp and paper campaign was defunct by the time the US Cluster Rule was finalized, US environmental groups, including Greenpeace, nonetheless relied on their international contacts to build their case about the viability of ECF and TCF bleaching technologies. US environmentalists’ submissions to EPA focused in particular on the TCF mills of the Swedish firm, Södra Cell. The EPA was, of course, mandated to conduct its own review of the international state-of-the-art for the industry and in response it invited pulp mill regulators from Canada and Sweden to meetings in Washington DC. The regulatory docket also contains ample correspondence between EPA officials and their counterparts in other countries. This legislative context had the impact of shifting the debate to one between two technological options, both of which were more advanced than typically employed by US pulp mills in the mid-1990s.

However, in the end, EPA’s decision between those alternatives turned not on international examples but on the employment impacts on a relatively sheltered domestic industry. The relatively relaxed definition of BAT reflected in the final rule represents a compromise between an upward pull toward the international leaders and downward
pressure associated with traditional “job blackmail” arguments. In that sense, the US case was influenced second least by trans-national forces.

**Australia**

The case of Australia is unique among those considered in this paper in that it is not a major international player in the pulp and paper industry. At the time of EPA’s 1987 dioxin announcement, Australia had relatively insignificant bleached Kraft production capacity. Most of the country’s pulp and a significant share of finished paper was imported. That was by no means a reflection of a shortage of wood in Australia, however. Indeed, Australia was exporting wood chips to Japan valued at AUD 350 million per year (Pulp and Paper International, 1989). The fact that AUD1.3 billion in pulp and paper was in turn being imported was a source of longstanding pressure for development of a value-added domestic pulp and paper industry.

In that context, the Australian pulp and paper industry found itself at a turning point in the late 1980s. The weakness of the Australian dollar in combination with a peak in global pulp prices in 1989-90 prompted at least nine tentative proposals for major pulp mill developments (Stutchbury 1989). The first of those to come to fruition, a proposal for construction of an export-scale bleached Kraft mill in a rural area of northern Tasmania known as Wesley Vale, quickly became the focus of not only national but international attention.

**History of the Wesley Vale Proposal**

As a condition of its license to export wood chips from Tasmania, the Australian company North Broken Hill was obliged to periodically assess the feasibility of constructing a pulp mill in Australia. The company concluded in 1987 that such a mill was finally viable and developed a proposal for what would at the time have been the largest bleached Kraft mill in the world, producing 440 thousand tonnes of pulp per year, 80% of that for export. With little experience in international markets, NBH actively sought a foreign partner to guarantee a market for the pulp. A 50/50 joint venture with the Canadian company, Noranda, was subsequently announced in May 1988.

In addition to the opportunity to dramatically reduce the trade deficit in forest products, the promise of 700 direct and indirect jobs was particularly attractive in a state with a perennially depressed economy. The Commonwealth Environment Minister at the time, Senator Graham Richardson (1990) later recalled:

The first time it came up in Cabinet we voted to give all sorts of money to the project to get it off the ground. We were offering money, we were throwing millions at it. At that time, of course, there had been no environmental investigation of it at all. No-one in the Government was particularly interested in that. This was a billion dollar development. A billion is a very impressive figure in Cabinet. They love it, and it was going to earn foreign exchange, $300 million we were told, and they loved that as well. So that was all they needed to know.
The Commonwealth government offered the project a package of duty exemptions, accelerated depreciation, and financial assistance for infrastructure worth $300 million (Dargavel 1989; Chapman 1992, 22).

Despite the enthusiasm with which the project was initially received by both the State and federal governments, the Wesley Vale proposal quickly encountered environmental opposition. The campaign against the mill was largely orchestrated by a local group called Concerned Residents Opposing the Pulp mill siting (CROPS), which built alliances with local farmers, fishers, scientists, and Green independents in the Tasmanian legislature, though CROPS also had support from the Wilderness Society at the state level and the Australian Conservation Foundation and Greenpeace at the national level. Attention focused on the prospect of release of 13 tonnes of chlorinated contaminants daily into the Bass Strait, the body of water separating Tasmania from the Australian mainland.

Despite strong support for the project, the Tasmanian government insisted that it would ensure that the mill met strict environmental standards. (It is noteworthy that, because there were no bleached Kraft mills in the country at the time, no applicable standards existed at either the State or Commonwealth level.) NBH-Noranda released their environmental impact statement (EIS) in October 1988. The following month, the State government passed the Northern Pulp Mill Agreement Act, which established a fast track environmental assessment process. After the public comment period on the EIS, the state government, in consultation with the Commonwealth, forwarded a list of 85 critical questions concerning the EIS to the proponents. The proponents responded by way of an Addendum to the EIS that was quite remarkable in its recalcitrance. For instance, the Addendum noted at one point that “We completely disagree with this assessment which misconstrues the nature of the discussion in the EIS. This is not surprising, since it has its origins in the submission from the Department of Sea Fisheries which is notable for its misconstructions” (cited in Toyne 1994)).

The state government forged ahead, releasing environmental guidelines for the mill, which were ratified by the state parliament on 10 January 1989. The state guidelines called for a limit on chlorinated discharges of roughly 1.3 kg/ADt AOX. NBH immediately rejected the State guidelines as infeasible and threatened to withdraw their proposal. Weeks of closed negotiations between the proponents and the state government culminated in an agreement to revise the state guidelines. The state parliament subsequently passed the dubiously entitled Northern Pulp Mill (Doubts Removal) Agreement Act in late February. Although the government insisted that the bill merely provided clarification and interpretation of the original guidelines, a senior representative of the proponents later recalled “we basically wrote the regulations the way we wanted them” (Confidential interview).

State approval of the project left the ball squarely in the Commonwealth government's court. Approval by the Commonwealth Foreign Investment Review Board was required given Noranda’s participation as a partner in the venture. With NBH-Noranda again threatening to withdraw their proposal if a Commonwealth decision was
not soon forthcoming, the federal government commissioned a quick assessment of the EIS, the Addendum, and the Tasmanian guidelines by the Commonwealth Scientific and Industrial Research Organization (CSIRO). Cabinet met to discuss the Wesley Vale proposal the day after receiving CSIRO’s conclusions that insufficient meteorological, oceanographic, and biological baseline studies had been conducted. According to Senator Richardson (1990), any prospect of discord within Cabinet was allayed when one Minister who had been one of the mill's strongest proponents opened the meeting by stating, “this EIS is ratshit, and this proposal can’t go ahead in its present form.”

Members of the Cabinet met the following morning with representatives of NBH and Noranda to inform them that the project had been conditionally granted foreign investment approval, subject to further oceanographic and ecological baseline studies being conducted and standards more stringent than the Tasmanian guidelines being drawn up by the Commonwealth. Wary of proceeding with a delicately timed $1 billion investment in the face of uncertain environmental requirements, the proponents announced the withdrawal of their proposal the same day.

On the surface, the failure of the Wesley Vale proposal, and the fact that there is still no world-scale mill in Australia and that the trade deficit in forest products has doubled in the last decade, suggests that the Australian case is a cautionary tale that individual jurisdictions that set their environmental standards too high in a global economy will pay a high price. However, on closer inspection, it was not the stringency of environmental standards so much as their timing that killed the Wesley Vale project. The proponents faced a narrow window of opportunity for their $1 billion investment for two reasons. First, in light of the projected cycle in pulp prices, their economic analysis indicated that production had to commence by mid-1991 for the project to be viable. The second issue was an opportunity for accelerated tax depreciation of the project, which had been extended to the proponents by the Commonwealth when the accelerated depreciation program was phased out, subject to a condition that production commence by June 1991. That $200 million tax concession was essential to the profitability of the project. Both issues came to a head the week of March 15, when the Commonwealth government made its decision. With virtually no remaining contingency in the project schedule, the proponents had forged ahead with equipment orders (albeit with cancellation clauses) in December 1988, even before knowing what the Tasmanian guidelines would be. When the Commonwealth government proposed a further delay to develop its own environmental standards, the proponents elected to take advantage of their last opportunity to cancel the project rather than go forward with a contract for a $20 million boiler.

Development of the proposed Commonwealth standards proceeded in the absence of the Wesley Vale project. CSIRO was commissioned to evaluate the state of environmental control technology for the industry. A team of 3 CSIRO scientists, accompanied by representatives from the departments of Industry and Environment, made a whirlwind trip to Finland, Sweden, and Canada. Their report, released in June 1989, concluded that mills employing “best available technology economically achievable” should be able to achieve AOX levels of between 0.5 and 1.0 kg/ADt. The
Australian government's national guidelines, released with fanfare in December 1989, drew heavily on CSIRO’s recommendations. The Commonwealth government emphasized that the guidelines, including an AOX standard of 1.0 kg/ADt, were “the world’s most stringent limits on pollution levels for new bleached eucalypt Kraft pulp mills” and, in particular, that they were more stringent than the Tasmanian guidelines.40 Ironically, both the engineer that designed the Wesley Vale mill and a CSIRO scientist involved in developing the Commonwealth standards believe that the Wesley Vale mill would have met the standards (Personal communication; (Collenete 1992).)

When the Commonwealth guidelines were developed in 1989, it was proposed that they would be revisited every 5 years. The guidelines were thus reviewed by a committee of Commonwealth and state officials in 1994-5, at which point the AOX standard was revised downward, to 0.3 kg/ADt based on an annual average, a figure comparable to the final US cluster rule standard for new mills. Although the committee's report acknowledged that “[a]t the level of discharge from mills using current best practice in 1994, AOX is not an indicator of potential environmental impact,” they nonetheless elected to maintain an AOX requirement as an indicator of the application of best available technology.41

Domestic Interests, Institutions, and Ideas

With the Wesley Vale pulp mill proposal, the longstanding Tasmanian tradition of "hydro-industrialization" through concession of natural resources and infrastructure to developers confronted modern environmental sensibilities (Dargavel 1984). It did so during a period of unprecedented concern for the environment among Australian voters.42 The balance of domestic political interests clearly shifted from job creation to environmental protection. The victory by the environmental movement in seeking stringent effluent standards was, however, made easier by the fact that the mill did not already exist. Opposition to the potential loss of jobs held by identifiable voters tends to be stronger than to the loss of mere potential jobs. A Cabinet Minister who participated in the Wesley Vale decision later reflected, “I don’t think we could have shut down another mill. But we could stop a new one” (Confidential interview.)

Politically, the Commonwealth government was more successful in its handling of the Wesley Vale proposal than the Tasmanian government. The latter, publicly ridiculed as a puppet of NBH during the “Doubts Removal” episode, lost its majority government in May 1989. At the same time, several of the mill’s opponents won seats -- and the balance of power -- in the Tasmanian legislature as green independents. In contrast, a former Commonwealth Cabinet Minister insists the Australian Labour Party (ALP) won the 1990 election by using Wesley Vale and other conservation decisions to win voters’ second preferences, which were particularly critical given the ALP’s low first preference share in that election.

This balance of domestic political interests in favour of environmentalists was amplified by the political institution of federalism. The Tasmanian and Commonwealth governments effectively engaged in a bidding war in the Wesley Vale affair, as each sought to impress voters that its environmental standards were the “toughest in the
world” (Chapman 1992). The fact that Labour controlled the Commonwealth government and the Liberals the Tasmanian legislature made federal-state collaboration that much more unlikely.

With respect to ideas, the Commonwealth government buttressed its position by turning to the highly respected independent scientists at CSIRO.43 However, as discussed below, influential causal knowledge about the impacts of pulp mills on the environment and the state of control technology was transmitted not only via CSIRO’s access to the international scientific community, but also through trans-national networks among government bureaucrats and environmentalists.

Cross-Border Influences

Sonnenfeld (1996, 395) has observed that, in the Wesley Vale controversy, “Australian environmentalists, government regulators, research scientists, and industry officials all benefited from years of efforts by their European and North American counterparts.” While trans-national ties within the industry tended to create some downward pressures on environmental standards, these were overwhelmed by upward pressure as a result of international ties among bureaucrats and environmentalists.

The fact that the Wesley Vale project was a joint venture between Australian and Canadian partners facilitated international exchange of information about the state of environmental research and control technologies. Moreover, the project’s Australian chief engineer had extensive experience in Sweden, Canada, and Japan, and was even able to translate emerging studies from Sweden. As anticipated above, the proponents argued long and hard about the impacts of various regulatory proposals on the economic competitiveness of the proposed mill, and time and again threatened to withdraw their investment in order to win regulatory concessions from the state. It is noteworthy, however, that in arguing about the viability of proposed environmental standards, even the proponents were pointing to the standards set by the cleanest mills in the world, rather than the dirtiest. Short of provoking a race to the bottom, they were merely resisting a race to the top by contesting the definition of “best available technology.” For instance, the proponents sponsored a trip by Commonwealth, State, and local government officials and journalists to see leading-edge mills in Scandinavia and North America.44 And, at the final meeting between members of Cabinet and representatives of the joint venture in March 1989, debate focused on the technological details of one particular Kraft mill in Sweden.45

Local environmentalists’ campaign against the mill was greatly enhanced by their international ties. One of the leading Australian opponents of the mill noted that newly emerging fax technology facilitated a “world link-up of the environmental movement” and that, as a result, Noranda President, Adam Zimmerman “had not just Australia against him but the whole world” (Benesh 1989). A Tasmanian government official later recalled that “We were always on our back foot because the environmental groups had better international contacts. They always knew more than we did” (Confidential interview).
In particular, Greenpeace Australia provided a trans-national pipeline for the latest scientific research and technological developments reviewed by Greenpeace’s international pulp and paper campaign. International developments were quickly incorporated into the Australian campaign, who publicized EPA’s announcement of its dioxin discovery the same month as NBH’s proposal emerged in late 1987 and who also ensured that Australian press prominently covered the closure of shellfisheries on Canada’s west coast due to dioxin contamination from pulp mills in December 1988. The latter, which occurred just as the Tasmanian government was reviewing the proponents’ EIS had a profound impact on the public and politicians alike. Greenpeace and CROPS also brought US environmental lawyers and scientists to Tasmania speak about the environmental impacts of pulp mills.

CROPS played the Canadian angle offered by Noranda’s participation in two directions. They had some success in generating critical Australian press coverage of Noranda’s environmental record in Canada. At the same time, they took their Tasmanian campaign to Canada, depicting the Wesley Vale mill as an act of eco-imperialism by a Canadian company. Tasmanian farmers called Toronto radio stations and wrote letters to the Toronto Star and the Globe and Mail (Sonnenfeld 1996), and one did a “talk back” editorial on CBC Radio.

Finally, trans-national ties among government officials were crucial in developing effluent standards based on the best technology available worldwide. A commonwealth official reflected, “We had had been relatively isolated [before Wesley Vale]. But then there were really a globalization of environmental management. We got swept up in asking ‘what’s the best available technology? Who’s doing what?’” As with the environmental community, international ties were facilitated by the concurrent revolution in communication technologies. A Tasmanian official recalled, “Right about that time we got our first fax machine and it was great. I could send off a letter to Sweden in the evening and come back in the morning and there would be all the answers.”

In developing their state effluent guidelines, Tasmanian officials, who had no experience with Kraft mills, relied heavily on their counterparts on Sweden. One explained, “We realized we were out of our depth, so we got the Swedish EPA to advise us. I think that figure [of 1.0 TOCl] came from them.” As noted above, the Commonwealth Cabinet’s decision to set more stringent standards than the State was heavily influenced by their own advice from Sweden on performance of state-of-the-art Scandinavian mills. The international search for BAT continued when CSIRO scientists and government officials undertook their tour of mills and research labs in Sweden, Finland, and Canada. Their recommendations were buttressed by detailed analysis of existing and proposed standards for new mills in those countries. Later, when the Commonwealth standards were revised in 1995, the committee kept close tabs on the proposed US cluster rule.

Summary
Although eager to promote development of an export-oriented domestic pulp and paper industry in the late 1980s, Australia did not hesitate to set the toughest effluent standards for the industry that existed at that time. Moreover, Australian governments have stood by, and even tightened, those standards, despite the seemingly cautionary lesson of the failure of the Wesley Vale project. This outcome can be seen as a result of convergent domestic and international factors. The Wesley Vale proposal coincided with surging public interest in the environment in Australia, which challenged the tradition of resource-driven economic development in Tasmania and prompted a bidding war between the State and Commonwealth governments. However, Australian public concern about the potential environmental impacts of the Wesley Vale project was further stimulated by emerging knowledge supplied to local environmentalists through transnational networks. As the balance of domestic political interests was tipped in favour of environmentalists, bureaucrats turned to their own trans-national networks to set standards based on the best available technology world-wide. Although the proponents raised concerns about the consequences of strict environmental standards for their competitiveness in international markets, the debate focused on the risk of going beyond the commercially demonstrated international state-of-the-art, rather than the threat to competitiveness posed by the dirtiest mills in the world.

Indonesia

As a developing country, Indonesia offers a very different economic and political context than the other four countries analysed in this study. In particular, Indonesia has few environmental standards, and those that do exist are weakly enforced at best. The forest sector historically has been characterized by a high degree of collusion between firms and the state (Dauvergne 1997). Environmental opposition was suppressed, sometimes by military force. Indonesia would thus seem a likely candidate to offer a pollution haven for the pulp and paper industry, which could in turn provoke a race to the bottom among other countries. The prospect of a race to the bottom is particularly salient in light of the fact that the Indonesian pulp and paper industry has expanded dramatically, moving from a position of relative insignificance to become a top 10 producer in little over a decade.

Yet, as David Sonnenfeld (1999) has noted, “contrary to conventional wisdom, Southeast Asia was one of the first places in the world to employ new cleaner technologies in pulp and paper manufacturing.” The six world-scale Kraft mills built in Indonesia in recent years all employ advanced ECF technologies comparable to those installed in new mills and expansions in North America and Scandinavia during the same period. Why would firms invest tens of millions of dollars in pollution control equipment when environmental standards are practically nonexistent? The answer lies in transnational environmental networks and the upward pressure they created via international trade and investment.

Political Economy of the Indonesian Industry
The Suharto government began to actively promote development of the forest industry in the 1970s (Marchak 1995; Dauvergne 1997). However, although Indonesia was a global leader in exports of plywood, its pulp and paper industry remained relatively undeveloped as of the late 1980s. Although there were dozens of mills, they tended to be old, small, and exclusively oriented to meeting the relatively limited (by industrialized countries’ standard) domestic demand for paper products. However, when the state did turn its attention to the pulp sector, capacity increased from 317 thousand tonnes in 1986 to 4.9 million tonnes in 1999 (Pulp and Paper International, July 1999), an expansion equivalent to the construction of 9 Wesley Vale projects.

Investment in the Indonesian pulp and paper industry was attractive for several reasons (Marchak 1995; Lohmann 1996; Barr 2001). First and foremost was access, via the state, to plentiful and relatively inexpensive fibre. The Suharto government granted forest industry entrepreneurs access to “logged over” concessions in return for their commitment to develop pulp wood plantations and, eventually, mills. The prospect of plantation-based mills was attractive since some tropical hardwood species can be harvested in as little as 7 years, compared with the 80 years required for trees to reach maturity in Scandinavia and Canada. In any case, the financial appeal was not limited to plantation forestry. Mill owners can also purchase wood from independent contractors, many of whom engage in lower-cost illegal logging (Mapes and Madani 2001), and take advantage of clear-cutting the extensive natural forests that existed initially on many plantation concessions (Forest Watch Indonesia, 2002).

A second factor was proximity to Asian markets, which at the time were the fastest growing in the world. Prior to the Asian economic crisis, paper demand in Indonesia alone was increasing at 13%/yr (Down to Earth, Pulping the People), in contrast to 2-3%/yr that typifies demand in industrialized countries. A third factor was direct financial support from the state. In addition to access to forests and land, pulp mill developments were often supported by government grants for “reforestation” (which amounted to grants to harvest natural forest in many cases) and loans from government-owned banks, often at the President’s direction (Barr 2001). In turn, typical of the patron-client relationships that pervade the Indonesian political system, some developers entered into business “partnerships” with President Suharto’s children (Dauvergne 1997). Cheap land and labour were final attractions. The combination of these factors has allowed the Indonesian pulp industry to undercut pulp producers throughout the world, with production costs half of those in Canada and Scandinavia.

Six world scale export-oriented bleached Kraft mills have been built in Indonesia since the late-1980s, and some of those have already undergone multiple expansions. Asia Pulp and Paper (part of the Sinar Mas Group) owns two mills, Indah Kiat and PT Lontar Papyrus Pulp and Paper, both in Sumatra. Asian Pacific Resources International (APRIL), which is part of the Raja Garuda Mas Group, also controls two mills in Sumatra: PT Riau Andalan Pulp and Paper and Indorayon. The former is one of the largest Kraft mills in the world with annual capacity of 2 million tons. The latter has a troubled history of environmental accidents, public protests and violence, and, most recently, political controversy when operations were suspended by the Wahid
government.50 Plywood baron Bob Hasan built the PT Kiani Kertas mill in East Kalimantan. Barito Pacific's Tanjung Enim Lestari Pulp and Paper (PT TEL) mill was the last of the six to start up when it began production in 2000.

The Regulatory Context

As anticipated, there has been less environmental regulatory pressure on the Indonesian pulp and paper industry than in the industrialized countries studied. Development and enforcement of environmental regulations is the responsibility of the Environmental Impact Management Agency (BAPEDAL), which was created in 1990. However, from the outset, BAPEDAL was hamstrung by inadequate capacity, including a lack of legal authority to enter facilities to conduct inspections (MacAndrews 1994). BAPEDAL did develop effluent standards for 14 industrial sectors, including the pulp and paper industry, in 1991. The pulp and paper standards were subsequently revised in 1995.51 The standards cover only conventional pollutants, such as BOD and suspended solids, drawing no distinction between new and existing mills. Sonnenfeld [, 1999 #8] reports that the Environment Minister, Sarwono Kusumaatmadja, announced in 1993 that all new pulp mills would be required to employ leading-edge technologies, in declaring “We want your investments, but don’t come to Indonesia expecting to build factories with anything less than what you are using in your own countries.”

That declaration was never backed up by legal requirements, however. An AOX standard of 1.5 kg/ADt, not out of line with international standards at the time, was proposed for new mills in the early 1990s (no dioxin standard was included) (Jenkins, Jardine et al. 1993, 65, 72). However, in the face of industry opposition, that standard was never finalized by BAPEDAL (Simons Consulting Group 1994).52 More stringent requirement than those established by the sectoral regulation may be established on a case-by-case basis in the course of the environmental assessment and project approval process (AMDAL) which was created in 1996. However, it is noteworthy that responsibility for project approvals falls to the Ministry of Industry and Trade, which tends to be supportive of pulp mill developments.

Whatever the formal standards on paper in Indonesia, many authors have decried an almost complete absence of enforcement. A World Bank study (1990, 122) noted that “After an industry begins operation, there is little systematic monitoring of effluent discharges.” Similarly, Pargal et al. (1997, 435) observed that “the monitoring and enforcement capabilities of Indonesia’s National Pollution Control Agency (BAPEDAL) are extremely limited, technical staff are almost nonexistent, and very few actions have been taken against noncompliant facilities.” Government officials and activists alike claim that some mills that have wastewater treatment facilities in place do not bother to operate them routinely (Confidential interviews, Carrere and Lohmann 1996). Although all new mills have ECF technology in place, one government official doubted whether the mills always operate with full ClO2 substitution. AOX tests are not available to confirm that suspicion one way or the other. Ongoing maintenance is also an issue in a tropical climate. Sonnenfeld (1999) quotes a Nordic equipment supplier who explained, “I sell the same stuff here as we sell anywhere in the world. … How they operate it, what they
do when the wastewater treatment facility breaks down, that I can’t say ... maybe they keep on operating, get it fixed in a week. All I know is the equipment’s there.”

However, an official contacted by the author at the Riau Andalan claimed that the mill operates at an AOX level of “0.127 kg/ADt compared to the US cluster rule of 0.3.” Moreover, Sinar Mas has obtained ISO 14001 certification for both of its Indonesian mills.53

Constrained by limited resources and a corrupt court system, BAPEDAL changed course somewhat in 1995 when it established the voluntary "PROPER" program in 1995. The program assigns annual rankings (ranging from black to gold) to individual polluters based on their self-reported discharges. The rankings are then publicly disseminated to shame polluters. Recent studies by the World Bank have concluded that the program is surprisingly effective, as polluters apparently fear the local community and international markets more than state regulators. After pulp and paper mills fared poorly in the first year's rankings, the Indonesian Pulp and Paper Association created a task force which work successfully with individual mills to improve the industry's image.

Impact of the Political and Economic Crisis

While the Asian economic crisis began in 1997, it deepened in Indonesia during the 1998 political crisis, which finally prompted President Suharto to resign. The value of the Indonesia currency declined by 85%. The initial impact, however, was less severe for large pulp and paper firms, which had access to foreign currency by virtue of their exports. (It was arguably much more problematic for the environment, however, as the desire for foreign currency prompted mills to run at or above full capacity at all costs (Mapes and Madani 2001).) The day of reckoning arrived, however, as Indonesia mills were forced to confront their massive foreign debt loads when pulp prices fell in the year 2000. Pulp production is highly capital intensive, and given investors’ wariness of cyclical prices, mills tend to rely heavily on debt financing. However, the Indonesian industry took leveraging to unprecedented levels in the 1990s (AUSNEWZ, 1999; Barr 2001. APRIL signed a $1.2 billion debt restructuring agreement in June 2000 but failed to make agreed payments as early as 2001, while APP, whose stock declined in value by 98% in one year, suspended payments on its $1.3 billion debt pending restructuring. It was delisted by the New York Stock exchange in early 2002, though its mills continue to operate.

The industry is also feeling the belated effects of the political crisis as the Wahid and Sukarnoputri governments have launched investigations into the corruption of the Suharto years. Bob Hasan was jailed on charges of misusing reforestation funds of over US $100 million for the plantation that feeds the Kianni Kertas pulp mill. Suharto’s daughter "Tutut" and her partner in the TEL mill, Prajogo Pangestu, are also under investigation for misuse of reforestation funds allocated to their plantation concession. Finally, years of suppressed anger and grievances have prompted an explosion of resistance to pollution in many communities. At the limit, violent protests have resulted in several deaths at the Indorayon mill.
The interplay of domestic interests, institutions, and ideas in Indonesia suggest both weak environmental standards and industry performance. The industry’s interests clearly dominated over those of environmentalists and local communities prior to 1998, buttressed by personal and financial ties to the President and his family. Political institutions for environmental management are weak and, in many cases, corrupt. And with respect to causal knowledge, no cutting edge environmental impacts research or technology development for the industry is conducted in Indonesia. However, while environmental standards are weak as anticipated, the degree of investment in pollution control technology by the Indonesian industry cannot be explained by domestic factors alone.

Cross-Border Influences

As Sonnenfeld (2000) has argued, the environmental performance of the Indonesian pulp and paper industry owes much to economic globalization, including “new technologies developed and available in the Nordic countries, green pulp and paper markets, converging global environmental regulatory standards, intergovernmental assistance programs, and global interaction between social movements.” This section considers in turn the influence of trans-national networks among bureaucrats, environmentalists, and business.

A variety of international aid programs have served to strengthen the capacity of Indonesian regulators (Sonnenfeld 2000). These include the UNEP Network for Industrial Environmental Management, which has offered environmental workshops and developed manuals concerning the pulp and paper industry, as well as sponsoring demonstration projects at 3 older Indonesian mills. US AID supports the PROPER program, and in 1996 sponsored a two-week tour of US pulp mills for a dozen Indonesian industry, government, and NGO representatives. Others international programs have offered direct staff support via secondments of bureaucrats from other countries. For instance, the Canadian International Development Agency’s Environmental Management Development in Indonesia program seconded Canadian environmental officials, who played a critical role in drafting the Indonesian standards for the pulp and paper industry and co-authoring a study justifying BAT for new mills (Jenkins, Jardine et al. 1993). While these various programs undoubtedly had some positive impact, BAPEDAL remains underfunded and constrained by corruption. In contrast to the Australian case, trans-national ties among bureaucrats have had limited impact because environmental law itself has had limited impact in Indonesia.

Domestic groups, including the Indonesian Forum for the Environment (WALHI), an umbrella organization of some 300 local groups, and the Indonesian Center for Environmental Law (ICEL) have actively campaigned against the expansions of the pulp and paper industry. From 1995 to 1997, some 30 Indonesian NGOs, including WALHI, ICEL, Greenpeace, and local groups from Kalimantan and Sumatra (where the large mills are located) joined together to form the Network for Advocacy on Paper Pulp to lobby, among other things, for new mills to employ TCF bleaching technology. Ecclestone and Potter (1996) argue that Indonesian groups’ links to international NGOs may have been a
key factor in explaining their survival during the repressive Suharto regime. Domestic environmental organizations have worked in concert with international rainforest and human rights campaigns, which have largely focused on questions of forest practices and displacement of indigenous peoples. However, several networks have focused their attention on mill effluents.

The first of these was Greenpeace's international pulp and paper campaign. A Greenpeace staff member based in Indonesia was central to the advocacy network that operated from 1995 to 1997. Greenpeace and ICEL cosponsored a conference in 1996 entitled “Towards an Eco-Pulp and Paper Industry in Indonesia,” at which government, industry, and environmental community representatives heard presentations by a US public health expert on dioxins, a scientist from Greenpeace's Exeter UK lab, and a representative from the Swedish firm Södra Cell who discussed the performance of his company's TCF mills. Greenpeace Indonesia also publicized dioxin and AOX analyses of effluent samples it had surreptitiously collected from Indonesian mills and sent for analysis to Greenpeace's Exeter lab.

The UK-based group "Down to Earth: The Campaign for Ecological Justice in Indonesia" has played a critical role in publicizing both the Indorayon experience and the environmental impacts of the PT TEL pulp mill. It is noteworthy that the TEL campaign strategy has focused on foreign investors and lenders who contributed 85% of the capital for the mill. Down to Earth sponsored a letter writing campaign to the Bank of Scotland, while WALHI organized a visit to the proposed mill site by Japanese parliamentarians and members of Japanese NGOs in 1995. Members of the community near the TEL site also traveled to Japan in 1996 to meet with representatives of the Japanese Overseas Economic Cooperation Fund and private sector firms investing in the mill. More recently, Down to Earth has collaborated with an international campaign to publicize the environmental impacts of projects, including pulp mills, being sponsored by development banks and credit agencies from industrialized countries.

Finally, when APRIL entered into a strategic alliance with the Finnish forest company UPM-Kymmene in 1997, Finnish environmental groups worked in concert with international environmental and human rights groups to place pressure on the latter's shareholders. The campaign also brought members of the Finnish Parliamentary human rights group to tour APRIL’s Riau mill. The partnership has since been cancelled, though it would appear primarily for financial reasons given APRIL’s debt troubles.

It is noteworthy that these campaigns have, for the most part, directed their energies not at the Indonesian government or even Indonesian firms, but at market agents, foreign ones at that. While they have not achieved their goals -- the mills they opposed have been built, and those mills at best employ ECF, rather than TCF, bleaching -- as discussed below, it seems likely that trans-national efforts by NGOs substantially contributed to the pressures that have been placed by foreign investors on Indonesian mills to adopt state-of-the-art environmental technologies.
Turning to the industry, one can identify three categories of market forces that have placed upward, rather than downward, pressure on the environmental performance of Indonesian Kraft mills. The first is transfer of technology via engineering design services and equipment purchases. An official with the Indonesian Pulp and Paper Association explained, "We don't yet have the technology and expertise, so we buy it" (Confidential interview). Indonesian firms buy equipment designs from the same North American and Scandinavian companies that supply the industry in those countries (Lohmann 1996; Sonnenfeld 1999). Moreover, Indonesian mills are designed by Canadian and Finnish engineering consultants that dominate the sector globally. One industry insider reflected, “There are more Canadians than you can shake a stick at in the Indonesian jungle.” However, while technology transfer from industrialized to developing countries might be expected to facilitate convergence on the most efficient new pulping technologies, it fails to explain why an Indonesian firm would invest in additional "bells and whistles" in the form of pollution control equipment and alternative bleaching technologies.

Green consumer pressure represents a second market influence. When asked why Indonesian mills would invest tens of millions of dollars in technologies not required by law, an Indonesian industry official explained, “We want to be part of global trade…. When we export, we have to meet the environmental demand in those countries." Although Indonesian mills currently export primarily to Asia, where there is little or no demand for ECF or TCF pulp, they did not want to foreclose the possibility of future exports to North America or Europe, and thus were willing to invest an extra 5% in capital costs up front. The same official explained, "We’re not afraid of the government. But we are afraid of our customers.”

Finally, it is significant that Indonesia's new mills have relied heavily on foreign loans and investments, a process “lubricated” by foreign export-credit organizations, and multilateral development banks (Lohmann 1996; Barr 2001). Moreover, both APP and APRIL are listed on the New York Stock Exchange. Investors are wary that mills with weak environmental records may be closed down or unable to sell their products in future. Thus, pressure from international investors and lenders has apparently been influential in prompting Indonesian mills to employ best available technologies.59 One mill even volunteered in its EIS that “Given the present absence of air quality, effluent quality and solid waste quality standard for new pulp mills in Indonesia, the project will aim to meet or exceed the new Canadian standards and/or any standards set for new bleached Kraft pulp mills by international financial institutions as interim compliance targets” (Jenkins, Jardine et al. 1993, 76). In an effort to impress both customers and investors, APP's Indah Kiat mill publicizes its top ranking from the PROPER program and certification of its environmental management system by ISO 14001 and BS 7750.60 The PROPER program seeks to amplify this foreign investment effect by sending its annual rankings in the first instance to foreign banks, international agencies, and foreign embassies.61

Summary
The Indonesian pulp and paper industry has undergone tremendous expansion since the late 1980s. Despite minimal regulatory pressure from Indonesian government, new mills have invested in state-of-the-art control technologies, largely as result of pressure from customers and investors, prompted at least in part by international ENGO and human rights groups campaigns. It is noteworthy, however, that to a large degree the green market pressure on Indonesian mills, and the availability of technologies with which to respond, were not the result of NGO campaigns concerning the environment in Indonesia, but rather campaigns by European environmental groups to generate demand for chlorine-free paper in Europe (Sonnenfeld 2000). Although trans-national forces have created upward pressure on the Indonesian industry, domestic politics still creates considerable drag. Nepotism, corruption, and lack of monitoring and enforcement provide few incentives for mill operators to maintain environmental technologies at peak operation. It is therefore difficult to know degree to what degree the promise of the advanced technologies installed on the new Kraft mills has been fulfilled in practice. Actions taken in response to market campaigns typically are not accompanied by the same degree of third party monitoring and public reporting as those overseen by public law.

Several important caveats concerning the upward pressure on the Indonesia industry are in order. First, many of the dozens of small, older mills dedicated to domestic markets continue to operate with few or no pollution controls, often in more populated areas than the large new mills (Sonnenfeld 2000). While the operation of such mills is no worse as a result of economic globalization, neither have they been substantially improved. Second, although the new mills constructed since the late 1980s have low emissions per unit of production as a result of the transfer of advanced technologies from the industrialized world, that benefit is largely undermined by a massive increase in capacity (Volders 1997). While the average capacity of an Indonesian pulp mill in 1970 was 5 tonnes/year (Carrere and Lohmann 1996), the new mills produce from 400 thousand to 2 million tonnes/year. Thus, while the mills may be state-of-the-art, the emergence of an export-scale pulp and paper sector in Indonesia has nonetheless dramatically increased levels of environmental contamination. While it is true that, given emerging economies of scale in the industry, those releases were going to be concentrated somewhere, whether in Indonesia, Australia, or Alberta, the impact of the effluent is exacerbated by the fact that Indonesian mills tend to be located on rivers, rather than the ocean, and that downstream villagers rely on the untreated river water for drinking.

Third, pulp production on such a massive scale demands liquidation of large tracts of tropical rainforest (Sonnenfeld 2000). At best, logged-over concessions are being converted to monocultural plantations on grand scale, though most authors are highly skeptical of the viability of many of those plantations (Lohmann 1996; AUSNEWZ Pulp and Paper Intelligence Service 1999; Barr 2001). At worst, mills are contributing to deforestation that is occurring on a massive scale by taking advantage of rampant illegal logging of native forests for up to 40% of their fibre supply as well as exacerbating air quality throughout Southeast Asia via forest fires (often started in an effort to prepare logged over land for plantation planting) (Forest Watch Indonesia 2002; Barr 2001). If
so, the Indonesian rainforest will be depleted to feed consumer demand for paper products throughout the globe. As one industry analyst observed, “Sure international financiers insisted on ECF. But they weren’t concerned where the wood came from” (Confidential interview).

Finally, construction of such large scale mills and plantations has resulted in displacement of indigenous peoples, many of whom were pursuing livelihoods based on agriculture and rubber-tapping in state-owned forests (Lohmann 1996; Down to Earth). As Volders (1997) has observed, “people living in the vicinity of pulp mills and their associated plantations experience integration in the global economy through dispossession from their traditional lands with little or no compensation and pollution of vital waterways.”

Conclusions

Since 1987, when the US EPA revealed that dioxins were being generated by pulp mills, all 5 countries analysed in this study have tightened their regulatory standards for the pulp and paper industry. And in response, the pulp and paper industry has invested billions of dollars to reduce the environmental impacts of its facilities. However, as illustrated by Table 2, significant differences remain between the regulatory standards adopted by each country. In 1990, Sweden established AOX targets of 0.3 to 0.5 kg/ADt for existing mills, which remain the most stringent national standards among the five countries. The Australian standard for new mills of 0.3 kg/ADt is somewhat less onerous than the Swedish standard because it is less expensive to install state-of-the-art technology at a new mill than to retrofit an existing one. The US new source standard of 0.3 kg/ADt is comparable to the Australian new source standard, but the US standard for existing mills of 0.6 kg/ADt AOX, while on the surface very close to the Swedish upper limit for existing mills, was deliberated selected so that US mills would not have to invest in the oxygen delignification technology that is required in Sweden. That seemingly small numerical difference in the standards represented a $1 billion concession to the US industry. The Canadian government chose not to regulate AOX at all, but did promulgate a dioxin standard considered equivalent to reducing AOX discharges to about 2.5 kg/ADt. Finally, Indonesia has yet to regulate either AOX or dioxin releases from the Kraft pulp industry. The extent of divergence among these national standards demonstrates that the unique political and institutional context within each country continues to influence policy decisions, whatever upward or downward pressures may result from globalization.

It is noteworthy, however, that in practice industry performance in the five jurisdictions is closer than suggested by formal regulatory requirements. In response to a combination of European consumer demand and tighter provincial requirements, many Canadian Kraft mills have moved to complete chlorine dioxide substitution and thus lower AOX levels than required by the national standard. Similarly, a third of US bleached Kraft mills have installed oxygen delignification, even though it is not required under the cluster rule. In both countries, the extent of overcompliance is presumably a response to a combination of stricter State level permits and customer pressure. As noted
above, Swedish mills’ performance has significantly exceeded regulators’ already high expectations since the early 1990s. Similarly, the 6 new mills in Indonesia have installed technologies comparable to those in place at state-of-the-art mills in industrialized countries.\textsuperscript{64} While overcompliance is thus widespread, it would be incorrect to conclude that regulatory standards are irrelevant. The differences tend to be most pronounced not among the leaders but among the laggards in each country. While all mills in Sweden operate with very advanced ECF or TCF technologies, not all mills in Canada and the US are yet operating with 100\% ClO\textsubscript{2} substitution, nor is oxygen delignification is not standard practice.\textsuperscript{65} At the limit, older mills in Indonesia operate with a complete lack of environmental controls that would not be tolerated in either North America, Australia, or Scandinavia.

As the case studies demonstrate, both the stringency of national environmental standards and the environmental improvements made by mills going beyond those standards owe much to two kinds of upward pressures as a result of globalization. The first is the transfer of ideas through trans-national networks of environmentalists, scientists, and bureaucrats, a process greatly facilitated by advances in communications technology during this period. This reflects a process of political, rather than economic, globalization. Environmentalists used their international ties to gather the latest research on both the environmental impacts of pulp mills and technologies available to mitigate those effects. They then applied that information in the domestic context to mobilize public concern and thus transform the balance of domestic political interests in favour of stricter environmental regulation. In turn, bureaucrats charged with developing regulatory standards relied on advice from their counterparts in other countries in developing effluent standards based on "best available technology."

The second source of upward pressure concerned the impacts of international trade on the interests of the industry. It bears emphasis that the case studies presented here provide no evidence of a race to the bottom with respect to effluent standards. Although the industry in each country invariably made the expected arguments that overly strict regulations would hinder competitiveness and result in sacrifice of jobs, it is striking that for the most part the baseline for such arguments was not the weakest standards in the world, but the most stringent standards. In the end, the lax environmental standards in Indonesia did not drag other countries down; rather, the prospect of selling their products in the markets of industrialized countries pulled the performance of Indonesian mills up.

The positive impact of global markets on environmental standards, however, was not a simple matter of free markets “lifting all boats.” Rather, the particular influence of global market forces in this case turned on the linkage between political and economic globalization. In effect, environmental groups used their trans-national networks to turn global markets to their advantage. They succeeded in stimulating consumer demand for chlorine-free paper in Europe, which in turn created market pressure for mills, even halfway around the world in Indonesia, to voluntarily reduce their AOX discharges. Indeed, it is possible that NGOs would not have achieved the same success (via domestic market campaigns) had it not been for a separation of consumers and producers in global markets.
markets. In particular, it was arguably easier to provoke consumer demand for chlorine-free paper products in Germany, where at the time there were no Kraft mills and there was thus no domestic opposition from labour and industry to stringent effluent limits for the industry, than it would have been in Scandinavia or North America. It is noteworthy also that although demand for chlorine-free paper in Germany was akin to the California effect identified by Vogel, it was distinctive in that it was prompted by non-governmental actors, rather than state regulation.66

The global experience with environmental regulation of effluents from the pulp and paper industry offers a more optimistic picture than often depicted by critics of globalization. However, several distinctive feature of the case may limit the transferability of the findings to other sectors engaged in global trade. Alternatively, the pulp and paper case provides an opportunity to consider potential criteria for success of market campaigns. First, it is significant that the issue of chlorinated discharges from the pulp and paper industry came to light in the late 1980s, when the environment was highly salient in all industrialized countries, further assisted by the headline grabbing appeal of dioxin. There is clearly much to be said for non-governmental organizations striking while the iron is hot by focusing on issues or products that are most prominent.

Second, the timing of the dioxin discovery happened to coincide with a boom in pulp prices and a concurrent expansion of the industry worldwide. The fact that the industry was flush facilitated development of more stringent standards (the flip side is that vulnerability of “mill towns” certainly looms larger with politicians during economic downturns). Moreover, periods of expansion present an opportunity to introduce tighter standards for two reasons: it is less expensive to design a clean greenfield mill than to retrofit an existing one; and hypothetical future employees do not present as much opposition to environmental regulation as real employees concerned about the fate of their very real jobs.

Third, environmentalists' international market campaign was blessed by certain characteristics of the product in question. In particular, the environmental risks of the manufacturing process (releases of dioxins and other toxic substances) directly translated into perceived health risks of the resulting product (dioxins in paper), a situation that does not hold even with respect to non-chlorinated pollutants from the same industry let alone other manufacturing processes. In other words, a direct linkage could be made between a process concern and product quality. The issue thus was particularly salient to consumers. German consumers demanded chlorine-free diapers and tampons not because they were concerned about impacts of manufacturing process on the drinking water of indigenous peoples in Indonesia, but because they were worried that they or their children would personally be harmed by dioxins. The immediacy of consumers’ perceived interest undoubtedly facilitated environmentalists’ ability to provoke a non-governmental “California effect.” This can also account for the success of market campaigns concerning organic and GM-free foods.

In keeping with this, however, upward pressures to date have primarily been limited to water pollution from the pulp and paper industry (and even then only the
chlorinated discharges). Consumers preoccupied with their own health and investors wary of those consumers’ reactions did not express much interest in issues such as deforestation and displacement of indigenous peoples. As Vogel (1999) has observed, “Citizen outrage in rich countries is highly selective.” It thus remains to be seen whether environmentalists will be able to enjoy comparable success with market campaign predicated on consumer altruism. However, ongoing efforts to shame European and North American paper retailers based on their reliance on Indonesian pulp produced from illegal and unsustainable logging will provide a critical test.

Although globalization placed upward pressure on effluent standards of Indonesian Kraft mills, it bears emphasis that the mills nonetheless got built, and on a grand scale, in Indonesia rather than Australia. (Ironically, one of those mills, Kianni Kertas, is now importing wood chips from Tasmania.) Since a combination of global market forces and environmental activism prompted those mills to install state-of-the-art equipment, one might argue that their environmental impacts are the same regardless of their location. However, that denies both that Indonesians are more likely to drink untreated water downstream from the mills and that, while Indonesian may not have offered a pollution haven with respect to effluents, it did offer a haven for unsustainable exploitation of the forest resource. Although there was no evidence in this case that Indonesia’s low standards prompted a race to the bottom, Indonesians continue to suffer from severe poverty, inadequate regulatory capacity, and lack of democratic accountability, a state of affairs that international trade has done little to alleviate.
<table>
<thead>
<tr>
<th></th>
<th>Sweden</th>
<th>Canada</th>
<th>USA</th>
<th>Australia</th>
<th>Indonesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment in Sector</td>
<td>30,000</td>
<td>66,000</td>
<td>217,000</td>
<td>4,600</td>
<td>106,000</td>
</tr>
<tr>
<td>Emp as % Mfg</td>
<td>3.8%</td>
<td>2.9%</td>
<td>1.2%</td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td>Total mills</td>
<td>45</td>
<td>150</td>
<td>512</td>
<td>32?</td>
<td>67?</td>
</tr>
<tr>
<td>Kraft mills</td>
<td>22</td>
<td>47</td>
<td>120 (only 86 bleach)</td>
<td>6?</td>
<td>12</td>
</tr>
<tr>
<td>Total Kraft prod’n, Mtpy</td>
<td>7.2</td>
<td>13.0</td>
<td>47.4</td>
<td>0.3</td>
<td>3.6</td>
</tr>
<tr>
<td>Bleached Kraft Mtpy</td>
<td>5.1</td>
<td>11.7</td>
<td>28.0</td>
<td>0.1</td>
<td>3.5</td>
</tr>
<tr>
<td>Kraft as % pulp production</td>
<td>67%</td>
<td>49%</td>
<td>83%</td>
<td>6%</td>
<td>88%</td>
</tr>
<tr>
<td>Net exports Bleached Kraft</td>
<td>2.3</td>
<td>7.4</td>
<td>-0.9</td>
<td>-0.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Net exports as % BK prod’n</td>
<td>45%</td>
<td>63%</td>
<td>3%</td>
<td>-175%</td>
<td>23%</td>
</tr>
<tr>
<td>Net exports paper and board</td>
<td>8.3</td>
<td>13.2</td>
<td>-6.9</td>
<td>-0.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Net exports as % paper, board prod’n</td>
<td>77%</td>
<td>64%</td>
<td>-8%</td>
<td>-38%</td>
<td>43%</td>
</tr>
</tbody>
</table>

Source: Pulp and Paper International, all data for 2000 except number of mills, which is based on most recent data available.
### Table 2

**Comparison of Effluent Standards for Chlorinated Organics**

<table>
<thead>
<tr>
<th>Country</th>
<th>Year Adopted (Year compliance required)</th>
<th>AOX requirement, kg/ADt, new mills</th>
<th>AOX requirement, kg/ADt, existing mills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>1987 (1992) NA (no new mills)</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1990 (1995) NA</td>
<td>0.5 - 1.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1990 (2000) NA</td>
<td>0.3 - 0.5</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>1989 (1989) 1.0</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1995 (1995) 0.3</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>1998 (2001) 0.3</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>1992 (1996) No separate new source standards, but more stringent requirements normally emerge from federal and provincial EIA processes</td>
<td>No AOX standard, but dioxin regulation considered equivalent to ~2.5 AOX</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>1995 Potential pressure for BAT via EIA process</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1 - Employment as percentage of employment in manufacturing
Sources: Pulp and Paper International, Statistics Canada, US Bureau of Labor,
Australian Bureau of Agricultural and Resource Economics, Sveriges Statistiska Databaser

Figure 2: Net Exports of Sulphate Pulp
Source: Pulp and Paper International


Carey, J. H., P. V. Hodson, et al. (1993). Recent Canadian Studies on the Physiological Effects of Pulp Mill Effluents in Fish, Environment Canada and Fisheries and Oceans Canada.


The degree of capital mobility may seem surprising given both the industry’s reliance on region-specific forest resources and its capital intensity. However, unlike iron ore or diamonds, trees can be found in most countries around the globe. Moreover, a combination of economic expansion and technological change (which has rendered older mills less competitive) has meant that investors have been willing and able to relocate capital.

Swedish participation in agreements concerning the Baltic represents an exception, but there Sweden tended to be leading the regional community’s efforts, rather than facing international constraints.


The discussion here sets aside arguments concerning the details of particular trade agreements – for instance whether they create barriers to environmental regulation or effectively promote upward harmonization -- since neither the terms of international trade agreements nor environmental agreements were at issue in this case. For reviews of the trade and environment literature, see Esty and Geradin (1998);

The latter could emerge, however, in the case of industries, such as hazardous waste treatment, that present concentrated environmental costs that may politically outweigh their concentrated benefits in the form of job creation Markusen, J. R., E. R. Morey, et al. (1995). “Competition in Regional Environmental Policies when Plant Locations are Endogenous.” Journal of Public Economics 56: 55-77.

In such a scenario, interdependent jurisdictions are engaged in a game of assurance rather than prisoners’ dilemma. De Sombre (2000) also argues that “baptist-bootlegger” alliances between environmentalists and clean producers can facilitate harmonization of process standards via international environmental agreements.

In that case, the most relevant factor endowment might be access to the resource, rather than stringency of standards or access to capital. While it is not clear whether wealthy or poor countries are generally more abundant in the relevant resources, poor countries may be more generous with respect to access.

Analysis based on data from Pulp and Paper International


For instance, when demand for consumer products declines during a recession, that not only leads to a decline in demand for cardboard or paper packaging, but also a decline in newsprint because manufacturers spend less on print advertising.

16 interviews were conducted in Australia, 14 in Indonesia, 11 in the US, 11 in Sweden, and 35 in Canada.

Statistics on the industry can be found at the web page of the Swedish Forest Industries Association, www.forestinustries.se/eng.

The policy actually required reductions to 1.5 kg/t TOCl, which is an alternative measure of chlorinated compounds that has since been superseded by the AOX test. The ratio between the AOX and TOCl tests varies from mill to mill, but AOX levels are typically 30% higher.

It is noteworthy that Swedish AOX limits are based on annual average performance, in contrast to the monthly average requirements typically imposed in North America. The implication is that the stringency of Swedish AOX regulation is sometimes overstated, since the same numerical limits based on an annual average are easier to meet than on a monthly average. The relevant conversion factor would vary from mill to mill, depending on the variability of operations, but Simons Consulting Group Simons Consulting Group
notes that at one mill examined, an annual average AOX of 1.25 kg/ADt corresponded to a monthly average of 1.5 kg/ADt, a figure 20% higher.  
16 Data from the web site of the Forest Products Association of Canada.  
17 Mechanical pulping, primarily based in Eastern Canada, is a significant source of Canadian newsprint exports, while Kraft mills tend to export “market pulp.”  
20 58 FR 66078  
21 61 FR 36835  
22 The Federal Register notice promulgating the new standards (63 FR 18504) was not actually published until April 1998.  
23 Installation of oxygen delignification in advance of the Cluster rule could be accounted for by two factors: some states set strict permit limits in advance of the federal decision, and oxygen delignification reduces operating costs. Savings from the latter are sufficient to outweigh the capital costs only for a subset of mills, though, which accounts for AF&PA’s continuing resistance to an AOX limit that would effectively mandate AOX.  
24 EPA offers no explanation for the quite bizarre practice of regulating to three significant figures. Standards for mills discharging to municipal sewers are set higher at 1.4 kg/ADt for existing mills and 0.814 kg/ADt for new mills, since EPA assumes that publicly owned treatment works will reduce their AOX discharges to levels comparable to those set for mills discharging directly to the environment. Bleached sulphite mills, which can more readily rely on alternative bleaching agents, are required to eliminate all use of chlorine.  
. The US industry, recognizing that victory or defeat on the technology issue would be reflected in the AOX level chosen by the EPA, conceded the inevitability of AOX regulation and offered their own AOX counter-proposal.  
27 Letter from Boyd Young, UPIU, and Lenard Roberts, AWPPW, to US President Bill Clinton, 12 February 1997.  
28 Environmentalists and industry offer disparate estimates of the number of letters EPA received from members of Congress. However, the EPA cluster rule docket contains at least three boxes of Congressional letters. There were 120 letters in the one box I opened. While industry officials claim that they had enough votes for a veto, they did not believe they could have mustered the 2/3 of members necessary to override an anticipated Presidential veto.  
29 Another factor was the extent to which the EPA decision, to a much greater degree than the other jurisdictions studied, was framed primarily in terms of dioxin. Since most of the dioxin is already removed by CI02 substitution (Option A), the addition of oxygen delignification (Option B) thus did not appear to Agency decisionmakers to be “worth it” (Confidential interview). Had the Canadian NWRI research had a greater impact in the US, the more significant justification of OD as a way of reducing releases of natural toxins from the wood would have carried greater weight.  
Highly critical leaked reviews of the EIS by state government departments raised similar questions to those that had been raised by the environmental movement. The Department of Sea Fisheries, in particular, referred to the EIA as “a collection of superficial, unsubstantiated, untested and unacceptable claims.” Andrew Fisher, “Mill dealt new low in report,” Hobart Mercury, 21 Dec 1988.

The actual standard was 1.0 kg/ADt based on the TOCl test, which was common before the AOX test became standard. The original State guidelines called for a limit of 1.0 kg/ADt never to be exceeded, but that was relaxed to a requirement for a 1.0 kg/ADt annual average, which was more consistent with norms in international regulation of the industry, in the “Doubts Removal” bill.


The reference to “doubt” in the title of the Act would seem to refer to doubt as to whether the Minister of Environment had made a finding that the EIS was “adequate” as required by the previous legislation. Ironically, the Doubts Removal bill did not receive Royal Assent until March 17 1989, two days after the Wesley Vale project was cancelled.

Various ways in which the original guidelines were relaxed are analysed in Department of the Arts, Sport, the Environment, Tourism and Territories, “Report on the Environmental Aspects of the Tasmanian Northern Pulp Mill (Doubts Removal) Agreement Bill 1989,” February 1989.


The deadline for cancellation of the order, albeit with a penalty, was the end of the week of March 15.

The team held 27 meetings in 11 different cities in the 3 countries in just two weeks. It is noteworthy that NBH and other industry representatives also accompanied the group, and even helped to schedule their meetings, particularly with industry officials.


Ministers Senator John Button, Senator Graham Richardson and Mr. John Kerin, “Pulp and Paper Industry Package,” December 1989. The Commonwealth guidelines also set a standard of 5 ppt of dioxins in the crustacean hepatopancreas beyond the mixing zone, with no detectable increase in receiving water, and established requirements for minimum dilution and for studies of site-suitability, baseline conditions, and biological monitoring.


notes that at the time the environment had surged from 12th to 2nd place in public opinion polls.

A 1990 survey found that Australians considered CSIRO scientists to be their most trusted source of advice about the environment, with CSIRO scoring twice as high as the next group, environmentalists. (“CSIRO can arbitrate: survey,” Canberra Times, 16 May 1990)

Environmentalists declined an invitation to join the trip.

Cabinet briefing documents prepared by the Bureau of Rural Resources stated that the Morrum mill was operating with 90% ClO2 substitution and had 1/4 the chlorine gas charge per tonne of pulp proposed for Wesley Vale. The project proponents in turn argued that, if one took into account both chlorine gas and ClO2 the chlorine charge at Wesley Vale would be comparable to that at the Morrum mill, and that Morrum had neither oxygen delignification nor secondary treatment, both of which would be in place at Wesley Vale. The issue here is not which side’s claims had greater validity, but that the debate revolved around what constituted the highest standard of performance globally, rather than the weakest standard.


See, for instance, faxed correspondence from T.R. O'Brien, Environmental Assessment Branch of DASET to Dr. Gunnar Eriksson, Director, Research Socreratier, National Swedish Environmental Protection Board, 17 Feb 1989, and response from Erik Nyström to Terry O'Brien, 22 Feb 1989.
46 For instance, Barito Pacific developed a partnership with Suharto's daughter "Tutut" for their TEL mill, and timber tycoon Bob Hasan entered a partnership with Suharto's son Sigit Harjojudanto for his Kianni Kertas venture.


50 See a history of the Indorayon mill, see Sonnenfeld [1999 #8] and Down to Earth (2000).

51 KEP-03/MENKLH/1991 and KEP 51/menlh/3/1995

52 Curiously, government and industry officials alike explain that it was not feasible to adopt an AOX standard because there is no laboratory capable of conducting the test in Indonesia. While that is plausible with respect to dioxin tests, which cost upward of $1000 per analysis, it is striking that billion dollar mills could not be asked to install equipment capable of conducting the much simpler and less expensive AOX test.

53 It is noteworthy, however, that ISO only requires that a facility demonstrate a commitment to comply with the relevant environmental laws of its own jurisdiction.

54 Although Greenpeace maintained an office in Indonesia for a couple of years thereafter, it had phased out its international pulp and paper campaign, and directed the Indonesian staff person to other activities.

55 See Down to Earth, “Tanjung Enim Lestari (PT TEL) and Musi Hutan Persada (PT MHP): A Down to Earth Campaign Update, Jan 1999; and Down to Earth, “Pulping the People: Barito Pacific’s Paper Pulp Factory and Plantations in South Sumatra,” June 1997.


57 See Down to Earth, “Tanjung Enim Lestari (PT TEL) and Musi Hutan Persada (PT MHP): A Down to Earth Campaign Update, Jan 1999; and Down to Earth, “Pulping the People: Barito Pacific’s Paper Pulp Factory and Plantations in South Sumatra,” June 1997.


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63 That is not meant to suggest that regulations are irrelevant. While some mills in each country have gone beyond regulatory requirements, the performance of “laggards,” who comply with minimum standards if that, continues to diverge significantly. Moreover, the “leaders” in Sweden, prompted at least initially by strong regulatory mandates, have gone much further in reducing chlorinated discharges than their North American and Asian counterparts.

64 The reverse situation is true with respect to the conventional pollutant BOD. Canadian and US mills have all installed secondary treatment systems in response to BOD requirements, while Swedish mills,
which do not face such strict BOD standards, tend not to employ secondary treatment – and have correspondingly higher BOD discharges.

66 In economists’ terms, the ‘technique effect’ was expressed not only in demand by citizens of wealthy countries for strict environmental regulations, but also in market demand for environmentally preferred goods. The latter offers the prospect for the technique effect to spill over to other countries via trade.