

**GREEN CONSUMERISM AND CHLORINE-FREE PAPER PRODUCTS:
AN ALTERNATIVE STRATEGY FOR ELIMINATING ORGANO-
CHLORINE DISCHARGE FROM PULP MILLS**

by

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A THESIS

**Presented to the Interdisciplinary Studies Program:
Environmental Studies
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Master of Science**

June 1991



Cross Pointe Bond
COTTON 25% RECYCLED

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An Abstract of the Thesis of
Dennis Hall Morgan for the degree of Master of Science
in the Interdisciplinary Studies Program: Environmental Studies
to be taken June 1991

Title: GREEN CONSUMERISM AND CHLORINE-FREE PAPER PRODUCTS:
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Dioxin residues in the environment and in paper products have generated considerable public concern. Several organizations have called for the elimination of chlorine-based pulp bleaching, the primary source of dioxin and other organochlorine pollutants.

Regulatory agencies in Canada and the United States have recently set specific dioxin emission standards. These standards will not eliminate organochlorine pollution associated with pulp mills. In the absence of stringent regulation, the phenomenon of "green consumerism" offers an alternative strategy to the application of pollution laws. Preferential product choice by "green" consumers provides an economic incentive for paper companies to produce chlorine-free paper products. In this thesis I examine the North

American markets for chlorine-free paper products and conclude that a significant demand for these products exists. I further conclude that sustained consumer pressure, rather than regulation, will be the mechanism through which zero discharge of organochlorines is achieved.



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ACKNOWLEDGEMENTS

To Professors Alexander Murphy and John Baldwin I express my sincere appreciation for their patience, support and perseverance in refining this manuscript and providing critical advice. To Drs. John Bonine and Mary O'Brien I am extremely grateful for the use of the resources at the Western Environmental Law Clinic and NCAP. I am indebted to Toby Deemer at the Graduate School for special arrangements made after an untimely theft.

For the tree sacrificed in the making of this document, I have planted another, and printed this thesis on recycled paper. My love and thanks to Karin for all of the support and popcorn.

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CHAPTER I

INTRODUCTION

I've telephoned various [pulp and paper] plants and was told that...the public demands pure white paper. Do we now? If, for the sake of the planet, we consumers make it known that we are willing to let a little grey or beige into our lives, surely the companies will comply.¹

Public participation in environmental issues comes in many forms, from testifying at public hearings to exercising personal choice with consumer products. Knowledge of the issues is of great importance, and the increased number and sophistication of environmental publications, as well as the intensification of the awareness and activity level among the public, has greatly facilitated public involvement with issues which were once considered the domain of the 'expert'. Spokespeople for science, government and industry have been considered the only parties well enough informed to make many decisions, but their burden may be lessening. The increasing participatory role of the public reflects the growing demand for environmental improvement, and a commitment to be part of the change.

One issue in particular which has generated considerable interest, controversy and public input is the use of organochlorines in many areas of everyday life, including common industrial processes. These extremely potent molecules are used as insecticides (eg. DDT, aldrin, dieldrin, heptachlor, chlordane and others), pesticides (eg. 2,4-D), and herbicides (eg. 2,4,5-T).² Moreover, many organochlorines, and in particular dioxin, have been found as

byproducts of certain bleaching methods used by the pulp and paper industry. Over the past few years, dioxins,³ one of a family of organochlorine molecules, have become something of a household word, eliciting images of insidious toxins potentially affecting us in a myriad of ways. Certain characteristics of these compounds enhance this image. As newcomers to the natural world, dioxins are extremely persistent,⁴ as nature has not yet evolved mechanisms to break them down. This, coupled with their ability to bioaccumulate, places entire food chains, including humans, at risk.

Concern about dioxin dates back to an accident at an herbicide manufacturing plant in 1957, when 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD) was discovered to be a contaminant of the herbicide 2,4,5,-T.⁵ More well-known instances of dioxin contamination of the environment include the infamous Times Beach and Love Canal incidents, which occurred in 1974 and 1977, respectively. Discoveries in 1980 of dioxin in Great Lakes gull eggs⁶ and fish⁷ began to show that these compounds could bioaccumulate in the food chain, resisting degradation.

Increased interest was engendered when the United States Environmental Protection Agency (EPA), in their National Dioxin Study, found many different types of organochlorines in the fish downstream from two pulp mills which employed chlorine-based bleaching technologies.⁸ These findings led the EPA to associate TCDD residues with effluent discharges from pulp and paper mills located upstream. A logical progression commenced, with organochlorines being found in the pulp and effluent from similar mills across the nation in a study done jointly between the EPA and the pulp and paper industry.⁹ All told, approximately three hundred different types of

organochlorines have been identified in bleach plant waste, which represents only 10% of the total weight of organochlorines. The majority of these compounds have not been identified or tested for their toxicity to humans and other biota.¹⁰

The existence of organochlorine residues subsequently found in bleached paper products such as coffee filters, disposable diapers, tampons, milk cartons and stationery generated even greater public concern.¹¹ In the United States,¹² Canada¹³ and New Zealand¹⁴ dioxins were shown to migrate from milk cartons into milk. Because dioxins are lipophilic, they were attracted to, rather than held back, by the waxy layer on the milk cartons: this lipophilicity also means that dioxins preferentially move to fatty tissues when inside organisms.¹⁵ The presence of bleached pulp in tampons and diapers has aroused suspicions that the toxins are entering body tissues, possibly enhanced through the use of baby oils and other lubricants. Whether or not a similar migration is occurring through the use of bleached writing paper is unknown.

A controversial debate has centered on whether these molecules cause cancer in humans; certainly their record with laboratory animals and certain species of wildlife raises valid concerns.¹⁶ The Environmental Protection Agency has characterized 2,3,7,8-TCDD, the most well-known dioxin, as the "most potent animal carcinogen ever tested...and also the most potent animal teratogen known,"¹⁷ and currently classifies it as a "probable human carcinogen."¹⁸ Recent studies, however, seem to indicate that dioxins may not affect carcinogenic responses as much as they cause problems with fetal development,¹⁹ and organ damage.²⁰ A shift in the focus of the debate may be

necessary; dioxin's effects are significant, though not necessarily cancer-related, and so far the focus of regulation has been with dioxin's carcinogenic powers. The carcinogenicity debate remains, however, particularly in light of recent re-analysis of epidemiological studies done by BASF and Monsanto, studies upon which much of the "dioxins don't cause cancer in humans" case is based. These efforts have shown that cancer rates due to dioxin exposure are significantly higher than previously thought. This controversy is examined in greater detail later.

The concern over the toxicity of organochlorines is obviously warranted, but there is another angle from which the debate over the use of chlorine in the bleaching of pulp can be approached. This angle centers on the functional performance of the paper products, and whether or not we are dealing with "perceived" needs or "performance" needs. Is paper of blue-white brightness and extreme durability, qualities currently attained through the use of chlorine bleaching, desired in all cases by the public? Could we do without them, and hence largely do away with chlorine bleaching?

For the purposes of this thesis, the major question revolves not so much around whether dioxins cause health problems for humans, but whether or not consumers are willing to compromise in their "perceived" needs, and support the growing move toward "alternative" paper products. The EPA is currently conducting research into these questions, including the growing market for alternative products, as they attempt to enter negotiations with industry from an informed position. Swedish government studies have concluded that there are no products currently available which absolutely require chlorine bleaching on the basis of performance.²¹ The concerns relating to toxicity to humans and

other species should be joined by questions concerning performance need. Scientific certainty concerning human health risks will be very hard to achieve, largely because of the many different yet potentially complimentary organochlorines found in pulp mill effluent.²² We are still singing that old refrain: "At what point do we have sufficient data to warrant public and/or governmental action?"

Questions which must be raised include: Has the public been led to believe by the paper industry that white is clean and necessary, a perception aided by advertisers who use brightness as a selling tool? Is our desire for white a "cultured" phenomenon which can be reversed if the same industry which promoted it begins to supply greyish, or tan-coloured alternative products, rather than continuing to propagate an industrial mythology? Consider the following quotes made by members of the pulp and paper industry:

The Kraft [chlorine-using] pulp industry has worked toward ever brighter pulp for years, and it is taken as gospel within the industry that "brighter is better."²³

If consumers came to our customers and said there is a real need for these types of [unbleached paper] products we would respond in a fashion to what our customers want.²⁴

Is the drive toward white paper then the result of development engineers who strive for a whiter product? Are we, the consumer, really waiting for unbleached and/or chlorine-free products to be supplied by an unresponsive industry? Would we accept them? What does it take before the desire for such products is sufficiently evident such that large-scale production is warranted?

Many people are questioning the perception that white is necessary, with the result that strategies are emerging which will, in the end, result not only in

reduced (and eventually eliminated) organochlorine emissions from pulp mills, but also in the increased availability of paper products which are lower in brightness and free of dioxin residues. Importantly, it is now possible to produce "alternative" products which retain the qualities needed for their specific task, be they tissue paper, xerographic paper, letterhead or many of the other uses of paper. As well, state-of-the-art technologies in Europe can produce *white* paper products which are free of organochlorines: it will be some time before the North American pulp and paper industry reaches that point.

Against this backdrop, the key questions which I seek to address in this thesis are:

1. Are 'alternative' products (meaning products produced by methods not resulting in organochlorine discharge) becoming widely available, and, if they are, how are they performing in the marketplace?
2. What is encouraging the availability of these products? Is it:
 - a) consumer action, whereby the demand by green consumers is producing supply, or;
 - b) is the availability of these products the result of the pulp and paper industry's reaction to potential and implemented regulatory action by state, federal and provincial governments?

There is no doubt that consumers are increasingly voicing their concerns in their buying habits, and markets for alternative paper products are appearing. This increase in availability of such products is not occurring in a vacuum, however. A phenomenon known as "green consumerism" has taken hold in many industrialized nations, and "green" paper products are among a host of other products marketed as "environmentally friendly". Anything from recycled paper or re-refined oil to non-disposable cotton diapers seem to qualify for this designation, and these terms have been marketed mercilessly and in some

cases shamelessly. For example, a confused but concerned public must deal with labels which claim that certain types of packaging will photodegrade inside landfills, where the sun will never penetrate.

As described in Chapter V, efforts at quality control are underway, as both private companies and governmental programs attempt to relieve some of the confusion faced by consumers who wish to make the right choice. Canada, Germany, and Japan all have product labelling systems in place, and the U.S. Environmental Protection Agency has commissioned background work on such a program. In the United States, a push for investigations into dubious product claims based on environmental premises has come from a Task Force of state Attorneys General led by Hubert Humphrey III, attorney general of Minnesota.²⁵

Responsible consumerism represents one strategy for dealing with organochlorine discharges. The other is more traditional: use of the legal system and existing environmental statutes to challenge permits which allow mills to pollute. In the case of dioxins, these strategies are not exclusive of one another. In North America both are being used as alternative products become available and pollution permits under the Clean Water Act, which when initially granted did not consider organochlorine discharge, come up for reauthorization. Both strategies have the same essential goal in mind: forcing the pulp and paper corporations to adopt the best available technology for the bleaching of pulp. Such technologies, which exist in Sweden,²⁶ can lower organochlorine discharge levels to zero, though not, at present, without sacrificing some brightness. It remains for laws to be enforced in North America to bring about the use of this technology, and for consumers to demand

organochlorine-free paper products in order to force the markets and thus the technology.

The pulp and paper industry claims that a complete switch to non-chlorine based bleaching is not feasible, that it will cost too much money, that dioxins are not worth the time and money it would take to produce alternative products, and that dioxins do not pose a serious threat to the environment and/or human health.²⁷ As well, they are not convinced that consumers will buy alternatively bleached and/or unbleached products.²⁸

Some critics of the pulp and paper industry have questioned whether or not there is high level cooperation among the corporations to maintain the status quo: in this thesis it becomes clear that there exists in the industry what one might call a denial mentality, such that alternative products are given very short shrift. Appearing to run somewhat against this mentality, it is encouraging to note that James River Corporation is taking an important step in producing its Natural Copybond, a virgin unbleached paper. The production of this paper does not result in the production of organochlorines, and with proposed technological advances - in particular the use of oxygen in the pre-bleaching stage - the paper could become a more acceptable shade of "off-white" (see Chapter III).

Admittedly, a change to non-chlorine based technology will involve large capital outlays to finance changes in mill processes. Considering the unprecedented profits of the pulp and paper industry over the last few years, now seems a good time for investments to be made before an increase in pulp-producing capacity brings prices down and capital outlay becomes less attractive.²⁹ Although a recession is currently lowering profits, it should not be

allowed to be used as an excuse for lax regulations which would move the industry toward chlorine-free technology. "The pulp industry always has its ups and downs. We can't delay regulation every time their markets go soft."³⁰

There are other factors to consider besides investments in technology and future pulp prices. The North American design and development engineers involved, most of whom have worked with chlorine-based bleaching all of their careers, are not familiar with the new technologies and may find changes undesirable. We cannot disregard the influence of the companies that have millions of dollars invested in the production and supply of chemicals to the pulp and paper industry, or the influence of those companies that develop and produce chlorine based pulping technologies.

The general public, however, may not find the changes as hard to accept, and will have the last word on whether or not demand for unbleached paper products actually exists. The growing number of retailers of 'environmental' products show that with adequate information, the public will not only accept new products, but may very well demand them. And the potent ability of advertisers to sell us products that we may not need (or want!), illustrates the fact that markets can be created even where demand does not exist. Unilateral purchasing commitments such as government procurement programs can play an important role in 'jump-starting' markets, and have played an important part in countries which have developed environmental product labelling programs. With alternative paper products, there are latent markets waiting to be supplied, and the demand will become apparent once the product is presented to the consumer.

In the case of alternative paper products, a great deal of education (and thus advertising) has been carried out by the media, whose attention was garnered by several groups including Greenpeace, the Environmental Defense Fund, the Natural Resources Defense Council, the Western Natural Resources Law Clinic at the University of Oregon, the West Coast Environmental Law Foundation in Vancouver B.C. and a host of other groups. The current environmental mood of the general public, assisted by efforts of these groups, helps reduce the task of marketing (though active promotion is still very important); all that is needed to complete the picture is a large volume supplier.

Consumers in many nations, particularly in Europe, are now demanding these products, and those who are producing or importing limited quantities into North America are finding that where awareness exists, demand is often outstripping supply.³¹ Importantly, potential consumers are willing to pay more for 'clean' or environmentally-sensitive products.³² In Sweden, the government has decided that organochlorines pose a significant enough risk that alternative paper products have been officially promoted, so that they are widely available and considered the intelligent choice to make.³³ It is important to note that in Sweden chlorine-free paper products initially appeared in response to consumer demand, and stringent government regulation followed. In North America, the demand has grown without significant provincial, state, or federal government support, and regulations on organochlorine discharge from pulp mills are being finalized in both Canada and the United States. These regulations, unfortunately, will not result in organochlorine-free paper products or water bodies within the foreseeable future. That job seems to have fallen to the consumer.

Discussions with some representatives of the pulp and paper industry seem to indicate a growing realization that the "writing is on the wall" and a movement toward chlorine-free bleaching is inevitable, even if not, as they claim, for the right reasons. Uninformed emotion is said to be causing the ground-swell of concern, rather than absolute proof that organochlorines pose health risks, which the industry seems to need. Complimenting this belief is a trend among many corporations to present themselves as being environmentally conscious. In the case of the pulp and paper industry, a more believable case would be presented if they moved quickly to produce organochlorine-free products, and remove organochlorines from mill effluents beyond what the new regulations mandate. In the end, such concrete actions must occur if these companies seriously wish to be considered 'green'.³⁴

Each of the following chapters provides a background for illustrating the link between the complex dioxin issue and the potential of green consumerism. The scientific basis for the claim that dioxin presents an environmental threat is briefly presented in Chapter II, particularly as it relates to areas and organisms affected by pulp and paper mills. The phenomenon of green consumerism, in all of its forms, is described in Chapter III, including information concerning a variety of products and services not directly related to the pulp and paper industry.

In Chapter IV legal strategies which are being used in the attempt to lower organochlorine output are discussed, particularly in relation to the mills of the pacific northwest, including British Columbia. The second part of that chapter is devoted to the various zero chlorine, low chlorine or unbleached paper products which are appearing, including comments on their market

performance. Also included are the results of an informal survey which asked various organizations if they would use unbleached paper products, and if they were willing to pay more for them. Finally, Chapter V presents information concerning environmentally oriented labelling programs which have appeared around the world, and provides a description of the efforts which are underway to curb spurious "environmentally-friendly" product claims here in the United States.

This is a very interesting time to be a conscious consumer, and to feel that the choices one makes are actually having an effect. And they are. For the present, however, I believe that consumers must still operate under the age-old saying "caveat emptor," qualified, in the new environmental climate, as "caveat emptor viridis": may the green buyer beware.

Notes

¹Betty Nickerson, Ladysmith, British Columbia. Letter to the editor of the Vancouver Sun late 1989: exact date unknown.

²Caroline Cox, "Pesticide Reform and Chlorine-using Pulp Mills," Journal of Pesticide Reform 10, no. 2, (Summer 1990): 1.

³The term dioxin is commonly used to refer to 2,3,7,8-TCDD (tetrachlorodibenzodioxin), considered the most potent of several forms of dioxins. In this thesis, unless otherwise specified, this is the molecule referred to.

⁴Leena R. Suntio et al, "A Review of the Nature and Properties of Chemicals Present in Pulp Mill Effluents," Chemosphere 17, no. 7 (July 1988): 1250.

⁵ChemRisk™ A McLaren Company, Assessment of the Human Health Risks Related to the Presence of Dioxins in Columbia River Fish (Portland, Oregon: private publisher, 1990) 2.

⁶D. Hallett, and R. Nostrom, TCDD (2,3,7,8-Tetrachlorodibenzo-p-dioxin) in Great Lakes herring gulls (Canadian Wildlife Service, Ottawa, Ontario, December, 1980).

⁷J.M. Clark, A Review of polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs): Sources and Effects (United States Environmental Protection Agency, Region 5, 1981).

⁸United States Environmental Protection Agency, National Dioxin Study, EPA/530-SW-87-025 (Washington, D.C.: Government Printing Office, 1987).

⁹United States Environmental Protection Agency, US EPA/Paper Industry Cooperative Dioxin Screening Study, EPA-440/1-88-025 (Washington, D.C.: Government Printing Office, 1988).

¹⁰N. Bonsor, N. McCubbin, J.B. Sprague, Stopping Water Pollution at its Source: Kraft Mill Effluents in Ontario, Report of the Technical Advisory Committee, Pulp and Paper Sector, Municipal/Industrial Strategy for Abatement (MISA), (Toronto, Ontario: Environment Ontario, 1988), 163.

¹¹Janet Raloff, "Dioxin: Paper's Trace," Science News, no. 135 (18 February 1989), 104.

¹²United States Public Health Service, Quantitative Risk Assessment Committee, Carcinogenic Risk Assessment for Dioxins in Milk Based on FDA 1989 Survey (Washington D.C.: Government Printing Office, August 15, 1989).

¹³John J. Ryan, Food Research Division, Health Protection Branch, Health and Welfare Canada, Ottawa, Canada, paper presented at the International Dioxin Symposium, Umea, Sweden, August, 1988.

¹⁴Department of Health, Health Protection Programme, A Survey of Some New Zealand Retail Milk Supplies for the Presence of Dioxin, March-April 1989 (Wellington, New Zealand, n.p. May 12, 1989).

¹⁵Tom Webster, "Why Dioxin and Other Halogenated Aromatic Hydrocarbons are Bad News," Journal of Pesticide Reform 9, no. 4 (Winter 1990): 33.

¹⁶For comprehensive reviews of the effects of bleached pulp effluent on animals both in the lab and in natural systems, the reader is referred to: Kraft Mill Effluents in Ontario, a study done by Environment Ontario 1988 (see cite 9), and R. Eisler, "Dioxin hazards to fish, wildlife and invertebrates: a synoptic review," United States Fish and Wildlife Service Biological Report 85(1.8), (Washington, D.C.: Government Printing Office 1986), 37 pp.

¹⁷Steven P. Bayard, "A Cancer-Specific Dose Estimate for 2,3,7,8-TCDD," EPA-600/6-88/007a Review Draft, Appendix A. United States Environmental Protection Agency Carcinogenic Assessment Group, (Washington, D.C.: Government Printing Office, 1988).

¹⁸United States Congress, Office of Technology Assessment, Technologies for Reducing Dioxin in the Manufacture of Bleached Wood Pulp OTA-BP-O-54 (Washington, D.C.: Government Printing Office, May 1989), 3.

¹⁹Joseph Jacobsen et al. "Effects of in utero exposure to polychlorinated biphenyls and related contaminants on cognitive functioning in young children," Journal Pediatrics 116 (January 1990): 38-45.

²⁰Universities Associated for Research and Education in Pathology, Inc., Human Health Aspects of Exposure to PCDDs and PCDFs (Bethesda, Maryland, n.p. June 1988), 1-3.

²¹Dr. Thure Svensson, Swedish Chemicals Inspectorate. Quoted in "Preliminary Comments on the COWIconsult Study," Greenpeace International, 1990, 6. (Obtained from Greenpeace, Gotenberg, Sweden).

²²Suntio, 1249.

²³Neil McCubbin, "Dioxin '89: A bit like the adventures of Alice in Wonderland," Pulp and Paper Canada 90, no. 11 (1989): 17.

²⁴Ron Woznow, V.P. for Environment, Fletcher Challenge Canada. Cited in Poison in Paradise: Pulp Mill Pollution in B.C. Produced by West Coast Environmental Law Research Foundation, Vancouver, British Columbia. August 1989. Videocassette.

²⁵Bob Geiger, "'Green' Monster - Cry goes up for uniform ad standards," Advertising Age, 19 March 1990, 2.

²⁶Greenpeace International, Preliminary Comments on the COWIconsult Study, (Gotenberg, Sweden, Greenpeace 1990).

²⁷see American Paper Institute, "Dioxin and Paper: Perspective and Progress," (New York, 1990) as well as Northwest Pulp and Paper Association, "The Dioxin Issue: Overview," (Bellevue, Washington, 1990).

²⁸Kara Kuryllowicz, "Tissue markets very competitive with price and quality key factors," Pulp and Paper Journal 43, no. 7 (July 1990): 53.

²⁹Bruce Kirk, "After the gold rush: The paper industry in 1990," PIMA Magazine 71, no. 12 (December 1989): 43.

"Spotlight on the Paper and Pulp Industry - Benign or Baneful? - The Environmental Cost," FERTecon Environment Matters newsletter, (London, U.K.) March 1990, 7.

³⁰Bill Andrews, Executive Director, West Coast Environmental Law Association, quoted in: "Canadian pulp mills gain reprieve on pollution curbs," The Vancouver Sun, 2 February, 1991.

³¹Personal communication Anne Barnes, Earth Care Paper, Inc. and Susan Kinsella, Conservatree Paper, October 1989.

³²Several polls have indicated that consumers are willing to pay more for environmental products, and even switch brands if they do not feel that a certain company is 'green' enough. For examples, see: Chemicalweek: Environment Newsletter "Shoppers will pay to be green", 21 February 1990; Oregon Dept. Env. Qual, Hazardous and Solid Waste Division Newsletter, October 1989; Opinion Research Corporation Issue Watch "Environmental Concerns are

Resulting in Changes in Consumer Behavior" 28 June 1990; Environics Research Group Limited public opinion survey prepared for Forestry Canada February 1989; "The Price," The Province (Vancouver), Friday 1 September 1989; Register-Guard (Eugene OR) 3 July 1990 "Environmental concerns affect our buying habits"p B1; Advertising Age, 30 July 1990 "Green concerns influence buying"; Advertising Age, 3 September 1990 "Green buys taking root."

³³Goran Bryntse, "Environmentally Friendly Paper: The Swedish Situation," Journal Of Pesticide Reform 10, no. 3(Fall 1990): 16.

³⁴Indeed, recent articles in such publications as Fortune, Financial Week, Vista (a Canadian business journal), Advertising Age, Marketing News and others point to the growing desire of corporations to be seen not only as green, but as leaders in the greening. While efforts to be more conscious are commendable, many such companies have dubious histories, and it seems hard to believe that they could come around so easily. In at least one case, a company (Mobil) which manufactured 'degradable' plastic garbage bags has been taken to court by the Federal Trade Commission for failing to prove their claim. In the case of pulp and paper companies, trade magazines are replete with editorials and articles dismissing concerns over dioxins.

CHAPTER II

THE UBIQUITOUS DIOXINS

Dioxin remains a substance that has potential only for harm.
It has no known utility in the environment.¹

Dioxin as a Member of the Organochlorine Family

The purpose of this chapter is to familiarize the reader with a group of chemicals known as organochlorines, including their biochemical dynamics and associated health risks. The key point to this chapter is that the structurally similar organochlorines constitute a family of toxins, and should not be broken down into individual types, such as has been done with dioxin, in the policy making process. The fundamental similarities of these compounds demand inclusive regulations.

The term dioxin, when used specifically, refers to 2,3,7,8-tetrachlorodibenzo-p-dioxin, the most well-studied and the most toxic of the dioxins. In actual fact, there are seventy-five types of dioxin, twenty-two of which are tetrachloro-dibenzodioxins.² All seventy-five form a group more formally known as polychlorinated dibenzo-para-dioxins (PCDDs),³ with a common structure of two benzene rings joined by two oxygen atoms (Figure 1).⁴ Each number on the benzene ring corresponds to a potential position for a chlorine atom, allowing for numerous combinations and forms of these organochlorines. Closely related to the dioxins, and often included when using the term dioxin, are the furans. There are 135 congeners (closely related forms) of the furans,

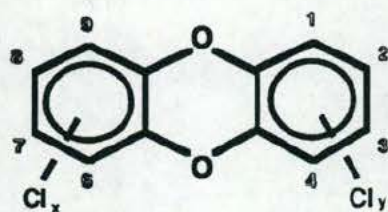
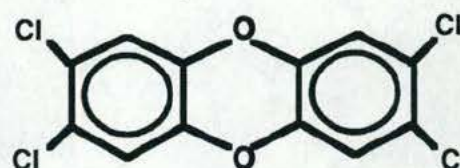
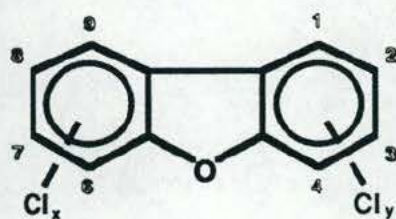
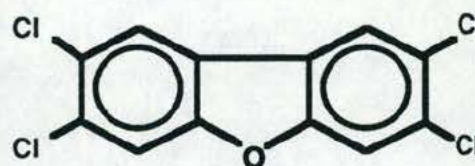
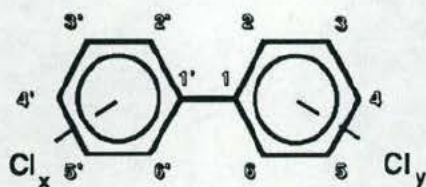
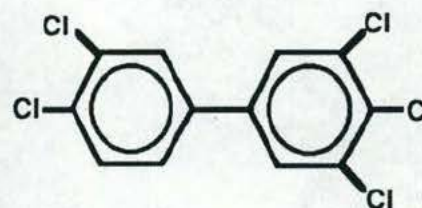
Dioxin**2,3,7,8-TCDD****Furan****2,3,7,8-TCDF****PCB****3,3',4,4',5-PeCB**

FIGURE 1. Structural Formulae for Selected Organochlorines (Generic Structures are on the Left and a Specific Example on the Right).

which have structures similar to dioxins⁵ (see Figure 1). The most toxic of the furans, estimated to be one-tenth as toxic as 2,3,7,8-TCDD, is 2,3,7,8-tetrachlorodibenzo-para-furan (2,3,7,8-TCDF). Polychlorinated biphenyls (PCBs) are another chemical family closely related to dioxins. With similar chemical structures, PCBs act in a manner similar to dioxins, although they are much less potent. PCBs are often contaminated with dioxins, and, when incinerated, PCBs will degrade to the more toxic dioxins and furans.⁶

The members of the organochlorine family vary in toxicity. The most toxic, 2,3,7,8-TCDD, is used as the reference standard against which the relative toxicity of other organochlorines is expressed. An internationally agreed upon ranking system uses Toxic Equivalency Factors (TEFs),⁷ also known as TEQs,⁸ to allow expression of other organochlorines as 2,3,7,8-TCDD "equivalents."⁹ Table 1 indicates the TEFs for various organochlorines.

The use of TEFs in North America is increasing, and will allow for a more comprehensive view of the overall organochlorine loads in various water bodies. This will help move away from simplistic regulation of individual organochlorines, and will also help in estimating risk associated with exposure to organochlorine mixtures.¹⁰

In New York State, the TEF system is being used in the development of incinerator emission standards. Dioxin emission standards are defined as:

Any combination or mix of polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans containing from four to eight chlorine atoms which are expressed as 2,3,7,8-tetrachlorinated dibenzo-para-dioxin equivalents using current New York State Department of Health toxic equivalency factors.¹¹

In the case of pulp mills, organochlorines have largely been regulated only for 2,3,7,8-TCDD, ignoring the presence of as many as three hundred other

Table 1. Toxic Equivalency Factors for Selected Organochlorines.

Compound	Toxic Equivalency to 2,3,7,8-TCDD (TEF)
<u>Dioxins</u>	
2,3,7,8-TCDD	1.0
Other TCDDs	0
2,3,7,8-PeCDD	0.5
Other PeCDD	0
2,3,7,8-HxCDD	0.1
2,3,7,8-HpCDD	0.01
<u>Furans</u>	
2,3,7,8-TCDF	0.1
Other TCDFs	0
2,3,4,7,8-PeCDF	0.5
1,2,3,7,8-PeCDF	0.05
Other PeCDFs	0
2,3,7,8-HxCDFs	0.1
2,3,7,8-HpCDFs	0.01
<u>PCBs</u>	
3,3',4,4'-TCB	0.0009-0.003
3,3',4,4',5-PeCB	0.1-0.4
3,3',4,4',5,5'-HxCB	0.002-0.007

T=tetra (4 carbons); Pe=penta (5 carbons); Hx=hexa (6 carbons); Hp=hepta (7 carbons)

An example of TEFs: if you have 50 parts per trillion (ppt) of 2,3,4,7,8-PeTCD, this is equal to a TEF of 25ppt of 2,3,7,8-TCDD. This becomes very important considering organochlorines other than 2,3,7,8-TCDD are present in pulp mill effluents in significant amounts.

Source: Mary O'Brien, "A Crucial Matter of Cumulative Impacts: Toxic Equivalency Factors," Journal of Pesticide Reform 10, no. 2 (Summer 1990): 25, 26.

identified organochlorines present in the effluent of mills¹² (and the approximately seven hundred other unidentified or little-known organochlorines).¹³ Toxic equivalence factors will help in recognizing the

overall organochlorine burden. This recognition is of great importance considering that the heavier molecular weight organochlorines have been shown to degrade to the more stable, persistent and toxic lower molecular-weight chlorophenolics.¹⁴ In this context, single pulp mills cannot be looked at in a vacuum; the cumulative and synergistic effects of discharged organochlorines from many sources must be given more attention.

Pulp mills are not the only source of dioxins. Table 2 indicates other identified sources, and also shows that pulp mills represent a relatively minor source of dioxins. While levels which are emitted in pulp mill effluents may appear small (a point belabored by industry), the ability of organochlorines to bioaccumulate and bioconcentrate¹⁵ to levels many thousands of times higher than concentrations in the ambient environment (as high as 159 thousand in some fish species), as well as their potent toxicity, raises concerns for organisms high on the food chain, including large fish, birds, humans, and other mammals.¹⁶ The ability of dioxins to bioaccumulate to such a degree adds context to the debate concerning so-called "minute" concentrations of dioxins.

Dioxins and furans are almost insoluble in water, so they tend to travel through ecosystems on particles or as residues in living organisms, often ending up in the sediment where they may become resuspended or taken up by detritus feeders.¹⁷ The persistence of these molecules is largely a result of their being very newly introduced, evolutionarily speaking, into the environment. Organisms have not yet evolved mechanisms for dealing with organochlorines, and they build up in tissue rather than being metabolized and excreted.¹⁸ Organochlorine compounds are now ubiquitous throughout the environment, testifying to their persistent nature.¹⁹

Table 2. Annual Releases of Dioxin in the United States and Sweden (TCDD equivalent g/year).*

Source	United States (1989)	Sweden (1987)
Municipal Solid Waste incineration	23,703	50-100
Car exhausts	39.3	5-15
Metallurgical processes	5346.0	50-100
Pulp and Paper (air and water)	314.8	20-40
Coal-fired power plants	n/a ^a	1
Hospital furnaces	550.3	10
Hazardous waste ^b	314.8	2-6
Fuel combustion	6053.6	n/a

^adata not available

^bfor the United States this figure includes industrial and hazardous waste incineration

*see text for explanation of toxic equivalents of TCDD.

Sources: United States data: American Paper Institute, cited in "'Environmental Friendliness': Responsibility vs. Hype" Peter Balousek and Terry Grant, Weyerhaeuser Paper Company 1989. The American Paper Institute is a trade group for various forestry related industries, including the pulp and paper industry. Swedish Data: Prof. Christopher Rappe, "The Swedish View of the Dioxin Issue" Department of Organic Chemistry, University of Umea, Umea, Sweden S-901, 1987.

A theory put forth by chemical companies which holds that dioxins are naturally occurring in association with such events as forest fires has been shown to lack credibility in light of studies showing that significant levels of dioxins appeared in the environment around the 1930s. This appearance corresponds with the growth of the chlorinated aromatic chemical industry.²⁰ As well, researchers in Chile examined nine 2800-year-old mummies for traces of dioxins in body fat, where it preferentially accumulates.²¹ Even though the equipment used was sensitive enough to detect levels of dioxins as low as 0.3 ppt, no traces were found. The mummies were considered ideal subjects for examination, as the Indians at that time would have spent a great deal of time

cooking over wood fires, and their dried bodies were not embalmed when they died.

Halogens such as chlorine (others are fluorine, bromine, and iodine) are common in their ionic form (eg sodium $[\text{Na}^+]$ chloride $[\text{Cl}^-]$: salt), but ionic bonds are relatively weak compared to the covalent bonds which hold chlorine to carbon (organochlorines). Covalent binding of halogens is rare in nature, with one interesting exception being thyroxine, a thyroid hormone.²²

As the focus on the toxic potential of pulp mill effluents widens from simply looking at dioxin levels, measurement parameters are being expanded to include the aggregate amount of chlorine being emitted from the mills. Absorbable Organic Halogens (AOX), a measurement growing in use both in North America and in Sweden,²³ and Total Organically-bound Chlorine (TOCl) are both methods which allow the amount of chlorine discharged per air-dried tonne (adt) of pulp to be measured, and both involve standard laboratory procedures. Table 3 lists some of the organochlorines found in the effluent from a 'typical' bleached Kraft pulp mill.

The AOX parameter can be used to measure any halogen (eg bromine, fluorine, chlorine and others), but in the case of pulp mill effluent, chlorine is by far the dominant halogen present.²⁴ The chlorine concentration is measured, then the total weight of organochlorines is estimated by multiplying by a factor related to the ratio of the weight of chlorine to the total organochlorine weight. The factors used average 10 to 13; i.e. an AOX of 5 kg per air dried tonne (kg/adt) means that approximately 50 to 65 kg of organochlorines are produced. Chemical pulp mills using conventional chlorine-based bleaching methods discharge between 5 and 8 kgs (11 to 17.6 lbs) of TOCL or AOX per adt

Table 3. Selected Organochlorines Found in Effluent of Pulp Mills Using Chlorine-based Bleaching Processes.

Organochlorine	Concern
dichloromethane	mutagen
carbon tetrachloride	slightly toxic, non-persistent, animal and suspected human carcinogen
chloroacetaldehyde	mutagen
chlorodehydroabietic acids	toxic, persistent
chloroform	slightly toxic, non-persistent, animal and suspected human carcinogen
chlorofuranone	mutagen
chlorohydroxyfuranone	mutagen
chloropropenal	mutagen
dichloroacetone	mutagen
dichloroethane	slightly toxic, non-persistent, animal carcinogen
bromodichloromethane	mutagen
hexachloroacetone	mutagen
pentachloroacetone	mutagen
pentachlorophenol	extremely toxic, very persistent
pentachloropropene	mutagen
phenols (non-chlorinated)	toxic, impair flavor
PCBs	high bioaccumulation, very persistent, carcinogens, mutagens
PCDDs	animal carcinogens, probable human carcinogen
PCDFs	potential animal carcinogens
tetrachloroacetone	mutagen
tetrachloroethane	mutagen
tetrachloroguaiacol	toxic, persistent
tetrachloropropene	mutagen
trichloroacetone	mutagen
trichloroethane	moderately toxic, non-persistent, 1,1,1-isomer: mutagen; 1,1,2-isomer: carcinogen
trichloroethene	mutagen
trichloroguaiacol	toxic, persistent
trichlorophenol	extremely toxic, persistent, 2,3,6-isomer; possible animal carcinogen
chloroveratroles	lethal and sublethal effects, tainting
chloroanisoles	tainting

mutagen = causes changes in gene structure; such changes may promote cancer.

teratogen = causes birth defects

carcinogen = cancer causing

tainting = causes off-flavor in fish

Source: original list prepared by Cecil Inniss, Ontario Ministry of the Environment, cited in Kroesa, Greenpeace Guide to Paper, 1990; additions to list from Sprague and Colodey, 1989, "Toxicity to Aquatic Organisms of Organochlorine Substances in Kraft Mill Effluents" Environment Canada 1989. p 13-16.

bleached,²⁵ a number which is getting steadily lower as new regulations and technologies are implemented. When dioxins are measured as single compounds, their concentrations are often such that they are measured in such minute (though potent) quantities as parts per trillion (ppt), or even parts per quadrillion (ppq). One part per trillion is equivalent to one nanogram (10^{-9} grams) per kilogram or per liter; one picogram (10^{-9} grams) per kilogram is one part per quadrillion. One pg/kg -ppq- is equivalent to one inch in eighty-five trips to the sun and back.

Revelations in the Pulp and Paper Industry

In the United States, the attempted regulation of dioxins has left a rich and intriguing trail, involving cover-ups, collusions, and some questionable data manipulation.²⁶ While much of the history centers around pesticides, notably 2,4,5-T and 2,4,-D (which are invariably contaminated with 2,3,7,8-TCDD), by the beginning of the 1980s a picture was emerging of dioxins being produced as by-products of a number of industrial processes, including paper making and municipal incinerators.²⁷ Swedish industry and government have been carrying out research programs on dioxins since the late 1970s, and this produced early evidence that bleached mill effluent poses a danger in the environment.²⁸ In Canada concern began to crystalize in late 1980, when the Canadian government released a study showing contamination of gull eggs and tissue by dioxins in the Great Lakes area. This prompted the Canadian government to urge the United States to undertake a comprehensive study of all sources of dioxins in the Great Lakes region.²⁹

In 1983 the U.S. Environmental Protection Agency (EPA) found relatively high amounts of dioxins in fish downstream from several pulp and paper mills on the Wisconsin River, confirming suspicions that dioxins were associated with this industry.³⁰ In November of that same year the EPA initiated its "Dioxin Strategy," outlining provisions for the "National Dioxin Study" which was to investigate the extent of dioxin pollution in over one thousand areas throughout the United States.³¹ This study, the release of which was severely delayed, confirmed that pulp and paper mills, as had been suspected, were sources of dioxins in the environment. The presence of TCDD and TCDF was detected in fish and bottom sediment samples downstream from several pulp mills. The highest levels were found at sites on the Androscoggin River in Maine, (29 ppt) and the Rainy River in Minnesota (85 ppt), both of which were downstream from pulp mills.³²

To investigate the nature of the dioxin contamination associated with pulp and paper mills further, the EPA and the pulp and paper industry (through the National Council of the Paper Industry for Air and Stream Improvement-NCASI) jointly undertook a study ("The USEPA/Paper Industry Cooperative Dioxin Screening Study")³³ of five pulp mills across the country, including James River Corporation's mill in Wauna, Oregon. The results of this study were released (after initial suppression by the EPA),³⁴ at the Dioxin '87 Conference.³⁵ They revealed that dangerous levels of dioxins had been found in pulp, sludge, and treated effluent of the mills.³⁶ TCDD was found in seven of nine bleached pulp samples in concentrations of 1.0 ppt to 51 ppt, and TCDF was found in eight of nine samples at levels ranging from 1.2 ppt to 330 ppt.

Treated effluent concentrations of TCDD ranged from 3 to 120 ppq, and for TCDF from 7 ppq to 2200 ppq.³⁷

Most recently, the EPA again entered into a cooperative agreement with the American Paper Institute (API) and the NCASI to look at all 104 domestic pulp mills which manufacture chemical bleached pulp to further elucidate the nature and consequences of organochlorine production.³⁸ As will be discussed below, the concentrations found so far at several mills are high enough to pose a health hazard to species associated with the aquatic environment into which the effluent is discharged.

Once it was established that pulp mills were producing organochlorines, research into their origin in the pulping process began. Several modes of organochlorine production have been identified:³⁹

1. The major mode of dioxin formation involves natural components of wood. Lignin is a major component of wood (approximately 30%)⁴⁰ which the pulping and bleaching processes are designed to remove. Lignin, however, contains some dioxin precursors in the form of phenolic (non-chlorinated organic ring) compounds. Under conditions present in bleaching processes such as heat and alkalinity, the bonding of chlorine to these phenolics results in organochlorines. Reduction of the amount of lignin which remains after pulping (which averages approximately 10%), and which is thus exposed to chlorine, could therefore reduce the number of organochlorines formed (as would, of course, a reduction in chlorine usage).
2. Oil-based defoamers made with contaminated recycled oil could be a source of non-chlorinated dioxin precursors. This is not a major source of organochlorines, and is easily remedied by using cleaner oils.

3. The raw materials used in the mills may themselves be contaminated before they even reach the mill. Wood preservatives such as pentachlorophenol contaminating the wood chips, and pesticides such as 2,4,5-T which have been sprayed on forests may introduce organochlorines into the wood which remains as it goes through the pulping and bleaching processes. Again, this is not a major source of organochlorines.

Strategies for reducing and even eliminating the organochlorines produced as by-products of the pulping and bleaching processes have been appearing with increasing frequency over the last few years. Uncontaminated defoamers are now used, and wood chips are more likely to be examined for contamination by organochlorines. Technological changes, notably the substitution of chlorine gas with chlorine dioxide gas (which does not eliminate organochlorines), have been implemented at many mills. More costly changes, such as oxygen delignification - a very effective way of reducing the amount of lignin in the bleaching stage - are not appearing as fast. These strategies are discussed in greater detail in Chapter 4.

Dioxin Toxicity

The attention focused on the toxic potential of dioxins is based on sound scientific research. Numerous studies both in the laboratory and in the field have documented the potent ability of dioxins to cause a number of effects on different organisms; indeed, it is this variety of effects that until recently had researchers mystified as to their mode of action. These effects, including carcinogenicity, mutagenicity, organ dysfunction, reproductive failure and dioxin-mediated birth defects have been shown to occur at unimaginably low

doses, as low as a few parts per quadrillion. While the effects of dioxins on many animal species are well documented, a clear link, "a smoking gun," has not yet been found which links dioxins to cancer in humans, and carcinogenicity has traditionally been the acid test needed to prove that dioxins pose a significant health risk. Nonetheless, absolute scientific certainty is not required to regulate pollution in the United States.

Recent studies indicate that a major mechanism of dioxin action is through the mimicing of steroid hormones.⁴¹ Dioxin molecules are structurally similar to certain hormones and can bind with those hormones' receptor molecules located inside of cells. This dioxin/receptor complex attaches to the cell's DNA (as would the correct hormone/receptor complex) and facilitates the so-called "cascade effect" of physiological changes. Potency is related to structural analogy: 2,3,7,8-TCDD fits best into the receptor and is therefore the most potent. Depending on the hormone, or its organochlorine "mimic," the production or the inhibition of production of particular proteins can be caused. As chemical messengers, hormones take directions from RNA and catalyze dramatic changes in the body.

In the case of dioxins, they appear to be acting in 2 major ways:

1. They act as an anti-estrogen, causing hormonal disruptions which have a role in promoting other tumors (often in concert with other factors);
2. They act to turn on the production of the biotransformation hormone aryl hydrocarbon hydroxylase (AHH),⁴² normally a self-regulating process. Dioxins upset the feedback mechanism for self-regulation and the production switch is stuck in the 'on' position. While the process involving AHH is normally one of 'detoxification', occurring in the liver, it can promote formation of more toxic, and

even carcinogenic chemicals. If the intermediate molecule produced binds with DNA, mutagenic changes and eventually cancer may be caused. Through enzyme induction, this molecule may facilitate the conversion of other compounds into carcinogens, or turning on other enzymes which have toxic effects. The evidence for this theory comes from research on mice; other species, including humans, make use of a receptor similar to the mouse AHH receptor, and presumably their DNA is affected by this similar dioxin/receptor complex.⁴³

Through mimicry of a hormone, dioxins affect normal body functions of a highly diverse nature. This is evident in the toxic array of dioxins' affects. Cancer, birth defects, impairment of fetal development, atrophy of the thymus, liver damage, reduced immunity, reproductive failure, skin disfiguration, and weight loss are all manifestations of dioxin exposure, appearing at phenomenally low doses and with striking variability from species to species.⁴⁴ The inability to link many of these manifestations of dioxin exposure to humans can be attributed to the fact that humans are relatively resistant to these compounds or to the fact that humans have not been exposed to doses sufficient to cause them. The authors of a major 1988 review on the human health effects of dioxin exposure state that the latter explanation appears more likely.⁴⁵ Although the fact that dioxin's effects appear to be "receptor-mediated" a panel of international dioxin experts (the so-called Banbury Conference) recently could not reach consensus on whether or not this meant that "safe" levels for dioxin exposure could be set.⁴⁶ A conclusion that such a level was possible could result in changes in the way risk assessments for dioxin exposure are conducted, which in turn would have policy implications. The EPA

is currently reviewing the panel's findings which, again, concentrated on the carcinogenetic aspects of dioxin exposure.

Animal and human studies of dioxin exposure convincingly demonstrate the potency of these molecules. Studies have been done in the lab, in the field, with pure dioxins, with bleached pulp mill effluent, and at varying distances from pulp mills. The literature is voluminous: I will review only a relatively small number of studies.⁴⁷ The key point is that every dose ever tested on animals has caused harm.

The toxic effects of dioxin on fish are well-documented. Perhaps the most impressive of the studies was done on rainbow trout (*Salmo gairdneri*), a species often used to gauge toxicity. In one experiment trout were exposed to concentrations of 38 to 789 parts per quadrillion (ppq) TCDD.⁴⁸ The fish were first exposed for twenty-eight days at the various doses, followed by a twenty-eight day period in clean water. At 789 ppq, fish died at significant rates within fourteen days of being exposed. Fish exposed to 38 ppq died at significant rates by the end of the twenty-eight day clean period. All of the fish that had been exposed at any dose showed slowing of growth and behavioural abnormalities by the end of the twenty-eight day exposure period. During the subsequent 'clean' period, these fish did not resume normal growth nor behaviour. The experiments also showed that these trout bioconcentrated 2,3,7,8-TCDD an estimated thirty-nine thousand to eighty-six thousand times. These low doses are approximately one thousand times lower than studies done on rats by the EPA ten years earlier, which resulted in EPA's conclusion that TCDD is an animal carcinogen, as well as a co-carcinogen (meaning it can

work with other chemicals to facilitate or cause cancer) at a concentration of 1 ppt.⁴⁹

Swedish studies have documented various manifestations of dioxin exposure as well.⁵⁰ Fish population density has been shown to decrease with proximity to pulp mills. Fishermen responding to surveys reported an increase in injuries to eyes and vertebral columns of fish in waters receiving pulp mill effluent. Physical injuries such as skin sores, fungal infections, deformed filaments and gill rakers, skeletal deformation, deformed jaws and fin erosion were found in an investigation of two thousand individuals of various species of fish, including perch, pike, and sticklebacks. Fourteen of forty pike caught in an area receiving effluent from a mill had "pug-head", an upper jaw deformation. This symptom was not found among more than one thousand pike observed in areas not receiving effluent.

Physiological investigations revealed a number of 'typical' symptoms, effects which were strong nearest the mills but could be identified as far away as 10 km from a coastal mill. Inhibited growth of sexual organs, enlarged liver, marked induction of enzymes in the liver's detoxification system (AHH and EROD, another liver enzyme), metabolism disorders, changes in red blood cell status, immunodeficiencies and disturbances of blood ionic balances were all recorded in a thorough study done by the National Swedish Environmental Protection Board.⁵¹

The induction of the AHH and EROD (7-ethoxyresorufin) liver enzymes is normally facilitated to metabolize and detoxify lipophilic (fat-loving) substances. The authors of the Swedish study state that increased induction in these fish may lead to formation of substances, including carcinogens, which are more

biologically active and toxic than the original substances. They concluded that most of the physiological symptoms may have relationships with the dioxin load, particularly the induction of liver enzymes.⁵² The same study also looked at bottom fauna, both invertebrates and plants, and found, again, that close to the discharge point the number of species was low in comparison to unexposed areas.

While toxic effects on fish in many areas have not been assessed, the response of rainbow trout is often used as an indicator of potential effects of dioxins in other species. With this in mind, it is disconcerting to see that dioxins have been found in fish in many areas, and that the concentrations often approach levels in the trout study. Recently, fish sampled in Lake Roosevelt in Washington state were found to contain elevated levels of dioxins and furans, with the only known source of these organochlorines being the Celgar pulp mill in Castlegar, at the headwaters of the Columbia River.⁵³ Levels of furans ranged from 1.2 ppt to 174 ppt were found in fillets (muscle, not fatty, tissue where dioxins prefer to migrate), with concentrations ranging from 120 to 174 ppt in whitefish (bottomfeeders). Walleye, rainbow trout, and kokanee were all found to contain elevated levels.

Lake trout and walleyes from the Great Lakes have been shown to contain 476 different organic contaminants, some of which are "lethal at fractions of a part per million, and organochlorines were well-represented in that more toxic group."⁵⁴ Fish from sites downstream of pulp mills on the Columbia and Willamette Rivers in Oregon have been shown to contain TCDDs and TCDFs.⁵⁵

Experiments with other animals again illustrate dioxin's toxicity.

Experimental doses as low as one ppt have been shown to produce cancer,⁵⁶ adverse reproductive effects,⁵⁷ and immune system damage⁵⁸ in rats. The LC₅₀ (acute lethal dose to 50% of the test organisms) of TCDD to mink is 4.2 ug/kg (ppb).⁵⁹ Bald eagles have been found to be suffering reproductive failure due to eggshell thinning from organochlorines, reminiscent of threats from DDT in previous years,⁶⁰ and the population of these birds on the lower Columbia River is considered by some to be in danger of dying out.⁶¹ Canadian Wildlife Biologists documented high levels of dioxins and furans in a colony of great blue herons in British Columbia near a pulp mill; one colony, the Crofton colony, suffered complete reproductive failure at fifty-seven nests after levels of dioxin were found at three times the level that had been present the year before.⁶² Peregrine falcons, already hard hit by pesticide residues, suffered reproductive failure at twenty-two of twenty-eight nests in southern Oregon and northern California. Observations showed that embryonic mortality, rather than eggshell thinning, was responsible. Tests of similar unhatched but whole eggs from peregrine falcons collected from the Big Sur region of California showed that eggs in that region contained elevated levels of dioxins, furans, and PCBs.⁶³

Non-human primates have also been studied. Experiments involving rhesus monkeys showed that concentrations as low as 10-20 parts per trillion body weight in monkeys resulted in reproductive failure in a majority of cases.⁶⁴ More recent studies have looked at behavioural effects on infant monkeys who receive TCDD through the placenta of their mothers and through mother's milk after birth.⁶⁵ Stating that "it appears that the organism is generally most

vulnerable to chemical insult during development," the authors note that several behavioural effects were detected and replicated in the offspring of monkeys carrying elevated levels of TCDD. These included increased care-giving by mothers of exposed infants related to passivity of the infants, decreased viewing of visual stimuli, increased self-directed behaviour in exposed infants (regarded as a maladaptive sign), and altered performance on learning tests. These organisms are very close to humans on the evolutionary scale and share many physiological similarities with us. Further studies by the same researchers suggested that TCDD may interfere with the maturation of central inhibitory competence, which is a cognitive deficit rather than an impairment of perceptual or motor function.⁶⁶ Similar results have been found for perinatally PCB-exposed rhesus monkeys tested in the same manner.⁶⁷ The authors also suggest that behavioural effects of TCDD are mediated by altered thyroid function, with TCDD competing with thyroxine, a thyroid hormone, for its nuclear binding sites. Both hyper- and hypothyroid states are known to impair cognitive function in animals and humans.

These authors readily admit that the cognitive effects of their studies were subtle. However, the dose in the maternal diet was only 5 ppt TCDD. The fact that effects could be detected in offspring at such a low maternal dose is cause for concern in humans, given that exposure to human infants to similar doses exists in certain segments of the population, notably fish-eaters.

All of the above studies present a convincing picture that dioxins pose a significant threat to the health of many different organisms; indeed, they threaten ecosystems in general in that entire food chains have become contaminated. This has not, however, convinced many in the pulp and paper,

agrochemical and other industries that dioxins pose a threat to *humans*. Our health above all is considered, perhaps somewhat inappropriately, to be the core issue. Toxicity to humans is certainly of great importance and relevance, but in light of the fact that we are at the top of many food chains, that we indirectly depend in many non-dietary ways on all other organisms in the food chain, and that industries based on threatened resources such as fisheries are at risk, we cannot disregard evidence on the basis that it may not apply to humans. Ultimately, there are even more fundamental questions we must answer. Can we justify poisoning everything around us while we relax with our risk assessments and say "It's O.K. It's not going to affect us like it does all the other animals."? This seems extremely arrogant and short-sighted.

On top of this, convincing evidence does exist that dioxins pose a threat to human health. In the past, much attention has been focused on effects of PCBs on humans and other animals, and their ability to cause health problems is proven. For example, cognitive effects of the type mentioned above following pre- or perinatal exposure to PCBs have been documented in humans.⁶⁸ Evidence of teratogenicity in pregnant women in Japan and Taiwan who consumed cooking oil contaminated with PCBs and PCDFs is cited by the same authors. Ample evidence exists that PCBs caused neurodevelopmental deficits in infants born to women who ate PCB-contaminated fish from Lake Michigan.⁶⁹ This is all relevant to a discussion of dioxins, as PCBs are invariably contaminated with dioxins, and the presence of PCBs generally indicates the presence of other organochlorines, notably dioxins.⁷⁰

The pesticides 2,4-D and 2,4,5-T have also been found to be contaminated with dioxins,⁷¹ although, like PCBs, previous research has not

made allowances for the fact that dioxins were likely present. Two separate EPA studies, the Alsea I and Alsea II, linked miscarriages in women from Oregon with 2,4,5-T spraying. This, along with numerous animal studies, led to the emergency suspension of this pesticide in the late 1970s.⁷² After years of litigation - largely between Dow chemical and the EPA - and trails of falsified data and corruption, all 2,4,5-T registrations were cancelled in October of 1983.⁷³ It now seems reasonable to assume that dioxins were present in these women as well, contributing to the documented health hazards.

Humans living in industrialized countries have been found to contain measureable levels of TCDD in their tissues, levels higher than those found in persons from less industrialized regions.⁷⁴ This so-called "background level" averages 5 - 15 ppt and exists in human adipose (fat) tissue, blood and milk,⁷⁵ and seem to increase with age.⁷⁶ In at least one case, elevated levels were found to have remained in exposed worker's tissues for thirty-two years.⁷⁷

An average breast-fed baby in an industrialized country ingests levels of dioxin which have been shown to induce toxic effects in laboratory animals. These babies are ingesting up to one hundred times the tolerable level for adults recommended by the World Health Organization(WHO),⁷⁸ a dose which is estimated to be around 70 pg (ppq) toxic equivalencies of dioxin per day.⁷⁹ Donald Barnes, Director of the U.S. EPA Science Advisory Board, after returning from a WHO conference on risks associated with PCBs, PCDDs and PCDFs in human milk, stated "...there are reasons to be concerned about both the nursing infant and the general population."⁸⁰ He has since further indicated that the current "body burden" (that background level which exists in our tissues) of dioxin of humans in North America is associated with a cancer risk of

one in every thousand people, even for those who do not consume an above-average amount of fish.⁸¹ In the case of those who do eat a large amount of fish that has been contaminated with dioxins (such as in the Columbia River), including Native Americans and Asian-Americans, the EPA estimates that they run a cancer risk of 1.5 people in one thousand. They further estimate that these populations are nine times above the level considered acceptable for reproductive damage due to exposure through diet.⁸² Native Canadian peoples in areas near the Peace and Athabasca Rivers in Alberta, where there are several mills in operation and a new, mega-project proposed, have been shown to be similarly at risk.⁸³

Even in studies sponsored by the American Paper Institute, the conclusion has been reached that levels of PCDDs and PCDFs are reaching the point where adverse health consequences for humans may result from additional exposure.⁸⁴ This is particularly true of individuals who are already carrying the average body burden of dioxin equivalents. The Panel charged with the review noted that exposure limits designed to be protective for a carcinogenic endpoint should also be protective for reproductive or immune system damage endpoints. The panel reached the conclusion that until information is available which allows estimates of risk associated with body burden, it is not possible to recommend any single model for risk assessment.⁸⁵

Risk assessments are complex procedures meant to designate "acceptable" levels of effect for pollutants, a process Greenpeace terms "linguistic detoxification."⁸⁶ Description of the various methods of risk determination are beyond the scope of this thesis. Suffice it to say that there are often criticisms of these procedures from all sides, and all of the involved parties

have not agreed on how to express levels of risk. For dioxin, essentially arbitrary levels have been chosen, as there are no federal standards for exposure. The Environmental Protection Agency currently uses a risk assessment model which is based on the belief that no safe level for dioxin exposure exists.⁸⁷ This model uses the stringent estimate of one in one million (a number commonly used by the EPA and the FDA)⁸⁸ as being protective of human health for TCDD, and uses a cancer potency factor of 156 thousand (mg/kg-day)⁻¹ based on rat studies done in 1978, the so-called 'Kociba' studies.⁸⁹ Other agencies, as well as the pulp and paper industry, have evaluated the Kociba data and come up with different potency factors. The Center for Disease Control (CDC) uses 700 to 36 thousand and the Food and Drug Administration (FDA) uses 17,500.⁹⁰ The FDA is required to take economics into account in determining their potency factor: this is not allowed in the determination of water quality standards.⁹¹

The CDC, FDA and industry numbers minimize the risk associated with dioxins, but the EPA have chosen to take a conservative approach and use their own numbers in regulating the ambient water quality standards. Industry has repeatedly attacked them for this. On the other hand, environmental groups have attacked them for even attempting to set a 'safe' level, when all animal studies performed, even those involving extremely low concentrations of dioxin, have resulted in adverse health affects.

Acceptable Daily Doses are calculated by agencies using the risk and cancer potency values. In the case of dioxin, 10^{-6} (the acceptable risk) is divided by the 156 thousand potency factor to give 0.006 pg/kg-day, which is the Acceptable Daily Dose (also known as the Virtually Safe Dose and/or

Tolerable Daily Intake). Table 4 provides Tolerable Daily Intakes for various countries and agencies.

It should be remembered that babies in industrialized countries are estimated to be taking in 70 pg (ppq) per day of dioxin equivalents. The TDIs indicate the amount of dioxin we can take in (largely through food, which is the major mode of intake)⁹² before we begin to enter the 'level of concern' for cancer. Current daily intake for humans is now estimated to be in the range of 0.5 to 1 pg/kg/day,⁹³ a chilling figure when compared to the TDIs. Essentially, we are at risk.

Finally, there have been epidemiological studies which point to a role for dioxins and their equivalents in promoting or causing cancer. Unfortunately, epidemiological data has not been definitive. This is not due to a lack of effects, but rather because data have been incomplete and difficult to interpret, and because there have been numerous potential causes for the effects, clouding the issue of causality.

A serious skin disease known as chloracne is the most consistently documented effect of dioxin exposure.⁹⁴ This is the one human health effect which all parties agree is definitely caused by dioxin exposure, but it is often, and erroneously, termed the *only* effect of dioxins linked to humans. It has occurred in situations of moderate to massive exposure, such as at a BASF plant which exploded in Germany in 1957, and after an industrial accident in Seveso Italy in July 1976, which resulted in the exposure of the surrounding community.⁹⁵ Other health effects have also been documented, but data is largely non-conclusive.

Of greatest interest to the "dioxin as carcinogen" debate is the mounting

Table 4. Tolerable Daily Intake of Dioxin - Levels for Various Countries and Agencies (Expressed as Dioxin Equivalents in pg/kg Body Weight/day).

Country (Agency)	TDI
US(EPA)	0.006
US(FDA)	0.06
US(CDC)	0.03
Sweden	1 - 5
Canada	10-20
F.R.G. and G.B.	1.0
Netherlands	4.0
World Health Org.	1.0

Sources:

1. Greenpeace Factsheet "Dioxins, Furans and PCBs: The True Story," 1990.
2. Memo dated September 25, 1990 from John T. Marlar, Chief, Facilities Performance Branch, Environmental Protection Agency Region 4 to James R. Elder, Director, Office of Water Enforcement and Permits re: Review of Dioxin Cancer Potency Factor.

evidence that data analyzed in several studies of dioxin-exposed workers are fraudulent.⁹⁶ These studies include those done by the CDC (Agent Orange Studies), Monsanto, Hoffman LaRoche (responsible for the Seveso incident) and BASF (above). Two of these incidents, the Monsanto and BASF cases, have recently been scrutinized.

In the Monsanto case, a scientist at the EPA, Dr. Cate Jenkins, has stated that Monsanto falsified data in studies which were then used to make the claim that dioxins do not cause cancer.⁹⁷ After an explosion in 1949 at a Monsanto factory in Nitro, W.V., many workers were exposed to 2,4,5-T, which was contaminated with dioxin. In order to even out the effects which were seen from the exposure, the authors of Monsanto's studies (which were published in scientific and medical journals) put exposed workers in the unexposed (control)

class, and vice versa, to make it appear as if there were no differences between the two.⁹⁸ The overall cancer rate, after being readjusted for the manipulation, was found to be 65% higher than that for a normal population. Dr. George Roush, Medical Director at Monsanto, admitted in court that the conclusions of two of three Monsanto studies were incorrect.⁹⁹ Dr. Roush further admitted that two studies that came out following the original study, and which involved data manipulation, were designed to strengthen Monsanto's position that dioxin does not cause cancer. EPA has partially based risk assessments on these studies, using them to establish "levels of concern" for dioxins.

The BASF case is similar in nature. After the exposure of workers at a chemical plant in West Germany to high levels of TCDD, many workers suffered from chloracne. Studies paid for by BASF failed to find any significant links to cancer, and workers who had developed cancer were denied any compensation. This was despite earlier studies which had found an increase in gastric cancer among the workers.¹⁰⁰

At the 1989 International Symposium on dioxin and its toxic effects, West German scientist Friedemann Rohleder delivered the "biggest bombshell of the symposium"¹⁰¹ by revealing results of a re-analysis of the BASF data. Rohleder had reviewed the data for the West German Court of Social Affairs, and he reported that the BASF data had been "deliberately massaged" to change the final results and obscure the fact that significantly elevated levels of respiratory and digestive system cancer were present.¹⁰² In particular, he argued that the BASF-sponsored study was fraudulent: non-exposed workers had been added to the exposed, and exposed workers had been eliminated from the study.¹⁰³ Dr. D.W. Schindler, Killam Professor of Ecology at the University of Alberta,

stated in a critique of proposed federal (Canadian) regulations for pulp and paper effluents that "Tragically, many court decisions to disallow compensation to workers exposed to dioxins appear to have relied on publications based on this erroneous data."¹⁰⁴ Eric Muller, head of Environment Canada's data section, agreed that cases of fraud in U.S. dioxin studies had been confirmed. He termed a report by Schindler on the topic as "excellent".¹⁰⁵

Despite the submitted evidence that dioxins pose a threat to the health of many species, including humans, we are still exposed daily to them and the regulatory process drags on, emphasizing reduction rather than elimination of organochlorines. The lesson of 2,4,5-T is that regulation came too late for several people and their unborn infants: this should not be repeated. The International Joint Commission¹⁰⁶, Environment Ontario,¹⁰⁷ and reports commissioned by Environment Canada¹⁰⁸ have all recommended that regardless of the level of proof which may be forthcoming, the elimination of all organochlorine discharges, not just dioxin, should be set as a regulatory goal. This is the goal of environmental groups, natives, unions, fisherpeople, and many others who are working on this issue. The major barriers to such a goal include the laissez-faire attitude in government, industry's attempt to combat regulation through the use of fraudulent data and technological mediocrity, and consumers who have been white-washed to believe that "white is best".

Dioxin in Paper Products

Concerns about dioxins have increased in recent years since their discovery in various types of bleached paper products. On one level this discovery seems rather anti-climactic, not really too much of a surprise. While it

may represents the straw which breaks the camel's back, regulation toward elimination of organochlorines should nonetheless have been undertaken. Dioxins are already ubiquitous in the environment, and paper products are simply another potential route for human exposure.

On another level, however, the discovery of these residues is both sobering and challenging. Sobering because the potential exists for increased and intimate contact with dioxins, and challenging because a tangible avenue is presented which allows consumers to funnel their angst into influencing development of paper products, and thereby paper-making technologies, which are organochlorine free.

When dioxins were first found in paper products, immediate questions were raised concerning the potential for these residues to migrate from paper products into consumers using them. An industry assessment (done by the National Council of the Paper Industry for Air and Stream Improvement Inc., NCASI) produced results indicating that the risk to humans from dermal contact with a variety of products including disposable diapers, facial tissue, toilet tissue, sanitary napkins, coffee filters and paper towels, was extremely low, less than one in a million for all of the products.¹⁰⁹ However, criticisms were not long in coming. These included claims that NCASI had only evaluated risks from 2,3,7,8-TCDD and 2,3,7,8-TCDF, without looking at the hundreds of other organochlorines also found in the paper products. Others noted that the cumulative effects of using a wide range of paper products daily were not considered, and that NCASI did not evaluate the enhanced mobility of dioxins in the presence of lipids, solvents or fats, which occur when paper towels are used in cooking, or in conjunction with the use of baby oils or other

lubricants.¹¹⁰ Because of these criticisms and others, the Office of Technological Assessment declared itself unable to evaluate the industry's findings and conclusions.

To look at this problem more closely, the EPA is currently coordinating an Interagency Task Force On Dioxin In Paper, to include the FDA, Consumer Product Safety Commission and others. The program of the task force is to examine cumulative effects and assess technologies that could reduce dioxin production.¹¹¹ The Task Force has widened its scope to include an examination of markets for alternative (i.e. non-chlorine or alternatively bleached) paper products, as well as an examination of perceived needs vs. functional performance needs (i.e. is bleaching to bright white needed for product performance reasons or for purely aesthetic reasons). The Task Force's report was originally planned to be out in the fall of 1990, but, due to the sensitive nature of the subject matter, it has remained under revision within the EPA for several months.¹¹²

The question of dioxin's ability to move from paper products into humans is an area which requires further research, since the amounts which NCASI calculated to be 'safe' in paper products seem dangerously high in light of the toxicity of dioxins. NCASI determined that safe levels for bond paper, newspaper, and other paper used for communication ranged from 4,200 ppt of TCDD for female managers to 9,100 ppt for male managers. Toilet tissue safe levels for females were calculated at 27 million ppt for females and 65 million ppt for males. Actual concentrations of TCDD were measured at 13 ppt in bond paper and TCDD was not detected in disposable diapers.¹¹³ To promote a

value of 27 million as being a safe level would necessarily require adoption of very low transfer rates from paper products to humans.

A German study, which did not look at rates of transfer to humans and did not evaluate risks, found comparable levels of TCDDs in paper. In scrap recycled paper, a level of 8.8 ppt of TCDD was found, with a total of 12.2 TCDD TEF for the paper.¹¹⁴ Newsprint, which is not usually made with chlorine-bleaching technology, had a total of 0.3 ppt TEF TCDD.

Coffee filters and milk cartons are two other types of paper products which have received considerable attention. In both cases the potential exists for dioxin to leach into liquids which humans consume directly. Milk raises particularly important questions because it contains significantly high "background levels" of dioxins and because infants and older children ingest a relatively large amount of it. When dioxin was discovered in milk, the Food and Drug Administration stated that "during the short period of time it will take to complete corrective steps, milk is safe to drink."¹¹⁵ Does this mean to imply that we have been drinking unsafe milk all along? While many mills have reduced the amount of organochlorines present, bleached paper is still used in the majority of milk cartons.

Initially, the EPA and the paper industry assumed that the wax coating on milk cartons would prevent serious leaching of dioxins into milk, but it was soon found that this was not the case. TCDDs and TCDFs have been found at concentrations of 0.04 ppt of 2,3,7,8-TCDD and 0.75 ppt 2,3,7,8-TCDF by Canadian researchers,¹¹⁶ and researchers in New Zealand found dioxin levels of 0.012 to 0.216 ppt in whole milk, and 0.130 to 0.263 ppt in skim.¹¹⁷ The Canadians reported that milk packaged in plastic containers did not have

detectable levels.¹¹⁸ The FDA confirmed in 1989 that dioxins and furans were present in polyethylene-coated bleached paper cartons, with levels averaging 0.02 ppt TCDD and 0.150 ppt TCDF. Again, they did not find these compounds in unpackaged milk.¹¹⁹

Using the Canadian results, Carol Van Strum and Paul Merrill, authors of numerous reports on organochlorines including "No Margin of Safety," have calculated the estimated daily dose in TCDD Toxic equivalents from drinking three eight-ounce glasses of milk in one day. For all of the weight classes calculated (i.e. all of the different size people, 10 - 70 kg) the estimated daily dose exceeded the EPA's acceptable daily dose of 1.0 pg/kg per day for reproductive effects,¹²⁰ and greatly exceeded the cancer risk-specific dose of 0.006 pg/kg/day.¹²¹ This was especially true at the lower end of the scale, where 10 kg toddlers had an intake of 8.28 pg/kg per day, and 30 kg children had an intake of 2.76. A 70 kg man had an intake of 1.183.

Several governments have taken the initiative and banned bleached milk cartons. The Government of the Province of Quebec became the first in North America to ban them through the adoption of a regulation essentially identical to the State of Oregon's existing rule prohibiting toxic substances in food.¹²² Oregon's rule¹²³ lies unenforced, (even after the State government was petitioned for a ruling by the Western Natural Resources Law Clinic at the University of Oregon) with the logic that the daily intake of milk does not exceed the EPA's ADI. The Province of Nordheim-Westfalen, West Germany also has enacted a law which requires schools to switch from bleached milk containers as soon as possible.¹²⁴

Coffee filters, as mentioned, have also received attention. NCASI released results of an assessment of the potential exposure to dioxin through coffee brewed using bleached paper filters, and again found that the risk ranged from zero to one in one million.¹²⁵ The tested coffee filters had TEF dioxin contents ranging from 2.2 to 6.6 ppt, and it was assumed that 65 to 90% of the dioxin migrated from the filter. If we follow a calculation method similar to that used by Van Strum and Merrill, and assume that 4 ppt migrate from the filter into the coffee, and three 8-ounce cups of coffee (mass equals 0.72 kg) are consumed per day, then 0.003 pg/kg per day would be consumed. This is a much more reasonable number than that obtained for milk, although it does rely on industry data. While neither the government nor pulp and paper industry have responded to the potential problems caused by dioxins in coffee filters, the makers of the coffee filters have. There are at least 5 different varieties of unbleached or alternatively-bleached filters available, all of which have entered the markets in response to consumer concern about dioxin intake (Chapter IV).

Conclusion

It should be clear that we are receiving dioxins from a variety of sources, and there are still others I have not discussed. Not only are dioxins ubiquitous, a veritable bombardment is occurring, and regulation still fails to consider cumulative impacts of various sources. An interesting (and potentially frightening) exercise would be to add together all of the dioxins we are receiving from the various sources and determine a cumulative daily intake. Judging from the calculations concerning milk intake, we would very likely greatly exceed the limits which the EPA have set, and very likely approach

those which industry advocates. Even the air which we breathe, at least that the Swedes breathe, is estimated to contain 0.02 pg/kg/day,¹²⁶ and already dioxins may be exerting a subtle, almost undetectable effect on the health of people everywhere in the world.

There are those who feel that many of the cancer incidence figures which we now consider normal may be due in part to the long-term, low-dose exposures of people to such chemicals as dioxins, skewing epidemiological studies. How can we know? Dioxin does not kill in the 'James Bond' style; these compounds have the patience of a scorpion, and will be around long after we are so much detritus. The quest for the holy grail of absolute proof must be abandoned.

In the case of the pulp and paper industry we have an opportunity to eliminate organochlorines from production processes completely. Pulping and bleaching technologies can now get AOX values down as low as 0.2 kg/ad^t without costs which destroy competitiveness. Indeed, there are signs that to stay competitive, low AOX values will need to be obtained, particularly in the European markets. Low-chlorine bleaching technologies, and evidence that commodity markets are shifting toward non-chlorine bleached pulp are explored in later chapters, as is the question of where the origin for this change lies. It is increasingly clear that consumers are playing a major role. The next chapter delves into this consumer role in exploring the subject of green consumerism, with an eye to how this phenomenon can be employed to bring about corporate environmental policies which promote 'cleaner' technologies.

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²⁶For a complete story on the EPA's attempts at regulating this substance from its early days as a pesticide contaminant, and the efforts of Dow Chemical to thwart and manipulate findings and policy, see Carol Van Strum and Paul Merrill's carefully documented report "No Margin of Safety" released by Greenpeace in 1987 (see note 30). Through information obtained with Freedom of Information Act requests, leaked documents, and dogged perseverance, these authors give an outstanding account of the process.

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CHAPTER III

GREEN CONSUMERISM: ADDRESSING POLLUTION THROUGH PRODUCT CHOICE

It is truly enough said that a corporation has no conscience; but a corporation of conscientious men is a corporation *with* a conscience.¹

I think we're going to see a lot of green bullshit this year.²

Consumers are becoming more sophisticated. We have long read labels on products with health warnings and/or nutritional information, but lately we have started to consider the social and environmental effects inherent in the production and character of everyday goods. A basic understanding of today's environmental problems and a growing desire to participate in solutions is helping consumers recognize that product choice can affect the planet in many ways. Paper goods contaminated with organochlorines present one example of products whose associated pollution problems can, to a certain extent, be addressed in the new "green" marketplace. Such a strategy seems feasible in light of experience in other areas: people commonly equate styrofoam with ozone depletion and disposables with landfill problems. But how do individuals address these problems?

For many, the discretionary use of purchasing power is increasingly recognized as a potent force, a vehicle for change, a way of answering the question: What can I do? This fact has not been lost upon the producers, who have translated consumer concern for the planet's health into "the fastest-

growing and most far-reaching dynamic in the world of business."³ Thousands of businesses are expanding product lines and services as part of a steady shift to fill a "green" void.⁴ Shopping, for many, has entered the realm of politics.

Signs of Change

This new "green revolution" has taken off over the last two to three years. Tragedies such as Chernobyl, the Exxon Valdez, and events such as the discovery of holes in the ozone layer, have certainly stimulated the "revolution." Two other events are also of importance: one of these was the publication in 1987 of Our Common Future, also known as the Brundtland Report, which espoused the ideals of sustainable development as described by a United Nations-appointed Commission.⁵ The ideals of this report were embraced by many nations, and discussion groups known as 'round-tables,' including industry, government and environmentalists began to work out the logistics of practical sustainable development.

The second catalyst, more populist-oriented, occurred on April 22, 1990, with the celebration of the 20th anniversary of the first Earth Day in 1970. Earth Day 1990, an environmental extravaganza with educational events of a diverse nature, had a profound effect on millions of people. It motivated them not only to think about environmental problems, but also to take action. In the process, the business world became involved; it could hardly allow such an event to pass without significant promotion of their own. Whereas corporate involvement in the first Earth Day of 1970 "was basically limited to CEOs drawing up plans to evacuate their offices if the protesters stormed the citadels,"⁶ Earth Day 1990 was a veritable trade show. The number of self-styled "environmental"

promotions and products caused some concern among long-time environmentalists, but it nonetheless greatly increased the environmental consciousness of the world. Many corporations participated, and through extensive advertising and promotional efforts, they contributed a great deal to the education of the public.

An important effort which gained much support from Earth Day organizers was the promulgation of the "Valdez Principles" by the Coalition for Environmentally Responsible Economies (CERES), a United States-based group composed of socially responsible investors and environmental groups. These Principles call for corporate support for increased protection of the Earth's biosphere, sustainable natural resources use, wise use of energy, marketing of safe products, disclosure of information related to environmental performance, hiring of environmentalist staff people, assessment of operations in terms of environmental soundness, an annual audit and more.⁷ The Valdez Principles, which are slowly making their way into corporate boardrooms, offer a standard by which businesses can judge their environmental efforts.

Green consumerism is often narrowly perceived of as the increased availability of less environmentally damaging products such as recycled goods, chemical-free products and others. In actual fact, however, there are many more facets to the phenomenon. Central to it is the acceptance of 'cradle-to-grave' (or 'life cycle') analyses for products and processes as the standard against which companies' operations are judged, rather than on the basis of certain product characteristics alone. If a company is producing a "green" product, but is causing unacceptable amounts of pollution in the process, it can hardly expect to meet the rigorous demands of today's knowledgeable

consumer. The threat of backlash is very real; if a company promotes something that is false or misleading and gets caught, it can expect to be crucified in the marketplace.⁸ Green consumers seem to have high standards, and there are those in media and consumer groups who are ever watchful. Risks can be minimized, however, by good market research. This research is presently telling producers just what they like to hear: consumers are describing exactly what they want to buy, and they are stating that they are willing to pay more for such products.⁹

Is it a fad? Is this the latest trend that Wall Street and Madison Avenue have embraced, legitimized, and foisted upon the unwary consumer? The level of involvement by the public, the willingness to act, and the intensity with which this phenomenon has been embraced suggest that this is not something that will soon go away. The phenomenon has been compared to a fundamentalist religion, with the green consumer "looking for a kind of personal salvation."¹⁰ Health-conscious consumers are concluding that personal health concerns are directly related to environmental concerns, and that "Short-term thinking (who gives a hoot about my environment/body) is also a probable recipe for a short-term life."¹¹

Millions of dollars are being committed by companies who feel that this is a long-term concern. General Electric, General Mills, Kodak, H.J. Heinz, McDonald's, 3M, General Motors, and a host of others are among those involved.¹² Companies are trying to "out-green" each other, with increased market share, profit, and credibility going to those that provide the more innovative and ecological products, and that show a proactive concern.¹³

Pollsters Gauge the Mood

Well-used indicators of the public's mood and level of commitment are the polls and surveys relevant to the environment that have been commissioned over the last few years. Results of numerous polls illustrate an increased level of concern with the environment over the last few years, increasingly accompanied by a willingness to act. For example, a New York Times/CBS News poll regularly asks if "protecting the environment is so important that requirements and standards cannot be too high, and continued environmental improvements must be made regardless of cost." In September 1982, 45% agreed and 42% disagreed with this fairly radical statement. In 1988, however, 79% agreed and only 18% disagreed. Respondents include liberals, conservatives, Republicans and Democrats, all of whom profess a similar level of concern.¹⁴ Similarly, a Wall Street Journal/NBC poll conducted in 1989 reaffirmed results of other polls when it found that consumers want to protect the environment, even if they have to pay more. 76% of the respondents said that they had changed the kinds of products they buy and use because of environmental concerns.¹⁵ In Canada, an Angus Reid poll in 1988 found that 83% of Canadians surveyed ranked the environment as very important; 80% said that they were willing to pay more for environmental products.¹⁶ More recently, a June 1990 poll conducted by Opinion Research Corporation of Princeton, New Jersey, found that more than one-fourth of all Americans say that they have boycotted products because of a manufacturer's poor environmental record, and more than 70% of the respondents said that they have switched brands because of environmental concerns.¹⁷ Choosing *not* to

buy a product perceived of as being an environmental hazard is more common than buying products that are seen as advantageous to the environment.¹⁸ A July 1990 poll reported in Advertising Age magazine found that among people who had stopped buying products for environmental reasons, 33% had stopped using plastics, 33% had given up aerosols, 10% no longer bought tuna fish, 4% no longer bought detergent and 2% had stopped using insecticides.¹⁹

Surveys of business and industry show analogous results, although manufacturers are somewhat hesitant to introduce new products until consumers "show the same willingness with their wallets."²⁰ A Gallup poll of Fortune 500 packaging design executives showed that awareness of environmental issues was high, and that companies were willing to make changes.²¹ Twenty eight percent of the executives polled said that they plan to convert current packaging designs to more environmentally sound ones, and 26% said that they had already moved in that direction.²² Productscan, a New York market research firm, has found that environmentally sensitive products are being introduced thirty times faster than all new packaged goods.²³ In the first half of 1990, according to the Marketing Intelligence Service, 308 green packaged goods were introduced, comprising over 9% of all new packaged goods introduced in North America.²⁴

A U.K. survey, conducted by the magazine Director found that directors of manufacturing companies seem to be taking the lead in environmental efforts, while their counterparts in non-manufacturing, service-oriented businesses appear to be more likely to merely pay lip service to the issues.²⁵ It also pointed out that manufacturers have been the bigger offenders in the past, and therefore have more scope for corrective action. Ninety-five percent of the

more than five hundred company directors surveyed said that they have become more informed about environmental issues over the last two years, and of those directors who have come under pressure to develop an environmental policy, the main influence has been their families and public opinion. Overall, however, much room for improvement was found among all surveyed.

Publications for Green Consumers

Books pertaining to environmental consumerism offer another indicator that the public is taking the message to heart and acquiring the resources to take action. Guidebooks for environmentally conscious lifestyles quickly became bestsellers in many instances.²⁶ For example, The Green Consumer Guide²⁷ was one of the best selling books in the U.K. in 1988 when it was released.²⁸ The Canadian Green Consumer Guide,²⁹ prepared by The Pollution Probe Foundation in Toronto and based on the The Green Consumer Guide, takes a look at all aspects of our lives and provides information about how to go shopping without costing the Earth. Earth Day 1990 heralded the release of a variety of resource books such as 50 Simple Things You can do to Save the Planet. Possibly the most relevant book for green consumers is one published by the Council on Economic Priorities, Shopping for a Better World. This book rates 168 companies and more than eighteen hundred brand names in eleven categories, ranging from minority advancement policies to investment in South Africa to environmental issues.³⁰ In its first year (1988) 350 thousand copies of this book were sold, and with the new edition of 1990, that figure has risen to over 550 thousand.

Accompanying the deluge of environmental books is the appearance of a number of newsletters devoted to green consumerism. "The Conscious Consumer Newsletter," "The Earthwise Consumer," and "The Green Consumer Newsletter," have all appeared within the last two years and provide information about new environmentally responsible products and services.³¹ "Green MarketAlert," a similar publication oriented more toward the business impact of green consumerism, includes polls, surveys, and business strategies.³²

Polls of industry people indicate that in the context of green consumerism, it is not just the consumer attitudes that are changing. Green consumerism offers socially responsible opportunities to those involved in business as well. In Business, a magazine oriented toward more socially and environmentally responsible business ventures, has been around for many years. Vista, a Canadian analogue, bills itself as "Canada's alternative business magazine," and frequently carries "green" articles. Marketing agencies are funding research, seminars, and educational programs for employees and customers, and as their commitment grows (and many feel it must), the greening of the business world will become more permanent.³³ Visionary leaders within business are playing a key role in carrying forth programs that promote environmental concerns, admitting that like quality control and the globalization of business, environmental concern must now be a fact of corporate life.³⁴

Business-oriented magazines such as Marketing News, Financial Week, Fortune, Advertising Age, Director, Accountancy, Vista, Working Women, In Business, Business Week, Business Month, Discount Merchandising, Money, Business Marketing, The Economist, Industry Week, International Management,

and others have carried major articles on the implications of environmental concerns for business and industry, and the World Press Review recently carried a cover story dealing with international articles on this topic.³⁵ The language in some of these articles, with terms and phrases such as "sustainability," "short-term profits vs. long-term survival," and "proactive," is similar to what one might find in an environmental periodical.³⁶ Marketers are beginning to think about products in terms of durability, rather than disposability.³⁷ Why should business people not want to do work that is more socially and environmentally oriented? A little education (and perhaps profit) can do wonders in promoting a corporate conscience. Certainly employees will feel better about their jobs.

Conferences for the Curious

Finally, a number of "Business and Environment" conferences have been occurring. No less than a dozen such conferences have taken place over the last two years, including "Globe '90: Global Opportunities for Business and the Environment," "The Environmental Shopping Conference" sponsored by the Pennsylvania Resources Council, the Financial Times' "Industry and the Environment" in London, England, "Environmental Entrepreneurship," sponsored by In Business magazine, and the "Green Marketing Summit," sponsored by Advertising Age magazine. The level of interest in environmental opportunities for business is running very high, and while many are involved simply to make money, there are those who are genuinely concerned about the effects of their businesses on the environment. At last year's Globe '90 conference, those in attendance could be distilled into three main groups:

1. those who were wondering just what is going on, and will likely become involved in some way in the future;
2. those who were there to find out how to get rich quick; and
3. those who were interested in becoming more informed about the issues and implementing environmental policies in their businesses.

The authors of the majority of the articles and publications mentioned above feel that it is the third group who will do the best in the long run.

Who Buys This Stuff?

"Who are the green consumers?" is a question many businesses are interested in, largely so that their marketing agencies can target their efforts effectively. In general, it seems that environmental issues have permeated into the mainstream consciousness, spreading among "typical" mass-market consumers.³⁸ Baby boomers, many of whom were influenced by the events of the sixties, are having children, and at the same time a significant part of the population is moving into the senior years.³⁹ Both of these groups are more likely to adopt an attitude of stewardship, which greatly helps sales of environmental products. Gallup Organization survey results show that 49% of people over fifty identify strongly with environmentalism, compared with 39% of those between thirty and forty-nine and 31% of those under thirty.⁴⁰

It is interesting to note that while general patterns of charitable giving show that people donate a higher proportion of their income than do the wealthy, the opposite is true of green consumers.⁴¹ This new phenomenon is something of a 'young, white and wealthy' phenomenon, as these are the people who can afford the extra costs currently associated with green products.

It seems that purchasing green products is not perceived by the buyer as an act of charity; rather they want to get their money's worth, and are willing to pay to get the most environmentally sensitive product. Whereas Adam Smith spoke of the fully-informed "rational man(sic)" driving the hardest bargain and getting the best price (maximizing his utility), I would argue that the more sophisticated among the new 'green consumers' (wholistic man/woman?) are also looking for the best bargains, but their information is leading them to believe that getting a bargain may not mean getting the cheapest price. They realize that somewhere, something or someone is paying the true price.

What is a Green Product?

A great deal of debate has been engendered on what actually constitutes a green product. Terms such as "recyclable" and "degradable" have not been universally defined, although efforts are underway by recycling organizations and governmental agencies to see that this happens soon. These issues are discussed in more detail in Chapter V. However, general characteristics for "green" products have been promoted, and before continuing with a description of the facets of green consumerism, these characteristics deserve comment.

Standards for what can qualify vary from quick and dirty, largely superficial packaging changes which minimally qualify for a "reduces waste" label to products which truly contribute to the conservation of resources, such as low-flow shower heads, toilet dams, compact fluorescent light bulbs, solar water heaters and battery chargers. These products are the only type that may truly

be called "environmentally friendly", as they have a beneficial effect on the environment.

Joel Makower, co-author of The Green Consumer, gives the following list of criteria for "ideal" green products:⁴²

- it is not dangerous to the health of people or animals;
- it does not cause damage to the environment during manufacture, use or disposal;
- it does not consume a disproportionate amount of energy and other resources during manufacture, use or disposal;
- it does not cause unnecessary waste, due either to excessive packaging or to a short useful life;
- it does not involve the unnecessary use of or cruelty to animals; and
- it does not use materials derived from threatened species or environments.

Other characteristics could be added, such as:

- it makes use of recycled materials to the maximum extent possible;
- it promotes the use of the best available technology to the extent that "technology forcing" (and hence "market-forcing");
- it actively conserves resources (as in the examples given above);
- it promotes the viability of cooperatives and local community efforts;
- it is produced and used within the same area, promoting local economies and reducing transportation costs and hence energy use.

Obviously, all products cannot have all of these characteristics. Those products incorporating several of them, however, are most deserving of an "environmental" designation. A labelling or designation system would therefore be of most use if it involved a ranking system, providing a specific set of criteria by which to judge the product. This seems necessary in that some products may be good in one way but harmful in others (e.g. packaging chemical pesticides in recyclable containers). Analyses employing cradle-to-grave analyses attempt to address these concerns.

The green products that are appearing with the greatest frequency

seem to fall into two categories. They either have environmentally sound contents (e.g. phosphate-free detergents) or they make use of environmentally sound packaging (reuseable, recyclable or made from recycled materials).⁴³ "Green" paper products that are appearing would fit into the first category: the actual paper content of the product is made through the use of technologies that are the best choice for the environment among those paper-making processes available. This "best choice" situation provides an example of the main quandary associated with green products: there is no large-scale pulp and paper-making process that is beneficial to the environment. There are only choices between "evils". However, as with any type of product and its associated production processes, it is important to choose products that are the least detrimental to the environment so that the best available technology and level of innovation are promoted, and so that pollution is minimized.

The Facets of "Green Consumerism"

As stated above, green consumerism is actually a catch-all term used to describe many aspects of a large phenomenon. All of the facets and players involved deserve some analysis, and while there is overlap between them, separation allows for a comprehensive view. These facets include:

1. Green Consumerism - most appropriately, green consumerism refers to the preferential buying of products deemed (officially or not) to be better for the environment than traditional products. Consumers have found a very accessible way to participate in "saving the planet": the choice of green allows consumers to feel as if they are doing something in a world in which environmental problems seem very complex and solutions seem out of their

hands. The shift in the public's attitude, suggested by the survey results discussed above, represents a hopeful indicator of more substantial changes which must come from business and industry. Green consumers could be considered a new form of grass-roots activists, as their increased sophistication and motivation causes ripples far up the business chain. Their increased level of understanding of environmental problems may also help in raising consciousness about our highly consumptive society.⁴⁴ The most sophisticated green consumers will be the ones who say "No thanks, I don't need it."

2. Green Marketing - Marketers/advertisers in many ways operate in between consumers and manufacturers, translating industrial and manufacturing advances into forms that the buying public will accept. They play a very important role, as they influence which products are in, which are out, how much to charge for them, who to aim them at, and where to distribute them. While they have the potential to act in the public interest and could greatly help in making environmental products available, they are also purveyors of the commandment "buy, buy, buy." This is where a fundamental change is needed. Marketers can facilitate this through promotion of recycled goods and services, products designed to last, and products such as energy efficient appliances, that carry an implicit conservation message. Advertising serves as a very effective vehicle for education on such issues.

A reader's poll conducted by Marketing News in late 1989 showed that marketers largely ignore the environmental implications of their actions.⁴⁵ Specific criticisms included:

- a. marketers encourage throw-away attitudes by promoting disposable, often plastic products;

- b. promotional products such as door-hangers are usually in plastic bags and are one-time use oriented;
- c. direct mail advertisements are rarely on recycled paper, rather they are more likely to be on glossy, hard to recycle stock;
- d. frozen foods, such as T.V. dinners use a large amount of packaging;
- e. the philosophy promoted is one that encourages new products, and ignores durability. The latest is best.

Respondents indicated that enlightened marketing that is in touch with avant-garde consumer concerns can be a huge success, but to act without sound knowledge invites product disaster. Some marketers, however, still view public perception of environmental issues as "conceived in ignorance and raised on the hysteria generated by special-interest groups and propagated by a generally acquiescent public."⁴⁶ This particular author recommended that "in pricing to secure your own bottom line, do it fast and don't bet the farm on it," unless the environmental perceptions get locked into law, which has the capacity to stabilize prices by adding security to the pricing equation.⁴⁷ Fortunately, this article seemed to stick out as the exception, with many more consultants and marketers recommending innovation and imagination.⁴⁸

3. Green Manufacturing/Businesses/Corporations - This multi-faceted sector of green consumerism is largely composed of the producers of goods, and therefore the producers and purveyors of many of the pollution problems we must deal with, from toxic waste to excessive packaging and disposable items. It is in this sector that substantial changes in both processes and products must occur for both shifts in attitudes and product designs are to consider effects on the environmental in the long term.

The business world is at present in the middle of a "two-way attack" aimed at getting its operations cleaned up. On one end the government is regulating its activities, while on the other, consumers are demanding changes in products.⁴⁹ These demands have resulted in intense pressure to incorporate environmental concerns into operations and products, if only for competitive reasons. For many, however, being green is not seen as a fad, but rather as part of a change of values, and businesses that truly wish to be part of the solution are taking this approach.⁵⁰ Of course, it helps that environmentalism has been identified as a growth industry worth an estimated \$100 billion a year in the North American market alone, and that it is expected to grow at a rate of 20 to 40% annually.⁵¹

There are several principles and guidelines that are recommended for businesses to help them "get green."⁵² To start with, it is critical to have an accurate and up-to-date understanding of environmental concerns and expectations. In many cases the public may have different priorities from the government or the media, and they may be more realistic. Second, being proactive is very important in defining the debate over issues and policy alternatives. If businesses wait too long, they face a credibility problem. Third, honest and open communications with the public are very important. A sincere commitment must be reflected. Fourth, it is important that realistic goals and standards be established, and that policies be developed that reflect a commitment to them. These policies must come from top level managers in order to create a coherent corporate response.⁵³ Most important, environmental issues must be considered in all areas of a business, from recycling in the office to investment policies in the boardroom.

Businesses and Green Business Advice

Some examples of how business and industry are responding follow. They illustrate that general advice for "greening" a business can be manifested in many ways. These examples are meant to show initiatives emerging largely as a result of choice, rather than through legislative regulation. An important point to remember is that many companies are beginning to consider pollution legislation as the minimum level of performance.⁵⁴

The Body Shop, a U.K.-based chain of cosmetic stores, is a prime example of a company that has implemented environmentally sound practices at all levels of its operations. The company's natural cosmetics are not tested on animals and come in inexpensive refillable containers. Wherever possible, raw materials are purchased from environmentally sustainable, cooperative ventures in developing countries. They do not purchase from producers or suppliers whose standards are not as high as their own, and employees are trained to educate customers on health care as well as environmental and social issues. Employees are also required, and even paid, to spend a certain portion of their work time working in their community. They use only recycled paper, all cars run on unleaded fuel, with newer ones equipped with 3-way catalytic converters. Energy consumption during manufacture is minimized by steam heating, and energy efficient lighting is used.

The company has grown from \$12,500 in 1976 to a network of almost 400 stores in thirty-four countries and a gross income of \$125 million per year. Anita Roddick, founder of the company, was named England's Businesswomen of the year in 1988 for her achievements.⁵⁵ In Canada, the first shop was

opened in 1980, and since then the number has risen to seventy-two. Sales have been growing at 40% annually for the last five years, doubling between 1988 and 1989.⁵⁶ Not bad for a company in an extremely competitive international industry that thrives on glitzy, elaborate promotional campaigns.

3M provides an example of a far-sighted corporate waste reduction policy. 3M's "Pollution Prevention Pays" program has meant increased profits for the company, a more satisfied work force, and a cleaner environment. Cited by activists as one of the most environmentally conscientious companies around, 3M has invested millions in pollution control equipment, as well as in programs designed to recycle everything possible in their production processes (and they have found that it *is* possible to recycle virtually everything). 3M's program is dependent upon the twenty-four hundred ad-hoc employee teams whose participation and advice have made waste recycling and reduction possible.⁵⁷ 3M's CEO Allen Jacobsen asserts that environmental benefit is as important as return on investment for pollution control equipment.

3M launched its "Pollution Prevention Pays" program in 1975, designed to reduce pollution through source reduction and waste recycling. Employees were encouraged to propose changes that would facilitate the program, and ideas soon poured in concerning ways of reformulating products, altering production processes, redesigning equipment, and recovering waste material. Since that time, the program is estimated to have saved the company over \$1 billion by cutting waste by over half. This has meant the elimination of over 100 thousand tons of air pollution, 275 thousand tons of solid wastes and sludges, and 1.5 million gallons of wastewater per year.⁵⁸ By selling some of the recovered wastes, 3M adds nearly six cents per share to the company's profits.

These results have greatly impressed 3M's neighbor, H.B. Fuller, a \$700 million-in-sales-specialty chemical maker, and they have instituted a similar program.

Other large corporations have begun to realize that environmental concerns must be made more central to management decisions. These include Dow Chemical, Monsanto, DuPont, Pacific Gas and Electric, and several large oil companies.⁵⁹ These commitments, while not a result of green consumerism per se, are largely aimed at placating the increasingly environmental orientation of the public, and its perception of these companies as environmental "bad guys." Richard Mahoney, Monsanto's Chairman and Chief Executive, seeks to allay such perceptions by aiming at "zero effect on public perception" of the risks associated with many types of pollution.⁶⁰ Certainly, it will take more substantial changes than reduction in public perception to remove the reasoning for continued government regulation and environmentalist pressure, and it would be naive to believe that such pressures are not a factor in Mr. Mahoney's comments. At the same time, the "sea change" that is occurring in many corporate boardrooms is laudable and cannot be dismissed outright, as many people are liable to do.

Pacific Gas & Electric chief Richard Clarke, whose company works with the Environmental Defense Fund on relationships between conservation and electricity costs, offers the following advice to corporations wishing to bring environmental consciousness into their operations:⁶¹

1. Make environmental considerations part of any decision from the beginning, rather than something extra that is thrown into the pot.

2. "Develop an internal cadre of environmentalists" who will press environmental concerns. "They may not get everything they want, but there certainly are occasions where they prevail."

3. "Have a continuous dialogue with environmental groups."

4. "Put someone on your board to help you factor in environmental issues."

5. "Do these things because they are the right thing to do, not because somebody forces you to do them."

While this is music to the ears of many environmentalists, it is obviously important that the environmentalists involved maintain high standards and stay 'at arm's length' from the corporate wheeling and dealing which accompanies such dialogue. The National Wildlife Federation (NWF) offers an example of one of the so-called "corporate environmental groups" which has perhaps become too close to the interests it is supposed to be protecting. In 1989 NWF offered a seat on its board of directors to Dean Buntrock, the head of Waste Management Inc., which, as well as being a major corporate donor to NWF, is also the largest processor of toxic chemical waste in the world. That in itself is not reason to put WMI on an "environmentally untouchable" list, but there are good reasons for not becoming too friendly, either. Waste Management has been the subject of numerous bribery and antitrust convictions, as well as countless environmental violations.⁶² Such incidents, and there are others, have the potential to put the credibility of the environmental movement at risk. This movement and its large national representatives are clearly not immune to the sort of analysis traditionally reserved for corporations, including

examinations of sources of funds, boards of directors, and management practices.⁶³

British Columbia Hydro, a Crown corporation (government-owned) in British Columbia, has decided to take a more environmentally oriented approach to the use of hydro power in the generation of electricity. B.C. Hydro recently announced that, largely in response to concerns of environmentalists, it has shelved plans for any future "mega-project" developments and instead will rely on a number of alternatives.⁶⁴ These alternatives include the "PowerSmart" program, which will provide subsidies and incentives designed to encourage customers to use energy efficient products and conserve energy, and the "Resource Smart" program, which involves improvements to B.C. Hydro's existing generation and transmission facilities. As well, B.C. Hydro will support private initiatives such as small scale hydro facilities that can then sell power to the grid if a surplus is generated. As well, they will attempt to increase the number of industries making use of cogeneration and self-generation abilities. These policies are expected to save B.C. Hydro money, help it become more efficient, and allow it to be more flexible in responding to future electricity demands.⁶⁵

Integrated pest management (IPM) offers green consumers hope at the produce market and at home. IPM is the practice of controlling insects, fungi, and other organisms that damage or displace desired plants through the use of natural, non-toxic means wherever possible. Employing the use of predators, sprays using natural ingredients (there are many citrus-based sprays), releasing sterile breeding stock for pest insects, increasing the amount of manual labor involved, and other practices can all be used instead of synthetic

chemicals. Appleseed Lawn Care of Ottawa, Ontario is one example of an IPM business that is increasing its customer base as urbanites become increasingly wary about the health and environmental effects of "traditional" lawn care products.⁶⁶

Integrated Pest Management is used extensively in organic farming, which has become successful to the point where demand for organic produce cannot be met by producers. Not only do IPM practices keep pesticides out of groundwater, for example, they also save farmers money. Organic farmers have long known this, and their position was officially endorsed in September of 1989 when the U.S. National Academy of Sciences concluded that carefully managed farms producing a variety of products with little or no chemical use are as productive as, and often more profitable than, those using synthetic fertilizers and pesticides.⁶⁷ More and more, grocery stores are testing their produce for pesticide residues and labelling them as having been analyzed in some manner. However, organic farmers are concerned that this type of testing will confuse customers, as the criteria for produce to be certified "organic" involves more than residue testing; certified organic farming requires that no synthetic chemicals be used in any stage of the growing of the produce.

Supermarket chains and some department stores have jumped on green consumer opportunities with a vengeance. By adopting "green lines" of products, they have served an important role as launching points for a number of suppliers. One of the first chains to take this route was the Loblaw International stores in Canada, which now offer a wide variety of products under the President's Choice Green Line. Within a month of introducing the products, and accompanied by a major promotional campaign, Loblaw moved \$5 million

worth of Green Line products in Ontario alone.⁶⁸ As well, Loblaws has increased market share by 2% since introduction, and shares of the company have gone up from \$9.50 to \$17.00. Though not all of this is attributable to the 'green line,' it has, to say the least, had an effect.⁶⁹

Other chains which have taken on some form of environmental product line include Wal-Mart, which has taken out full-page ads in major newspapers challenging other "manufacturing partners" to join them in improving products and helping to prevent environmental problems. K-Mart, Safeway ("Environmental Options"), Shopko, Kash 'n Karry, Big Bear, Fred Meyer ("Earth Friendly Products"), Albertson's and a number of other supermarket chains have also introduced programs and lines of products designed to educate customers and project an environmental image.⁷⁰

Two strategies seem to be available for these chains. They can either take a short-term approach, as Loblaw's initially did, with products that are high profile but demand little sacrifice by consumers (organochlorine-free coffee filters and disposable diapers, dolphin-free tuna, or products with packaging of varying recycled fibre content), or they can take a more integrated approach, as Tesco, a super store chain in the U.K. has done.⁷¹ Tesco investigates every supplier and their products and demands accountability from 'cradle to grave,' giving preference to suppliers who, for example, deliver goods in reuseable shipping cases. All of Tesco's trucks use unleaded fuel, they have recycling depots at their stores, and they use low energy lighting. They have chosen this approach even though it means that they "pay now and profit later."

Internal inconsistencies can exist in the green business world, and Proctor and Gamble is a case in point.⁷² Proctor and Gamble's contribution to

the municipal waste stream is estimated at 1% of the total for the U.S. In an attempt to address this situation P&G now markets its "Downy" fabric softener in a concentrated form which customers can dilute at home, saving on packaging for the product. As well, P&G is moving into the plastics recycling area, and now offers "Spic and Span" bottles made from 100% recycled PET plastic. Running against these efforts is P&G's position as the leader of the disposable diaper market. The company is actively searching for ways to stop a trend toward use of reusable cloth diapers, mainly through pilot programs exploring the feasibility of recycling and composting disposable diapers. P&G readily admits that current diapers are at best 80% biodegradable.⁷³

Polystyrene egg cartons illustrate what can happen to a product faced with consumer criticism. In Canada, Cascade Dominion, which produces half of Canada's egg cartons and controls most of the Ontario market, has stopped producing foam containers at its Ontario plant in response to a large number of customer and retailer complaints.⁷⁴ In addition, Bonnee-best, Canada's largest egg-grading company, has joined Cascade Dominion in switching to pulp containers.⁷⁵ In the United States, manufacturers of polystyrene cartons lost 25% of their market share in 1989. "In the Pacific Northwest, there are no polystyrene egg cartons left," states Jerry Powell, editor of Resource Recycling in Portland, Oregon.⁷⁶ Pulp containers have the added advantage of frequently being made from recycled fiber.

McDonald's, long a favoured punching bag for environmentalists, is becoming very involved in recycling efforts as a way of cleaning up its image and addressing the solid waste problems inherent in its operations. Through its McRecycle USA program, McDonald's is committing \$100 million in 1990 to the

purchase of recycled materials in all aspects of its operations, a figure that is expected to rise to \$150 to \$200 million as the program progresses.⁷⁷

Everything from napkins to the surface of the children's play areas will be made from recycled materials. In effect, McDonald's has created the largest new U.S. market for recycled materials and has become a powerful purveyor of recycling information through the use of its tray liners, which are seen by an estimated 18 million customers every day.⁷⁸

McDonald's has also taken a very important step by announcing that it will begin using unbleached kraft bags (brown grocery style) rather than the bleached kraft white bags now in use.⁷⁹ Not only will the bags be unbleached, they will also have 50% recycled content in the first quarter of next year, and 100% content in the second quarter. Fast food restaurants, bakeries and delicatessens comprise the largest segment of the bleached kraft bag users, accounting for approximately 55% of the bleached kraft bag and sack paper total tonnage (255 thousand tons). If the move by McDonald's begins a trend among these other users of bleached bags, it will greatly help in reducing organochlorine pollution. The move by McDonald's comes as a result of ongoing discussions with the Environmental Defense Fund aimed at reducing packaging waste, promoting recycling, and promoting technologies that are less harmful to the environment.

There are thousands of other examples that could be cited as evidence that businesses large and small are taking a very serious look at their operations through a "green filter." Polystyrene "peanuts" used in shipping seem headed for the "endangered products" list, home milk delivery companies, which use reuseable glass bottles, are coming back, and the number of stores

and mail order enterprises specializing in environmentally oriented products, such as Seventh Generation in Vermont and Co-op America in Washington D.C., is on the rise. Even Encyclopedia Britannica, in television ads, is focusing on the wealth of environmental knowledge to be found in its books.

Manufacturers and retailers are becoming much more sophisticated in terms of what they will market as an environmental product. They realize that green consumerism is a phenomenon which will be around for a while, and long-term profits and consumer confidence may be more desirable than the risk associated with the fast buck and environmentally-marginal products. In terms of paper products, there is a number of variations emerging based on a green theme. The next chapter looks at these products in particular.

4. The Auditors - A new type of environmental consultant is appearing as businesses increasingly ask the question "What can we do to become more environmental?" Consultants, particularly in Europe but in growing numbers in North America, termed auditors for the approach they use, are being hired for the express purpose of answering the above question. Some of their efforts are extensions of existing environmental consulting firms which have traditionally offered services related to pollution law compliance, hazardous waste clean-up, and pollution control technologies. The new breed of consultants are conducting audits of the operations of a company as a whole and providing advice to manufacturers and other types of businesses at every stage of their operations, from design to distribution.⁸⁰ Auditing not only provides a company with an in-depth review of company processes and progress being made toward long-term goals, but also provides management with an increased awareness of its workers and processes.⁸¹

Audits may focus on single issue such as energy efficiency, or they may cover the operations of the company. Within this range, there are a number of types of audits and strategies possible, including:⁸²

1. the compliance audit - evaluating levels of performance/activity against legal and standards;

2. the ethical audit - evaluating levels of performance/activity against organizationally determined standards and codes of conduct.

3. emerging issues audit - monitoring of new matters (e.g. green consumerism, Clean Air Act) as they emerge in the government or public eye, and determining how they will affect the company and how it should respond.

4. the environmental budget - promoting distribution of activities and resources to certain areas of the company and to the company as a whole on an environmental basis. A reward structure for employees is sometimes tied to environmental performance.

5. environmental asset evaluation - establishing a record of all environmental "assets" (e.g. wetlands) in the company's possession. These monitored for enhancement or degradation.

6. corporate social and environmental reporting - facilitating the inclusion of a social report in the annual report. This can includes an evaluation of non-market phenomena, as well as responsibilities such as health and safety measures as part of the overall quality of life for all employees.

7. technical audits - ensuring that supplies, processes and products are evaluated. The supplies section looks at materials a company uses to produce its goods or services. Everything from how offices are heated to what type of paper used can be considered, and potentially extended to supplier's practices.

The processes section examines activities such as energy usage, construction and design of new premises, staff education (discussion sessions can greatly add value to employee contributions), disaster response plans for both the environment and the company's employees, and much more. The third section, products, is the more obvious, and looks at what a company produces, not just in terms of wanted products, such as goods, but also in terms of unwanted by-products such as pollution.

8. management audits - this provides a look at the company's overall performance, and makes use of the other types of audits described above. Aspects such as investment practices, company response to specific issues of concern to the public, and employee commitment to and understanding of company environmental policies are considered. The designation of a high level employee responsible for monitoring environmental affairs may result from this type of audit.

A rolling series of specific audits can become a comprehensive audit over time, providing the best look at a company's overall effect on the environment. Once an audit is completed, auditors recommend that a final report be produced consisting of two parts.⁸³ The first part should be a formal statement concerning the company's current compliance status in terms of agreed-upon audit standards. An inventory of existing in-house programs addressing audit goals is also included. This portion of the audit should be made available for public scrutiny, as a way of addressing public pressure aimed at increasing access to corporate performance.⁸⁴ The second part of the audit's report constitutes a program for future action, which may be kept private

(optional) while the opportunities to create business and fulfill the audit's goals are realized.

In some environmental consultancies, a unique blend of profit and non profit activities can be found. In these two-part groups, a volunteer non-profit watch-dog group does research to help citizens with environmental concerns, while a consulting business provides funding for the non-profit arm and makes use of its research. One such example is that of Linda Lynch, who founded Environment Watch after an unsuccessful bid for public office in Toronto.⁸⁵ While campaigning, she heard concerns that environmental groups should be self-supporting and not use taxpayer dollars. Her consulting business was the result, and her work has since included advising a major drugstore chain that wants to become "green" and a Toronto company that handles waste from construction and demolition sites. She estimates that \$25 million (\$Cdn) worth of consulting opportunities will be created in 1990 by the national food, drug and retail chains alone.⁸⁶

Other examples of such consultancies exist in the U.K., two of which are the results of efforts by environmentalists turned consultants. Julia Hailes and John Elkington, two of the authors of The Green Consumer Guide, have formed a consultancy known as SustainAbility, which aims to make companies uncomfortable if they *have not* had an audit.⁸⁷ A major worry of Elkington is that there are not enough accredited auditors, and that as environmental pressures increase and more businesses come to them for advice, they will have to turn more people away. The rise of consultant businesses that may have lower standards than firms such as SustainAbility is a problem which will have to be addressed in the future, possibly through the establishment of

guidelines for auditing procedures and goals. The International Chamber of Commerce is now publishing its guidelines as to what an audit should comprise.⁸⁸

Bryn Jones, a past chairman of Greenpeace U.K., echoes Elkington's sentiments and criticizes consultants who direct their clients to become "green" simply because it will result in market payback. Jones considers himself an environmentalist first, and a consultant second. He has set up Landbank as a charitable trust, with Landbank Consultancy as a separate arm, operating under the following premise:

Environmentalists have got to roll their sleeves up and get stuck into working with industry. There's no point standing on the sidelines shrieking abuse. The first thing I insist upon is that the company agrees to an environmental policy statement which I write for them and which is very tough. We then prepare a strategy plan which looks at the major environmental problems, including global warming, deforestation... and ask in what way [the client] contributes to any of these.⁸⁹

Why do companies submit themselves to this? There are many advantages. In the U.K., it is a definite advantage to be "listed" by the auditors, as that shows that the company is making a commitment to cleaning up its businesses. Environmentally conscious investors are therefore more likely to consider them. Reducing the potential liability for pollution problems identified during audits, saving money through waste minimization and reuse, and the creation of new business are all important reasons to allow audits.⁹⁰ Credibility with the public and trust by local communities in which businesses operate is of increasing importance. Also, the "domino effect" that can occur once large firms begin to impose their standards upon their suppliers provides an incentive to businesses of all sizes to critique their operations in an environmental context. The dynamic nature of environmental regulation requires not only constant

monitoring of a company's operations, but also monitoring of the relevant regulations themselves. Staying in front of regulatory efforts is increasingly important, and a proactive stance is essential. The greatest advantage of businesses cleaning up their acts, however, is not commercial in nature. According to Bryn Jones, "The advantage is that we shall survive."⁹¹

5. Government - The most obvious way for governments to have an effect on markets for environmental products is through legislation. Legislation can create markets for technologies and products, and can help in stabilizing and even lowering prices through the stabilizing effect of legal prescription or proscription.⁹² Orienting procurement policies to allow for purchasing of environmental products such as recycled paper is one example of how governments can provide markets, and several governments have chosen to help recycling efforts at all levels.⁹³ The federal government in the U.S., through its purchasing power, is creating markets for lumber made from recycled plastic milk jugs, re-refined oil, recycled tires, cement made from fly ash from municipal incinerators, and other products. The National Institute of Governmental Purchasing estimates that government purchasing power represents 20 to 21% of the GNP, with the federal government alone representing 7 to 8%.⁹⁴

Several State initiatives are in place or in the works. For example, Neil Goldschmidt, former Governor of the State of Oregon, issued Executive Order EO-90-09 in April of 1990, calling for:

the use of paper and paper products that have not been bleached with chlorine whenever possible, to encourage the use of technologies that do not result in the discharge of dioxins into the environment.⁹⁵

Of course, much depends on compliance by state agencies. Monitoring purchasing activities of the Department of General Services is necessary to ensure that the policies are being carried out. Oregon has long had a law requiring the use of recycled paper (with considerations for cost), but this law, the 1975 Oregon Recycled Paper Act, has been unenforced despite efforts to see it more fully carried out.⁹⁶

The federal government of Canada has put its purchasing power behind the Canadian Environmental Choice labelling program (see Chapter V). It has directed Supply and Services Canada wherever possible to purchase products "certified" under the Environmental Choice Program, which includes a wide variety of recycled, biodegradable and chemical-free products. The Program may soon include categories for unbleached and low chlorine-bleached paper products as well.⁹⁷

In the U.K., the government is taking an active role as advisor to businesses that wish to make themselves more environmentally conscious. Through its Business and Environment Unit of the Department of Trade and Industry, the government offers information and expertise, particularly for small businesses, on issues such as pollution control, clean technology, waste minimization, environmentally benign products and environmental services.⁹⁸ Locally, the Oregon Department of Environmental Quality provides information about waste minimization, and municipal governments provide information to facilitate recycling programs.

Of course, the attitudes governments project through policies and support of issues are often directly proportional to public perception and acceptance of such issues. In terms of green products, Pat Carson at Loblaw's

offered a number of insights into the success of green products, as well as thoughts on why such products may be more successful in Canada than in the U.S. He feels that the role of government is crucial in supporting this kind of effort, noting that in Canada all of the politicians are "green," whereas in the U.S. the government is preoccupied with other matters. He feels that the government's priorities may not be the same as the public's.⁹⁹

8. The Environmentalists - Perhaps the biggest challenge of green consumerism lies within the environmental movement. Profit is a dirty word for some environmentalists, and the idea of working with industry and/or business smacks of "selling out" and raises fears of cooption. Fears exist that big companies with large amounts of money and media access may embrace the environmental cause and present themselves as the new leaders. Jeremy Rifkin, noted environmental writer and thinker, states that "The green movement [is in danger of being] steamrollered by corporate America."¹⁰⁰ Barry Commoner argues that using the environment as a sales pitch is nothing short of "deceptive exploitation."¹⁰¹

However, the green consumerism phenomenon is here to stay, and environmental and other socially oriented groups must evaluate their positions and determine how they will approach this problem/opportunity. One approach is that of Landbank and SustainAbility mentioned above. In such companies, the environmentalists are actively defining the debate and setting the standards upon which companies that wish to be considered "green" must operate.

There will certainly be continued opportunity for environmental and consumer groups to act in the traditional role as watchdogs, keeping "corporate America" in line and ensuring that green marketing becomes more than simply

a sales pitch with deceptive potential. Industry is much more willing to work with environmentalists than it has been in the past, and environmentalists may have to swallow some of their pride and work more cooperatively. Pat Carson counsels that the best way to deal with big corporations is to love them to death, and to remember that "business people are not stupid, just ignorant."¹⁰²

Dialogue will have to be accomplished in a mutually respectful way, with environmentalists remaining 'at arm's length' and able to pull back if they feel they are indeed being steamrolled. Keeping distance will also allow credibility to be maintained, including the respect environmentalists have won from a public that views environmental groups as acting in their interest. That seems to be the beauty of the approaches taken by the auditors mentioned above, and of efforts such as those that produced the Valdez Principles.

Remaining at arm's length may preclude active endorsement of products by environmental groups, a situation which in one case led to the resignation of the head of an environmental group in Toronto, Pollution Probe. Probe's Colin Isaacs got together with David Nichol, President of Loblaw's, and publicly endorsed the Green Line of products. This was not taken well by the others at Pollution Probe, who felt that he had crossed a perceived line and become too close to business.¹⁰³ Mr. Isaacs subsequently resigned, and now has an environmental consulting business.

Andre Carothers, editor of Greenpeace Magazine, would like to see the contradictions surrounding green consumerism bloom, so that "the benefits of this or that shade of green become an acrimonious, high-profile public debate. Then perhaps the danger posed by this country's profligate consumption patterns will get the airing it deserves."¹⁰⁴ Carothers also expresses the fear

heard among environmentalists that the opportunity to buy green products may satisfy the public's urge to take other actions, thus lessening their enthusiasm for more substantive changes that do not come as easily. Such fears notwithstanding, I do not see green consumerism putting environmentalists out of a job. There is going to be plenty to do.

It is hard to find sectors of the economy that have not been affected by the "green" phenomenon. Wall Street and the Dow Jones have certainly felt the effect of socially responsible investing, another method of incorporating social values into economic decision making (analogous to green consumerism but on a grander scale). This type of investing has been tremendously successful over the last few years. For example, in 1988 socially responsible mutual funds were two of the top five performing funds in the U.S., and the number one fund in the natural resources sector.¹⁰⁵ There is now \$500 billion on deposit in socially and ethically screened investment funds in the U.S.¹⁰⁶ Many of these funds employ environmental "screens" designed to exclude companies that have dubious environmental records.

Socially responsible banks, often in the form of community development credit unions, are also enjoying increasing popularity.¹⁰⁷ Such institutions are often designed to provide capital to groups that normally have a hard time getting loans for such projects as low-income housing. Larger banks are also becoming involved in this area: a branch of the First Interstate Bank in Portland, Oregon recently hired a loans officer who will deal exclusively with low-income clients. Canada Trust has launched a campaign which includes the establishment of the Friends of the Environment Foundation, the aim of which will be to promote community environmental initiatives.¹⁰⁸ Other sectors of the

economy getting involved include communications networks, many of which air environmental programming on a regular basis.¹⁰⁹ The entertainment business, especially popular musicians and well-known screen personalities, have become involved in all sorts of causes and events.¹¹⁰ Even a well-known beer company is giving up the tried and true "sun, sand, sex" formula in favor of a more ecologically minded advertising message.¹¹¹

It all sounds great ... perhaps too great. While the vast majority of the writings concerning green consumerism are upbeat in nature (pardon the pun), the phenomenon is not without its critics. Its most egregious aspect is obvious from the name of the phenomenon: consumerism. While many marketing strategies educate consumers about environmental problems and what they can do about them, few of them are telling us to consume less, which is essential for the alleviation solid waste problems, excessive natural resource depletion, and environmental degradation in general. The market system does not promote such sentiments since markets operate by stressing growth rather than conservation.

The belief that the marketplace is a suitable arena for addressing environmental problems is anathema to many environmentalists and others concerned with social equality. Markets derive their efficiency from the principle of competition, moderated by Adam Smith's invisible hand, and this runs directly against assertions that cooperative efforts are needed to deal with the complex ecological dysfunctions we have brought about. And, while consumers say that they are willing to pay more for products, this applies largely to those who can afford to pay. Green products are aimed at the affluent

consumer. By extension, they can further marginalize lower-income people from participation in environmentalism in general.

A great deal of skepticism is based on such dilemmas. While there is genuine concern behind some efforts, there can be little doubt that an underlying motive of many of the purveyors of environmental products is increased profits, whether through a better image or through the repositioning of product lines. Why else, when there are plenty of environmental products available, do supermarkets still stock non-green items? Why are they still made? "Freedom of choice is a feeble rejoinder when the issue is global suicide"¹¹²

Economic incentives to save the planet only go so far. If people truly wish to improve the health of the planet, their actions must be more comprehensive than simply purchasing "correct" products. Business interests as well must go beyond a green image if substantial change is to occur. Links must be made between the environment and such interests as financial institutions which, while seemingly distant from environmental problems, may be providing funds to interests involved in activities degrading the environment. As green consumerism becomes more entrenched in society, consumers must become even more sophisticated if their actions are to help. The educational potential of green consumerism is therefore of great importance.

Can Anyone be an Environmentalist?

This skepticism caused by such a rapid and sudden embrace of environmentalism brings up the question: can anyone be an environmentalist just by claiming the title? Veteran environmentalists fear that years of efforts will

pale as public sentiment is commandeered by business and industry. Radical environmentalists such as Earth First! "strike an increasingly responsive chord with statements about the roots of ecological devastation in our economic system and our way of life."¹¹³ One cannot help but wonder whether or not the "greening of the boardroom" is not related to efforts to allay the fears of the public concerning industry's polluting nature. This image hype may create a false sense of security and thus complacency among the public, as people are fed the message that industry has embraced environmentalism, and that there is no longer anything to worry about. Such complacency "diverts people from demanding something meaningful," according to Barry Commoner.¹¹⁴ Industry hype may also have the effect of making environmentalists appear ever more strident as they continue to make demands on an industry now painted green through its own promotion. "If these companies spent as much on environmental reform as they do on public relations, we would really see some progress."¹¹⁵ Can anyone be an environmentalist? The definition of this term is necessarily very broad, but it does have limits. It will be interesting to see whether contributions to environmental groups will decline as the public buys environmental goods, and begin to answer requests for donations with a "No thanks, I already gave."

Legitimate concerns are being voiced by consumers themselves. While most welcome the opportunity to contribute to environmental causes through the exercise of their purchasing power, confusion as to what constitutes a truly environmentally benign product is apparent. Moreover there are fears that this confusion is being taken advantage of with products that are little better for the environment than traditional products. "Some areas of advertising are heading

back to the days of the medicine show" states Minnesota Attorney General Hubert Humphrey III, who is active in the fight to halt misleading green advertising¹¹⁶ (see Chapter V). Advertisements provide a selective presentation of the facts, and, like many of the statements emanating from industry, lack a fullness of context concerning cumulative and other effects of production.¹¹⁷ Again, a cradle-to-grave analysis of products is needed before they can truly be considered environmentally benign. Friends of the Earth U.K., taking on the role as consumer champion, is heavily publicizing a "Con of the Year Award," given to the company making the most false claims.¹¹⁸

Consumers, like industry, are also going to have to accept some potentially distasteful changes if they wish to see green consumerism have lasting and real effects on environmental problems. They may very well have to pay more for environmental products, at least initially, and they will have to accept changes in products that they have been conditioned to believe are better, more hygienic, or safer. Changes in manufacturing and industrial processes represent a firm commitment. Once in place, such changes are more difficult to alter than are the whims of consumers. Consumers will need to undergo "radical behaviour modifications"¹¹⁹ as new, unfamiliar products are introduced.

This last statement underlies the hesitation of the pulp and paper industry in its attitude toward unbleached paper products. Will the public, for years encouraged to believe that white is clean and good, accept products that go against this conditioning? The present argument of industry that market demand for unbleached products does not exist is of limited credibility in light of green consumerism, particularly if the potent ability of marketing/advertising to

create markets for products is considered. A tremendous opportunity exists for the pulp and paper industry to move toward resolution of the persistently recurring dioxin problem by providing unbleached and chlorine-free paper products. At the same time the opportunity exists for the industry to present themselves as having done something for the environment, rather than maintaining their traditional intransigence.

While the jury is still out on whether or not green consumerism represents the panacea some say it does, there is virtual consensus on the potential of the phenomenon to educate both the public and the business world about the finer points of environmentalism. The 'spike' of concern centering around April of 1990 seems to have receded, but it was nonetheless sufficient to catapult this phenomenon forward and create a momentum that will not soon go away. The first challenge will be to ensure product quality control so that consumer disillusionment and frustration is avoided. It will also be important to provide support for standardized auditing procedures of businesses and industry.

A subsequent, and more difficult, challenge will be to widen the green consume agenda so that social issues of concern to women, minorities and peoples of "less developed" countries are also considered in purchasing decisions. Environmental and social problems occur through combinations of millions of individual economic decisions; until now these decisions have been taken by consumers who are woefully uninformed of the environmental effects of the products they are buying. Green consumerism offers hope for the creation of a more informed milieu, and for the use of the market as a creative force rather than as an arena for destructive competition.

Notes

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²³"Consumer Guide to Green Products," Portland Oregonian, 11 March 1990, L1.

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²⁵Tom Nash, "Green about the environment?" Director 43, no. 7 (February 1990): 40.

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²⁷John Elkington, Julia Hailes and Joel Makower, The Green Consumer (U.S. edition, Washington, D.C.: Tilden Press, 1989).

²⁸Cynthia Pollock Shea, "Doing Well by Doing Good," World Watch, November/ December 1989, 24.

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"The Earthwise Consumer," P.O. Box 275, Forest Knolls, California 94933. (415)-488-4614. Contact Debra Lynn Dadd.

"The Green Consumer Letter," Tilden Press, 1526 Connecticut Ave., N.W. Washington DC 20036. Contact Joel Makower.

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CHAPTER IV

OF CARROTS AND STICKS

Part 1 - The Stick: Legal Strategies

I doubt whether Columbus would have succeeded had Queen Isabella stressed practicability, technological, and economic feasibility.¹

Effecting the elimination of pollutants in the United States has, theoretically, been a process whereby public pressure leads to legislation, legislation leads to laws, and laws bring compliance and reduced pollution levels. Unfortunately, the process often does not proceed in such a straightforward manner, and litigation is often necessary to force either lagging governmental agencies to act on congressional mandates, or recalcitrant polluters to reach mandated pollution levels. Litigation may be drawn out, lasting for years, and while court battles rage and agencies produce mountains of paper, pollutants continue to be discharged. Adding insult to injury, pollution laws have largely been designed with end-of-the-pipe solutions in mind, culminating in pollutants being transformed into another material that must be dealt with.

Green consumerism, the offering of a "carrot," offers an alternative to wielding the "stick" of the legal approach in a number of ways. First, consumers, through preferential purchase of authentic "green" products, send a message to manufacturers that it is in their interest to supply what the customer wants, or the customer is liable to look elsewhere. Second, as more companies begin to see

the advantages that corporate environmental policies can bring, both in the market and in the public's perception of a company, they are more likely to look at alternatives to traditional practices. This may result in alterations in production processes and reduced pollution loads. Third, green consumerism, plain and simple, offers a financial reward for the innovator, the leader, the rogue, who comes out with the product that the public wants while the rest, citing technological infeasibility, cost projections, and outdated consumer opinion data, sit back and watch their market share fall.

There can be no doubt that green consumerism is already acting as a catalyst for significant changes in many industries. Staying ahead of pollution laws through innovation means that costly mid-process or add-on abatement procedures are not as likely to be required. As well, the "Not In My Back Yard" (NIMBY) syndrome can be avoided, as communities are more likely to accept a production plant if the operators have a solid reputation for avoiding excessive pollution and listening to community concerns. Staying ahead of pollution laws and on top of consumer preferences also can provide a steady base of consumer support, which removes uncertainty in production, pricing, and markets in general.

This is not to say that we can abandon the legal system and embrace this new green revolution as the panacea that will bring us all to a loving state of sister- and brotherhood. The "bottom line" is still the major factor for many of the environmentally oriented changes that are occurring, and that bottom line has been known to bring about non-environmentally oriented decisions in the past. Therefore the use of legal strategies to force compliance with existing laws and promote tougher laws where necessary must be ongoing. As well, litigation

remains a potent method for bringing issues to media attention, which in itself provides an educational benefit.

Given an opportunity to save face and rid itself of organochlorines, one might think that the pulp and paper industry would jump at the chance to introduce as many unbleached paper products as possible to take advantage of green consumerism. The timing is right for introduction of "green" products for all of the reasons just described, but also because the opportunity exists to introduce new, unfamiliar products now while the public is in an accepting mood. This has not been the case, however. While the second part of this chapter will show that many "alternative" paper products are appearing, they represent a very small percentage of the total number of products, and the pulp and paper industry is concerned that production of chlorine-free paper products now will amount to a tacit admission of these companies' role in continuing dioxin contamination of the environment. Consequently, litigation aimed at forcing government agencies to fulfill their environmental protection mandate are still being employed as a route toward lowering organochlorine output from pulp mills. The legal strategies described herein are those currently in use by environmental groups to promote elimination of organochlorines from pulp mill effluent, and thus paper products. Central to these effort in the northwest United States are the Environmental Law Clinic at the University of Oregon and the Sierra Club Legal Defense Fund in Seattle. The Northwest Coalition for Alternatives to Pesticides, the newly-formed Environmental Law Alliance Worldwide (ELAW) and Columbia River United (CRU), a coalition of interested parties, are the chief petitioners in suits in Oregon and Washington, although other groups, including the Columbia River Intertribal Fish Commission and the

Oregon Salmon Commission are also involved. Internationally, Greenpeace has been very active in this campaign, and in British Columbia the West Coast Environmental Law Association represents a very large coalition of Natives, environmentalists, fisherpeople, representatives of labor unions and others who are against pulp mill pollution. There are many other groups active around the world.

Pulp Mill Regulation in the United States

Technology Forcing and BAT

The use of the legal system to bring about the adoption of technologies to the level at which public health is protected has become known as "technology forcing", a concept that first gained widespread usage during congressional hearings on amendments to the Clean Air Act in 1969.² Inherent in the concept of technology-forcing is the use of "Best Available Technology," (BAT) which refers to relevant technology that must be used to achieve a mandated level of protection. BAT does not just refer to technologies that have been proven or are in operation, but to "the very best control and treatment technology"³ available in the world. This may include pilot plants or transfer technology, as was discussed in *Kennecott v. U.S. EPA*, where the Fourth Circuit Court stated: "In setting BAT, EPA uses not the average plant, but the optimally operating plant, the pilot plant which acts as a beacon to show what is possible."⁴

Obviously, a great deal of innovation, or at least communication between members of a certain industry is required to facilitate the spread of technological

advance. This is the idea behind technology forcing: to promote innovation among those who should best know how to approach technological problems - industry. However, it has often been the case that regulatory agencies and citizen groups are the ones who point the way to technological innovations, spurring the development and implementation of BAT.

Clean Water Act

Regulation of organochlorine-laden effluent from pulp mills in the United States is carried out through the mandates of the Clean Water Act (CWA) of 1972 and applicable Federal Regulations, which mandate the use of BAT for removal of toxic materials from industrial effluent.⁵ The main objective of this Act is "to restore and maintain the chemical, physical and biological integrity of the Nation's waters."⁶ Specifically, "water quality which provides for the protection and propagation of fish, shellfish, wildlife and provides for recreation in and on the water"⁷ is strived for, and "the discharge of toxic pollutants in toxic amounts" is prohibited.⁸

The Clean Water Act adopted a completely new approach in replacing its predecessor, the Federal Water Pollution Control Act.⁹ The ambient water quality standards of the previous Act were supplemented by the addition of standards limiting discharges by all point sources; these limitations were required to reflect "best available technology economically achievable" by 1983.¹⁰ The standards are meant to be determined by the technological ability to purify the waste, rather than by the water body's ability to assimilate the waste.¹¹

The Water Quality Act of 1987 amended the CWA to, among other things, reflect the frustration of Congress with EPA's failure to regulate toxic discharges. Section 304(l) was added to the Act,¹² requiring that States and the EPA identify specific areas - "toxic hotspots" - where it was not expected that water quality standards pursuant to the Act would be achieved. This included the identification of point sources, such as pulp mills, that were causing excessive pollution loads.¹³ The amount of each toxic pollutant discharged by a point source also had to be determined. To address these sources, Individual Control Strategies (ICSs) were to be implemented to focus on the most serious water quality polluters within each State's non-attainment area. In particular, problems due to "priority pollutants" were to be designated, and 2,3,7,8-TCDD, as discussed in Chapter II, has been identified by the EPA as such a pollutant.¹⁴ These pollutants were to be regulated on the basis of the ambient water quality standards, ensuring public health and safety through an "ample margin of safety," rather than through technological feasibility.¹⁵

The 1987 Amendments set a rigorous timetable for establishment of ICSs. Section 304(l)(1) required that not later than February 4, 1989 each State was to supply to the EPA a list of water segments that were not expected to meet water quality standards, thereby requiring an ICS. The EPA was then required to approve or disprove the ICSs not later than 120 days after they were submitted by the State. If EPA did not approve the ICSs, then, not later than one year later (June 4, 1990), EPA would be required to implement the requirements of Section 304(l) itself. Congress was clear in mandating that EPA and the States "must move aggressively in taking the necessary steps to make this program work within the timeframe established by the bill."¹⁶

1. ICSs, WLAs, TMDLs and NPDES Permits - Numeric Arguments

Individual Control Strategies (ICSs) consist of draft or final National Pollution Discharge Elimination System (NPDES) permits which, under the CWA, are the vehicle for imposing point source limitations.¹⁷ Central to ICSs and thus NPDES permits is the Waste Load Allocation (WLA), which is the allowable discharge of a particular pollutant allocated to each pollution source. The combined WLAs (and LAs - load allocations for non-point sources) give the Total Maximum Daily Load (TMDL), which is the amount of the pollutant at issue that can be emitted by all combined sources into a particular water body. In order to calculate an accurate TMDL, (which is crucial for obtaining ICSs and WLAs) a value for the maximum allowable ambient concentration must first be derived for a particular pollutant. In the case of dioxins, however, it is not a straightforward procedure. The TMDL procedure is based on the idea that a water body can assimilate a particular pollutant. However, in the case of dioxins, which are both bioconcentrating and persistent, this basis is undermined.¹⁸ Dioxins, once attached to sediments, can become resuspended and "re-activated" through such actions as dredging, and they can also be reintroduced back into the system with the decomposition of "toxic" fish. Their effect may therefore be many times what a TMDL originally accounts for.

Oregon provides a good example of the problems many states have run into as the implementation of the CWA has moved ahead, including criticisms of some of the basic scientific data used in the determinations. First, to obtain the maximum allowable ambient concentration value for 2,3,7,8-TCDD, the Oregon

Department of Environmental Quality has used data collected from fish tissue samples, and used the following formula to calculate the standard:

$$\text{Standard} = \frac{\text{Risk} \times \text{Weight}}{[\text{WCR} + (\text{BCF} \times \text{FCR}) \times \text{CPF}]}$$

where:

- RT = risk factor
- Weight = weight of the average adult
- WCR = water consumption rate (the amount of water ingested by the average person each day)
- BCF = bio-concentration factor
- FCR = the amount of fish ingested by the average person each day - fish consumption rate
- CPF = cancer potency factor

The EPA has determined values for all of these factors in the above equation, and the Oregon DEQ has adopted the EPA's numbers. The following values are those these agencies use:

- Risk = 1 in 1 million
- Weight = 70 kg (approx. 155 lbs)
- WCR = 2 liters/day
- BCF = 5,000
- FCR = 6.5 gms/day (approx 1/4 oz)
- CPF = 156,000

Using these values, the standard which is obtained is 0.013 ppq 2,3,7,8 TCDD.

The procedure for obtaining the standard is not in question. The numbers which have been plugged into the equation, however, are. For example, recent studies have shown that fish bioconcentrate dioxin at rates up to 159 thousand times, much higher than the value that the DEQ used. Further, the BCF does not consider bioaccumulation, which accounts for build-up of dioxins through the food chain, thought to play a role at least as important as

bioconcentration.¹⁹ The 70 kg average weight is criticized because it is not protective enough of women and children, whose weight averages less than 70kg. The fish consumption rate does not consider Natives, Asians and fisherpeople in general who consumer higher amounts of fish, and consumption rates of 3.5 to 5.25 ounces of fish per day for such sub-populations are considered more realistic by all involved, including industry.²⁰ Finally, the cancer potency factor is constantly under attack by both industry and environmentalists, and studies are underway to determine if this factor needs to be reevaluated.²¹

Because the new data on the various factors used in determining the water quality standard allows scientifically-based legal questions on whether or not the 0.013 ppq standard protects human health with an ample margin of safety, the ICSs that have been issued to Oregon's three dioxin-producing mills (as of November, 1990) are being appealed.²² The appeals will also be based on procedural grounds, due to EPA's failure to provide a federal comment period for proposed ICSs in Oregon. As well, the EPA must, according to the CWA, promulgate federal ICSs due to Oregon's failure to do so in a timely manner. The EPA has only very recently produced a TMDL for the Columbia River basin, even though ICSs for Oregon's three chlorine-bleaching mills were approved in November.²³ A TMDL must be determined before viable ICSs can be permitted, and the reverse has occurred in Oregon.²⁴

The permits that Oregon eventually promulgated in November of 1991 (November 7 for the Pope and Talbot Mill in Halsey, and November 14 for the James River mill in Wauna and the Boise Cascade mill in St. Helens) also fail to take into account two factors discussed in in Chapter II. The first of these is

dioxin's ability to elicit non-carcinogenic health problems that occur at doses as low, or lower, than those estimated to cause the one in a million cancer. The second, and more important fault is that the permits regulate only 2,3,7,8-TCDD, in spite of the fact that it has been shown that hundreds of other potentially toxic organochlorines are also found in pulp mill effluent. This organochlorine "stew" can be collectively considered with measurements such as AOX, which accounts for all adsorbable organic halides. Regulating for AOX not only accounts for the other organochlorines present, but it also allows for calculation of mass limits, which are required under the federal regulations regarding NPDES permits.²⁵ Any permit issued without numerical mass limits is legally invalid.

2. Different States: Different Standards?

While the EPA has, for the most part, supported the 0.013 ppq standard, it retains some flexibility. If a state can prove in a "reasonable and scientifically defensible" manner that a lower standard is appropriate, the EPA has the option of approving the state's alternative standard.²⁶ This lower standard must be appropriate to a particular state, and is not meant to affect national standards. This issue has been raised in the State of Georgia, where the Department of Natural Resources in March of 1990 originally proposed a water quality standard of 7.2 ppq for dioxin, under intense industry pressure. EPA immediately notified the state that it would disprove the standard, which Georgia had promoted without adding the pulp and paper mills of the state to their 304(l) list.²⁷ Early in 1991, however, Georgia backed down under threat of an EPA lawsuit, and decided on a 1.2 ppq limit, which the EPA may accept.²⁸ The EPA

has already accepted a 1.2 ppq standard for Maryland, and Virginia, Alabama, and South Carolina are also expected to obtain approval for this level.²⁹ However, by allowing a higher standard the risk of cancer also increases, as the 0.013 ppq standard is meant to provide for no more than one cancer in one million people. Acceptance of these higher standards only prolongs the elimination of dioxins, and allows procrastination on the part of the industry to apply the best available technology, primarily for economic reasons. A coalition of environmental groups has sued the EPA for allowing the high standard in Maryland, fearing that this could start a trend in the states mentioned above.³⁰

3. Narrative Standards

The inadequacy of the ICSs is only one part of the legal strategy underway to eliminate dioxin from, at least locally, the Columbia River drainage region (which includes the Celgar mill in Castlegar, British Columbia, at the headwaters of the Columbia). The attacks on the ICSs are based largely on "numerical" standards; however both the Clean Water Act and Oregon's toxic substances regulation contain "narrative" language to the effect that waters must be "fishable and swimmable", and that "toxic substances shall not be introduced above natural background levels in the waters of the state in amounts, concentrations, or combinations which may be harmful [at] levels that adversely affect public health, safety, or welfare; aquatic life; or other designated beneficial uses."³¹ In Oregon, the inability of WTD Enterprises, which proposed a chlorine-using Kraft pulp mill on the Columbia River, to prove that the additional pollution burden from their mill would not adversely affect "beneficial uses" (the quality of life for either humans or wildlife) was considered

reason enough for the Department of Environmental Quality to deny an operating permit. This denial illustrates the principle that the burden of proof is on the polluter, not the opponent of the permit, to show that the beneficial uses of the river will not be impaired.

4. Best Available Technology (BAT)

The third front of the legal strategy centers on BAT. A great deal of debate has centered around just what constitutes the "best available technology" for lowering and eventually eliminating organochlorines from pulp mill effluent. Rapid technological advances, pushed to the fore by increasingly restrictive regulations as well as growing consumer demand for dioxin-free paper products, have made it possible to lower organochlorine output to near zero levels. The pace at which the developments have moved is illustrated by a comment by Neil McCubbin, a Canadian pulp mill engineer who has written extensively for the Ontario Ministry of the Environment, including a document (the Ontario MISA Report of 1988) which the DEQ uses as a reference source in determining regulation for Oregon mills. In testimony given at hearings on the Alberta-Pacific mill in Alberta, Mr. McCubbin stated that the levels of AOX presented in Al-Pac's original proposal are now "laughingly outdated."³² He further stated that the best technology available today can produce high quality pulp while keeping the AOX value under 0.5 kg per air dried tonne of pulp: 0.4 for softwood and 0.2 for hardwood are feasible even if high brightness pulp is required. This low AOX, which represents what can be achieved using the best available technology, should, therefore, be the standard that pulp mills in the

United States are required to meet under the BAT mandates of the Clean Water Act.

Alternatives to Chlorine Bleaching

There is no one technology - no quick fix - that can be easily applied to all chlorine bleach-based mills that will result in a dramatic lowering of organochlorine output. Even mills that use the same general process may vary in their own particular engineering, and differences in bleaching sequences, wood species, equipment and desired pulp quality affect the type of changes that may be required.³³ However, there are a number of process modifications that have been shown to have general applicability in lowering organochlorine output, many of which have been pioneered by Swedish mills.

One alternative embraced by the pulp and paper industry is the substitution of chlorine gas, the traditional delignification and bleaching agent, with chlorine dioxide. Chlorine dioxide substitution does decrease organochlorine output, but does not eliminate them (chlorine is still available to bind to the organochlorine precursors in lignin): this substitution has proven popular mostly because it is a relatively inexpensive and rapidly implementable method of lowering dioxin discharge.³⁴ While dioxin production may be decreased, use of chlorine dioxide results in the formation of large amounts of chlorate, a potent herbicide, which is released unless secondary biological waste treatment is used at the mill.³⁵

Originally only 10 to 50% substitution was utilized, but the state of the art has advanced to the point where 100% substitution is possible, and this technology is now in use at a Korsnäs Company mill in Sweden,³⁶ and has

been proposed for the Alberta-Pacific Forest Industries mill in Alberta. The Alberta-Pacific mill is illustrative of the innovative ability of the paper-making engineers: a federal-provincial review panel turned down a proposal for the first version of the proposed mill early in 1990, due to the fact that it would produce 1.5 AOX using 70% chlorine dioxide substitution in combination with other methods. The company was able to put forward another proposal within four months which utilized 100% chlorine dioxide substitution, lowering the AOX to 0.2 - among the lowest in the world.³⁷ Chlorine dioxide is not a final solution to the problem, and should only be considered a step along the path to organochlorine elimination.

Another alternative that enables a significant reduction in organochlorine discharge is the installation of an oxygen delignification system. Such a system operates by lowering greatly the amount of lignin that remains in the pulp prior to bleaching, and thereby reduces the amount of chlorine or chlorine dioxide that is needed to bleach the pulp.³⁸ When used in a bleaching sequence with chlorine dioxide and/or other non-chlorine bleaching agents, the resulting pulp can retain a brightness level only slightly lower than conventional methods. As of 1988, over fifty oxygen delignification units had been installed worldwide, half of them in Scandinavia and Europe, one-fifth in Japan, and one-fifth in North America.³⁹ The first oxygen delignification plant in North America was started up at in 1975 at the E.B. Eddy Forest Products Co. mill in Ontario, and today most mills planning modifications include oxygen delignification.⁴⁰

Oxygen delignification is one of several methods known as extended delignification. Other such processes include modified continuous cooking, (MCC), which is in use at the Longview Fiber bleached Kraft mill on the

Columbia River in Washington. Using MCC in combination with oxygen delignification, has dramatically lowered the lignin content of its pre-bleach pulp.⁴¹

The use of hydrogen peroxide is another alternative bleaching agent seeing increased usage. It can function as a replacement for hypochlorite in sulphite mills (which normally make pulp for use in such products as tissue, towelling and hygienic products) and thereby make these pulps completely chlorine-free.⁴² It can also be used in sulphate (Kraft) mills as a pre-bleaching agent, reducing the demand for chlorine-based chemicals. The reaction by-products of hydrogen peroxide usage are water and oxygen, making it one of the "friendliest" chemicals in the pulp and paper industry.⁴³

Ozone is another chemical that has been shown to function as an alternative to elemental chlorine gas.⁴⁴ Union Camp Corporation announced a new technology they have been working on in a press release of June 27, 1990, which stated that "by using both oxygen and ozone in the new process, we have achieved success in producing white pulp of top quality, competitive with today's cost standards, while significantly reducing many of the environmental problems normally associated with bleaching." Oxygen delignification is a prerequisite for ozone bleaching, as the kappa number (the measurement of the amount of lignin left in the pulp) must be sufficiently low to achieve optimum results. Combinations and/or sequences of ozone with oxygen and peroxide will likely see greater use in the future.⁴⁵

Other methods of reducing organochlorine output are simply a matter of streamlining existing processes. These methods include screening of chips for use in pulping so that only optimum sized chips are used, making washing of

pulp more efficient, and adding chlorine in brief shots instead of one big load.⁴⁶ All of these alternative methods, which do not significantly decrease pulp quality, are rapidly becoming the norm in new mills and in the plans for proposed mills, so that in the future organochlorine discharge will certainly decrease even further, eventually reaching the zero point.

Endangered Species Act

While the vast majority of the legal strategies for elimination of organochlorines in the United States has concentrated on aspects of the Clean Water Act, other legislation is also relevant. In particular, the Endangered Species Act⁴⁷ is being brought into play as another tool for addressing organochlorine buildup in the food chain of the wildlife associated with the Columbia River. Bald eagles in the lower Columbia River basin, home to roughly 25 resident breeding pairs of eagles,⁴⁸ have been experiencing reproductive failure, and this has spurred action to petition the United States Fish and Wildlife Service to "uplist" the eagles from its current threatened status in Washington and Oregon to the more serious endangered.⁴⁹ This could be accomplished using the citizen suit provision of the E.S.A., and also section 1536(a)(2) of the Act, which states that any federal agency, in consultation with the Secretary of the Interior, must "insure that any action [the agency] authorize[s] ... is not likely to jeopardize the continued existence of any endangered species or threatened species." Section 7 of the Act prohibits the "taking" of a protected species, stating that any incidental taking caused by an agency's actions cannot jeopardize the existence of a threatened or endangered species.⁵⁰

The USFWS has suggested that the EPA participate in further investigations of dioxin accumulation in the eggs of Columbia River Bald Eagle eggs, and the EPA has noted that "there is insufficient information at this time to determine the impact of dioxin on eagles."⁵¹ In spite of this lack of evidence, and in the face of the downward trend of the lower Columbia eagle populations, the USFWS has agreed with the EPA that the recently-issued TMDL for the Columbia River basin should reduce dioxin levels such that any endangered species will not be adversely affected.⁵²

The basis for such a decision is questionable. No sampling for dioxins or furans have been performed on Columbia River Bald Eagles, though a 1988 report for the U.S. Corps Army of Engineers found extremely high concentrations of DDE (a metabolite of DDT) and PCBs in eagle eggs, averaging 10.8 parts per million for both chemicals.⁵³ The eagles' stately position at the top of the food chain places them at great risk, and there is an obvious need, both biologically and legally, to determine whether or not dioxins are present in the bodies or eggs of these birds.

This action would serve to broaden the debate from one simply focusing on human cancer-related effects of organochlorines to one concerned with the wider aspects of the effects of organochlorines on wildlife. While dioxins specifically have not been found in eagles, they have not been tested for. The presence of PCBs, considered to be a marker for the existence of 2,3,7,8-TCDD, indicates that they may very well be present and exerting untoward effects. Reclassification of the eagles in Oregon and Washington to endangered status would certainly result in management strategies that would necessarily include

further reduction of any organochlorine discharges into the Columbia River from any sources.

Regulation in Canada

Federal/Provincial Jurisdictions

Regulation of the pulp and paper industry in Canada is carried out under both federal and provincial auspices. This has resulted in overlapping and sometimes confusing regulation, much of which is due to the separation of powers which the constitutional arrangement in Canada mandates. Provinces are the owners of lands and other natural resources, including waters within their boundaries, while federal jurisdiction covers such areas as interprovincial trade and commerce, sea coast and inland fisheries, and the power to maintain "peace, order and good government."⁵⁴ Provinces have historically fought vigorously against a federal role in the management of their natural resources, and this autonomous attitude has led to pollution regulations that vary from province to province, even though federal guidelines, which do not have the force of law (as opposed to regulations), may exist. The federal government's ability to promote their guidelines, which may be more stringent than provincial laws, is often limited to the amount of leverage federal agencies have through distribution of federal funding to provincial governments and the private sector.⁵⁵ For the wood products industry, any funds intended to support woodlands operations or plant development would become unavailable if the guidelines are not followed. Although for the most part distinct regulations may exist both provincially and federally, in some cases provincial-federal

agreements have been produced to offset perceived incursions on provincial sovereignty.

The two major pieces of federal legislation which govern the pulp and paper industry's release of organochlorines into the environment are the Fisheries Act,⁵⁶ which contains special regulations for pulp and paper mills, and the new Canadian Environmental Protection Act of 1988,⁵⁷ which consolidated a number of older, relevant laws, including the Ocean Dumping Control Act, the Environmental Contaminants Act, and the Department of the Environment Act.⁵⁸ Together these laws attempt to provide protection for humans and other species.

The Fisheries Act

The Fisheries Act allows federal jurisdiction (through the Department of Fisheries and Oceans) over sea coast and inland fisheries, and for the harvesting and protection of various fish species and their habitat.⁵⁹ The overall objective of the policy is to increase the productive capacity of fish habitat and to reduce contamination of that habitat from discharges of chemical pollutants, or of other material deemed deleterious to fish. Most relevant to regulation of discharge from pulp and paper mills are the Pulp and Paper Effluent Regulations developed in 1971, which, under the Fisheries Act, prohibit the release of "toxic" mill wastes and serve as minimum national standards.⁶⁰ However, grandfathered into these regulations was a provision whereby they do not apply to pulp mills expanded or altered since 1971, which includes 93% of Canada's mills.⁶¹ Because it has proven difficult to legally define 'altered' or

'expanded' under the badly worded regulations, prosecution of polluters have been "nearly impossible."⁶²

The non-compliant position of most of the pulp mills in British Columbia was illustrated by data released by John Reynolds, former Minister of Environment and Parks for British Columbia to the West Coast Environmental Law Association (whose executive director, Bill Andrews, represents 54 organizations with over 250 thousand members concerned about pulp mill pollution in B.C.) in June of 1990. The information showed that in 1989 not a single B.C. pulp mill had met all of the relevant pollution standards without the benefit of a variance order.⁶³ Subsequent to the disclosure of this information, the British Columbia Ministry of Environment and Parks laid a record number of charges under the Waste Management Act which brought the number of mills out of compliance down to fourteen out of twenty three.⁶⁴ British Columbia's position as a major pulp and paper producing province provides a relevant example for federal-provincial regulatory efforts, and will be used in the following discussion.

Fisheries Closures in British Columbia

The serious nature of the organochlorine pollution problem in British Columbia has been dramatically illustrated by actions taken by the Department of Fisheries and Oceans (DFO) over the past three years. In December 1988 a closure was announced for a portion of the shellfish fishery in Howe Sound, just north of Vancouver, and this closure was widened in June of 1989.⁶⁵ In December of 1989 the DFO halted shellfishery in nearly all areas adjacent to pulp mills on the British Columbia Coast. Finally, in the closing months of 1990

the closures were extended, and a warning was also issued against consumption of diving ducks and other animals.⁶⁶ Said one fisherman: "What they are doing is creating fishermen-free zones instead of pollution-free zones."⁶⁷

The closures are accompanied by warnings against consumption of any shellfish caught in the areas; the levels found in many species of shellfish were well above the 20 ppt level that Health and Welfare Canada has set as the allowable intake of dioxins.⁶⁸ This 20 ppt standard is based on an estimate of the average amount of fish eaten by the average Canadian, which, as in the United States, is much smaller than the amounts eaten by Native people. Since the first round of closures, all mills which use chlorine bleaching have been required to provide information to the federal government on the mills' plans to deal with the problem.⁶⁹ Health and Welfare Canada is said to be looking at the 20 ppt standard for dioxin consumption with a view toward tightening it.⁷⁰

The intensity of the debate in Canada over organochlorine discharge from pulp mills has led to a re-evaluation of the federal Fisheries Act, specifically the Pulp and Paper Effluent Regulations, as well as the British Columbia Waste Management Act. For the Fisheries Act, new changes may include a requirement that mills monitor the environmental effects of their operations, including data gathering which will be of use in the future. Also, the Pulp and Paper Regulations may lose the grandfather provision which now excludes most of the mills due to the pre-1971 exemptions.⁷¹ There will be a phase-in period before the new regulations are actively enforced, and during this transitional period site-specific authorizations, analogous to ICSs under the Clean Water Act, will be issued for each mill.⁷²

British Columbia's Waste Management Act, which governs pulp mills discharges, has also been undergoing changes. In May of 1989 the Ministry of Environment announced *proposed* controls on dioxin discharges, which at that time were relatively stringent. It was promised that a forthcoming Waste Management Act regulation would require mills to reduce their AOX to 2.5 kg/adt by December 31, 1991, and to further reduce them to 1.5 kg/adt by December 31, 1994.⁷³ The Ministry, before implementing the proposed regulations planned to discuss them with the pulp and paper industry. On December 4, 1991, the cabinet actually approved the promised regulations. However, Premier Bill Van Der Zalm vetoed the 1.5 AOX by 1994 limit, citing the cost to the industry.⁷⁴ John Reynolds, Environment Minister, resigned in protest, stating that "I don't think big business should be dictating to the province...the [1.5 kg] regulations...truly represent the standards that are required."⁷⁵ The 1.5 AOX level has now been targeted for an unspecified date in the future, depending on the outcome of research which is now only in the initial stages,⁷⁶ and expected to be complete within two years.⁷⁷ Obviously, the Premier has come under considerable attack for his reneging of the agreement to set a 1.5kg AOX standard.

The Canadian Environmental Protection Act

In 1988 the Canadian Environmental Protection Act (CEPA) was passed. It provides a vehicle by which the federal government may directly regulate dioxins, furans, and pulp mill effluent in a nationally consistent manner. The need to do so was confirmed in a comprehensive report formally titled

Controlling Pollution From Canadian Pulp and Paper Manufacturers: A Federal Perspective, written by William Sinclair, a senior economist with Environment Canada in Vancouver.⁷⁸ The document, which many see as a rounded condemnation of some industry practices and federal bureaucratic impotence, is largely oriented toward revamping the Pulp and Paper Regulations under the Fisheries Act, but it does contain recommendations for nationalizing standards for effluent and testing procedures.⁷⁹ Interestingly, the report also found that the industry's claims of economic hardship were often exaggerated, and that investments in air and water pollution controls declined continuously between 1971 and 1985 as a percentage of total capital investment.⁸⁰

This report, combined with the catalyst of the fisheries closures, increased pressure upon Environment Canada to formally assess dioxins, furans, and organochlorines (AOX) in pulp mill effluent under CEPA for addition to the Priority Substances List. Assessments have been completed for all of these substances. Draft regulations have been released for dioxins and furans, the first of the 44 substances on the Priority Substances List to be evaluated.⁸¹ These draft regulations have drawn criticism for a number of reasons. The Rawson Academy of Aquatic Science, which represents leading aquatic scientists and resource professionals in Canada, has gone so far as to recommend that the the proposed regulations be withdrawn, revised and resubmitted for public review.⁸² They criticize the draft regulations for addressing only 2,3,7,8-TCDD and 2,3,7,8-TCDF, while not guaranteeing decreases in other dioxins and furans, as well as any of the other organochlorines. Although the federal government is in the process of completing an assessment on organochlorines found in pulp mill effluent in

general, this "piecemeal" approach is criticized as a means of complicating surveillance and enforcement, with different industries regulated differently for the same emissions.⁸³ The Academy also noted that the new regulations seem to go against the current Great Lakes Water Quality Agreement which commits Canada to zero discharge of persistent toxic chemicals. The International Joint Commission, which oversees the agreement, has recently called for stronger actions by governments to eliminate the discharge of persistent toxic substances into the Great Lakes.⁸⁴ While the draft regulations would obligate non-detectable levels of dioxins and furans,⁸⁵ Dr. Gordon Runtz of the Academy finds the regulations misleading and feels that they will actually permit the discharge of "quite measureable concentrations."⁸⁶

The assessment of effluents from pulp mills which use chlorine bleach is almost complete, and "the word is that they will deem it toxic."⁸⁷ Until this is complete however, the federal government is refusing to divulge any AOX figures. If the effluent is not categorized as toxic, unenforceable guidelines would be adopted, as opposed to the legally enforceable regulations which will result from a "toxic" categorization.⁸⁸

Standards in Other Provinces

While federal officials ponder the assessment of pulp mill effluents, provinces other than British Columbia have also been moving ahead with their own regulations under the appropriate provincial statutes. In Alberta a great deal of public attention has focused on the proposals for a number of new mills in northern Alberta. Two mills in particular, the recently-completed Daishowa mill in Peace River and the proposed Alberta-Pacific mill near Athabasca, have

engendered attention due to their size, and the fact that they will be discharging effluent into the Peace-Athabasca River system, already considered overloaded with pulp mill pollution from existing mills.⁸⁹ The rivers flow into the McKenzie River basin in the Northwest Territories, and this area's government has come out against the mills. Native groups in both Alberta and the NWT, who are at greater risk due to their high level of fish consumption, have all threatened to sue on the grounds that they depend on the rivers' food and water for their existence.⁹⁰

Alberta has now set standards such that operating and proposed mills will have to include oxygen delignification and/or other processes such as high substitution of chlorine with chlorine dioxide or oxygen bleaching to reduce their organochlorine discharge.⁹¹ This does little to placate the criticisms which have been aimed at the Alberta government's commitment of over half of the province's forests to two major pulp and paper interests. While Alberta's Premier Don Getty backs the leases as a way for Alberta to diversify its economy, critics look at the unprecedented number of new pulp mills that will come on line in the early 1990s. It is expected that production at these mills will swamp the market and drastically lower prices for market kraft pulp.⁹²

Other provinces have also come out with regulations on organochlorine effluent. In Ontario a great deal of research has been done on aquatic effects of pulp mill effluent under the auspices of the Municipal/Industrial Strategy for Abatement (MISA) program of the Ontario Ministry of the Environment, including a widely-cited report "Kraft Mill Effluents in Ontario" of 1988. This Ministry is now using the AOX parameter, and have announced that all kraft pulp mills will have their effluents reduced to no more than 2.5 kg/adt of pulp produced by

December 31, 1991.⁹³ As well, MISA will develop guidelines for "best available technology economically achievable" to be implemented by 1993.⁹⁴ Note the allowance of the qualifier "economically achievable" in the statement. This loophole has been removed from American regulations.

Quebec, one of Canada's other "pulp" provinces, has also announced regulations. AOX has been set at 1.5 by December 31, 1991, and dioxins and furans are to be down to non-detectable levels by Dec. 31, 1993. Already in that province, mills have had to submit effluent characteristic reports to the provincial environment agency.⁹⁵

Regulation in Sweden

Sweden seems to be the favorite example of a country that has done the right thing in terms of pulp and paper mill regulation. And although the Swedes may not be perfect, particularly in relation to secondary treatment of mill effluent (which is much more common in North America), their level of innovation in pulping and bleaching technologies has set the standard for the rest of the world.

Swedes have been carrying out studies on the biological effects of the bleached pulp effluent for almost two decades. This research, most of which involves mills on the Baltic Sea and Gulf of Bothnia coasts, started in 1977 with a program known as the Environmental Harmonization of Manufacture of Bleached Pulp.⁹⁶ This program ran until 1982, and was continued by the "Environmental impact of Bleach Plant Effluent" and the "Environment/Cellulose" research program which ran from 1982 to 1985 and 1983 to 1986, respectively.⁹⁷ The results of these studies, as well as other

studies done cooperatively with Finland, led to a conclusion which illustrates the major difference in attitude toward regulation of organochlorines in North America and Sweden. Whereas North American regulatory agencies are still struggling with the degree to which dioxin *alone* represents an environmental and health risk, the Swedish attitude is illustrated by the following:

During the Symposium there was much discussion on whether the key role of halogenated organics [organochlorines] has now been discovered. A common opinion was that their significance to human health has not been completely studied although the effect on the ecosystem is evident.⁹⁸

Effectively, the Swedes had decided five years ago that enough was known to conclude that total organochlorine discharge, and not just dioxin, needed to be regulated and decreased, while in North America this realization is only just entering regulator's consciousness.

The findings of the Swedish studies produced responses from environmental organizations, government, and industry. Environmental organizations used the results to step up their campaign against bleached pulp mills, and pressed harder for alternatives to chlorine-bleached paper products. The Swedish government announced its intentions to regulate organochlorines with the ultimate goal of elimination, and industry attempted, initially, to allay the fears which were brought out by the release of the studies. Later, as they realized that the public was sincere in its demands for chlorine-free paper products, they began to produce them for domestic consumption. The reactions of each of these groups deserves further comment.

The activities of Swedish environmental groups, particularly the Swedish Society for the Conservation of Nature and Greenpeace, have been instrumental in convincing consumers that unbleached and chlorine-free paper

products are the best choice for the environment. Since the end of the 1970s these groups have pushed for unbleached and chlorine-free products, but it was not until 1986 that real progress was made in obtaining such paper.⁹⁹ In that year the Munkedal paper company was able to supply copy paper which was produced with a discharge of only 1.0 kg/adt AOX, which at that time was the most "environmentally friendly" copy paper possible. That paper was immediately successful in the marketplace, and many Swedish consumers have since learned to associate whiteness with pollution and actively prefer unbleached products. Today, supermarkets are full of brown coffee filters, cream-colored diapers, milk cartons and tampons; *oblekt papper* (unbleached paper) has replaced traditional bright white chlorine-bleached paper.¹⁰⁰

At the same time that the Swedish government was coming out with the world's most stringent pulp mill regulations for organochlorines, many Swedish paper products were being produced that met the consumer's even more stringent standards. Essentially, the consumers were pushing those mills which produced products for domestic consumption, while the government regulations controlled the discharge of mills which produced pulp and paper products for export. Central to the successful efforts of the Swedish environmental groups was the creation of a ranking system that retailers make active use of, which rates paper on the basis of AOX levels at the mills.¹⁰¹ This rating system is described in more detail in Chapter V. The system has worked well enough that many mills are already meeting regulatory limits imposed for the future. For example, Proctor and Gamble has instructed Stora, the supplier of pulp for their disposable diapers, to meet 0.1 kg AOX discharge levels so that Proctor and Gamble's Swedish diapers could qualify for the highest rating level.¹⁰² Proctor

and Gamble has made no such demands on mills which supply pulp for its North American diapers.

The Swedish government has long regulated pulp and paper mill effluent, but until the mid-1980s the focus had been on Biological Oxygen Demand (BOD) levels which rise with the discharge of oxygen-consuming biodegradable substances.¹⁰³ In the mid-1980s, however, with the results of several studies showing that organochlorines were causing widespread damage to the Baltic Sea ecosystem, regulation shifted to control of not just dioxin, but organochlorines in general. The Swedes believed that chlorinated organic chemicals had been responsible for environmental disasters in the past, and therefore warranted regulation to a greater degree than other components of pulp mill effluent.¹⁰⁴ In 1986, the Swedish Environmental Protection Board (SNV) announced that they were formulating an action plan to deal with organochlorine discharges.¹⁰⁵ The plan, known as the "Action Plan against Marine Pollution" was presented as part of the government's "Environmental policy for the 1990s" in the Swedish Parliament in 1987, and was enacted in that year.¹⁰⁶ The Plan set mills on a timeline to achieve 1.2-1.5 kg TOCl per tonne air dried pulp by 1992, 0.5 by 2005, and 0.1 by 2010¹⁰⁷ (1.5 kg TOCl is approximately 1.8-2.0 kg AOX).¹⁰⁸

Note that the SNV plan was announced before the U.S. EPA findings that bleached paper products contained dioxin residues. These findings prompted the Swedish Environment Minister, Birgitta Dahl, to declare in June 1988 that she wanted all household products to be chlorine free within one year.¹⁰⁹ In subsequent speeches both she and the Swedish Prime Minister reiterated their concern about dioxins, and reemphasized their long-term goals

of eliminating organochlorines from the pulp and paper industry. Speaking at the Dioxin '88 Conference in Umea, Sweden in August of 1988, Birgitta Dahl stated:

...our action programme to counteract marine pollution and the international agreements we are working towards include commitments to change the technology and structure of the spheres of society in question...In this work, steps to eliminate discharges of chlorine compounds and dioxins have been given top priority. I have urged authorities, companies, consumers and so on to switch completely to chlorine-free packaging and products, such as paper and toilet requisites. The target is to eliminate the discharge of chlorine entirely.¹¹⁰

Similarly, the Swedish Prime Minister, Ingvar Carlsson, had the following to say in that same month at the International Environment Symposium in Stockholm:

In hindsight...Sweden and other North and Baltic Sea nations have acted too little too late rather than too much and too early. The only sustainable level of harmful emissions is zero... For instance, dioxin emissions should be reduced to zero as soon as possible...the emissions from the pulp and paper industry should be reduced to close to zero around the turn of the century.¹¹¹

Since that time, Sweden has gone even further. A tax has now been levied on TOCL and chlorine dioxide to discourage its use as a long term method for reducing dioxins. For TOCl, a tax of approximately \$0.80/kg will be charged, and approximately \$0.16/kg will be charged for chlorine dioxide. Certainly, Sweden has certainly taken the most proactive stance of any country in the world. Importantly, the accent has been on cleaning up the process, rather than using an end-of-the-pipe approach.¹¹²

Not surprisingly, the paper industry objected strenuously to the SNV Action Plan. The Cellulosa and Paper Mill Organization stated that "It is unrealistic to reach the level of 1.5 kilograms per ton pulp. We can reach 2 kilograms, but not before the middle of the nineties and it will cost twice as much

as the [Swedish] EPA has estimated."¹¹³ That was in September of 1987. In June of 1988 the tone had changed considerably, and a spokesman for the Swedish Wood Research Institute (STFI), the industries research institute, stated:

We will reach the government's goal in 1992 and we are doing it with technology that is available today. Of course the technology existed last autumn. But it is a kind of negotiation of course - the pulp industry can't just give up right away, even if our image suffers because of this kind of behaviour.¹¹⁴

By substituting chlorine dioxide for chlorine gas, using oxygen delignification and oxygen bleaching and better control of the processes, the Swedish mills were drastically reducing organochlorine while North American regulators were just starting to wrestle with public outcry against dioxins in the environment and in paper products. Indeed, since the mid 1970s the Swedish industry's consumption of chlorine has declined by more than half, while bleached pulp production has increased by one third.¹¹⁵ This decline in chlorine usage has only been achieved through heavy investments in pollution controls. The regulation of organochlorines and other parameters have meant that the Swedish pulp and paper industry has spent 12-15% of its total annual investment on environmental protection measures over the last two decades. This is the highest proportion spent in the world.¹¹⁶

The Swedish pulp and paper industry's initial reaction to the concerted and well-coordinated effort to obtain unbleached and/or low chlorine paper products was for the most part predictable. The industry took a stance similar to that which we see in North America today, and "tried to convince people that this paper was a lot of rubbish."¹¹⁷ A media campaign was initiated to that effect, but it essentially backfired and acted as a promotional campaign for the

environmental groups. As market shares began to fall, the companies first lowered prices, then, for those mills which were producing products for the Swedish domestic market, they began to explore ways of lowering their organochlorine discharge.¹¹⁸

The situation developed to the point that in early 1988 one paper company (SCA-owned Mölnlycke) was set to launch a major promotional campaign extolling the virtues of its chlorine-free products. However, three of Sweden's major pulp and paper companies, Stora, SCA and Modo came to an "internal" agreement and decided that certain words/phrases should not be used in marketing. "Unbleached" and "non-chlorine bleached" were two which were of particular concern.¹¹⁹ A major reason for this agreement was that the industry did not want the unbleached demand carrying beyond Sweden's borders. Ninety percent of Sweden's bleached pulp is exported, mostly to Western Europe, and this was a stable and comfortable market they did not want to endanger.¹²⁰

Since 1989, however, the industry has changed its position once again, and is now promoting non-chlorine bleached paper products. This, of course, is due to the fact that such products have done so well in Sweden that, whether the industry likes it or not, the popularity has spilled over into other European countries. As well, the companies realized that changing bleaching technologies would still not allow them to meet the government's limits, and therefore it would be advantageous to have the public accept unbleached products. Furthermore, as the marketing strategy expanded successfully into Europe, Swedish products actually began to capture market share from North American competitors, providing further incentive to produce more of these

products.¹²¹ North American exporters may face even greater problems if some of the major pulp buyers in the European Common Market carry out plans to regulate the organochlorine content of imported pulp.¹²²

One of the most interesting and relevant pieces of information to come out of Sweden came in 1989, and confirmed the feelings of many chlorine-free paper advocates. Industry assertions that bleaching is necessary to retain functional characteristics in paper products were soundly rebutted by a report from the Swedish National Chemicals Inspectorate. This report states that after evaluating products for performance "...the Inspectorate has been unable to find any concrete proof of products that need to be chlorine bleached for functional purposes."¹²³ Just as the "forest fires create dioxins" myth was scientifically shot down after sound research was conducted, so to have many other myths which the pulp and paper industries in many countries have propagated. And in Sweden, the biggest myth of all, that consumers will not use "brown" paper, has been relegated to the marketing history books. So much of what has happened in Sweden is mirrored in activities occurring in North America today. One can only hope that the outcome here will be similar to that in Sweden.

More than the Law Needed in North America

The elimination of organochlorines from the environment will not come in North America for some time, if environmental laws are the only strategy pursued. While enforcement of relevant laws is of the utmost importance, it is painfully obvious that regulatory agencies are not willing to push the paper industry too hard on this issue, a blatant example of this being provided in British Columbia. Regulatory logic, particularly in the United States, seems to

dictate that if dioxins cannot be proven to be carcinogenic, there is no need of stringent regulation.

This logic, unfortunately, fails to consider the effects which organochlorines are having on other species in the environment, which may not be as well protected as humans. It is therefore of great importance to shift the debate concerning the adverse health affects of dioxins, and organochlorines in general, in three ways, all of which can be addressed through existing laws described above. First, it must be stressed that organochlorines are toxic to species other than humans, and therefore we must control emissions for that reason. If we protect ourselves but allow all around us to be adversely affected, we are committing a grievous error. Second, the debate over affects on humans should shift away from the carcinogenicity debate. Regulators must consider other, more subtle health affects, such as the developmental problems experienced by mothers in the Great Lakes region, and the studies done recently with rhesus monkeys described in Chapter II, in which dioxin-mediated effects occur in the post-natal stages. Third, regulation must be carried out with all organochlorines in mind, not just 2,3,7,8-TCDD or -TCDF. AOX should become a standard regulatory parameter, such that emissions of dioxin as well as the other 300 known and over 700 unknown organochlorines may also be controlled. Related to this, cumulative effects of these persistent and bioaccumulating molecules must also be considered.

It is encouraging to see that the use of the AOX parameter is being adopted in Canada, and slowly being accepted in the United States. In the U.S., unfortunately, it does not seem that AOX will be extensively used in this

round of permit authorizations, postponing effective and inclusive regulation to a later date.

If regulatory activities in North America cannot rid us of organochlorines, then the consumer approach must be used to augment and potentially supersede regulation. For this to be as successful as it was in Sweden, a clear message needs to be sent to the public that organochlorines are worthy of concern. In Sweden, an important rallying point was the unimpeachable documentation of the environmental destruction of the Gulf of Bothnia. Swedish environmental groups were able to make use of this in their campaigns to convince consumers that chlorine bleaching was damaging the environment, and the success of this campaign made it much easier for the government to subsequently implement stringent regulations. This, in turn, further boosted the consumer campaign.

In North America the failure of regulatory efforts can largely be summed up as a failure of vision justified by economics. Flying in the face of such events as the extensive fisheries closures in British Columbia, the findings of dioxins in everyday paper products, and the progressive build-up of damning scientific evidence showing that organochlorines cause extensive damage to ecosystems as well as to humans, regulators have failed to exercise their mandate to protect the environment. Public concerns are repeatedly dismissed, and with each dismissal, consumer desire to be provided with alternatives is dampened. In the United States there has been no tangible occurrence, no shocking 30-second sound-bite around which consumers and environmentalists can rally, only a number of serious revelations, each of which by itself has not been sufficient to raise the public's ire. It is a lot to ask of the

public that they become intimately informed about the science of organochlorines, such that they could make a well-educated choice concerning paper products. Making this type of well-informed decision so that public and environmental health is protected is the job of regulatory agencies, independent of economic considerations. A government which takes the position that organochlorines pose a problem presents that message to the public. This position will be reflected in consumer purchasing decisions, which in turn will effect production of alternative products. What we hear now from some retailers and of course from the pulp and paper companies is that "all of the facts are not in", and therefore the impetus to push for the increased availability of alternative products has not passed the threshold necessary to bring about large-scale production.

In spite of the fact that organochlorine-free paper products have not been embraced by the majority of the buying public, enough of the message about organochlorines has gotten through that demand for such products is rising. Those who are demanding them are the people who more fully educate themselves on the issue, and it may be assumed that they are speaking for a large number of others who are not as well informed. Such is often the case with environmental issues.

The next part of this chapter examines the chlorine-free or low chlorine paper products which are becoming available in North America, and discusses the reasoning for their appearance. Many such products are appearing, and they are acting as the torch-bearers for those which are sure to come.

Part 2 - The Carrots: Growing Consumer Demand

"The astute paper marketer is making a concerted effort to understand the end user's needs."¹²⁴

The raging legal battles have done much to publicize the issues surrounding the organochlorine debate. And while legal strategies have been very successful, the complimentary alternative, consumer education and preferential purchasing, has also been making strides. Consumer awareness of chlorine-free paper products has been tested in many places, and where awareness exists, willingness to buy is expressed.¹²⁵ It should be noted that this willingness is not always carried through on at the check-out stand, but polls indicate the level to which education has permeated the general populace.

The Vancouver Sun reported in October of 1990 that almost 9 out of ten Canadians (86%) would buy unbleached paper products such as toilet tissue and paper towels if they were available. In return for this and other 'sacrifices' they wanted the government to enact tougher pollution laws and protect more wilderness areas.¹²⁶ A similar result was obtained from an informal (and unscientific) poll conducted by KATU-TV in Portland, Oregon. In April of 1990 the station asked viewers if they would buy unbleached paper products if available at the same or slightly higher prices than white paper. Eighty-six percent of the respondents said that they would. A poll commissioned by the Natural Resources Council of Maine found that 59% of the respondents said they would be willing to "compromise on color" in their paper products to reduce pollution: 78.6% said that they were very or somewhat likely to change buying habits to include products which are off-white or light gray.¹²⁷ Earlier poll results

show that the public has held such views since news of dioxins began to permeate public thought.

A January 1989 public opinion poll prepared for Forestry Canada by Environics Ltd showed that one in two Canadians were aware of the presence of dioxins in paper products, with awareness most widespread among residents of British Columbia.¹²⁸ The poll also found that 66% of Canadians said that "they would definitely be willing to purchase unbleached paper products that do not contain dioxin," even if these products were not available in white or some other color.¹²⁹ Willingness to buy such products was most widespread among British Columbians and Ontarians.

The most interesting poll, however, was one commissioned by the paper industry by Cambridge Reports, Inc., which was not released to the public until it was leaked to Greenpeace by an employee at the American Paper Institute (API). This poll, conducted in June of 1987, found that 34% of all Americans had heard of dioxins and associated them with health problems, with an even higher awareness (40%) in the "paper states," including Maine, Ohio, Minnesota, Texas and Oregon.¹³⁰ The survey did not ask whether or not respondents would buy unbleached paper products, but it did find that 59% of those polled stated that they would cut back on their use of paper products if dioxin was discovered at extremely low levels in them, perhaps indicating that if unbleached products were available, they would buy these rather than cutting back. This is an important result, for it shows that the paper industry was aware of consumer attitudes about dioxin in paper products over four years ago, yet instead of moving to provide unbleached paper products, and reducing

pollution from pulp mills, they have taken an "easier" route and addressed the issue as a public relations problem.

A further indication of the API's reluctance to recognize the demand for unbleached paper products and widespread consumer willingness to buy them is seen in their position on a consumer study commissioned by the EPA's Office of Toxic Substances. This study, which was essentially finished and submitted to the EPA for review in the fall of 1990, is still, as of February 1991, being circulated within EPA.¹³¹ The study was contracted to Abt Associates in Cambridge, Massachusetts, and Randi Zielinski, one of the authors, states that there is a great deal of concern at the EPA about what is said in the study, an indication of the overall volatility of the issue. Moreover, the API initially did not want the study done, and, because some of the data in the study has come from similar methods to those I have used (interviews etc.) and not "hard" data such as sales information, the EPA is concerned that the report will be subject to criticism from the API and others. Ms. Zielinski informed me that much of what she has found in her study, which covers a broader range of issues than those covered here, mirrors what I have found: markets exist and products are selling quite well. The release of the study is said to be imminent, and should provide a needed basis for further discussion of the consumer strategies for eliminating organochlorines.

In order to test the hypothesis that a latent market exists for organochlorine-free paper products, a two page letter/survey (see Appendix A) was developed and mailed to 151 environmental organizations and businesses (see Appendix B for a complete list). The letter, the second page of which was printed on organochlorine-free stationery obtained in Sweden by John Bonine

of the Western Natural Resources Law Clinic at the University of Oregon, gave a brief overview of the issues surrounding the dioxin debate, and asked the organizations how much paper they currently use, whether or not the organization would be willing to use unbleached and/or organochlorine-free paper products, and what premium they would be willing to accept in order to obtain such products. Admittedly, the organizations which were sent the letter are potentially biased, as most of the groups' work is environmental in nature. However, the purpose of the survey was to show that organizations exist that would buy such paper products if they were available, and to quantitatively illustrate the potential buying power of even a small group.

Twenty-six of the organizations responded to the letter which was initially sent out in April of 1990, and followed up in June of the same year. Appendix D provides quotes from the responses which are considered most relevant and illustrative of commitment. Also, where obtained from the responses, quantitative data is presented. The aggregate amount of paper which the various organizations estimated they used approximated a minimum value of approximately 178 tons. This amount of paper is, in the scheme of things, very small, and could be produced by many pulp and paper mills in one day. However, the purpose of the survey was not to show that we have found enough users of chlorine-free paper that a guaranteed market exists (although the presence of a latent market certainly is indicated). The results are meant to show that potential users do exist, and that they can be found in business, industry, environmental and other groups. Combined with government procurement policies such as that Oregon has instituted, the potential buying power begins to add up. The combined number of members of these groups is

in the millions, and these members were to be informed about the issue, the buying power of that potential market could quickly become very significant.

Responses to the survey were very positive. It could be seen that a great deal of awareness exists about the dioxin issue, even among businesses polled. Comments such as "if [pulp mills] don't understand that [organochlorine pollution] is a major concern to all corporations today, they have their head in the sand" from Paul Delorey, President of JanSport, Incorporated, and "we understand that products may cost more but we believe that everyone should put their money where their values are and help save the environment and our health" from Debbie Leopold, Marketing Coordinator for Coop America, Inc., a successful "alternative" products outlet echoed the sentiments of many of the respondents. The response from Antony G. Marcil, President and CEO of the World Environment Center, a coalition of industries (including James River Corp., Johnson and Johnson, Monsanto, Exxon) which promote the worldwide exchange of technical expertise and information on environmental issues was especially pertinent. Mr. Marcil stated that "We do believe that chlorine-free and maybe even unbleached paper will go into widespread use in future. It will be brought about by consumer demand."

Generally, respondents felt that choosing chlorine-free office paper was the sensible route to choose, and there seemed no reason, including a modest cost premium, why they would not make use of such paper if it was available. In some cases, the responses illustrated the problems faced by those advocating for chlorine-free paper products. For example, the Sierra Club in San Francisco was concerned that reproduction of the color photographs used in their magazine would suffer in quality of paper of lower brightness was used. Using

chlorine-free paper as stationery, however, is quite different, and Michael Stewart, Executive Director of LightHawk, referring to the second page of the letter stated that "We ...checked out the quality of the second sheet of non-chlorine treated paper, and found it to be just fine as far as professional look and texture."

Several other points are worth noting:

1. The results presented here do not include the number of envelopes used, which are also available in unbleached - these can be suitable for any mailing which involves a standard business sized envelope.
2. The number of cases reported here includes some groups which are already using Glatfelter 100 and other papers perceived as being chlorine-free (see below).
3. The comments of some of the business people who responded indicate that they understand the problem as much as do the many environmental groups, and this is a favorable sign considering that the business world represents a very large market. It may not be as difficult as environmentalists imagine to convince some businesses to use chlorine-free paper products.
4. The idea of creating a buying cooperative, as put forth by the representative of Ben and Jerry's Ice Cream has a great deal of merit: such a strategy is underway at the national level through the Washington D.C. office of Greenpeace (Mark Floegel, Pulp and Paper Campaign) in cooperation with the Natural Resources Defense Council in Washington D.C. This effort is oriented toward importing European chlorine-free paper products to North America in order to spark production of such products domestically.

5. Interestingly, a number of replies to the survey were on off-white or tan-colored paper - the color of unbleached.

6. Volatility of supply was a concern of more than one respondent: until this concern is met use of chlorine-free paper by groups who depend on large orders of paper will be limited.

Again, see Appendix D for more complete responses.

The Growing Markets for Chlorine-Free Paper Products

For the discerning and concerned consumer, alternative paper products have begun to appear, largely in response to consumer demand. In discussing these products, it is important at the outset to clarify certain terms. "Unbleached" or "alternatively-bleached" refers to products that are made without the use of chlorine in any form (i.e. either chlorine gas, chlorine dioxide, or hypochlorite) in the paper-making process. Chlorine-free processes do not result in the discharge of organochlorines to the air, water, or sludge, and there are no organochlorine residues in the products themselves. It is also important to note that some of the products described below may have been produced with hypochlorite as a bleaching agent. Some products are being promoted as chlorine-free under the erroneous assumption that if elemental chlorine gas is not used, they are chlorine-free. In many cases, they have not understood the difference. While these products are important for purposes of testing attitudes and potential markets, they cannot be called chlorine-free. They may, however, be considered transitional products on the path toward truly chlorine-free products.

It should also be made clear that chlorine-free paper products do not have to be brown, although limitations on alternative technologies presently available in North America result in paper which has lower brightness and may be beige or off-white grey. Chlorine-free paper products widely available in Europe, some of which are being imported to North America, do retain the whiteness which the paper industry maintains is necessary for survival in North American paper markets.

One final clarification. Recycled paper products which are not subsequently bleached or de-inked using a chlorine-based bleaching process are not necessarily free of organochlorines. Organochlorine residues in the "furnish" for recycled mills remain in the final recycled product, and, although their amounts are reduced, these products are not technically "chlorine-free," or "dioxin-free." However, if they have not been bleached white in the recycling stage, they may theoretically be considered "unbleached," (although technically they are more likely "de-inked") and as such are helping to reduce the load of organochlorines the environment receives. A more appropriate name for these products may be "secondarily unbleached."

Although 'indirect' evidence shows that chlorine-free products are competing successfully in the market, actual sales information to prove this is very hard to come by.¹³² Paper companies and/or their marketing agencies balk at releasing such data. Other methods for estimating market performance, such as interviews with retailers, industry representatives and pulp mill personnel have therefore been used to demonstrate that the paper industry is getting input from consumers who wish to rid themselves of contaminated paper products.

It seems certain that these products sell best where the population has been sensitized to the dioxin issue to some degree. In many situations the media has served in the advertising and marketing role for suppliers through informative journalism. This role is evident to some degree here in the Pacific Northwest, where demand for these products is relatively high, and where the products have met with some success. However, according to marketers, even here in the Pacific Northwest considerable promotion is necessary to help sales.¹³³ A second reason for the relative success of the products both here and in Washington D.C., where another demand locus exists, is that a significant 'grapevine' among activist groups exists which has helped spread the word and contributed greatly to the demand.

Some examples of domestic products,¹³⁴ that are either unbleached, alternatively bleached with a process that does not produce organochlorines, or are marketed as chlorine-free but were produced using hypochlorite, are given below, categorized by the type of product. This is not meant to be a complete list for two reasons. First, the chlorine-free paper products markets are extremely dynamic, and new products are constantly appearing. Second, I have concentrated on writing, copier (xerographic), and tissue paper products. Obviously there are many other types of paper products available, such as linerboard for milk cartons, feminine hygiene products (which are touched on briefly), disposable diapers, and many others. Analysis of the availability of all of these types of products is beyond the scope of this thesis.

A. Copier/Writing Paper

1. Recycle 100

One of the first products touted as unbleached was copier/writing paper produced by P.H. Glatfelter Company at their mill in Neenah, Wisconsin, where it goes by the name of Offset 100.¹³⁵ Sold by distributors under various names, notably Recycle 100, the paper is 100% recycled, bleached with hypochlorite, and produced as an offset grade meant to be used in the publishing market, rather than as copier or writing paper. Because of consumer demand (due to the reputation of this paper as "unbleached"), and its ability to be used as a xerographic and letterhead paper, however, it has become very popular. The demand for this paper seems to be concentrated in two areas: Washington D.C. and the Pacific Northwest. The D.C. demand is due to the large number and size of environmental groups, while in Oregon and Washington the demand is attributable to the media attention on dioxins due to the proximity of many chlorine-bleaching mills.

While much of the research for this paper was done under the assumption that it is a secondarily unbleached product, recent conversations with Mark Floegel of Greenpeace reveal that Glatfelter uses some hypochlorite to lighten the pulp, completely annulling the "unbleached" claim (which is mostly made by distributors, though not actively denied by Glatfelter).¹³⁶ However, this fact is completely unknown to the vast majority of people who use the product, and the paper has been used by customers under the assumption that it is unbleached for several years (including some of the survey respondents). As such, it makes an interesting candidate for testing the markets

for unbleached paper products, and consumer attitudes toward this product would presumably apply to a "real" unbleached product of comparable quality.

Producing Recycle 100 is a small part of Glatfelter's operations; until late 1990 production was limited to one run of a minimum of 40,000 pounds (approx 20 tons) at their mill every month. This is not a large amount considering that their production of chlorine-bleached pulp averages 250 tons per day. The entire amount of Recycle 100 pulp produced was, until recently, allocated based on standing orders, making it very hard to satisfy extra orders. However, the onset of the present recession, as well as the growing overcapacity situation in paper markets, has caused Glatfelter to take Recycle 100 off of an allocation basis and make the paper available based on demand. Nevertheless, Glatfelter representatives state that the demand for the paper is still growing, and production has increased steadily in the past year.¹³⁷

In terms of cost to the mill, Jim Gudsmietl (Senior Sales Representative in the Chicago office) indicated that the Offset 100 is 15-20% less expensive than bleached paper; however the fact that only short runs are made does force the price up. Mr. Gudsmietl also said that there were two main elements driving the market for this paper at present. One is consumer driven, i.e., driven by people and organizations who have been going to print shops, recycled paper outlets etc and asking for such a product. The other component, more important to Glatfelter, is the growing number of corporations who wish to be perceived as environmentally aware. Such corporations are helping sales of the paper greatly, and these customers are felt to be the logical place to go for additional sales.

Recycle 100 is produced using approximately 80-95% bleached pre-consumer wastes (mill scraps, clippings etc: 'used pulp substitutes'), with 5 - 20% post-consumer waste. When this mixture is recycled, the resulting pulp is light enough that bleaching with elemental chlorine is unnecessary. The resulting tan-colored paper has been very popular, and it has served the important function of bringing the idea of unbleached paper into the consciousness of many people. The positive response to Recycle 100 indicates that people do not have a problem with a tan-colored paper, and that they will enthusiastically accept an "unbleached" product.

The paper performs very well in photocopiers and computer printers (including laser and dot-matrix); this was independently tested by the University of British Columbia's Computer Science Department, which did the tests for its own purposes and then shared the results with the people at Paper Choice Recycled Paper in Vancouver (see below).¹³⁸

There are several distributors for Recycle 100. Earth Care Paper Inc., based in Madison Wisconsin (see list of contacts at the end of this chapter) is probably the largest, and Earth Care markets Recycle 100 as 'Minimum Impact'. According to Anne Barnes at Earth Care,¹³⁹ Minimum Impact is their best selling paper, and "very hard to keep around." Sales of the paper run at an average of around 500 reams/wk, and like the rest of their business, this is increasing (the company has grown over four times in less than two years). Earth Care distributes the paper all over North America.

Conservatree Paper Company in San Francisco was the major West Coast distributor for this paper, but as of February 1990, they no longer deal with Glatfelter. Instead they have adopted a new type of paper (described in #4

below).¹⁴⁰ While they did supply the paper, however, it was reported to be selling faster than they could supply it, with new customer requests coming in continuously. Many of Conservatree's former west coast customers are now being supplied by Paper Choice Recycled Paper company in Vancouver, which supplies Recycle 100 to customers in British Columbia, Alberta, Oregon and Washington. There is a great degree of loyalty to this paper, and Paper Choice now sells to many of Conservatree's old customers. This has no doubt contributed to the growth of Paper Choice, which has developed from a two-person, basement operation only two years ago to now having four full-time and two part-time employees, as well as their own warehouse and sheeting operation.

In Eugene, Oregon, Kinko's Copies sold Recycle 100 for some time before switching largely to an imported paper bleached with hydrogen peroxide ("Recyconomic" paper). It was a very popular item.¹⁴¹ One reason they switched to the other product that the supply of the paper is erratic, a complaint heard from other users as well. Wayne Merrit, in charge of purchasing for the Printing Department at the University of Oregon, valiantly tried to get a constant supply of the paper, but also ran into this problem.¹⁴² The result was that he was forced to find an alternative type of paper. Now that Glatfelter is supplying the paper on demand, it may be easier to maintain an adequate and dependable supply.

Another Eugene distributor is Save Our ecoSystems (S.O.S.) which has been selling Recycle 100 for some time. Barbara Kelley, who owns and operates the S.O.S. retail store, reports that demand for this paper is always greater than what she can supply.¹⁴³ She has lately reported that sales have

slowed, largely due to the increased availability of other recycled papers and because Kinko's in Eugene now has Recyconomic, which they market as unbleached. The fact that the Glatfelter paper is overpriced in the market is also a factor, highlighting the importance of competitive pricing. Originally Kelley obtained the paper from Conservatree; she now has it shipped down from Paper Choice in Vancouver.

The cost for a ream of this paper varies somewhat, but with the price hike of June 1990, the retail price now averages around six to seven dollars, depending on the source. This compares to \$2.50 - 3.50 for virgin unbleached, \$3.82 for 50% recycled (pre-consumer waste) and \$5.65 for 100% recycled with watermark.¹⁴⁴ Prices for all products are lower as the volume purchased rises. It is a little hard to understand why the cost for Recycle 100 is so high if Glatfelter claims that it costs less to produce, but such can be the way with specialty items.

While I have not checked with all of the distributors of this paper, those with whom I have spoken seem to indicate that there is a significant market which could be developed given an increased supply of this paper. Demand for this paper seems to have gone through a rapid growth period. Sales have since slowed somewhat, with demand still increasing at a lower rate. More effective marketing of the paper would certainly help expand its usage, especially in the corporate world, as Jim Gudsmietl (above) noted.

2. Natural Copybond

James River Corporation produced the first North American virgin unbleached paper for use as a copier/writing paper. In a news release of April 20, 1990, James River announced that their mill in Camas, Washington,

produced and cut a run of paper from unbleached pulp using Douglas Fir as a source (a softwood which would otherwise have been bleached using the chlorine-based Kraft process). The paper, which looks and feels somewhat like a lighter version of a paper grocery bag, is known as "Natural Copybond", and was given out to a number of organizations and offices for testing.¹⁴⁵

Initial response to the paper came from many areas and was both positive and negative. Initially, there were criticisms about the fact that there was no recycled fiber used in the manufacture of this paper, a criticism which has been addressed in the latest version of the paper, now being marketed. Market testing of the original paper showed that it was popular in the Pacific Northwest but not as much in southern California: this is not too surprising considering the amount of attention dioxin has been given by the media in the Northwest, as well as the long history of concern with dioxin.

Other criticisms of the original version of the paper included complaints that James River had not done the best they could in terms of lightening the paper so that it would be more aesthetically pleasing.¹⁴⁶ Some critics charged that they could have added some pulp from the sulfite portion of the Camas mill, which would have lightened the paper. Brian Cruse, in Training and Development at James River in Vancouver WA, claims that in order to lighten it any more (with existing facilities) they would have to bleach it, defeating the purpose altogether.¹⁴⁷ He said that James River wanted a product that they could produce at any of their Kraft mills, with the hope that the product would be successful enough to warrant additional production. The paper is, however, quite brown, and there are fears among environmentalists working on the issue that it may do more to turn consumers away, except for those 'hard-core'

customers who will buy it to make a definite statement. One step which would lighten the paper would be to install oxygen delignification in the pulping process, which lightens the pulp and lowers the chlorine demand in the bleaching stage, if bleaching is used. According to Brian Cruse, James River has been "looking real hard" at this possibility.

Katie Cutler, at James River's office in Oakland, stated in July 1990 that the paper had performed well enough that they sincerely planned to make it a commercial product once they confirmed that the newer version performed as well as the original. The newer version, with 30% recycled content (pre-consumer waste composed of bag cuttings), was put through the same 'functionality' tests, and became commercially available later that year. According to Bruce Claire, in sales at James River Vancouver, Western Paper Company is the only merchant to purchase and begin to sell the paper, and initial sales have been slow.¹⁴⁸ Richard Martinez at Western Paper's Portland office said that interest in the paper was definitely increasing, and that they were getting calls daily about it.¹⁴⁹ Although James River maintains that promotion of the product is forthcoming, little has been done so far and as of February 1991 a representative of James River stated that the product had not been promoted as much as it should be.¹⁵⁰ That being the case, it is surprising that this representative argues that promotion and education is the only way to get the paper selling.

Several major potential buyers, as well as several smaller ones have inquired about the product, but as yet none has made a big purchase.¹⁵¹ Portland General Electric (PGE), Fred Meyer's Stores, Hewlett Packard and Freightliner have all inquired about the paper, but declined to buy. Pamela

Brown, Assistant Vice President and Director of Environmental Programs at Fred Meyer's in Portland, Oregon stated that they declined to buy the paper for a couple of reasons, notably that the paper does not have a high value for recycling, although she did not seem to realize that it can be recycled as one would a paper grocery bag.¹⁵² She also stated that she felt that "all the facts [were] not in on the dioxin debate" and, because she was not convinced either way, obtaining this paper was not a priority. It seems that this was her feeling after talking to representatives of James River, perhaps indicating that James River did not try too hard to sell it to her.

Carol Klinge, in Purchasing at PGE, cited different reasons for not buying the paper. In tests in PGE's photocopiers, PGE found that when doing double-sided copies the paper tended to curl, due to its dryness.¹⁵³ They are currently trying to find a use for it anyway, and will probably buy it for some uses. Ms. Klinge also gave another reason for not buying the paper. In initial discussions with James River representatives, both James River and PGE came to the conclusion that if PGE, a large and "visible" company, was seen by the public to care enough about the dioxin issue to buy unbleached, then customers and the general public might actually believe that there is a problem with bleached paper. This would make James River look bad because the production of bleached paper would be seen as a process that puts dioxins into the Columbia River, and neither company wanted to give that impression.¹⁵⁴ In spite of all of the "difficulties" PGE has encountered in buying the paper, Ms. Klinge remains optimistic about the paper.

One final customer which may soon purchase some of the paper, is the State of Oregon. The state may purchase Natural Copybond for as much as

1/20th of the state's total paper bid for next year (approximately 2,000 reams or 10,400 lbs). The State Forestry Department and other agencies are already using the paper, and a variety of other groups and individuals also purchase it, largely for photocopying purposes.

The introduction of the paper is a commitment which deserves support. The paper is one step toward showing others in the paper industry that such products can be viable. Interestingly, the willingness that James River has shown in working with some environmental organizations may very well be an important component in making the paper a success in the marketplace.

Compared to the cost of virgin bleached paper (\$2.50 - 3.50/ream), the price of Natural CopyBond is a little high, as it sells for \$3.80/ream from Western Paper. Compared to the price for Glatfelter's Recycle 100, i.e. \$6-7/ream, this is a bargain. Bruce Claire explained that there are three major reasons for the slightly higher price:

- a. The paper is only being made in short runs, and the down-time for cleanup before production can return to white bleached paper is expensive. As the paper begins to sell, and the run time and volume go up, this cost will go down.

- b. The bleach plant at the paper mill is a fixed cost which must be incorporated into the cost of the paper even if it isn't bleached;

- c. They have to buy the material for the recycled portion of the paper. Not until 1992, when James River plans to have their own recycling plant in operation, will this cost be excluded.

3. Cascade

Another product available from Paper Choice in Vancouver is "Cascade," a paper that is made in Canada of 60% total recycled fiber, of which 30% is post-consumer waste.¹⁵⁵ The paper is produced in a mill (partially owned by the Quebec government) in Trois Rivières, Quebec, from unbleached virgin pulp and de-inked recycled pulp. It appears much like the Recycle 100 with its light tan color, but it also has 'woody debris' in the paper, giving it a less-refined appearance. Cascade appears lighter than Natural Copybond, which is due to the introduction of the de-inked recycled pulp. The paper is available only in 20 lb weight and only in the 8.5 x 11" size. The Federal Government of Canada is now using this paper for some of its mailings,¹⁵⁶ and Loblaw's International contracts with this mill for pulp for its unbleached products.¹⁵⁷

This paper has only been available for approximately one year, and sales of Recycle 100 at Paper Choice are still higher because it has been around for longer and is more well-known. According to the people at Paper Choice, the Cascade paper is growing in popularity greatly, especially for those who want a Canadian domestic product.

4. Conservatree 100

Conservatree Paper Company in San Francisco was, until early 1990, the major western distributor of Recycle 100, but this company no longer carries that product. In its stead they now carry a different paper under the old name of Conservatree 100, with the new paper being produced by the Sorg Paper Company in Ohio.¹⁵⁸ This paper is 100% de-inked fibre, with a minimum of

10% post-consumer fibre, and is of a varying off-white color. Unfortunately, the de-inking process involves the use of sodium hypochlorite, which causes the production of organochlorines, particularly airborne chloroform. This paper is not designed for copy machines, as it tends to be too dusty and linty, and this has limited its success.¹⁵⁹

According to Mark Lesser at Conservatree, the sales of this paper are not tremendous, largely because of the customer loyalty to Recycle 100. Mr. Lesser admitted that when they switched paper types they lost a number of customers who preferred the unbleached to their new bleached product, even though Conservatree claims that their new product is 'dioxin-free'. Some of their major customers insist on the unbleached paper Conservatree previously supplied, and have therefore changed suppliers.

5. Recyconomic

Many pulp and paper companies in Europe have been producing chlorine-free (and largely dioxin-free) papers for some time, a market shift which developed through consumer preference rather than regulatory action. The idea of importing European chlorine-free paper products to the United States as a way of prodding the domestic pulp and paper industry to produce such products has been circulating for some time, and Recyconomic is an example of one such effort. Two companies, Atlantic Recycled Paper Company and Garret Buchanan Company, both in Baltimore, are obtaining paper from Steinbeiss Company of West Germany through Canusa Corporation of Baltimore, and retailing it throughout the United States.¹⁶⁰ Greenpeace and other environmental groups are also beginning to import European chlorine-free

paper products for use in their magazines; these papers are listed following this section.¹⁶¹

Canusa Corporation is mostly a waste paper brokering company, but, according to Ben Hoen, Special Projects Manager, his supervisor at Canusa saw the attractive qualities of this paper and the company decided to act as a torch bearer/test marketer.¹⁶² At present, Canusa is selling everything it can get, and Hoen says that this paper is far superior to any groundwood (newspaper and catalogue) papers here. The furnish for production of Recyconomic is largely old newspapers and catalogues: in Germany consumers are demanding that recycled paper be made from the worst possible junky wastepaper, and Steinbeis is able to create a quality product from this source. Mr. Hoen said that Canusa feels that eventually consumers in North America will make the same demands.

The paper is made from 100% post-consumer recycled fibre, is de-inked with a floatation process, and bleached using hydrogen peroxide, giving it a variable greyish color and slightly decreased brightness. The paper is meant to be used as a copier paper, and has proven to work very well in copy machines and printers and as a letterhead.

The retail cost of a ream of paper is \$4.00 in Eugene, Oregon (October 1990), and the University of Oregon Printing Services, ordering large amounts both for themselves and in partnership with Kinko's Copies in Eugene, has gotten the price down to \$3.45 by ordering 40 pallets (40 boxes /pallet; 10 reams/box; 500 sheets per ream = 200,000 sheets). This is the largest order Atlantic has had, and Wayne Merritt, the director of Printing Services, said that getting this much was not easy, as the supply is limited and "everybody is

looking for it."¹⁶³ Tom Mullen, Vice President at Atlantic, informed me that as of September, they are selling 5 - 10 pallets per month, with sales increasing. The paper is now available through the Campus Copy Center at the University of Oregon (a branch of Printing Services), and several University departments are using it.

Kinko's sells Recyconomic as an "unbleached" dioxin-free product in their Eugene stores. While it can claim to be dioxin-free, (the waste paper used to make it is newspaper, which is typically not bleached to high whiteness and strength with chlorine) it is not an unbleached paper. More appropriately, this paper would fall into the alternatively-bleached segment of products, which is important in "leading the way" away from chlorine bleaching.

6. Other Suppliers

a. Other imported papers - Greenpeace recently produced a list of suppliers importing virgin chlorine-free papers from Europe.¹⁶⁴ There are now several of these. There are two U.S. outlets for Holmen printing papers from Sweden, one in New York (212-889-3001) and one in California (415-925-0300); these outlets may only carry magazine stock. Clausen Papertronics in Dallas (214-490-5128) is carrying various coated paper products from the Hannover mill in Germany, and The Orient Foundation (206-842-1114) is carrying chlorine-free office papers imported from Austria.

b. Seventh Generation - Seventh Generation is a retail company which produces a wide variety of "Products for a Healthy Planet." In their September 1990 catalogue they list a number of unbleached, 100% recycled paper products, as well as some good information about why they are supplying them.

Of great interest is a quote on page five of their catalogue: "The request we've heard most often from you, our customers, is for 100% recycled paper that's UNBLEACHED" (emphasis theirs). Seventh Generation supplies toilet paper, paper towels, facial tissue, and stationery made from 100% unbleached (presumably de-inked) newspaper. In addition, they have Panty Liners and Maxi Pads which use pulp made using the BCTMP (bleached chemi-thermo-mechanical pulp) process, which, although chlorine-free, does result in some rather noxious effluent of its own, and uses more energy than chemical pulping. Secondary biological treatment of this effluent, which includes toxic organic sulphur compounds as well as resin acids and other wood wastes, would greatly enhance the positive aspects of this type of pulping.

The paper which Seventh Generation uses for its products comes from Wisconsin Tissue in Menasha, Wisconsin.¹⁶⁵ The paper's claim of being unbleached (secondarily) is based on the fact that a de-inking process is used instead of bleaching: screens, gleaners and non-chemical washes are employed. Importantly, white printed recycled paper with minimal writing on it is used as the furnish; the resulting recycled paper is an off-white shade which appears "unbleached".

B. Tissue Paper Products

A wide variety of unbleached and chlorine-free tissue products have appeared in North American markets. Tissue paper markets are always been among the most competitive in the paper business, and the "environmental" tissue products (those with recycled content or those which are unbleached or chlorine-free) are no exception. In order to retain market share, continuous and

aggressive promotion and frequent "feature pricing" are necessary.¹⁶⁶ Brand loyalty only seems to go as far as price dictates; in order for new "green" products to be successful, it is necessary for marketers to keep their prices competitive. Quality is the second major determinant of which brand a consumer will choose, and it is very important for marketers of 'green' products to convince consumers not only that these products are the right choice for environmental reasons, but that they are also of high enough quality to warrant a shopper's choice.

Mention of the new environmental lines of tissue products (or any unbleached products for that matter) in pulp and paper industry trade magazines has been hard to come by. In the July issue of Pulp and Paper magazine, however, an article appeared which does refer to unbleached products indirectly. A statement in this article illustrates the central problem faced by those who advocate unbleached products: "Both North Americans and the Japanese perceive white products as cleaner and more sanitary, and in itself, *that is reason enough for bleaching*" (emphasis added).¹⁶⁷ Obviously, there are those who would disagree, particularly if the words "dumping tons of organochlorines into rivers, lakes and oceans" are substituted for the word "bleaching" in that statement. The quote, however, is a succinct reminder of the industry's rationale for the use of chlorine bleaching to obtain white products.

White tissue certainly makes up the vast majority of the bathroom and rolled tissue market in Canada - accounting for 83.9% of sales. Again one must ask how much of this demand has been perpetuated by the industry itself. The status quo of "white is necessary" is used again and again to justify the need for white products, even if the industry realizes that consumers are willing to

change their tastes in certain ways. Suzanne Blanchet, general director, Les Industries Cascades Inc. in Kingsley Falls, Que., states that "Consumers want bright white tissue and they want us to make it from post-consumer waste without using chlorine" as if this is a utopian request which is completely unrealistic.¹⁶⁸ While at present it is a great deal to ask, this statement should be posted on the bulletin boards of pulp mills everywhere, a constant reminder of what the customer wants and a goal for the industry. The polls cited earlier in this chapter illustrate that many consumers are perfectly willing to accept lower brightness levels if that means that fewer toxic chemicals are present. If mills were to install the best available technology available in the world, they would come very close to having chlorine-free white paper. Perhaps it is the industry's standards which are in need of adjustment.

The Pulp and Paper article goes on to say that in Europe there is a growing demand for unbleached and chlorine-free, bleached products, and that such products do exist. In actual fact, such products not only exist, but have been very successful, especially in Sweden, where they are considered the only choice by most consumers, and bright white bleached products are becoming difficult to find.¹⁶⁹ The only mention by the article of this type of product in the U.S. is a reference to these products currently on the shelves in retail outlets in California. This is in direct contrast to information I have gathered which shows that these products are now selling from coast to coast in both Canada and the United States.

Barry Ellwood, manager of industry economics with H.A. Simons Ltd's strategic services division in Vancouver B.C. (H.A. Simons is a company specializing in the pulp and paper industry), states that he does not foresee a

major shift in attitudes in North America.¹⁷⁰ He believes that the number of people who want unbleached products is still insignificant. Robert Hentges (NLK-Celpap) echoes this: "We haven't seen much consumer pressure in North America, although there is some locally made product appearing on store shelves."¹⁷¹ Again, this is in direct contrast to information I have gathered concerning these products. Possibly there is a great deal of lag time between submission and publication of articles for this journal and the comments of these authors are simply dated. Perhaps these authors are not willing to admit that alternative products are appearing, or possibly the market research cited has not yet tapped the environmental concerns of the public. These concerns are translating into new chlorine-free products *available* on store shelves.

In contrast to the statements quoted above, the last paragraph of the article states that as environmental issues become a way for tissue makers to advertise and sell their products, everyone will eventually move in that direction. Considering the proliferation of environmentally friendly lines of tissue products already on the market this research is unquestionably lacking. Based on the number of tissue makers moving to supply these products, the author's estimation of consumer demand also seems inadequate. It is even more bewildering that this article should not consider many of the available alternative products in the light of information readily obtainable from Dana Blanton at the American Paper Institute.¹⁷² The information includes the 1989 U.S. pulp and paperboard consumption for bleached and unbleached pulp, and states that "Among industry output, a number of products are available in both a bleached and unbleached option." Some of the available products available

include: paper towels, toilet tissue, napkins, record/CD jackets, computer papers, writing papers, xerographic papers, greeting cards, and calendars.

Certain products have been available in unbleached and/or recycled form for years; only recently have some of these products seen a change in marketing strategy. Unbleached paper towels offered for commercial, rather than consumer use can easily be found. Scott Utility Paper Towels, Crown-Zellerbach, Kimberly Clark, and James River all produce such products.¹⁷³ In the past, recycled and 'brown' paper products have generally been considered inferior by many consumers: they were considered, for example, to be too rough or not absorbent enough. Whether based in fact or in industrial mythology, these beliefs caused the producers of such products to remain quiet about their composition. Recently, however, being recycled or unbleached has become a selling point, and marketing strategies have changed to reflect this. It is now beneficial to state that the product is made from recycled fibre, and that company "X" has a long history of producing such products. Tissue paper makers seem to have an easier time than fine paper makers in moving toward green products since they can make use of many types of recycled fiber more easily, and they do not have to worry as much about certain quality considerations such as low dust levels, high tear strength and extreme brightness. Also, tissue products can be made at sulphite pulp mills which have been able to switch from chlorine to hydrogen peroxide or other bleaching agents relatively quickly.

Two companies that are well known in the tissue/towel end of the paper industry are Fort Howard and Scott Paper. The following describes what they are doing in the face of public demand for recycled and unbleached products.

A third, smaller yet quite active company, Orchids Paper Products Company, is also discussed.

1. Fort Howard Corporation

Fort Howard Corporation produces such products as bathroom tissue, roll towels, facial tissue, and napkins for consumer, commercial, and industrial markets internationally. If you've ever seen a brown paper towel in a public or corporate washroom, the chances are good that it was made at one of Fort Howard's mills. They claim to be the world's largest manufacturer of tissue products produced from recycled waste products. They hold the largest market share for paper products in the commercial or away-from-home markets (e.g., schools, offices, hospitals etc).¹⁷⁴

Fort Howard's new 'Envision' and 'Green Forest' lines are relevant to the "unbleached" products discussion. Both lines have the same fiber content, but are marketed quite differently. Originally, the 'Envision' line of tissue products was developed as a response to EPA goals dictating the amount and type of recycled fibre necessary to allow products to be purchased by federal, state, and local government agencies. Public bids of this type are a traditional market for Fort Howard. According to Sherry Olsen, Corporate Communications Manager at Fort Howard in Green Bay, Fort Howard was caught by surprise by the sudden demand for these products by health and safety oriented consumers who consider Envision an unbleached product, and their marketing strategy changed considerably to cater to this new 'niche' market. They have since gone one step past these consumers, and asked the question: "Who are the big users who want to make a statement?" The health/specialty products stores

and others that retail "Envision" products represent only a small, but growing, portion of their sales, and they are finding that large corporations, whose CEOs want to make a statement about their concern for the environment, are now the major marketing target. Ms. Olsen informed me that she was working with some very large corporations, although she gave no names.

This 'consumer' side of their business, which includes the "Green Forest" product line, is very new to Fort Howard, and it has not been given much attention because their products were not traditionally considered desirable for home use. Originally Ft. Howard entered the consumer business to sell out their capacity (i.e. get rid of what they had left over after filling their public contracts). They are now finding that with the new 'consumer consciousness' their products are becoming more generally desirable, and they have been developing lines of products accordingly.

According to Gary Pappas, at Kelly Clark, a broker for Fort Howard, sales of Green Forest have been slow, but they are definitely picking up momentum.¹⁷⁵ Regional pockets of sales exist, and the number of reorders is dependent upon how the product is promoted. Price is very important. Mr. Pappas feels that there will be a steady climb in sales and he reiterated that the tissue paper markets are always very competitive, with the "environmentally friendly" products even more so. Importantly, he is "pretty happy with sales," and he feels that down the road these environmental brands may shoulder out the traditional ones.

Fort Howard deals strictly with waste paper; they use no trees. They use the hypochlorite bleaching method at reduced temperatures, which does not necessarily get the recycled fibre bright white; at best it is grayish-white. For

those consumers who really think about what the products are used for, however, this coloration obviously does not make a difference. The hypochlorite bleaching method is not as desirable as chlorine-free bleaching methods, and does result in organochlorine discharge (particularly chloroform). Ms. Olsen stated that Fort Howard believes that production at their recycling mills produces "measureable" levels of dioxins. The Fort Howard "Statement on Dioxin" (May 1990) states that in June 1989 the EPA conducted a study of Fort Howard's recycling process and did not find any detectable levels of 2,3,7,8-TCDD (the lower temperatures of their process may be a factor in this). Fort Howard has, however, been shown to emit a number of other very toxic substances, especially those derived from the removal of inks which can contain PCBs, and metals such as cadmium and lead. In the case of Ft. Howard, the major source of PCBs are the old carbonless copy papers.¹⁷⁶ Cost effective pollution control technologies do exist, according to the EPA, but Fort Howard has rejected adoption of them. Reducing PCB discharges would certainly add credibility as Fort Howard attempts to market their 'greenness'.

2. Scott Paper Limited

Scott Paper is Canada's largest manufacturer of sanitary paper products; it is something of an analog to Fort Howard in the United States. A major difference is that a portion of Scott's operations involve producing approximately 50% of its own pulp, with the remainder made up of unbleached kraft pulp purchased from suppliers such as Fletcher Challenge or MacMillan Bloedel. In British Columbia, Scott maintains its own cottonwood tree farms and nursery. To produce pulp from cottonwoods, Scott uses a mechanical

groundwood process, with the light color and longer fibre length of the cottonwood lessening the need for bleaching. Hydrogen peroxide is used to whiten the pulp at the 100 ton per day mill in New Westminster, B.C.¹⁷⁷

In March of 1990 Scott introduced a series of products in response to public demand which are extensions of existing product lines. "Cashmere" bathroom tissue and "Viva" paper towels, both long-time products of Scott's, appeared bearing "unbleached" labels. The products, distributed mostly in western Canada (slightly into Ontario) are manufactured only at the New Westminster mill in B.C., with other companies and stores supplying analogous products in eastern Canada.

The introduction of these products has resulted in incremental listings for both (meaning that more stores have picked them up either along with their other Scott products or by themselves). According to John Philip, Division Vice President for Business Development, it is not clear "whether this will result in additional sales revenue or simply a trade-off for the product currently purchased." His personal opinion is that there will be added revenue from the two types of tissue. As of November 1990 the products seem to have stabilized at 20% of the brand category; in other words for every 100 rolls of tissue they sell, 20 of them are unbleached. This has come with very little advertising, a strategy chosen largely Scott does not feel that these products are better for the environment than their other products. Of importance, the price of the unbleached products is the same as the bleached ones, even though there are some additional production costs such as the down time involved as the machines are cleaned before producing a run of unbleached pulp. In

November 1990, Mr. Philip informed me that they plan to launch additional products of an "environmentally-friendly" nature in the near future.

The A.C. Nielson marketing research firm deals with Scott's marketing data, and Laura Holmes at Nielson's office in Cherry Hill New Jersey office informed me that it would not be possible to get any of the sales data for past or present years.¹⁷⁸ She did mention the new "environmental segment" that they follow in the paper products marketplace, a segment which includes Fort Howard, Ashdun Industries, A.P.L. Corporation, and Scott. They began to follow this group's environmental products as of January of 1990. As of August 1990, this segment (not any one of the companies in particular) had gained approximately a 1% market share, which Ms. Holmes said was not bad for a new product. She felt the major reason that the products were not doing better was that they were not being well distributed; the segment averages 40% distribution, which "is not great," in her words.

Of course, product success depends largely on advertising, and if any of the companies involved chose to, they could promote them more effectively to a waiting, hungry-to-do-something public. The problem with this, however, is that it would make all of their existing products look bad. Avoiding this potentially embarrassing situation is certainly a consideration for Scott, and might explain the labels of the new "unbleached" products. Customers are advised that if they want similar towels of "higher quality" the regular, bleached 'Viva' and 'Cashmere' towels are still available. One is tempted to ask whether Scott is banking on only a short-term showing for these products. Are they designing their marketing so that they *are* only short-term products?

This disconcerting advice is also found in Scott's "Our Commitment to the Environment" brochure in the statement that:

Some of you, our customers, have expressed an interest in unbleached products. Although we believe such products lack the same quality and performance standards of our regular products and are no more environmentally friendly, we are making unbleached product available.

This is disconcerting largely because it is reminiscent of some of the old myths concerning recycled paper products; that they were too rough and/or were generally of low quality and performance. The perpetuation of those myths proved a major stumbling block to the current widespread acceptance of recycled paper products, and suspicions linger even today in the minds of many.

3. Orchids Paper Products Company

Orchids Paper Products Company is a relatively small paper company which has been expanding their product line considerably over the last few years.¹⁷⁹ This now includes paper towels, facial and toilet tissue, and napkins, and Orchids now contracts with three pulp and paper mills for production of their paper products. These mills are located in St. Helens, OR (Boise Cascade), Flagstaff, AZ (Ponderosa Paper) and Pryor, OK (Robell Tissue Mills Inc.). Of these, only the mills in Flagstaff and Pryor are involved in the production of "environmental" products, as these mills have recycling capability.

In the context of chlorine-free and recycled paper products, Orchids is a significant factor, as this company supplies the paper which is subsequently marketed under a number of different brand names. Orchids has made an effort to keep its products white, as the company feels that this is what the American

consumer wants. The company states that marketing experience has shown that consumers will not accept 'quantum leaps' in product changes; rather the customers must be taken through a learning stage which could eventually result in 'brown' products. They feel that were they to introduce such products now it could result in consumer rejection (the same fear some environmentalist have about Natural Copybond above), which could jeopardize the future success of such products in general. The transition must be made slowly, quite possibly over a number of years. Only through time will consumers shake the doctrine of "white is clean and necessary."

Joseph White, Plant Manager at the Flagstaff mill, was very helpful in describing the processes which both the Flagstaff mill and the Oklahoma mill use to create the 100% recycled, non-chlorine-bleached (including hypochlorite) products.¹⁸⁰ To achieve the whiteness of the products, the recycling mills are furnished with "clean" grades of waste paper, such as recycled foodboard (from fast food outlets), computer printout paper, office waste (manifold or ledger - they are increasing their capacity to use this), and, increasingly, other post-consumer wastes. The Flagstaff mill is working on projects with Northland Recycling of Flagstaff to bring this material in.

It is important to note that Greenpeace has expressed reservations about the use of the term "chlorine-free" when talking about paper products made at the Ponderosa mill, as Ponderosa uses hypochlorite in de-inking its pulp (Ponderosa is one of the biggest suppliers of market de-inked pulp).¹⁸¹ However, the impression Mr. White presented was that production of chlorine-free pulp is separate from the main operations which use hypochlorite, and that

at present the chlorine-free portion of their production is small and waiting to expand.

The recycled material is broken down to pulp using a mechanical process. Next is the bleaching stage, which involves the use of existing technology (i.e., this is not one of the newer bleaching options) and "chemicals you can buy off the shelf." Mr. White said that their bleaching process was confidential, although he would go so far as to say that it involves an oxidative stage, which is combined with a further sulphur-based bleaching stage (likely a variation of the sulfite process, which has often been used for tissue products). Engineers at the mill have been refining the process for some time, with the end result being production of a product which competes well in the "green" marketplace. At present, the total production capacity of the mill is not geared toward production of the non-chlorine-bleached product; Mr. White stated that they are quite ready to increase production as the market demands it.

Mr. White states that "profit motive" is the reason why his company, as well as others, are introducing these products. Since the products were introduced in an exploratory manner in the first part of 1990, Mr. White reports that "Sales of environmental products have been good," and that the timing of their initial release around Earth Day 1990 helped greatly.

As stated, Orchids Paper supplies paper products for a number of brands. These are dealt with individually below (note that some of the distributors listed below also include other types of environmental products). In general, according to Jay Kulis, in Sales and Marketing at Orchids, the products are doing well and new markets are growing. While he admitted that he cannot say what the consumer is going to do, he feels that the products are needed

and the growing markets reflect this. In addition, he said that they have received some "very nice unsolicited letters" concerning their products.

a. CARE - "Consumer Action to Restore the Environment"

This product is marketed and distributed by Ashdun Industries, and includes paper towels, bathroom tissue, and coffee filters. Jonathan Mack, V.P. Sales at Ashdun states that sales are going very well, and that since their introduction in February 1990, distribution is now nationwide in 45-50 chains, including Safeway. Sales started out strong with a big surge around Earth Day, and since then they have leveled out at a "comfortable" level.¹⁸²

b. H.O.P.E. - "Helping Our Planet's Ecology"

The broker for these products is Mancini and Grosbeck, and Mark Mancini of that company offered the following information.¹⁸³ The HOPE line is exclusive to Albertson's Nationwide, which distributes them in the western (to eastern Colorado) and southwestern United States. In the eastern states, Jewel, Kroeger, and Stop and Shop are the retailers. Again, success at the retailer depends entirely on the sales effort. In Florida, where consumer awareness is high (Florida has little landfill space left, and recycling is part of everyone's consciousness), and where Albertson's have been actively promoting them, sales are going very well. Conversely, here in the Pacific Northwest sales have been disappointing because Mancini and Grosbeck depended upon consumer awareness alone, and little advertising was done. Texas is another place where sales are going well, in part due to heavy promotion.

c. START - Save Tomorrow • Apply Recycling Today

This is a line of products which Orchids is distributing directly. Introduced in July 1990, START products are aimed at major grocery outlets. In addition to being 100% recycled and manufactured using the bleaching process described above, the products are packaged in recycled materials, including roll cores, shipping cartons, tissue boxes and polyethylene film wrappers. Information on sales for this line in particular was not obtained. The marketing for this line is handled by Don Potter and Associates in California.

d. Today's Choice

Steve Peterson, V.P. New Products at Today's Choice, stated that sales of this line, which includes feminine hygiene products as well as tissue products (bath tissue, paper towels, facial napkins and paper napkins), was initially slow because of consumer confusion.¹⁸⁴ However, there have been significant increases lately. PayLess, for example, has carried the products for almost a year. In the first 1.5 months sales were slow but in the subsequent 1.5 months sales picked up significantly. Mr. Peterson said that understanding of the issue is a key factor - at least as important as price. To facilitate education of consumers on the chlorine bleaching issue, Today's Choice set up an 800 number for consumers to call for information, under the assumption that once people understand why the products are available, they will purchase them. The products fit into a niche market, and those buying the products are young, college-educated, and somewhat affluent. They join environmental groups and read about the issue. The people at Today's Choice would like expand this

niche, possibly through more education of the more "typical" consumer who is not as environmentally aware.

The tissue products for the Today's Choice line are obtained from Orchids, but the pulp for use in feminine hygiene products is manufactured by ITT Rayonier, and bleached using hydrogen peroxide. The pulp, which goes by the name of Rayfloc XJHME, uses a southern pine source which would normally be bleached using chlorine. However, for production of the "chlorine-free" pulp Rayonier eliminate the elemental chlorine and hypochlorite stages, go through a transition pulp stage, then do a run of pulp. They have been doing this for almost 1.5 years, and a spokesman at ITT (a chemical engineer who wished to remain anonymous) said that the demand, most of which is in Northern Europe, now seems to be stabilizing.¹⁸⁵ He felt that North American demand has not really started yet and that there would be more market demand for this type of pulp in the future for what he termed "strictly emotional" reasons. He was "brought up and trained to believe that chlorine is beneficial to humans - [he] can't believe that all of a sudden it's a big ogre." He also stated that "there is no evidence that chlorine is harmful to the environment," and that the chlorine-free environmental products which are appearing are the result of competition in the tissue products markets. The first such products which appeared had a competitive advantage, and subsequent product lines have appeared to keep up in the markets. Another of the diverse viewpoints on the issue.

4. CO-OP America

Another retailer of environmental and other products, Co-op America sells a selection of recycled tissue paper products, and some stationery. The

only unbleached product they carry seems to be the "Recycled Paper Kraft Roll", which Coop America's catalogue describes as "For the purist, this is plain, brown, unperforated towel".¹⁸⁶ This is what you will find in bathroom dispensers across the nation. Sales data have not yet been obtained.

C. Other Paper Products:

1. Coffee Filters

There is a great deal of competition among makers of coffee filters to get on the 'unbleached', or at least chlorine-free, bandwagon, especially in light of studies showing that dioxins migrate from coffee filters into coffee. Several companies have begun to market such filters, either as unbleached or as bleached without chlorine. For most of them, information concerning sales and marketing was not researched. Examples include:

a. Natural Brew - Ron Kerscher, of Rockline, Inc., manufacturer of 'Natural Brew' unbleached coffee filters, states that their filters were introduced in 1987 with limited distribution.¹⁸⁷ Since that time their market share has steadily increased, as has their distribution. Figures for market share, presented below, illustrate that consumers are certainly concerned enough to choose a brown filter.

<u>YEAR</u>	<u>Percent dollar share</u>
1987	0.2
1988	0.7
1989	2.3
1990	7.0 (estimated)

Rockline also supplies filters for Loblaw's Superstores (Canada) private "Green" label and Fred Meyer's private label filters.¹⁸⁸

b. CARE - as described above, the CARE products line includes coffee filters bleached by a chlorine-free process. Ashdun Industries plays on consumer fears of brown paper when they say that if you do a taste test using water poured through one of their bleached filters compared to water put through a 'brown' filter, you'll find a difference. "Taste the water in the glass with the brown filter - pretty awful isn't it? Our supplier informs us that in the absence of an effective bleaching process, trace metals and other substances remain in the brown filter." I personally haven't tried the test, so I can't comment. However, the attempt by Ashdun to infer that unbleached products haven't been 'refined' enough is counterproductive to efforts to promote unbleached products. The problem is, ironically, not that unbleached filters have nasty residues, but the opposite: over-refining of pulp is more likely to leave chemical residues (although you may not be able to taste them).

c. Mellita U.S.A. - produce an unbleached coffee filter.

d. Altrafilters, Inc. - this company offers a filter which is 100% oxygen whitened, with no chlorine bleach. They claim that this gives the best cup of coffee.¹⁸⁹

e. Mr. Coffee - have launched a promotional campaign for their new unbleached filters.

f. Somewhat related, Celestial Seasonings Inc. is now promoting their tea bags as being 100% oxygen bleached, because of consumer concern over dioxins.

Obviously, a cotton 'coffee sock' or a metal filter such as those made by Swissgold is the "environmentally best" filter; these are reusable for years.

2. Disposable Diapers and Feminine Hygiene Products

Disposable diapers, which are not covered in detail here, have elicited concern for several reasons, among them the fact that chlorine-bleached pulp is used as the absorbent material inside of a rayon (another highly refined and bleached paper product) liner. Criticisms are also based on the fact that these diapers are disposable, adding to solid waste problems. Chlorine-free diapers are now available on the market and, according to newspaper accounts, they are doing well. Diaper washing services which wash reusable cotton diapers are also becoming popular, however. For those who feel that they need to use disposables for some occasions (travel etc), the choice exists.

Also not covered in great deal in this thesis are feminine hygiene products. Today's Choice includes such products in their product line, and Seventh Generation sells chlorine-free tampons and panty liners (again, intensively bleached pulp is used as the absorbent material and for the liners). For more information The Women's Environmental Network (WEN) in London, England, is a good source. This organization has been instrumental in bringing about market success for unbleached women's products in Britain, particularly after the release of the book The Sanitary Protection Scandal by Bernadette Vallely, co-founder and Director of WEN. A newly-formed group in Eugene, Oregon, the Women's Environmental Bridge, plans to focus on obtaining chlorine-free products for North American women.

D. Miscellaneous

Other developments in the pulp and paper industry, as well as actions taken by other interested parties, are indicative of consumer concern. This section brings together various pieces of information related to elimination of organochlorines from the pulp and paper industry.

1. Increased Production of Chlorine-free pulp in Sulphite Mills

Over the last ten years Kraft sulphate pulp has largely replaced sulphite pulp on the world's markets as the pulp of choice. In Canada, sulphite pulp is down to just 15% of chemical pulp production, while in the U.S.A. it is even lower, accounting for just 6% of the chemical pulp output.¹⁹⁰ However, with the widening of the organochlorine issue, sulphite pulp, which is most often used to make tissue products but can also be used in fine paper making, has been making a comeback, as this pulp is lighter and does not require the intensive bleaching kraft pulp does. Several sulphite mills in North America have taken advantage of their ability to bleach with non-chlorine agents such as oxygen and hydrogen peroxide to begin production of chlorine-free pulp.

The June 1990 issue of the Pulp and Paper Journal (Canadian Pulp and Paper Association) reported that Atholville Pulp Inc. of New Brunswick is getting ready to produce chlorine-free bleached pulp using an oxygen/ peroxide process.¹⁹¹ The project, which will cost \$8.7 million, will involve the addition of a new oxygen bleaching tower, as well as the establishment of a new pulp route that will bypass the chlorine bleaching towers.

The inducement for production of this type of pulp lies in the many consumers in parts of Western Europe who are demanding a wide variety of chlorine-free tissue products. Niall O'Brian, Fraser President, is quoted as saying that the project represents "an opportunity to produce a value-added product that very few mills are capable of manufacturing. It's an area where we feel that we have a distinct competitive advantage."¹⁹² One industry commentator has gone so far as to say that "peroxide and sulphite pulp is a marriage made in environmental heaven."¹⁹³

A second such mill, run by Stora Forest Industries Ltd., of Port Hawkesbury, Nova Scotia, (Stora is also one of Sweden's largest pulp companies) is also moving toward being completely chlorine-free. This mill has been bleaching its pulp using peroxide since February 1990, and again, European demand for such pulp, which has an ISO brightness of approximately 83, is given as the reason for moving in this direction. Joe MacDonald, Stora's general manager of marketing, is quoted as saying that the ability of sulphite mills to produce chlorine-free pulp may give them "a new lease on life." Both mills have found that the demand for chlorine-free pulp has come from Europe, and, admits MacDonald, "It's a little surprising that it hasn't been looked at more seriously in North America." He says that he can see the trend spreading to the Benelux countries and the U.K., and he expects that it will also spread to the rest of Europe and eventually North America (North American mills currently export a large percentage of their chlorinated product to Europe). He expects that more chlorine-free paper products will reach markets not because of government regulations, but because of competition (a result of consumer demand) and self-imposed standards within the pulp and paper industry.

Regulations may play a role, however, in light of suggestions from some EC members that pulp imported from North America have a low organochlorine content.¹⁹⁴

Increased demand does not translate directly to an increase in production. MacDonald says that new end uses are not being created: instead a substitution is occurring. This could change, however, if increased exporting occurs to Asian countries, which represent a growing market. It would certainly be better in the long run if we initially supply Asian countries with chlorine-free, lower brightness pulp from the start, rather than taking them along the "bright is best" route.

2. New Chlorine-free Mills Planned

At least two new mills are planned in North America which will not use chlorine in any form. David Byrne of Conservatree provided information about a former Hyde Park Paper Co. in Boston which is scheduled to undergo renovation, making it a state-of-the-art de-inking mill.¹⁹⁵ The mill was owned by James River Corp., but it has been sold to some Canadian investors who plan to open it under the name Patriot Paper Company. The renovation work is underway, and the mill will use hydrogen peroxide as a bleaching agent, producing offset paper (for printing brochures etc, although it can be used as copy paper, as in the case of Recycle 100) for the domestic market. Conservatree plans to work with the mill toward production of a bond paper more suitable for office use. The siting of the mill, near Boston, will allow for an ample supply of waste paper.

The mill will produce 230 tpd, with a starting level of 10% post-consumer waste content, increasing to an average of 80%. Complete modernization, including the flotation de-inking project, will take about a year.

Steinbeis Temming Papier, the company which produces the imported Recyconomic paper described above, is planning to build a mill in Niagara, NY, which will use hydrogen peroxide as a bleaching agent for recycled paper destined for the domestic market. This mill should come on line in 1992, and Steinbeis is already lining up curbside pickup of waste paper in Washington D.C. Why a hydrogen peroxide mill? Steinbeiss is anticipating growing demand for non-chlorine bleached paper in North America, as well as tougher regulations on organochlorine discharges. Ben Hoen at Canusa Corporation stated that Steinbeis has no fears that Steinbeis can sell the total mill production (100,000 tons per year) when the mill comes on line in 1992. The fact that investors in this mill as well as those renovating the Patriot Paper mill believe production of non-chlorine bleached paper will be an economically viable enterprise belies statements by the pulp and paper industry that the public will only buy paper that is bleached to the blue-white point.

3. Errol Sowers, Stillpoint Publishing

Publishers represent an large potential market for chlorine-free paper, a market which papers such as Offset 100 are aimed at. At present a campaign by libraries and publishers to make acid-free paper widely available is underway, and Errol Sowers, President of Stillpoint Publishing International, based in Walpole, New Hampshire is active in this area.¹⁹⁶ He is also very interested in obtaining chlorine-free paper for use in his company, and during a

recent "fact-finding" trip to the Pacific Northwest he queried forest product's company executives on the subject of unbleached paper.

Mr. Sowers said that in a conversation he had with a representative of Weyerhaeuser (unnamed) he was told that Weyerhaeuser was thinking of producing non-chlorine-bleached pulp from one of its mills. However, Weyerhaeuser is reluctant to do so because it is not sure if the demand for the paper exists. Mr. Sowers asked if it would influence the decision if he could get a number of publishing companies together to buy this type of paper, and was assured that this would certainly help in moving toward production of organochlorine-free paper. Based on his conversations with publishing industry representatives, Mr. Sowers stated that if the paper were available and competitive, allowing for a premium which they would be willing to absorb, publishers would make use of it.

Mr. Sower feels that corporate managers must differentiate between *risky* decisions and *gutsy* decisions. They should be figuring out where the marketplace is going through social change, and providing products which are in line with these changes. He does not believe that producing unbleached, alkaline paper is risky at present, but it is gutsy. If leaders begin bringing the products out, the rest will follow (as in the case of tissue products), and satisfy the latent demand. Legislation will certainly help, he said, as it can set market forces into motion. Unfortunately, and this sentiment is echoed by many of the CEO's he has been talking to, we do not have strong political leaders willing to push for "controversial" projects, let alone take the time to understand that the economics of environmentally sound business practices are persuasive.

Conclusion

Consumers and industry are just beginning an uphill climb on a learning curve which is inexorably leading to a greater proliferation of chlorine-free paper products. That a great number of chlorine-free products are becoming available, and are creating competition in the marketplace based on the chlorine-free attributes, bears witness to this. One issue which must be resolved, however, is the establishment of a definition of what constitutes a chlorine-free product: the industry sincerely refers to anything not bleached with elemental chlorine as being chlorine-free, and this definition has been taken up by many of the producers and marketers of "unbleached" and chlorine-free products. However, the purpose of such products is to rid the bleaching processes and thus the environment of additional organochlorine burdens. A definition based on this criterion would therefore exclude products made with chlorine dioxide or hypochlorite as bleaching agents. Possibly these could qualify as low-chlorine products, if a system similar to that used in Sweden was adopted. Conservatree Paper Company has developed a system which rates recycled paper based on post-consumer recycled content, and such a system would be useful for chlorine-free products as well.

Something of a conundrum is presented by the success of those products which have been marketed as unbleached or chlorine-free that were made using hypochlorite in the bleaching process. On one hand, it is difficult to support such products, as they are not truly chlorine-free. On the other hand, the success of these products in the marketplace, based on their promotion as chlorine-free, indicates that consumers would accept truly chlorine-free

products, as in the case of some examples discussed above. The consumers who purchase the chlorine-free and unbleached products do not know that hypochlorite is used: they assume that they are making a choice which results in minimum dioxin exposure to themselves and to the environment.

While consumers seem to be accepting part of the responsibility for making changes, it does not seem that industry is as forthcoming. To a large extent, the demand for unbleached and chlorine-free products is still dismissed as emanating from an emotional, uninformed and unrealistic minority who won't really purchase these products if they are produced on a large scale. Attacks are continuously made on the quality of unbleached products, and it seems as though certain companies are telling potential customers that dioxin poses no problems, and that purchasing unbleached products will only hurt the reputation of the paper industry by calling attention to the fact that production of bleached products result in toxic discharge.

It is somewhat ironic that in this time of economic recession environmental attributes are actually becoming an even greater selling point in the paper industry, as companies attempt to stand out from the pack. In their desperation to unload paper to an oversupplied market, green consumers represent a market of great importance. This is something that environmental groups should take advantage of, as the willingness to produce unbleached products will become greater as the recession continues. The longevity of this willingness, however, may very well be related to the length of the recession. Encouraging production now should be a priority issue, as green consumers are in the right mood and traditional, bleached paper product sales are in a slump.

At least two mills in Canada are taking this approach, instead of the more traditional route of simply cutting prices. John Burgess, vice-president of pulp marketing for Noranda Forest Sales Inc., which own the Atholville sulphite mill mentioned above, states that "The chlorine-free issue is very dear to the Atholville pulp mills and its survival" during this recession.¹⁹⁷ Burgess further states that an effort is being made to go directly to the end users to sell their product.

Innova Envelope, an arm of Abitibi-Price Diversified Group, was recently awarded the Canadian government's EcoLogo label (see Chapter 5) for their Heritage envelopes, and are using the environmental benefits associated with this label in their marketing. In the current recession, this is the only one of their products which they are actively promoting.¹⁹⁸ The paper industry is recognizing the intense demand for recycled products as a manifestation of the "more socially conscious, environmentally aware 1990s."¹⁹⁹ The industry readily admits that printers, designers and consumers are all becoming more sophisticated. The paper companies also admit that they must actively gauge the public's mood, because "After all, it's the customers who are insisting on recycled paper." In the near future, it will not be surprising to hear that same sentence uttered with the words "unbleached or "chlorine-free" substituted for "recycled."

Judging by the proliferation of chlorine-free paper products, and the comments of the many people interviewed, these products are definitely shouldering their way quite successfully into the marketplace. Education is extremely important in getting the public to accept these products, and this has

been accomplished to a large degree through advertising, efforts by environmental groups, and the media.

With the success of these products evident, it is curious that industry still maintains that the public will not accept writing and copier paper which is not bright white. The industry's reluctance to introduce such products is likely related more to the fact that paper-making processes will have to undergo substantial changed, incurring added costs, than it is to a genuine consumer resistance.

Continuous pressure, be it through buying power, litigation or other means, must be applied. James River Corporation has provided a good example for others, and as Natural Copybond is further developed (possibly through addition of sulphite pulp or the use of oxygen delignification), it may provide a needed kick to the industry. There is considerable inertia involved in an industry of this size, though there is plenty of room for innovation.

Notes

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²*Ibid.*, 280

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⁴*Kennecott v. U.S. EPA*, 780 F. 2d 445, 448 (4th Cir. 1985). Cited in Memorandum to Jackson Fox, *ibid.*

⁵Clean Water Act. U.S. Code vol. 33 sec. 1251, Public Law Number 92-500.

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⁷*Ibid.*, sec. 1251(a)(2).

⁸*Ibid.*, sec. 1251(a)(3).

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¹⁹"Inside the Dioxin Standard: Is it Defensible?" Oregon Insider no. 30, 31 October 1990, 5.

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²²A notice of appeal was filed by John Bonine, Attorney for NCAP and CRU, to Fred Hansen, Director of the Oregon DEQ on November 27, 1990.

²³United States Environmental Protection Agency, Region X (Seattle), Total Maximum Daily Load (TMDL) for 2,3,7,8-TCDD in the Columbia River Basin, Decision Document, 25 February 1991.

²⁴Northwest Coalition for Alternatives to Pesticides v. United States EPA. Ninth Circuit Court of Appeals, No. 90-70262. Northwest Coalition for Alternatives to Pesticides(NCAP)/Columbia River United's (CRU) Response to EPA's Motion for Voluntary Remand, and NCAP/CRU's Cross-motion for Reversal with Directions to Establish Individual Control Strategies. 7 November 1990, 16.

²⁵Code of Federal Regulations, vol. 40, sec. 122.45.

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¹⁰⁵Shelley Stewart, Greenpeace U.S. Pulp/Paper Project Director, letter to Mary O'Brien, Northwest Coalition for Alternatives to Pesticides, 25 October 1989.

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¹¹⁰Birgitta Dahl, Swedish Minister of the Environment and Energy, from the transcript of a speech given at the "Dioxin '88" Conference in Umea, Sweden, 22 August 1988.

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125N.B.: The information contained here was largely compiled from a number of interviews which took place from October, 1989 until November, 1990. Due to theft of interview notes, exact dates, and sometimes names of those contacted, cannot be given. For phone numbers and addresses of those contacted, see Appendix C.

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128Enviro-nics Research Group Limited, Forestry Canada Public Opinion Survey, Toronto, Canada, January 1989, 5.

¹²⁹*ibid.*, 6.

¹³⁰Cambridge Reports, Inc., "Summary of Findings - Paper Industry Study of Dioxin Issue - Section IV," 1 June 1987, IV-2. Cover marked "Confidential - Not for Distribution or Release."

¹³¹Personal communications with Randy Zeilinski, Abt Associates, Cambridge Maine, November 1990, 6 December 1990, and 19 February 1991.

¹³²Personal communications with the following people, among others, have all indicated that markets are appearing and products are competing successfully: Anne Barnes, Earth Care Paper, December, 1989 and July 1990; Susan Kinsella, Conservatree Paper December 1989 and August 1990; and others in the paper industry (see text in later sections).

¹³³Personal communication, Gary Pappas, Kelly Clark Inc., June 1990.

Personal communication, Mark Mancini, Mancini and Grosbeck, February 1990.

¹³⁴I have concentrated on domestic papers: there are many fine, chlorine-free papers available in Europe which may find their way to North America in the near future. Greenpeace recently released a package containing 17 different *white* printing and copy papers made in Sweden, Austria, Switzerland and Germany, all of which were made with zero organochlorine discharge.

¹³⁵Information about Glatfelter's operations was taken from interviews with Elvin Meyers (Customer service, Spring Grove), Jim Gudsmietl (Sales Representative in Chicago), and various retailers in phone interviews conducted from October 1989 to September 1990. Glatfelter supplies an information packet about their products on request.

¹³⁶Personal communication, Mark Floegel, Greenpeace Pulp and Paper Campaign, Washington D.C. Mr Floegel is based in Washington D.C., and was in Eugene, Oregon for a strategy workshop on organochlorines and pulp mills on 11 March 1991.

¹³⁷Personal communication, Heidi Olsen, Sales Representative, P.H. Glatfelter, 13 March 1991.

¹³⁸Personal communication Larry Kushner, Paper Choice Recycled Paper, (Vancouver, B.C.), June 1990.

¹³⁹Pers. comm., Anne Barnes December 1989 and July 1990.

¹⁴⁰Personal communication David Byrne, Conservatree Paper, July 1990 and pers. comm. Susan Kinsella, Conservatree Paper, Nov. 1989 and Aug. 1990.

¹⁴¹Personal communication, Manager, Kinko's Copy's Eugene, March 1990.

¹⁴²Personal communication, Wayne Merritt, University of Oregon Printing Services, 14 June 1990.

¹⁴³Personal communication, Barbara Kelley, S.O.S., December 1989 and June 1990.

¹⁴⁴Personal communication, Richard Martinez, Western Paper Co., Portland, Oregon, July 1990.

¹⁴⁵Personal communication, Katie Cutler, James River Corporation, Oakland, California, June 1990.

¹⁴⁶Personal communication, Mary O'Brien, Staff Scientist, Northwest Coalition for Alternatives to Pesticides, June 1990.

¹⁴⁷Personal communication, Brian Cruse, James River Corporation, Camas, Washington, July 1990.

¹⁴⁸Ibid.

¹⁴⁹Pers. comm., Richard Martinez, Western Paper Ltd., Portland, Oregon, July 1990.

¹⁵⁰Personal communication, Bruce Clair, James River Corp., Camas, Washington, 25 February 1991.

¹⁵¹Ibid.

¹⁵²Personal communication, Pamela Brown, V.P. and Director of Environmental Programs, Fred Meyer Inc., Portland, Oregon, 5 March 1991.

¹⁵³Personal communication, Carol Klinge, Portland General Electric, Portland, Oregon, 13 March 1991.

¹⁵⁴Ibid.

¹⁵⁵Pers. comm., Larry Kushner.

¹⁵⁶I have received mailings from Environment Canada on this type of paper.

¹⁵⁷Personal communication, Pat Carson, V.P. Environmental Issues, Supplies and Services, Loblaws International, 10 March 1990.

¹⁵⁸Information in this section came from a representative at Treecycle Recycled Paper in Bozeman MT, interviewed July 1990, as well as interviews with others cited below.

¹⁵⁹Personal communication, Mark Lesser, Conservatree Paper. July 1990.

¹⁶⁰Pers. comm., Tom Mullen, Atlantic Recycled Paper, July 1990.

¹⁶¹Personal communication, Mark Floegel, 11 March 1991.

¹⁶²Personal communication, Ben Hoen, Canusa, Corporation, July 1990.

¹⁶³Pers. comm. Wayne Merritt, 14 June 1990.

¹⁶⁴Shelley Stewart, Greenpeace Seattle, memo to prospective paper purchasers, December 1990, 2.

¹⁶⁵Personal communication, Seventh Generation Representative, October 1990.

¹⁶⁶Kara Kuryllowicz, "Tissue markets very competitive with price and quality key factors," Pulp and Paper Journal 43, no. 7(July 1990): 53.

¹⁶⁷Ibid., 55.

¹⁶⁸Ibid.

¹⁶⁹Personal correspondence, from Margaret Rainey, Greenpeace Sweden, to Mary O'Brien, Staff Scientist for the Northwest Coalition for Alternatives to Pesticides, 12 June 1990.

¹⁷⁰Kuryllowicz, 57.

¹⁷¹Ibid.

¹⁷²Personal communication, Dana Blanton, American Paper Institute, August 1990; I subsequently received the information (no date).

¹⁷³John Elkington, Julia Hailes, and Joel Makower, The Green Consumer (Markham, Ontario, New York, N.Y.: Penguin Books, 1989), 112.

¹⁷⁴Information on Fort Howard was obtained through personal communications with Sherry Olsen at Ft. Howard's office in Green Bay, Wisconsin, and from an information packet received from Fort Howard.

¹⁷⁵Personal communication, Gary Pappas, Kelly Clark Ltd., August 1990.

¹⁷⁶Clean Water Action Council of N.E. Wisconsin and the Lake Michigan Foundation, letter to Mary O'Brien, NCAP.

¹⁷⁷Information on Scott Paper was obtained through interviews with John Philip, Division V.P. for Business Development, Vancouver, British Columbia, 11 July 1990, personal correspondence, July 18 in which Mr. Philip responded to written questions, and an interview on 8 November 1990, and written materials received from Scott Paper.

¹⁷⁸Personal communication, Laura Holmes, A.C. Nielson, Cherry Hill, New Jersey, July 1990.

¹⁷⁹Information in this section was obtained through interviews with Jay Kulis, Sales and Marketing at Orchids Paper in July 1990, as well as his responses to a letter of August 15, 1990. This letter was forwarded to Don Potter and Associates, who responded to questions posed in it with an information packet and letter of 26 September 1990. (see Appendix C for addresses and phone numbers).

¹⁸⁰Personal communication, Joseph White, September 1990.

¹⁸¹Personal communication, Shelley Stewart, Greenpeace Seattle, 6 December, 1990.

¹⁸²Personal communication, Jonathan Mack, V.P. Sales, Ashdun Industries, September 1990.

¹⁸³Pers. comm., Mark Mancini, July 1990.

¹⁸⁴Personal communication, Steve Peterson, V.P. New Products, Today's Choice, July 1990.

¹⁸⁵Personal communication, anonymous source, July 1990.

¹⁸⁶Co-Op America, Alternative Catalogue Spring 1990, 2100 M St., N.W. Suite 403, Washington, DC 20063, page 3.

¹⁸⁷Memo from Carl Merkle, Legal Intern, Western Natural Resources Clinic at the University of Oregon to other interns concerning discussion with Ron Kerscher, Rockline, Inc., manufacturers of Natural Brew Coffee Filters, 11 March 1990.

¹⁸⁸*Ibid.*

¹⁸⁹Letter to Carl Merkle (see note 43) from Altrafilters, Inc. with accompanying flyer concerning their new chlorine-free coffee filter, 25 June 1990.

¹⁹⁰"Canada's sulphite industry: going, going, ...," Pulp and Paper Journal, 43 no. 1(January 1990): 117.

¹⁹¹J.P. Mason, "Sulphite mills capitalize on demand for chlorine-free pulp," Pulp and Paper Journal 43, no. 6(June 1990): 27.

¹⁹²*Ibid.*

¹⁹³"Environmentally-friendly pulp mills will be a key feature of the 1990s," Pulp and Paper Journal 43, no. 6 (June 1990): 25.

¹⁹⁴Bonsor, 172.

¹⁹⁵Pers. comm. David Byrne, Conservatree, July 1990.

¹⁹⁶Personal communication, Errol Sowers, President of Stillpoint Publishing International. Mr. Sowers was interviewed in Eugene Oregon, March 1990.

¹⁹⁷Caroline Cagampan-Stoute, "When the market gets tough...the tough really get marketing," Pulp and Paper Journal 44, no. 2(February 1991): 24.

¹⁹⁸*Ibid.*, 25.

¹⁹⁹Kara Kurylłowicz, "Creativity and innovation crucial to selling in today's marketplace," Pulp and Paper Journal 43, no. 10(October 1990): 85.

CHAPTER V

QUALITY CONTROL: ENVIRONMENTAL LABELING AND MARKETING REGULATION PROGRAMS

The promise of this green revolution is too important to squander. But already it is at risk - at risk from confusion, at risk from half-truths and innuendo, at risk from deception.¹

As long as there has been advertising, there have been those who are more creative at conveying messages than others. A fine line exists between the fantastic and the fraudulent, and from the old west's snake oil sellers to the present, conflicts have arisen over whether or not products can really do what the advertisers say they can. Federal agencies, such as the Federal Trade Commission (FTC), as well as private watchdog and quality control groups such as "Consumer Reports" or the Public Interest Research Groups, now seek to protect consumers from those who would sell us "a bill of goods."

A year ago marketing based on environmental premises barely existed, yet today it is an extremely hot field. An enthusiastic though somewhat confused public has been presented with an array of products which are touted as being "good for the environment" in one way or another. Most consumers, however, lack the education to make responsible choices about what truly is "good for the environment," and in some cases this ignorance is being exploited through trivial and misleading product claims. Product labelling programs based on environmental attributes represent one method of dealing with such claims; regulation and standardization of relevant terms represents another.

Confusion is evident in consumers trying to sort out the variety of "chlorine-free" paper products. Many consumers do not understand the difference between, for example, unbleached and alternatively bleached paper products, both of which may be free of organochlorine residues if non-chlorine bleaching technologies are used. The term unbleached, however, seems to carry a "cleaner" connotation, and this is true in the sense that unbleached products are produced using fewer chemicals, whether or not they are chlorine-based. However, both unbleached and alternatively bleached (chlorine-free) products can have the same desired result: reduction in organochlorine emissions. As discussed in the previous chapter, the definition of "chlorine-free" is another issue requiring resolution, as some products are marketed as chlorine-free with the claim that no *elemental* chlorine is used in bleaching. While this can be partially attributed to ignorance on the part of the marketers, in some cases it can be categorized as exploitive marketing.

This type of marketing does not apply to paper products alone. The plethora of products appearing under the "green" banner is often presented with a variety of terms which are meant to indicate that the product is in some way the best choice for the environment. However, there are as yet no accepted definitions for many of the terms employed, such as "degradable," "recyclable," or "ozone-friendly," and thus the importance of some form of quality control, be it in the form of a labeling program or in accepted definitions, becomes clear.

The importance of full disclosure of all relevant information about a products' effects is evident in, for example, the case of aerosol sprays. Many of these sprays are now marketed as "ozone-friendly", or "CFC free" (which consumers equate to not harming the ozone layer). However, such claims are

misleading when one considers that the federal government of the United States banned the use of chlorofluorocarbons in most aerosol spray products in 1978,² and that these sprays may contain other ozone-depleting chemicals such as 1,1,1-trichloroethane (1,1,1-TCE) without making this information known.³ Such claims are misleading in the sense that they attempt to convey the message to consumers that the CFCs have recently been removed, which is not true, and they are false in the sense that the product is not "ozone-friendly" if other ingredients are present which harm the ozone layer. In the case of aerosols, the Natural Resources Defense Council has asked the FTC to pay special attention to these types of products, and has filed formal complaints against corporations making environmental claims, with 21 products identified as containing 1,1,1-TCE which are marketed as "ozone-friendly."⁴ Ironically, 3M Corporation, cited in Chapter 3 for its progressive environmental waste reduction program, was one of the companies identified as using a misleading claim on one of its 1,1,1-TCE-containing products.

There are many other examples of misleading claims, many of which fall victim to "cradle-to-grave" analyses. It should be noted, however, that not all cases of product claims are misleading or false, as there are examples of products which are indeed making use of recycled materials, or are generally recyclable, or that make use of alternative production technologies which have a less damaging effect on the environment than traditional production methods. Several types of paper products described in the previous chapter are cases in point. Exploitive claims do exist, however, and efforts are underway in the United States to control misleading advertising, and to provide consumers with more substantive and meaningful product information.

Labeling programs, which essentially operate as certification procedures, have existed in some countries for years. This chapter will provide an introduction to existing programs as well as newer ones planned or underway around the world. Also, the activities of a number of groups, both private and governmental, in the United States are looked at in the context of labeling and product certification programs and responsible advertising practices. Labeling programs *per se* are not new, and experience has been gained from existing programs in such areas as nutritional claims, health warnings, and automobile fuel efficiency ratings.

The basic goal of environmental product labeling programs is to help consumers make informed choices about the purchases they are making, thus alleviating frustration and raising awareness. A second goal, equally important, is that of providing product manufacturers and sellers with market incentives through which the development of more environmentally sound products and manufacturing processes will occur.

Before labeling programs can be of any use, however, uniform national standards and definitions for marketing claims need to be established, and this need illustrates the dual nature of the controversy surrounding environmental marketing occurring in the United States at present. On the one hand there are several private, mostly non-profit labeling efforts underway which are developing their own standards and procedures. At the same time the EPA, the FTC and a groups of 10 State Attorneys General are taking an active role in 'policing' environmental marketing claims, and working toward the establishment of a national system of definitions and possibly labeling. It is felt by many involved that definitions must be worked out to avoid the confusion

which could result from several separate labeling programs.⁵ In other countries which have labeling programs, or which are in the process of establishing them, it does not appear that this duality exists, since most such programs operate under government management, with integrated components involving industry and the public.

Not everyone believes that a government-directed approach is the best alternative. Critics contend that such an approach is likely to move at the glacial pace of government action, and that because government direction necessarily involves consensus, powerful industrial and business interests will take the opportunity to hinder adoption of the highest possible standards.⁶ In the case of the pulp and paper mills, it is likely that the pulp and paper industry will continually argue that dioxin-free paper products are not technologically obtainable without compromises in other environmental areas. The delay in production of guidelines for unbleached paper products by Canada's Environmental Choice Program's Advisory Board may be indicative of such maneuvering, as government and industry attempt to work out guidelines which are acceptable to all. Obviously, some areas are going to be much more contentious than others, and it will be imperative that environmental concerns are given priority over economic concerns *if the product is to be labeled*. If consensus cannot be reached on product guideline definitions, then the product should not be included until such time as agreements are reached. It can be hoped that 'rogue' members of an industry will appear who lead the way with innovative products and technologies that force others to abandon traditional positions and begin producing products that are at the leading edge of technology, safety, and public expectation.

In the last two years a great deal of interest has focussed on labelling programs. In late 1989 the EPA's Office of Pollution Prevention published a draft report on the topic, entitled "Environmental Labeling in the United States: Background Research, Issues and Recommendations," which includes a great deal of useful background information as well as recommendations for a labeling program in the United States.⁷ According to Dave Fege, in the Office of Pollution Prevention, the EPA is not at present pushing hard for a labeling program, although it are planning on coming out with voluntary guidelines for the terms "recycled" and "recyclable," in cooperation with the Federal Trade Commission and the National Association of Attorneys General, whose activities are described in more detail later in this chapter.⁸ Mr. Fege stated that in the long run a labeling program similar to Canada's may be viable, but this depends on how private efforts, also described below, work out.

Environmental products labelling programs are appearing in many countries, and their potential for focussing attention on the useful aspects of green consumerism is great. A brief description of existing and proposed labeling programs from several countries follows in order to provide the reader with an idea of what is involved in a useful program. Many of the ideas in the EPA's report can be traced back to these programs.

Germany's Blue Angel Program

West Germany adopted the first national environmentally oriented labeling program in 1978, partly in response to recommendations from the Council of the Organization of Economic Cooperation and Development (OECD), which urged member nations at that time to develop comprehensive

waste management policies.⁹ These policies were to include information campaigns for industry and consumers, and Germany, the only nation to respond, established the Blue Angel program. The symbol of and label for the program is a Blue Angel encircled by two ears of grain accompanied by a short explanatory text (figure 2). The symbol is an adaptation of the logo of the United Nations Environment Program.¹⁰ The German program has since served as a model for labeling programs in other nations, such as Canada and several Scandinavian countries.

The Blue Angel Program is structured such that the government (specifically the Federal Environment Agency - FEA) administers the program while remaining at arm's length from the process through which standards are decided upon, and does not participate in the testing and certification procedures. The general public, including product manufacturers, consumers and regulators, provide lists of product categories for possible inclusion.¹¹ These are given to the FEA, which screens the lists and passes them on to an



FIGURE 2 - Symbol for Germany's Blue Angel Program

independent commission (the Environmental Label Jury) made up of representatives from the general public, industry, the scientific community, and consumer and environmental organizations. The Jury then decides which of the initial lists qualify for detailed evaluation.¹²

In Germany, the 60 year old Institute for Quality Assurance and Labeling in Bonn (abbreviated as RAL) serves as the independent, nongovernmental organization which performs the testing and certification for the program.¹³ The RAL chairs hearings on the categories, which involve the FEA and other participants, including the Federation of German Industries, the Consumer's Working Group, and the Goods Test Foundation, a consumer quality testing organization.¹⁴ After the hearings, the recommendations of both the RAL and an FEA-appointed panel of experts are submitted back to the Jury, which makes the final decisions on inclusion and the criteria to be used. They then publicize their decisions.¹⁵

Manufacturers may then apply for the right to use the label, and the RAL begins testing. Before a manufacturer is awarded a contract to use the Blue Angel, however, local agencies within the manufacturer's Federal State are queried as to the manufacturer's compliance with local pollution standards, and how the company performs in general. The manufacturer must pass this scrutiny before a contract is awarded. Successful companies enter a civil contract with RAL, which allows the Blue Angel to be used for three years, after which the contract may be re-evaluated.¹⁶

Although the West German government footed much of the bill for the initial stages, fees which the manufacturers pay for the use of the label now cover most of the program's operational costs. The program started slowly, with

government procurement programs offering a great deal of support, but in recent years the number of categories and products which qualify for them have increased dramatically.¹⁷ While Blue Angel labels were approved for only 500 products by 1984, by 1987 2,000 products were approved, by 1988 3,000 products in 50 categories received labels, and as of August 1989, 3,100 products in 57 categories were labeled.¹⁸ 90% of the products are made in West Germany, with the other 10% manufactured in twelve other European countries.¹⁹ The categories which have been approved vary widely, including:

- non-CFC aerosols
- a variety of recycled paper, rubber and glass products
- re-treaded tires
- zinc-air batteries
- low-emission oil- and gas-fired boilers
- low-noise appliances and vehicles
- solar-energy products
- re-useable packaging
- season tickets for local public transport (the first entry of the program into the public sector)

As the product list indicates, the majority of the products are judged on a single-criterion basis. The decision to use such an approach was taken early by the program designers who recognized the difficulty in evaluating the benefits of a product over the product's life cycle. The qualification criteria were therefore limited to a single most important criterion which allowed comparison with other products.²⁰ In evaluating vacuum cleaners, for example, the single most important criterion was that of quietness. Low-solvent paints and varnishes qualify, while latex paints that do not contain organic solvents are ineligible because there is not yet a category for them.²¹ For recycled paper, the single criterion is recycled fiber content. To be certified a paper initially had to contain at least 51% waste paper content. This standard was updated in 1988,

and the requirement now stands at 100% waste paper, and the waste paper must be post-consumer or post-commercial, not only production trimmings from mills.²² It is interesting to note that some companies that produce recycled products that could qualify for the label have not applied because they do not want to call attention to the fact that many of their other products are made from virgin pulp.²³

Overall, the standards for recycled paper seem to have had a positive effect, according to a 1989 report by Environmental Data Services (ENDS), an independent research group in London. This group, which studied the existing and proposed labeling programs in Europe, found that the West German paper industry has seen increases in sales of recycled toilet paper, hand towels, kitchen rolls, stationery, napkins, and even paper handkerchiefs, all of which have begun appearing in "fashionable" shades of recycled grey.²⁴

The strengthening of the recycled paper criteria and other standards has come in response to criticisms that the Blue Angel Program has not updated its guidelines often enough. This is one of the major criticisms which has been made of the program, one which the decision-making commission is attempting to address by toughening standards in at least one category in each of its biannual meetings.²⁵

Other criticisms of the Blue Angel Program center on the traditional 'single criterion' approach of the program. Recent statements from persons involved with the program, however, indicate that the design of product criteria and product testing include consideration of all aspects of the product's environmental effects. They state that the Blue Angel Program has always used

a cradle-to-grave approach in developing product criteria, although the resulting category may consist of only one criterion.²⁶

Critics have also faulted the program for failing to guarantee that labeled products are of satisfactory quality or provide adequate performance.²⁷ A major consumer testing organization has now been formally included in the testing process so that overall quality of labeled products may be assured.²⁸ Criticisms have also been aimed at those who charge more for their labeled products than comparable, non-labeled products, as is the case for some of the recycled paper products. Addressing this criticism, however, is arguably outside of the Program's jurisdiction.

On the positive side, the program has been viewed as a success in many respects. The ENDS report found that the Blue Angel Program has succeeded in reducing pollution through adoption of more environmentally sound manufacturing processes, and environmental considerations are also given more thought in the research and design phases of product development. In terms of consumer awareness, a survey of 3000 households found that 78.9% of those surveyed were familiar with the label, and demand for products with the Blue Angel label is considered "healthy."²⁹ Quantitatively, the German government claims that the program has resulted in a cumulative reduction of 40,000 tonnes of solvents from household paints entering the waste stream.³⁰

An important change which occurred in 1988 reflects the increasing sophistication of both the consumer and the advisory board for the program. In 1988, the wording on the label was changed to avoid the use of the term "environmentally friendly." In its place, the labels now only reflect the general environmental benefits of a product, such as "helps reduce waste." The ENDS

report found that because of this change, some companies with labeled products felt that the new message does not differentiate their goods from other products.³¹ However, with the high degree of consumer familiarity indicated by the survey, this new wording should not be a deterrent to confidence in the products.

Canada's Environmental Choice Program

Canada's Environmental Choice Program, launched in June of 1988, began formally approving product categories in March of 1989.³² Modeled after the Blue Angel program, Environmental Choice was created "to help consumers find products which ease the burden on the environment."³³ Certified products are designated using the EcoLogo, a maple leaf formed into the wings of three interlocking doves, which represents cooperation between government, industry and society (Figure 3).³⁴ The logo is accompanied by a short note (in both French and English) explaining why the product qualifies. While the program was initially launched as the Environmentally Friendly Products campaign, the first meeting of the advisory and management board resulted in a name change to Environmental Choice for the same reasons that the Blue Angel wording was changed: the Board did not want to suggest that the products they approve are harmless to the environment.³⁵ While marketing people love the term, the Board did not feel that it was accurate, according to David Cohen, Board member and environmental law professor at the University of British Columbia.³⁶

As in the Blue Angel Program, the government is, for now, playing a central role, particularly in providing start-up funding and providing



FIGURE 3 - Canada's EcoLogo

administrative help. Also, the advisory and management board, known as the Environmental Choice Board, is appointed by the Minister of Environment.³⁷ Made up of 15 men and women from across Canada, the Board operates at arm's length from the government and brings expertise in fields ranging from health care, environmental science, retailing, economics, manufacturing, and environmental law. The Board is served by a Secretariat within Environment Canada, which has contracted the services of the Canadian Standards Association (CSA), a nationally-recognized product testing organization of long standing.³⁸ The CSA is a not-for-profit independent standards-writing and testing organization analogous to the RAL in Germany, or Underwriters Laboratories (UL) in the U.S.

The procedure by which products are labeled is, again, similar to that of the Blue Angel program. While the labeling process is still undergoing revision, the essential steps are in place. A potential product or product category is

submitted from the general public to the Secretariat, who prepares a report on the product or category for review by the Board. Each report contains an industry profile, an outline of socio-economic considerations, and an environmental assessment.³⁹ A significant difference can be found between the Environmental Choice Program and the Blue Angel program at this point, as the assessment provided to the Board spans the product's life cycle, including production, transportation, use and disposal: a cradle-to-grave analysis. Single attributes of a product are not considered sufficient for a label.

The suggestions received are screened by the Board, and are either accepted or rejected. The Board may also ask for more technical information from the CSA, Environment Canada, or others.⁴⁰ If the product or category is accepted, the CSA, with the assistance of a voluntary Coordinating Technical Committee, drafts a set of criteria for consideration by the Board. The Technical Committee, using experts from business, environmental, and consumer groups, sets up task forces which develop guidelines. These guidelines are then reviewed by the Board, which may accept, reject or set them aside for further development.⁴¹ Accepted criteria are then released for public comment for a period of 60 days. This gives manufacturers, environmentalists, consumers and others an opportunity to provide further suggestions on improving the criteria.⁴² After completion of the comment period, the Board revises the guidelines accordingly and submits the final guidelines (a 2/3 majority is needed for acceptance) to the Minister of the Environment. Public notification of guideline completion occurs in the Canadian Gazette (analogous to the Federal Register in the U.S.) under authority of the Canadian Environmental Protection Act (CEPA).⁴³

A number of categories and product guidelines have been approved. As of December 1990, fifteen categories had reached final status, and nine more were either in draft form or waiting final approval.⁴⁴ These categories are:

Final Guidelines

- re-refined lubricating oils
- craft forms from recycled paper
- insulation from recycled wood-based cellulose fibre
- newsprint from recycled paper
- products made from recycled plastic
- heat recovery ventilators
- zinc-air batteries
- reusable cloth diapers
- fine paper from recycled paper
- water-based paint
- solvent-based paint
- diaper services
- composting containers
- ethanol-blended gasoline
- reusable shopping bags

Guidelines Awaiting Final Approval

- compost
- non-rechargeable batteries
- water-conserving products
- energy-efficient major appliances
- energy-efficient lamps
- sanitary paper from recycled paper

Draft Guidelines

- laundry detergents
- dishwasher detergents
- hand dishwashing detergents

Products from 33 different companies are now certified, and, while the initial going is said to be a little slow, the number of certified products is growing measurably, particularly in those categories dealing with recycled products.⁴⁵ However, as Environmental Choice Marketing Director Charles Dickson says "...after decades - if not centuries - of accumulated environmental problems stemming from our industrial and consumer society, it does not seem

unreasonable that we take a year or two to get things going in a way that is credible and will endure."⁴⁶

Contracts granting use of the EcoLogo are established for a maximum of three years, and during that time the CSA conducts annual assessments of continued compliance with the relevant guidelines.⁴⁷ In order to cover costs of factory checks and compliance procedures, annual fees are charged to product manufacturers. Originally these fees ranged from \$1,500 to \$5,000 annually, depending on the gross annual sales of the product.⁴⁸ As of August 1990 these fees were revised downward, with the realization that "the low end of the scale may not, in fact, have been low enough."⁴⁹ The current fees are shown in Table 5. Again, while the start-up costs for the program have been provided by the Federal Government through Environment Canada, the program is intended to be self-sustaining within two years.⁵⁰ Government funding in the initial stages is also very important in terms of guideline standards.

According to David Cohen, it would be easier and more lucrative to set low standards so that many manufacturers can be certified, with their fees supporting the program. However, if the government provides initial funding, higher standards can be set, though this may mean that fewer manufacturers apply for certification and fewer products are sold. Once support of consumers indicate to manufacturers that the program is worthwhile, manufacturers will pay the higher fees, confident of product success.⁵¹

While the Environmental Choice Program has not been in place long enough for a critical analysis of its effectiveness to take place, responses from consumers and most industry sectors seem positive. Board member Alastair McKichan, President of the Toronto-based Retail Council of Canada, states that

TABLE 5. Annual EcoLogo Fees

Gross Sales of Certified Product	Annual Fees (\$Can.)
Up to \$100,000	300
\$100,001 - 250,000	750
\$250,001 - 500,000	1,500
\$500,001 - 1,000,000	2,500
greater than \$1,000,000	5,000

"there has been zero resistance from retailers. We think the program will be useful guidepost to the consumer."⁵² In addition, based on information given in Environmental Choice newsletters and communiques, there is great potential for the reduction of waste. For example, the guidelines for re-refined oil indicate that 300 million liters of used oil from automobiles are discarded each year, waste paper contributes 35% by weight of the municipal waste stream, and plastic products account for 7% by weight, or 30% by volume of the municipal waste stream in Canada.⁵³ The first three product categories certified, re-refined oil, construction material consisting of recycled wood-based cellulose fiber, and plastic products from recycled plastic, as well as newer guidelines are designed to address this waste. Once consumers become more familiar with the program, the market will begin to be a potent force in changing consumer product choice as well as manufacturing processes and recycled product availability.

The only potential problem with the program is that the "cradle-to-grave" analysis is difficult and time-consuming, though in the long term it is the best

strategy. The Board has experienced difficulty, for example, in certifying whether plastic, glass, or aluminum beverage containers are the best overall, once recyclability, energy use in manufacture, and other factors are considered.⁵⁴ In some cases it has been difficult, if not impossible, to gather information about the environmental effects of certain products, as manufacturers have never done environmental impact analysis of their products at the research and development level.⁵⁵ Labelling programs may produce the added benefit of promoting the development of product environmental assessments at the development level.

The Environmental Choice Program, while having addressed the issue of recycled paper, is still working on guidelines for a category which will include unbleached paper products. This is one of the 'contentious' areas referred to above, and the guidelines have been revised a number of times. According to a spokeswoman at the CSA, the draft guidelines were to be considered at an October 1990 meeting of the Advisory Board, after comments from the pulp and paper industry were received.⁵⁶ As the guideline is not listed as one of the new draft guidelines in the December issue of the EcoLogo newsletter, it may be assumed that the details are still being worked out. According to Heather Hattin, the CSA employee who wrote the draft guidelines, the Board is also waiting for additional information from Environment Canada, and the Board's direction with the guidelines might be more extensive than originally planned.⁵⁷

The latest (October 1990) discussion draft of the guideline showed several changes from a previous version, noticeably a category title change from "Unbleached Paper Products" to "Paper Products from Alternative Bleaching Processes," which would be indicative of a broader category.⁵⁸

Paper products authorized to be included in this category must "be made by a process that does not produce organochlorine compounds in the final effluent in excess of 1.5kg AOX per air dry tonne of pulp."⁵⁹ By allowing any level of AOX discharge, the idea that these paper products are "unbleached" is precluded; hence the name change. However, according to Ann Hillyer, a member of the Unbleached Paper Task Force for the Environmental Choice Program and lawyer with the West Coast Environmental Law Association in Vancouver, the Board still seems to be committed to guidelines for both unbleached and low organochlorine pulp.⁶⁰ The guidelines for unbleached paper products, however, are being hindered by pulp and paper industry representatives on the task force studying the guidelines. Ann Hillyer states that they seem to have some "backward ideas" concerning the potential for such products. It is interesting to note that all of the correspondence which comes from the Environmental Choice is printed on unbleached, recycled paper, which is made in Canada (Cascade Paper- see Chapter III). As in the United States, the issue of unbleached paper products and organochlorine discharges is a volatile one, and it may be a while before guidelines appear.

In terms of strictly recycled paper, a category has been approved. To qualify, the product must contain over 50% by weight of recycled paper, including a minimum of 5% post-consumer fiber. The percentage of post-consumer fiber will be raised as the availability of high quality "waste" paper increases: as of July 1 1991, the percentage will be raised to 10%.⁶¹

Japan's EcoMark

Japan has been the first among the Far East countries to promote an eco-labeling program, which is in some ways surprising yet in others not surprising at all. Surprising because of Japan's poor international environmental record (international deforestation, whaling, and other problems) yet reasonable in light of Japan's good domestic record in terms of recycling, and innovation in vehicle and power station emission controls, and advances in pulp and paper technology.⁶²

Japan's EcoMark program came out of an Environment Agency White Paper issued in May of 1988. The Paper proposed a new direction for domestic environmental policy, stating that pollution prevention should be considered throughout the life-cycle of the product, and that consumers should be educated to help them realize that environmental concerns are their concern and responsibility.⁶³ Symbolized by a pair of hands encircling the Earth (meant to convey the message of "protecting the Earth and environment with our hands" - see Figure 4) the program was officially launched in February of 1989. It is similar to Canada's and West Germany's programs.⁶⁴

As with other programs, Japan's program seeks to promote "clean" innovation by industry, heighten environmental awareness among consumers, recommend products that contribute to environmental protection and conservation, and encourages an ecological lifestyle.⁶⁵ The program was designed by two committees, one of which is within the Environment Agency and decides on product categories, design criteria, and application procedures. Manufacturers must pay a small fee to use the logo, and a normal contract is for two years, after which it may be renewed.⁶⁶



FIGURE 4 - Japan's EcoMark

Approximately 226 products have been approved so far,⁶⁷ and include such products as:⁶⁸

- personal care, non-chemical-propellant aerosol products
- kitchen strainers and filters
- compost-makers for organic wastes
- books and magazines from recycled paper

Products which may be added later include:

- electric cars
- solar-powered products
- low-mercury batteries
- machinery and appliances which consumer less water or energy
- recycled plastic and wood products
- bottle banks

The response to the program, according to Japan's Environment Agency, has been good from consumer and environmental organizations, though industry has been less forthcoming with support.⁶⁹ According to information from Canada's EcoLogo program, Canada and Japan are sharing information about their programs.⁷⁰

Other Non- U.S. Labeling Initiatives

Many other countries, particularly in Europe, have begun to develop labeling programs. Programs have been or are being developed in several countries, including: Norway, Sweden, Denmark, Holland, Great Britain, France, Austria, Italy, Spain, New Zealand, and Australia.⁷¹ A program designed for the European Community (EC) is also under consideration, in preparation for the opening of the European markets in 1992.⁷² The European Commission has funded a feasibility study on the issue, performed by the Danish Technological Institute in Copenhagen. Meetings were conducted in September of 1989 to review the results of the study, and a final report was expected in December of 1989. Discussions between the EC and its members will begin after the Commission presents a proposal to the Council of Environment Ministers in early 1990.⁷³ At present it seems that the EC program would be similar to, and consistent with, existing programs. This would be accomplished through a two-level management structure. It would be "national as far as product selection, quality objectives and administrative procedures are concerned, and international as far as common criteria defining and monitoring of their application is concerned."⁷⁴ It may be extremely difficult to coordinate programs within the structure of the EC, as not every country has the same level of environmental concern that has brought about initiatives in Germany, Sweden, Norway and the Netherlands.⁷⁵

Denmark, Norway and Sweden have plans for programs well underway, and Norway and Sweden will be the first participants in a joint Scandinavian program. Denmark, being both a Scandinavian country and a member of the

EC, has decided to participate in the EC program. Finland and Iceland are expected to join the Scandinavian program.⁷⁶ It is interesting that in Sweden and Norway the impetus for the programs has come as a result of industry pressure, rather than from consumers.⁷⁷ This may be due to the perception that an eco-label can be a valuable marketing tool.

Great Britain initially advocated a non-cradle-to-grave approach. While the British have positioned themselves to participate in the EC-wide program, their single-criterion design had put them at odds with the philosophy of the other participating countries. Several manufacturing firms, trade and industry groups, and consumer associations have stated their support for some form of labeling program. However, they have also stated their disagreement with the government's position of not using a cradle-to-grave approach.⁷⁸ In recent government publications, however, it is stated that "The U.K. is working within the E.C. to set up a voluntary scheme which will: take a cradle-to grave approach; be based on the highest standards; be simple, while commanding respect; involve the minimum of bureaucracy."⁷⁹

"Environmentally Friendly" Paper in Sweden

While the programs described above all involve the government, there is one private initiative in Sweden which requires comment. Similar to the "GREEN" line promoted by Loblaw's Supermarket stores in Canada, environmental groups in Sweden worked with a major retail chain in Sweden, ICA, to produce a classification system for paper products, based on the idea that the lower the AOX level emitted from a mill, the better the rating for the paper.

An abbreviated version of the story of the development of the system follows (for a more complete version of the story refer to the Fall 1990 Issue of the Journal of Pesticide Reform, produced by the Northwest Coalition for Alternatives to Pesticides).⁸⁰ Swedish environmental groups, particularly the Swedish Society for the Conservation of Nature (SSCN) and Greenpeace, have been very active in promoting the use of unbleached and chlorine-free paper products since the late 1970s. In 1983 the SSCN published the third version of a book entitled *Paper and the Environment*, which was widely distributed around Sweden. By the end of 1985, because of this book and public awareness of environmental problems in the Gulf of Bothnia, approximately 50 of Sweden's 280 local governments had decided to use "environmentally friendly paper," which was at that time was undefined. By 1985 a 'paper group' was formed, made up of local politicians, environmentalists (including Göran Bryntse, author of the article mentioned above), and others, who got together to work out a definition of "environmentally friendly" paper. They decided to work with one grade of paper, copy paper, and quickly realized that at that time it would be impossible to ask for totally unbleached or chlorine-free paper. Hence, they defined "environmentally-friendly" copy paper as that which had been produced using only 25% of the normal amount of chlorine bleach. This meant that less than 1 kg AOX per air dried tonne of pulp manufactured could be discharged.

The group's definition was sent to representatives of the paper industry, and only one positive response was received. The Munkedal Inc., paper mill was able to produce such copy paper, which was tested and found acceptable. A promise was made to buy at least 3000 tons of it the first year, and the paper

was introduced into the marketplace. It was immediately successful among the environmentally aware Swedish people. The paper industry attempted to counter this success with a large media campaign, which essentially backfired by making even more people aware that such paper existed. As manufacturers of conventional copy paper began to lose market share, they first dropped their prices, then began to look for ways to reduce their AOX. In 1987, a mill in the Stora group, Sweden's largest copy paper manufacturer, succeeded in reaching the 1kg AOX standard: in February 1988 two more large companies, Klippan and Papyrus reached it, and in May of that year MODO, the last large manufacturer, also reached it.

As the discussion widened to include other paper products, shop owners and retailers began to express increased interest. In January 1988 Lisbeth Kohls, a representative of ICA, contacted the SSCN about working out a classification system for the paper products ICA carried. SSCN had already worked out a system, and it was easily put in place at ICA, with the following standards: a. chlorine-free - discharges of less than 0.2 kg AOX per air-dried tonne (adt); b. low-chlorine - discharges of less than 1kg AOX/adt; and c. the rest (conventional chlorine-bleached pulp). Over the next few months, as ICA contacted its suppliers about the chlorine content of paper products, the desire to reach the "a" category became a matter of market survival, and many manufacturers changed their processes drastically. As of December 1990, the criteria have been strengthened so that to get an "a" rating the production of the paper must result in less than 0.1 kg AOX/adt, and a low-chlorine product less than 0.5kg AOX/adt.

The SCCN gives several reasons why an absolute zero level is not used for the "a" category. First, it states that even unbleached pulp contains some organochlorines, not necessarily harmful ones. Second, the organochlorines present at the 0.2 Kg AOX/adt are not bioaccumulating, not polychlorinated, and are much more degradable than those found in higher AOX concentrations. Third, by having a standard that mills could reach, they could argue with mills from a better position.

There are those who would disagree with these reasons, and these people would also make the point that using even the minimal amount of chlorine is only necessary if bright white paper is desired. Numerous studies, including some by Swedish scientists, dispute the fact that such low AOX levels are harmless (see Chapter II). However, the use of "realistic" goals enabled the mills to reach the highest standards, and criteria will likely eventually be such that the "a" category is reserved for those papers which are made without any form of chlorine. The author of the article describing this story recommends that in the United States, if a similar program is attempted, similar standards be used, with criteria tightened every two to three years.

The United States, however, is nowhere near the point where either government or private labeling initiatives can deal with this delicate issue. While private companies which market "unbleached" and chlorine-free paper products have put language to that effect on their product labels, there are as yet no relevant standards or definitions for unbleached or alternatively-bleached products per se. Canada's Environmental Choice Program seems the nearest of any effort, and it appears somewhat bogged down due to the intransigence of the pulp and paper industry. Obviously, both the demand for

such products and the technology to produce them have arrived in Sweden, and the order with which they did was crucial. However, the demand does not appear great enough in North America to cause such a widescale reaction in the pulp and paper industry, and this industry is in no way facilitating what demand does exist. With a labeling program in place which provided consumers with a clear choice and provided manufacturers with an incentive to use the best technology, things could change rapidly.

Government Initiatives in the United States

Activities concerning product labeling in the United States come in three separate, though somewhat interdependent, areas. First, there are the private efforts such as Green Seal and Green Cross, which are well underway and which are vying for prominence. Second, there are government initiatives concerning environmental labeling, particularly at the EPA, though some states have expressed an interest in this area. Third, there are the coordinated activities of the Federal Trade Commission, the EPA, and a Task Force of ten state Attorneys General who are attempting to regulate green marketing claims and bring about discussion on definitions for certain relevant terms. The Environmental Protection Agency and the Attorneys General Task Force have published preliminary, yet extensive, studies on product labeling and responsible environmental advertising, respectively, and these documents will likely form the basis for ongoing discussions.⁸¹

In terms of environmental labeling programs (as opposed to marketing claims regulation), the amount of activity on the part of the U.S. government is low when one considers the zeal with which several other countries have

promoted their labeling programs. A study commissioned by the EPA reviewed existing programs in several countries, examined the effectiveness of existing labeling programs in the U.S. (such as nutrition labeling, appliance labeling, automobile fuel economy labeling and cigarette labeling) and presented recommendations for an environmental labeling program in the United States. The report found that the development of criteria for determining which products receive labels was the most difficult and controversial aspect of environmental labeling, noting that no country has developed a formal methodology for developing such criteria.⁸² The report also concluded that development of product criteria (and product category screening) should use a cradle-to-grave approach which, though much more difficult to implement, "is crucial to the success of the program."⁸³ The importance of a credible testing, certification and monitoring body is also noted, although no such organization was recommended. Other authors have stated that the most likely candidate for such a role would be the Underwriters Laboratories, Inc. (UL) an independent, not-for-profit company based in Chicago, analogous to the RAL and CSA.⁸⁴ The UL logo already has a high degree of recognition, and this organization has an extensive and established testing organization in place. UL officials are said to be interested.⁸⁵

Overall, the program as designed in the EPA report is similar to the Blue Angel and Environmental Choice programs, with the exception of some innovations derived from other programs' experiences. While the EPA report agreed that fees should be paid by the manufacturers to cover program costs, it suggested that for small companies who are starting out and may not be able to pay the initial licensing fee, a special fee structure could be put in place

whereby the company 'borrows' the fee and pays it back later. This would help to stimulate environmental entrepreneurial activity.⁸⁶ Another interesting idea which the report proposed was that of a multi-layered labeling system for certain categories, similar to the Swedish system for unbleached paper described above. The EPA report uses the example of recycled paper, with the idea that 100% recycled paper would receive a gold label, 80-90% recycled paper a silver label, and 60-79% recycled paper a bronze label. A numeric scale could work as well.⁸⁷ Obviously, for recycled paper, allowance would have to be made for post-consumer waste content, which could be a constant in the hierarchy; for example all papers would have to have a minimum of 5-10% post-consumer waste to start, increasing over time.

If such a system could be used for recycled paper, and has been used successfully for unbleached and low-chlorine papers in Sweden, then it could be used to rank paper products in North America. This could circumvent the confrontational atmosphere which surrounds the unbleached paper issue here. Paper companies that either did not want to participate, or that felt such paper was not possible, could sit on the sidelines and observe as the market decided whether or not consumers really do have to have white, bleached paper as the pulp and paper industry claims.

A recent article in Environmental Action magazine (November/December 1990) states that the EPA has put aside its effort to develop a labeling program in order to see what happens with private initiatives.⁸⁸ Dave Fege, in EPA's Office of Pollution Prevention, informed me that nothing much has happened with the report since its publication, although the EPA is still working on it. For now they are devoting more attention to working with the FTC

on an Interagency Task Force, concentrating on environmental marketing claims and voluntary guidelines for terms such as "recyclable" and "degradable."⁸⁹ It is important that such definitions are clear before a labeling program can be undertaken.

Concern over the need for clear definitions acceptable to the public, environmentalists, industry, and government has led to legislation on the state and federal level. Several states, including New York and California⁹⁰ have taken the legislative lead in enacting regulations concerning green marketing terms, and the Attorneys General of New York and Massachusetts have submitted comments on draft regulations proposed by the Northeastern Recycling Council and the Source Reduction Council of the Coalition of Northeastern Governors which would define and regulate such terms as "source reduction," "reusable," "recyclable" and "recycled content."⁹¹ While the Attorneys General support the draft regulations, they have, in keeping with recommendations of the Task Force of Attorneys General, noted their preference for nationwide standards.

The Task Force has been very active in the last year, and has played a central role in getting manufacturers, businesses, environmentalists, government and others together to deal with the marketing claims issues. The Task Force's original members (Attorneys General of California, Massachusetts, Minnesota, Missouri, New York, Texas, Washington and Wisconsin) formed an ad hoc group in November 1989 to review advertising claims, and in July 1990 the Attorneys General of Florida and Utah joined the original members.⁹² Members of the Task Force had previously been involved in regulating deceptive nutritional claims, and "troublesome parallels" were seen.⁹³ They

soon identified three potential problems with the rise in environmental marketing. First, they felt that if consumers began to feel exploited, they would no longer look for products which were actually less damaging to the environment. Second, environmental claims might lead the public to believe that problems did not exist or that they had been solved. Third, the idea that products were in some way "good" for the environment was troublesome, as they recognized that manufacturing processes can occur which are less harmful, but production and consumption of goods necessarily have adverse effects on the environment.⁹⁴

The Attorneys General on the Task Force therefore initiated a number of investigations into specific environmental marketing claims, asking manufacturers to substantiate their claims. Concurrent with the Task Force's activities were investigations by the FTC's Bureau of Consumer Protection, which, as of May 1990, had over a dozen investigations in progress concerning environmental claims.⁹⁵ Among those targeted were First Brands Corp. for Glad degradable trash bags, Mobil Chemical Co. for Hefty photodegradable trash bags, R Med International for TenderCare diapers and American Enviro Products for Bunnies "degradable" diapers.⁹⁶ So far, these investigations have resulted in Mobil Corp. dropping its claim that its garbage bags are degradable, after settling in a suit with the Texas Attorney General. Also, the makers of Bunnies diapers have agreed to stop promoting its diapers as biodegradable.⁹⁷ The results of these investigations are said to have had a "chilling" effect on other such claims.

In late 1989 FTC Chairwoman Janet Steiger and Hubert Humphrey III, Attorney General of Minnesota, agreed to work together "in partnership" in this

area to avoid duplication.⁹⁸ The EPA was asked to become involved due to its activities in the area of managing plastic wastes, as well as its role in the publishing of the report on labeling programs.⁹⁹ These parties joined in hosting a national Public Forum, held in Minneapolis in March of 1990, which was designed to bring together leaders of government, business and environmental groups involved in some way in the issue of green marketing.¹⁰⁰

Over 45 different participants gave testimony at the Forum, including Proctor and Gamble, Weyerhaeuser Paper Co., the Environmental Defense Fund, the American Association of Advertising and others.¹⁰¹ While consensus was not reached in all areas, there was a good deal of agreement on many issues. In particular, most participants agreed that any standards developed in the future should be national in scope, rather than state or local.¹⁰² Among other things, the Forum resulted in the passing of a resolution by the National Association of Attorneys General (NAAG) on March 20 requesting the FTC and the EPA to "work jointly with the states to develop uniform national guidelines for environmental marketing claims."¹⁰³

For its part, the FTC is considering three courses of action. One, it may continue to investigate dubious environmental marketing claims on a case-by-case basis; two, it may develop advertising guidelines as requested in the NAAG resolution, and three, it may issue formal FTC rules, which would have the force of law.¹⁰⁴ Staff Attorney Michael Dershowitz states that whichever course is chosen, it will definitely have the effect of deterring other companies that might wish to practice questionable advertising with an environmental theme.¹⁰⁵

The Forum resulted in eight specific areas of agreement, which surprised many of those who attended.¹⁰⁶ These areas are:

1. consumer demand for environmentally oriented products is increasing;
2. intense competitive pressures exist for firms to use green marketing;
3. mounting consumer confusion is evident;
4. green consumerism has the potential for derailing environmental efforts;
5. corporate environmental responsibility was recognized;
6. a need for standards exists;
7. standards and guidelines must foster, not hinder competition;
8. standards should be national, and should be accomplished through an ongoing dialogue between the diverse interests involved.

There were also important points of disagreement, which centered on three issues:¹⁰⁷

1. degradability - a good deal of controversy surrounded the degradable plastic products which have been appearing, with arguments both pro (by the manufacturers of the products) and con (by other manufacturers and environmentalists). Several key points were made against these products.

2. recyclability claims - much of the controversy around these products centered on whether or not it is appropriate to promote something as recyclable if the mode of recycling does not exist in the area where the product is sold. Several problems were attributed to this practice, including the presence of these products in local recycling depots which are not able to handle them and therefore incur added costs in separating them from other recyclable waste.

3. Recycled content claims - a continuing debate exists over whether or not pre-consumer wastes should be considered when labeling a product "recycled" continues.

Recommendations for Federal Action

In response to the discussion surrounding these points, the Attorneys General came up with a number of recommendations to the federal government and to the business community:¹⁰⁸

1. Definitions - the lack of common meanings for terms used to make environmental claims can be addressed by government action. This will relieve deceptive potential as well as give business people a firm starting point from which to change their products in order to make specific environmental claims.

2. Testing Protocols - the federal regulatory scheme should include procedures for product testing. The Task Force states that testing protocols will be most useful if "cradle-to-grave" analyses are utilized. A preference was stated for government-sponsored product assessments over those sponsored by industry. The EPA has already begun work on procedures for product life assessments, with its Consumer Product Comparative Risk Project. This would tie in well with a labeling program.

3. Need for government regulation - While several organizations testifying at the Forum advocated industry-sponsored guidelines for environmental claims, the Task Force has concluded that a government regulatory response is preferable for a number of reasons. One compelling reason is that environmental advertising can affect environmental quality, and therefore the federal government must be a key participant in the standards

setting process. This recommendation does not exclude participation in the process by any other party.

4. Seal of Approval Programs - noting the proliferation of environmental product labeling programs both in other countries and private efforts in the U.S., the Task Force noted that the ultimate goals of these programs and those of the Task Force are the same: educating consumers and providing incentives to manufacturers. The regulatory scheme differs in two ways, however. First, all of the seal programs involve an independent third party for certification, while the Task Force's scheme does not. Second, the regulatory scheme provides minimum requirements that products must meet in order to use defined terms, while labeling programs set high standards which only a few products in a category can meet. While the Task Force has some reservations about labeling programs, it feels that such a program in the United States has great potential.

5. Steps toward Definitions and Standards - this includes the resolution of the National Association of Attorneys General mentioned above, as well as support for a bill authored by Sen Frank Lautenberg (D - N.J.) which is now before Congress. While the Attorneys General support federal legislation, they will not do so at the expense of the states' ability to continue monitoring and regulating deceptive environmental advertising, or their ability to enact more stringent or comprehensive requirements.

Preliminary Recommendations for the Business Community

1. Claims should be specific - avoid the use of such vague terms like "environmentally-friendly" or "safe for the environment." These statements do not allow meaningful comparisons and tend to be inaccurate.

2. Claims should reflect current disposal options - words such as "degradable" or "disposable" should not be used unless the advertised disposal option is currently available to consumers in the area in which the product is sold.

3. Claims should be substantive - trivial and irrelevant claims create a false impression of a product's overall soundness and contribute to consumer confusion. Claims that disposable items are "safe for the environment" carry the message that such items do not contribute to the overall solid waste problem, which is not true.

4. Claims should be supported - any claims made should be supported by competent and reliable scientific evidence.

The recommendations made by the Task Force in its Green Report were meant to be preliminary. In order to facilitate comment and continued dialogue between representatives of industry, business, the environmental community, and public officials, the Task Force sponsored open hearings on the recommendations in San Diego, California on December 10 and 11, 1990. All previous participants, including representatives of the FTC and EPA, attended. The hearings were meant to stimulate discussion on such questions as whether or not the recommendations provide a "level playing field" for all businesses making environmental advertising claims, and whether or not there are areas other than those covered by the recommendations for which the Task Force should provide additional guidance.¹⁰⁹

Responses to the Green Report have so far come mostly from the business community. Reflecting their desire to resolve these issues and get back to business, they have expressed concerns about several areas, notably

the recommendation that recycling be available locally. "We are all national marketers, and we can't live with that" stated Richard Parry, a spokesman for Dow Chemical Co.¹¹⁰ A spokeswoman for Proctor and Gamble stated that her company felt that there was value in the terms such as "recyclable" and "compostable" because they could stimulate community interest in such projects where they do not exist.¹¹¹

At the San Diego hearings, the business and advertising communities presented a series of guidelines of their own. This new group, formed largely of marketers, hopes to circumvent the Task Force and petition the FTC directly with its national green guidelines.¹¹² This way they hope to stay 'one step ahead' of the Task Force, which is promoting stricter guidelines. The proposal is likely to intensify the debate, possibly bringing environmentalists into the fray to a greater degree. Barry Cutler, director of the FTC's Bureau of Consumer Protection, stated that these new guidelines may have a better chance of success than the more rigid regulations proposed by the states. The FTC is more receptive to a general approach that doesn't specifically define what constitutes a non-deceptive environmental claim. This would allow them to continue on the case-by-case basis as they have done so far.¹¹³ The industry would use its proposed guidelines to police themselves, allowing them to focus on avoiding deceptive green claims rather than on meeting specific definitions.¹¹⁴

The bill introduced by Senator Frank Lautenberg (D-N.J.) in May of 1990 would require the EPA to set uniform criteria for environmental claims in marketing, and has provisions for the creation of a labeling program for "environmentally preferable products" to be administered by the EPA.¹¹⁵ The

bill, (S. 3218) which would create the "Environmental Marketing Claims Act of 1990", passed the Senate 29-4, but has yet to make it through the House.¹¹⁶ Senator Lautenberg's bill recognizes the potential of green marketing and "environmentally preferable" products while acknowledging the possibility of deception and exploitation of consumers. The purposes of the bill are essentially the same as the goals of labeling programs: prevent fraudulent claims, empower consumers, establish standards and definitions, encourage development of innovative technologies and practices by manufacturers, and "encourage both consumers and industry to adopt habits and practices that favor natural resource conservation and environmental protection."¹¹⁷ The bill also directs the Administrator of the EPA to establish an environmental claims regulatory program, including the establishment of an Independent Advisory Board, consisting of 15 members representing industry and manufacturing, consumer advocates, environmental organizations, government agencies, and others.¹¹⁸ Further, the bill provides for criminal penalties, including fines of not more than \$25,000 for each day on which an unauthorized claim is made.

The Task force of Attorneys General commented extensively on the draft version of this bill, including the addition of a number of terms which the Task Force has run up against in its activities, such as "landfill safe," "non-toxic when incinerated," "better for landfills" and others.¹¹⁹ Among other things, the Task Force also recommended that the FTC be given enforcement authority along with the EPA, in keeping with the FTC's traditional role. As well, it was recommended that enforcement authority be given to state and local authorities, including state Attorneys General.

Skepticism has been expressed about a government-sponsored labeling program working in the U.S. A common line of reasoning is that if the recycling community cannot even agree on a definition for recyclable, how can we hope to reach agreement among all of the interested parties on the complex procedures involved in a labeling program?¹²⁰ Joel Hirschhorn, senior associate with the federal Office of Technology Assessment feels that, unlike in other countries, the process by which a labeling program comes into being "would quickly become confrontational here."¹²¹ He adds that the U.S. public seems to have less confidence in the government, making it difficult for a government-sponsored program to succeed. As well, there is a great deal of resistance here to government involvement in the marketplace. David Cohen, EcoLogo Board member, counters by noting that there is no reason that the government has to run the program; the crucial ingredient is the existence of a credible third party, such as RAL, CSA, or Underwriters Laboratories. The government can be left in an administrative position, with a crucial role in supporting the program through procurement policies.

Private Labeling Initiatives in the United States

In the private sector there are two major efforts vying for control of the labeling frontier, with a small number of other, related initiatives also in the works. Born of the same concerns that have stimulated the creation of government labeling programs in other countries and the activities of the Attorneys General Task Force, Green Seal and Green Cross Certification Company are both not-for-profit companies wishing to gain the confidence of consumers with product "seals of approval". There is one significant difference

between the two. Green Cross, created by the National Toxics Campaign, identifies specific accomplishments, such as recycled content, in awarding their seals,¹²² while Green Seal has decided that the more comprehensive life cycle approach is necessary, and have taken longer coming out with product labels because of that decision.¹²³ Both organizations are open to public input in their labeling process.

Green Cross operates as a division of Scientific Certification Systems, Inc., which has been involved in evaluation of exceptional product claims since 1984.¹²⁴ The company launched its program just before Earth Day 1990 in four west coast supermarket chains, including Fred Meyer's of Portland, Oregon. The first products to be certified were those containing at least 50% recycled paper (10% post-consumer waste), with other products approved as of August 1990.¹²⁵ All of these products, including "fire logs" made from 100% recycled wood waste, and plastic trash bags, were found to contain "the highest levels of recycled content using state-of-the-art technology."¹²⁶ While most of the products so far have been analyzed on the basis of recycled content, other types of claims, including biodegradability (for cleaning products only), energy efficiency (light bulbs, appliances etc.) and sustainability of resource use (wood, cloth) are also slated for analysis.¹²⁷ Once a product earns the Green Cross, it can be displayed freely in all market areas, and participating stores are charged on a fee-for-service, with no licensing fee for the use of the logo.¹²⁸

As yet, Green Cross has not used dioxins in paper products as a criteria for exclusion from their program. According to Dr. Derek Augood, Director of Certification at Green Cross, they are "cognizant of what companies are doing in terms of dioxin when they look at a paper in terms of recycling."¹²⁹ He said

that they are concerned about chloroform in non-chlorine-bleaching processes as well (presumably he means mills using hypochlorite as a bleaching agent, which means that they are not chlorine-free). He stated that they would not certify any company which they consider "awful" in terms of any by-products of paper manufacture.¹³⁰ So far, the only unbleached products which have been submitted to them are coffee filters, which they are considering.

Green Seal, which is expecting to approve its first categories of products in early 1991, grew out of the Alliance for Social Responsibility, a New York-based group that saw a need to "outrun Madison Avenue in the race to produce a US 'eco-label.'"¹³¹ Headed by Denis Hayes, former CEO of Earth Day 1990, Green Seal has been developed by an impressive Board of Directors, including John Adams, Executive director of the Natural Resources Defense Council, Lester Brown, President of the Worldwatch Institute, Randall Hayes, Executive Director of the Rainforest Action Network, Alice Tepper Marlin, Founder and Executive Director of the Council on Economic Priorities (Shopping for a Better World), and others.¹³² Green Seal has announced five categories to be evaluated: light bulbs, laundry cleaners, house paint, toilet paper and facial tissue, although the criteria by which they will be evaluated, beyond the life-cycle orientation, has not been fully developed.¹³³ While attempting not to compete with Green Cross, Green Seal representatives emphasize the need for review of products on the basis of multiple criteria.¹³⁴ "You don't want to encourage people to purchase environmentally damaging products just because they come in an environmentally responsible package."¹³⁵

Green Seal has established an Environmental Standards Council, comprised of a board of scientists and experts in environmental and technical

fields. The Council seeks the input of representatives of business in determining product categories, and insures that no person with a financial conflict of interest is able to serve on the Board of Directors or on the Environmental Standards Council.¹³⁶ If a company applies to Green Seal to have a product tested, it pays a small fee for an independent testing laboratory to determine that its product meets the criteria. If it does, the company is eligible to license the right to use the Green Seal. An annual licensing fee is also paid, which is related to the size of the company.¹³⁷ The response to Green Seal has been very positive, although Janet Hughes, Assistant to the Executive Director, reports that the "plastics people" are somewhat hostile because Green Seal has not yet considered their products.¹³⁸

Other private initiatives in the United States include one from Good Housekeeping Magazine, which, as part of its Good Earthkeeping program, plan to use Popeye the sailor, known for eating his "greens," as a marketing tool (seriously!).¹³⁹ Good Housekeeping recently established a Bureau of Chemistry and Environmental Studies, which will evaluate marketers' environmental claims and may eventually judge products. This will wait until agreed-upon environmental standards are set.¹⁴⁰

Adding more complexity and potential confusion to the scene, the Environmental Institute in Gainesville Florida is promoting its own Good Earthkeeping program, which is not a product seal but a Code of Corporate Environmental Responsibility. Corporate memberships cost \$1,000 and up based on the level of sponsorship, and the company must, among other things, comply with environmental regulations, strive to reduce or eliminate pollution to the air, water, soil and climate, and, if practical commit to a recycling

program.¹⁴¹ Companies which have requested applications include Nature's Best and Millcraft Paper Co. In many ways this Code appears similar to the Valdez Principles sponsored by the Council on Economic Priorities.

Members of the Attorneys General Task Force, as well as Barry Cutler of the FTC's Bureau of Consumer Protection, have stated that the private labeling programs "have the potential to be deceptive," and that seal programs will be reviewed to ensure that they do not result in deceptive claims.¹⁴² Stephan Gardner, Texas assistant attorney general, argues that "Green Seal is uniformly a bad idea. The problem is we need definitions and clarity. There is no definition or meaning for green claims."¹⁴³ Denis Hayes of Green Seal counters: "The state attorneys general have done a wonderful job to raise this issue [of deceptive green claims] and give it visibility....I hope they will be 100% successful in eliminating all deceptive advertising. I hope while they are stopping the bad things, they don't stop the good things."¹⁴⁴

Finally, there are the efforts of Debra Lynn Dadd, who for years has worked on household toxic problems, and alternatives to them. Author of Nontoxic & Natural and The Nontoxic Home, Ms. Dadd now produces "The Earthwise Consumer," a newsletter published eight times a year on environmentally responsible products and individual means of reducing consumptive lifestyles. Within this newsletter one can find her Earthwise™ Standards, based on criteria covering human toxicity, ecotoxicity, sustainability, recyclability, energy-efficiency, packaging, compassion to animals and socially responsible business practices.¹⁴⁵ These guides are not meant to serve as product endorsements, but rather as guides by which individuals can make educated choices.

The need for such guides, in whatever form, is obvious. Equally apparent is the need for some order in the confusion as labeling programs and regulations are presented from all sides, potentially augmenting consumer frustration with multiple standards and approaches. Certainly the potential exists for a government-sponsored and supported labeling program, which could work with one of the established private initiatives to allay confusion, and offer support in the form of procurement and administrative services. A suitable candidate to serve as the independent testing organization exists, and much has been learned from the labeling programs in other countries. In particular, one necessity seems to be the use of the "cradle-to-grave" approach to product certification, despite the drawbacks such an approach entails. In the time it takes to formulate product criteria and define categories the recommendations of the Attorneys General Task Force, modified to consider testimony and proposals from the marketing community heard at the December hearings, could offer guidance to the manufacturers and businesses. Until such time as solid definitions, standards, and possibly product criteria are in place, however, the basic message of the Attorneys General seems the best advice: be straight with the consumer, be prepared to back up what you say, and remember that there are even more watchful eyes than ever. Basic honesty, which in the past may not have been the best marketing tool, seems to be hitting a responsive chord with today's socially and environmentally aware consumer.

The best approach to take in terms of increasing the availability of organochlorine-free paper products seems to be illustrated by the Swedish example. Providing the consumers with a choice, and enough information to make that choice an educated one, is the only way to define whether or not a

market truly exists for the products. A rating system removes much of the controversy involved, as paper of all organochlorine levels are provided. Such a rating system may be appropriate for many types of products, providing that pricing does not prevent a "level playing field" from being established. One might wonder if this is asking too much. As Wolfgang Schirmer, head of the RAL in Germany points out, many manufacturers are not embracing labeling programs such as the Blue Angel for humanitarian reasons, "they are doing it for the money."¹⁴⁶

Notes

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¹⁸ADA, 6.

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²¹Gemery, 22.

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²⁷Lösch, 26.

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Cross Pointe Bond
COTTON 25% RECYCLED

CHAPTER VI

CONCLUSIONS

If you try and anticipate the future, you never know everything, but you seldom know nothing.¹

Hell is truth seen too late.²

A year ago, if one phoned a local paper distributor and asked about obtaining a chlorine-free paper, the typical response would have been "What do you mean by chlorine-free?" After explaining, one would have been told that such a product probably didn't exist. Today, however, these same distributors know exactly what is meant by such a request, and, although they are still not able to supply domestically made, chlorine-free paper (except the James River paper), many are becoming well-versed in the technicalities of bleaching. In many cases they indicate that they are looking into obtaining such a product. While many of them erroneously consider paper bleached with sodium hypochlorite to be chlorine-free, the fact that they are cognizant of the problems associated with chlorine bleaching, and are willing to "check into" finding out if a completely chlorine-free paper is available, demonstrates the degree to which this issue has permeated our society. Apparently, the demand for this alternative product is such that sales representatives must be conversant on the subject.

In the introduction to this thesis two central questions were posed, both of which may now be answered. The first question centered on the availability and market performance of 'alternative' paper products. In answer to this

question, it is evident that such products are widely available, and have been successful enough, particularly in the case of tissue products, to cause intense competition in their markets. Production of fine writing and copier papers requires more significant changes in paper-making technology, and therefore it will take longer for these products to appear. Interviews, surveys (including the one done here), sales data, the green mood of the public, and the evident growing awareness of the dioxin issue all indicate that the markets for chlorine-free paper products will grow. Paper companies should be taking advantage of the willingness of the public to consider new products; they could at least provide a choice.

The second question posed in the introduction concerned the motivation for the appearance of these products. Are the mills feeling greater pressure from regulators or from consumers? In North America, regulation of organochlorine emissions is only in the first round, and the regulations which have been promulgated in both Canada and the United States will not move the industry toward chlorine-free products for quite some time. The best technology available in the world for reducing organochlorine emissions eliminates them, and if mandated for phased-in use here, would certainly result in chlorine-free products. However, this is not what is happening. For example, the Total Maximum Daily Load allocation for the Columbia River basin recently released shows that the EPA does not feel that zero discharge is necessary to meet established water quality standards.³ For at least the next five to seven years, unless new regulations are put forth, pulp and paper mills will be allowed to produce products that would not even qualify for the middle ranking of the rating system used by retailers in Sweden. Mills producing pulp for export may be

forced to clean up their acts if the Europeans put limits on organochlorine content in pulp, but producers of pulp for domestic consumption seem to be guarded from a legal mandate to produce pulp using little or no chlorine (in any chemical form). While the threat of stringent regulations existed, however, it was sufficient to cause some mills to look at eliminating chlorine from their mills, and a small number to actually did so. But it is now apparent that regulations alone will not cause a wholesale shift in technology.

I would conclude that consumer demand has been the most important factor in causing the appearance of chlorine-free products now available. Zero discharge has been dismissed by regulators as a goal, and it therefore seems that consumer pressure will be the force needed to bring about fundamental change in the North American pulp and paper industry (provided that production does not shift offshore, with developing nations saddled with associated pollution problems). It will, however, take a considerable increase in demand before a large number of such products will begin to appear. For a number of reasons, paper companies may not want to produce such products, even if consumers are demanding them.

For one thing, these products do not represent a new frontier in terms of markets: they are essentially substitution products that take the place of bleached paper products, instead of adding to existing markets. Therefore these products are not necessarily more profitable in the long run (unless the prices charged for them are high) even if they become widely accepted, as the bleached products will have to be phased out while chlorine-free ones are phased in. For this reason we will likely see consumers given a "choice" between the two for quite some time. Second, the production of these products

has, from industry's perspective, the undesirable effect of making all available bleached products look poisoned, and pulp mills discharging organochlorines appear to be dangerous polluters. This is not a perception that the paper industry would like to foster. Third, none of the paper companies wishes to be the first "off the blocks" in introducing chlorine-free products (especially white ones), thereby touching off dramatic market and technological changes. The example of the Swedish paper industry, which imposed a blackout on the use of terms such as "unbleached" and "chlorine-free" in marketing strategies, illustrates the level to which industry may go to protect the status quo. Whether or not such an agreement exists in North America is open to question. Continued, intensive consumer pressure was needed to overcome the self-imposed restriction in Sweden, and will definitely be needed here. Pulp and paper companies do not see themselves as innovators, only as suppliers. A final reason centers around the idea that many corporations may not want to put more power (read knowledge) in the hands of consumers. The more consumers know, the more they are apt to demand. Companies such as those that make paper have long been the ones to decide what is "right" for the consumers.

A major fear of the paper industry is that consumers will not accept paper products that are not white, and it is therefore argued that chlorine is needed not only to obtain the whiteness, but also to make the pulp more absorbent and strong. The question of functional properties created by chlorine bleaching has been addressed by the Swedish study, although to achieve the maximum absorption in pulp chlorine is the most effective bleaching agent. But where is the trade-off point between toxicity and absorbency? For many paper products,

such as file folders, foodboard, milk carton liners, envelopes, coffee filters, and a host of others, there is absolutely no reason to excessively bleach with chlorine. It is ironic that many office papers, annual reports and other documents are tinted to an off-white color, while Kraft pulp bleached with oxygen has an ivory color and needs no tinting.⁴

It is clear that our cultural perceptions of 'whiteness' drive much of the demand for paper products of this color. Certainly the pulp and paper industry is driven to produce the whitest possible pulp, which at present means the use of chlorine-based technology, because the world market demands it. Why does the market demand it? There are many reasons. Advertisers, graphic designers and even groups such as the Sierra Club (see their response to the survey in Chapter IV) desire the whitest paper available so that color reproduction comes out as crisp as possible, and advertisers can "grab" the eyes of potential buyers. Paper is very relevant to the presentation of a marketing package, and bright whiteness can be an integral part of the design. "The paper itself leads you to a judgement about [a] firm and its product."⁵ The challenge to the pulp and paper industry is to produce such paper for specific, not general, usage without the use of chlorine. This challenge is being met in Europe.

Perceptions about the sanitary aspects of paper products must also be considered. It is no coincidence that almost 84% of the bathroom and rolled tissue sold in Canada is white. These perceptions are instilled in us as we grow up, and are very hard to shake even for the greenest of consumers. These products are perceived as being cleaner, more sanitary, and safer, and the maintenance of this industrial dogma both drives and is driven by the paper

industry. Perhaps the reason that 84% of the tissue products sold are white is because the vast majority of the paper products available are white; visit a supermarket and check the ratios on the shelves. Is this whole scenario self-perpetuating? Do people in developing nations have the same preoccupation with white products?

Fortunately, however, the best technologies available can provide *white* paper that is chlorine-free, as has been demonstrated in Europe. We can have our cake and eat it too. In contemporary North America, however, we have not been presented with the choice, and this lack of choice is not making the campaign to rid paper products and the environment of organochlorines any easier. The present situation, in which industry states that there is no demand for the products, and therefore it does not want to supply the paper, while consumers state that they will buy the product, but it is not there, is almost slapstick in nature. One can almost picture two cavepeople banging each other on the head with clubs.

Ironically, the current economic recession may help to increase the availability of chlorine-free products, as paper companies seek a new angle in order to stand out in an overcrowded market. Being chlorine-free offers a way to be unique. The widespread success of green marketing, catering to the public's desire to participate in environmental issues, increases the possibility that such products will be successful. If and when the economy improves, an oversupply situation caused by the construction of a number of new mills around the world will produce sluggish paper markets,⁶ and the advantage of being chlorine-free will be retained. The time for introduction of these products is now. The markets for them are waiting. Many companies of a diverse nature

are taking advantage of this mood, and finding it to be a successful, and in many cases refreshing, change of pace.

Recommendations for each particular area covered in this thesis have been covered in the relevant chapters. There are a number of issues touched upon earlier which should be briefly revisited, however. First, much of what has been said here has attempted to provide the reader with information necessary for making informed purchasing choices concerning paper products. However, I would not like to leave the impression that using these products is the best choice ecologically. It is perhaps second best; second to using reusable products such as metal or cotton coffee filters, non-disposable cotton diapers and other such products wherever possible. Innovative opportunities exist for those who can design paper products with frugality in mind, evidenced by the growing demand for a decrease in product packaging. Whatever happened to the "paperless office?"

Our voracious appetite for paper is directly related to global deforestation, and demand for paper is predicted to increase. Therefore, no matter what type of paper one chooses to use, it should be used with a great deal more respect than paper is normally accorded, for paper is increasingly made from stands of old trees whose numbers are dwindling. In Alberta, for example, between January and December of 1988 over half of the province's boreal forests were committed to the production of pulp in a desperate bid to bring economic diversification to the province.⁷ British Columbia's abominable forestry practices record is becoming known internationally. Further afield, many developing nations are facing deforestation problems often associated with the production of pulp for export.

Aboriginal cultures are increasingly put at risk from pulp mill projects and accompanying deforestation in two major ways. First, their way of life is undermined as forestry licenses are granted which include Native lands, and which effectively "plan the Natives out." Simon Lucas, a chief of the Hesquiat Tribe on the west coast of Vancouver Island expressed the frustration felt by many Native people when he stated:

Recently ... there were some areas closed that surround our Nations. One of them is the Mowachat Tribe in Gold River where there is a pulp mill where they have been spewing out chemicals of all sorts. Now they are not allowed to harvest anything.... They told our people that the game, the deer and the elk would never be affected. Well, they were affected. Now when our people go out there to hunt for elk and deer, they are charged for poaching.... Our people in Mowachat ... no longer have the freedom to fish in the rivers; no longer have the freedom to roam the mountains ...The pulp mills have never, ever been charged for destroying the fish. The moose has been planned out of the plan; the beaver has been planned out of the plan. We assume that we have the ultimate authority to take out a forest. Well... you haven't talked about the forest like our people talk about the forest. When people have walked out with their millions of dollars, who do you think is going to be here 50 years from now? It will be our people. These foreign investors, do you think they are going to be here when all the trees are gone?... Our people are still living there. Their background is bare. No more deer in their areas.⁸

Similar sentiments are expressed by the Cree of Northern Alberta, whose language has over 200 words for the forest, each one a thoughtful description.⁹ Trees are considered living beings, a source of spiritual power, and the spirit world is closer in "a forest that hasn't been touched."¹⁰ These people know what extensive deforestation means for their way of life; it is cultural genocide.

A second major impact that the pulp and paper industry has on Native cultures is the pollution of their lands and waters through the chemicals that are discharged from the mills. British Columbian Natives were severely impacted

by recent fisheries closures, and the Tribes in Oregon and Washington on the Columbia River are forced to choose between contaminated fish or losing a way of life. The fact that Native (and Asian American) people in this area rely more heavily on fish in their diets puts them at additional risk; water quality standards that are set knowing that such populations will be subject to increased toxic loading provide context for the term "environmental racism." In this case, as in many cases, it is subtle and institutionalized, but nonetheless present. Emission standards should reflect the presence of these populations, rather than being set for the lowest common denominator. This complete separation of law and cultural geography should be reviewed, and the nexus regained.

The Yakima Indian Nation was the first government in North America to call for a cessation of the use of chlorine, and Tribal Council member Harry Smiskin succinctly presented the Tribe's viewpoint on organochlorine pollution of the Columbia River:

[T]he Yakima Indian Nation is not interested in discussing ... how much TCDD ... can be dumped into the Columbia River by the pulp and paper industry ... nor ... [how much of the] Columbia River is water quality limited, and what that means for beneficial uses. These topics wrongly assume that it is okay to dump pollution into the river that can impact the health of our fish and ... our people. [Your] decisions may create legal fictions that show beneficial uses will not be harmed. [We] will not be fooled by your actions, and we will diligently work to preserve our treaty right to clean, healthy fish...¹¹

Regulators would do well to consider cultural considerations which the current regulatory scheme distances them from.

Another issue briefly touched upon earlier concerns the use of alternative sources of fibre for the making of pulp and paper. In the interest of preventing further deforestation (70% of domestic wood consumption goes to pulp and paper manufacture),¹² as well as utilizing fibre more appropriate and

suitable for use as paper, several such alternatives have been presented. Hemp is perhaps the most controversial and well known candidate, but many others are also suitable. The Chinese have used a number of different plants as sources of fiber for hundreds of years, including reeds, straw, flax, swamp moss, marshmallow, bagasse (sugar cane pulp) and bamboo.¹³ Bagasse is currently used by a pulp mill in Taiwan to make particleboard and fiberboard.¹⁴ Arbokem Inc. of Vancouver, B.C. has announced plans to build a 20 tpd flax mill in Surrey, B.C., which will start up in later 1991.¹⁵ The mill will use no chlorine compounds, but instead will use hydrogen peroxide and oxygen. Raw material for the mill will be obtained from farmlands in Saskatchewan and Manitoba, and the paper made can be used to produce banknotes, bibles and other specialty papers of high value. Kenaf (*hibiscus cannibinus*) is another plant with suitable fiber content for paper making, and in the United States this plant is already being used to make newsprint (for the Bakersfield Californian) and there are plans to expand its use.¹⁶ In Oregon, the Willamette Valley could provide a great amount of straw and other fibers for use in paper making. This material is annually burned in the field, partially because there is nothing else to do with it.

Hemp has an interesting history as a source of fiber for paper making. Until the 20th century, 80% of the textiles and fabrics were made from this material, and until 1883 75% of the world's paper was made from hemp fibers.¹⁷ An acre of hemp produces four times as much pulp as an acre of trees (hemp is a fast-growing annual and can be harvested yearly), and making paper from hemp uses as little as 15% of the chemicals needed to make paper from trees. In 1937 a machine was invented which could strip the outer hurds

used for paper-making from the inner, unusable fiber, and Popular Science magazine predicted a billion-dollar hemp market.¹⁸

Unfortunately, hemp was criminalized in the 1930s, a policy attributed to a desire to stop the spread of "reefer madness" among the nation's youth. Others feel that this policy was a result of an agreement between William Randolph Hearst, who owned vast timber holdings as well as a newspaper empire, and DuPont Chemicals, which made the chemicals needed to pulp trees. For whichever reason, hemp was eliminated as a fiber source.¹⁹ As the Pacific Northwest and other areas face timber shortages and the demand for paper continues to rise, it may yet experience a comeback, although in the current political climate it would have to be under controlled growing and harvesting regimes. The *cannabis* plant used to make hemp is a close relative of the plant used for "recreational" purposes, but contains minute quantities of THC, making it of little value as a narcotic.

Finally, a cautionary note about green consumerism is warranted. Consumerism, especially in North America, is at the heart of many environmental problems. It is something of a contradiction in terms to say that we are going to help the environment by buying environmentally benign products. However, as green consumerism grows as a force in the economy, it will become a more useful and powerful - though exploitable - method of public participation. Much of the solution lies in the decision to buy and use only what one absolutely needs. Constantly incorporating the three R's and the E - Reduce, Reuse, Recycle, and Educate- into our daily lives is a must. It should be remembered that green consumerism is still consumerism, and that talk without action will do nothing to help reverse the ongoing global environmental

degradation. This applies to all of the parties with an active interest in green consumerism. For businesses expressing a desire to become more environmental in their activities, realization of green consumerism's most worthwhile benefits will only come to pass through tough, (dare I say it) short-term profit-lowering and sharing steps which provide tangible environmental benefits as well as economic viability in the long run.

At the same time, however, environmentalists need to accept the fact that "industry" does not always have to be perceived of as an enemy, and that there are those in business who can be worked with: indeed, there are those who want to work more cooperatively. Many environmentalists, however, prefer a confrontational approach because when they win, they win big, as opposed to the potential compromise inherent in resolving conflicts through dialogue and cooperation. Certainly there will be cases where no compromise is possible, and environmentalists will be relied upon by many (often silent) members of the public to stake the boundaries of environmental issues. The win-win strategy, however, has proven to be one whereby environmentalists are saving many pieces while the larger structure crumbles. A wiser strategy may be one where changes are effected in the process rather than in the products. This being the case, a more participatory role by environmentalists in the debates over the pros and cons of green consumerism is required. In the case of chlorine-free paper products, the best strategy may be to identify potential purchasers of these products, and organize a buying cooperative which a North American mill can supply, rather than using such a cooperative to purchase imported European products. While the Europeans products prove that high quality

chlorine-free paper is available, at this point this is not news to North American companies. Domestic production should be given priority over imports.

While the business world seems to be acting on the evident public concern about environmental issues, the government is still lagging. An important role exists for government representatives at high levels to "officially" legitimize and promote environmental concerns, in order to allay the fear and confusion which exists in a significant portion of the general public. This official "O.K." carries a great deal of weight, and as such would go a long toward decreasing the polarization which currently exists.



Cross-Bond
100% RECYCLED

Notes

¹David Scott, University of Victoria, speaking at the Globe '90 conference in Vancouver, British Columbia March, 1990.

²John Locke, 17th century.

³United States Environmental Protection Agency, Region X (Seattle), Total Maximum Daily Load (TMDL) for 2,3,7,8-TCDD in the Columbia River Basin, Decision Document, 25 February 1991, p. 5 Comments Section.

⁴Renate Kroesa, "The Greenpeace view of business paper," Pulp and Paper, September 1990, 318.

⁵Mary Plimpton, James River Corporation, quoted in Kara Kurylowicz, "Creativity and innovation crucial to selling in today's marketplace," Pulp and Paper Journal 43, no. 10(October 1990): 85.

⁶Bruce Kirk, "Riding out the recession: The paper industry in 1991," PIMA Magazine 72, no. 12(December 1990): 30.

⁷Ingrid Liepa, "Alberta commits forests to pulp," Alternatives 16, no. 3(1989): 8.

⁸Simon Lucas, quoted in "White society left Nature out of the plan," Calgary Herald, 27 January 1990.

⁹Christie McLaren, "Heartwood" Equinox, no. 53 (September/October 1990): 44.

¹⁰Ibid.

¹¹Harry Smiskin, quoted in Robert C. Lothrop, "Point/Counterpoint: The Tribes 'TMDL: Zero Discharge,'" NRLI News, (Natural Resources Law Institute, Lewis and Clark College, Portland, Oregon) 1, no. 2(May 1990): 7.

¹²David Johnson, "Paper Paper Paper," What's Happening, (Eugene, Oregon), 26 July 1990, 1.

¹³Ibid.

¹⁴Ibid.

¹⁵"Arbokem building flax pulp mills," Pulp and Paper Journal 44, no. 1 (January 1991): 8.

¹⁶Johnson, 6.

¹⁷"Ecologically correct technologies stalled by puritanic values," Oregonian (Portland, Oregon), 13 December 1990.

¹⁸Ibid.

¹⁹Johnson, 6.

APPENDIX A

SOURCES OF FURTHER INFORMATION

The following are contacts for more information about products, and for information from environmental groups working on the dioxin issue:

Atlantic Recycled Paper Co.
Tom Mullen, V.P.
P.O. Box 11021
Baltimore, MD 21212
1-800-323-2811
301-323-2676

Canusa Corporation
Ben Hoen
1616 Shakespeare St.
Baltimore, Maryland 21231
301-522-0110

Conservatree Paper Company
10 Lombard St., Suite 205
San Francisco, CA 94111
1-800-522-9200

CO-OP America, Inc.
2100 M. St. N.W. Suite 403
Washington, DC 20063
202-872-5307
802-655-2975 (for catalogue)

Don Potter and Associates
(Agency for START products)
4600 Willow Crest Ave.
Toluca Lake, CA 91602
818-760-8787

Earth Care Paper, Inc.
P.O. Box 3335
Madison, WI 53704

608-277-2900
Fort Howard
P.O. Box 19130
Green Bay, WI 54307-9130
414-435-8821

Glatfelter Offices:
Corporate Office
228 S. Main Street
Spring Grove, PA 17362
717-225-4711

Sales Offices:
P.H. Glatfelter Co.
Brittany Towers, Suite 205
17W 662 Butterfield Rd.
Oakbrook Terrace, IL 60181-4037
Jim Gudsmietl (senior sales rep.)
708-953-7600

P.H. Glatfelter Co.
1655 Bergstrom Road
Neenah, WI 54956
414-727-2200

ITT Rayonier
Connecticut Headquarters
1177 Summer St.
Stanford, Conn. 06904
203-348-7000

James River Corporation
300 Lakeside Dr.
Oakland, California 94612-3592

James River (Con't)
 Katie Cutler: 415-874-3458
 Frank Darling: 503-455-2221
 Bruce Claire: 206-896-4513
 (sales, Vancouver WA)

Mancini and Grosbeck
 (Broker for HOPE)
 Mark Mancini
 164 E.
 3900 South
 Salt Lake City, Utah 84107
 801-266-4453

Orchids Paper Products Company
 5911 Fresca Drive
 La Palma, CA 90623
 714-523-7881

Paper Choice
 303 E. 6th Ave.
 Vancouver, B.C. V5T 1J9
 604-873-5700

Peacetreer Recycled Paper
 Cheryl Welsh
 Portland, OR
 503-230-0436

Save Our ecoSystems, Inc.
 Barbara Kelly
 407 Blair Blvd
 Eugene, OR 97402
 503-484-2679

Scott Paper Ltd.
 1111 Melville St.
 Vancouver, B.C.
 Canada, V6E 3V6
 John F. Philip, V.P. Business
 Development
 604-688-8131

Seventh Generation
 Colchester VT
 054446-1672
 1-800-456-1177

Steinbeiss Temming Papier
 Mr Joachim W. Michael
 D-7121
 Postfach 1155
 West Germany
 fax: 071433723100 (not confirmed)
 tel: 071433720

Today's Choice
 Confab Companies
 Steve Peterson, V.P. New Products
 2301 DuPont Dr., Suite 150
 Irvine, CA 92715
 714-955-2690

Treecycle Recycled Paper
 P.O. Box 5086
 Bozeman, MT 59715
 406-586-5287

Western Paper Portland
 Richard Martinez
 503-289-2800

Wisconsin Tissue
 (supplier for Seventh Generation)
 P.O. Box 489
 Menasha, Wisconsin 54952
 1-800-451-3595

Environmental Organizations:

John Bonine
 Western Environmental Law Clinic
 School of Law
 University of Oregon
 Eugene, OR 97403
 503-346-3853

Mary O'Brien
 Environmental Law Alliance
 Worldwide (ELAW)
 1877 Garden Ave.
 Eugene, OR 97403
 503-687-8454

Becky Long
 NW Action Center for
 Dioxin/Organochlorine
 Elimination (NACDOE)
 NACDOE (con't)
 1247 Willamette
 Eugene, OR 97401
 503-687-0277

Anne Hillyer
 Bill Andrews
 Dianne Howland
 West Coast Environmental Law
 Assoc.
 1001-207 W. Hastings Street
 Vancouver, B.C. V6B 1H7
 604-684-7378

Vic Sher
 Rebecca E. Todd
 Sierra Club Legal Defense Fund
 216 First Ave., South, #330
 Seattle WA 98104
 206-343-7340

Samuel Sage
 Atlantic States Legal Foundation
 658 W. Onondaga St.
 Syracuse, NY 13204-3757
 315-475-1170

Florian Sever
 Patricia Sever
 Sitka Conservation Society
 PO Box 6001
 Sitka, AK 99835
 907-747-8466

Mark Solomon
 Idaho Conservation League
 Latah County Commission
 Courthouse
 Moscow, ID 83843
 208-882-8580

Diane Cameron
 Natural Resources Defense Council
 1350 New York Ave., NW
 Washington, DC 20005
 202-624-9347

John Deakle P.A.
 PO Box 2072
 Hattiesburg, MS 39401
 1-800-844-0031

Peter de Fur
 Dave Bailey
 Environmental Defense Fund
 1108 E. Main St.
 Richmond, VA 23219
 804-780-1297

Mark Floegel, Greenpeace Pulp and
 Paper Campaign
 Bill Walsh, Greenpeace Toxics
 Campaign
 1436 U Str. NW
 Washington, DC 20009
 202-319-2480

Shelley Stewart,
 Jackie Hunt Christensen
 Greenpeace Pulp and Paper
 Campaign
 4649 Sunnyside Ave., N.
 Seattle WA 98103
 206-632-4326

Lark Hayes
 Southern Envir. Law Center
 137 E. Franklini St., #404
 Chapel Hill, NC 27514
 919-967-1450

Deborah Wassenaar
 Southern Envir. Law Center
 201 W. Main St., Suite 14
 Charlottesville, VA 22901
 804-977-4090

Paul Merrel
7493 Five Rivers Rd.
Tidewater, OR 97390
503-528-7151

The Women's Environmental
Network
Bernadette Vallely
287 City Rd.
London, England
EC1V-1L4

Quicy Sugarman
OSPIRG
1536 SE 11th
Portland, OR 97214
503-231-4181

Harri Haikala
Burr and Forman
420 N. 20th St.
3000 South Trust Tower
Birmingham, AL 35203
205-251-3000

Danny O'Shea
Robles and Gonzalez
Suite 900
100 S. Biscayne Blvd.
Miami, FL 33131
305-371-5944

Other interested parties:

Fred Henton
Pulp, Paper and Wood Workers of
Canada
1184 West 6th Ave.
Vancouver, B.C. V6M 1A4
604-731-1909

Mark Massara
Surfrider Foundation
1222 Hopkins Gulch
Boulder Creek, CA 95006
408-338-9653

Tom Webster
CBNS
Queens College
Flushing, N.Y. 11367
718-670-4190

North West Pulp and Paper
Association
1300 114th Ave., S.E., Suite 110
Bellevue, WA 98004
206-455-1323

American Paper Institute
1250 Connecticut Ave., NW,
Suite 210
Washington, DC 20036
202-463-2420

APPENDIX B

LETTER/SURVEY SENT TO SELECTED ENVIRONMENTAL ORGANIZATIONS
AND BUSINESSES CONCERNING CHLORINE-FREE OFFICE PAPER

Dear _____,

The Western Natural Resources Law Clinic is currently engaged in a program to stop organochlorine (particularly dioxin and furan) pollution of the air and water by pulp mills. The problem is the chlorine-based bleaching process.¹ We need information from you to help us in this matter.

We would like you to write us a letter stating your organization's willingness to use chlorine-free stationery and paper for office work and high volume mailings. We will use your response to challenge the pulp and paper industry's claim that there is no market for chlorine-free paper. Currently, there is no source of virgin non-chlorine paper in North America.

In Sweden, unbleached paper products are widely available. The "zero discharge" goal of the Swedish government, consumer education, and marketing efforts have resulted in a market share of over 50 percent for many non-chlorine bleached paper products; for baby diapers and toilet paper it is approaching 100 percent. Both Greenpeace Sweden and the Swedish Society for Nature Conservation publish their glossy, full-color magazine on chlorine-free paper.

On a trip in February to Sweden by Professor John Bonine and our client, Dr. Mary O'Brien, the message was the same from pulp companies and government officials alike: it is the consumer more than Swedish government policy that is driving the companies toward non-chlorine bleaching methods. Groups such as your can likewise contribute to the elimination of organochlorines in North America via your buying power. The difference in the brightness and quality of the paper? The second page of this letter demonstrates the similarities; it is printed on European paper not bleached with chlorine!²

We have sent this letter to many groups. Taken together, the potential consumer demand is enormous. Governments are under considerable pressure by the pulp and paper industry to allow further discharges into American and Canadian rivers. Consequently, we would like to know as soon as possible whether «organization» feels compelled to continue using dioxin contaminated paper for its inter-office paperwork or would buy alternatively bleached and/or virgin unbleached products if available.

In sum, we would like your organization to write a letter indicating:

- a) Why you would prefer chlorine-free paper.
- b) How much paper your organization uses internally and/or for mass mailings (any reasonable estimate is satisfactory) in terms of: (1) reams for office paper and (2) tons for publishing.
- c) What percent of additional price your organization would absorb above the cost of chlorine bleached paper currently purchased.

Thank you for your time and effort. If you have any questions our fax number is 503-346-3985.

Sincerely,

Dennis Morgan
Environmental Studies

William Sherlock
Legal Intern

John E. Bonine
Professor of Law

¹Up to 3,000 organochlorine compounds are produced during the chlorine-based bleaching process. One third of this contamination remains in the paper products themselves. Organochlorines cause cancer, birth defects, and immune system suppression at the lowest levels ever tested. One of them, 2,3,7,8-TCDD, is the "most potent carcinogen ever tested" according to the EPA. Nobody can state a 'safe' or 'no effect' level.

²There are at least three sources of such paper in Europe:

Panda Copy, by Munkedals of Sweden, S-455 01 Munkedal,

Sweden. International Phone +4652417000

Naturkopi by Hunsfors Fabrikker, N-4700 Vennesia,

Norway, Tel: +47 42 557 11

Scan-Matt (coated - used by Greenpeace for magazine paper) by

Holmens Bruk AB, Wargoens Bruk, S-46060

Vargoens, Sweden, Tel: +46 521 23200

Biotop 3, by Neusiedler of Australia (exact address unknown at present)

Please do not write us about how to obtain this paper for import to the U.S., as we do not know. We bought Panda copy on a recent trip to Sweden from an office supply store (it is widely available) and were given a sample ream of Biotop 3 by a distributor company named Oscar Svensson AB, Hankerbangatans 12, Stockholm (phone: 08-520335).

APPENDIX C

SELECTED ENVIRONMENTAL ORGANIZATIONS AND BUSINESSES
INVOLVED IN CHLORINE-FREE OFFICE PAPER SURVEY

The Acid Rain Foundation, Raleigh, N.C.
 The Alberta Wilderness Association, Calgary, Alberta
 Alliance for Environmental Education, Arlington, VA.
 America the Beautiful Fund, Washington, D.C.
 American Cetacean Society, San Pedro, CA
 American Farmlands Trust, Washington, D.C.
 American Planning Association, Washington, D.C.
 American Trails, Washington, D.C.
 Animal Protection Institute of America, Sacramento, CA
 The Atlantic Center for the Environment, Ipswich, MA*
 Atlantic Salmon Federation, St. Andrews, New Brunswick
 The British Columbia Environmental Network, Vancouver, British Columbia
 The British Columbia Wildlife Federation, Surrey, British Columbia
 Boy Scouts of America, Irving, TX*
 The California Natural Resources Foundation, Berkeley, CA
 The California Bass Chapter Federation, Stockton, CA
 The California Native Plant Society, Sacramento, CA
 California Trout, Inc., San Francisco, CA
 California Wildlife Defenders, Hollywood, CA
 California Wildlife Federation, Sacramento, CA
 Canada-United States Environmental Council, Washington, D.C.
 The Canadian Environmental Law Association, Toronto, Ontario
 The Canadian Parks and Wilderness Society, Toronto, Ontario
 The Canadian Society of Environmental Biologists, Toronto, Ontario
 The Canadian Wildlife Federation, Ottawa, Ontario
 Cascade Holistic Economic Consultants, Eugene, OR
 The CEIP Fund, Boston, MA
 Center for Marine Conservation, Inc., Washington, D.C.
 Children of the Green Earth, Seattle, WA
 Citizens for a Better Environment, San Francisco, CA
 The Citizens Natural Resources Association of Wisconsin, Inc., Richland
 Center, WI
 Clean Water Action Project, Washington, D.C.
 Coalition for Clean Air, Santa Monica, CA
 Coastal Conservation Association Inc., Houston, TX
 The Conservation Council for Hawaii, Honolulu, HI

The Conservation Foundation, Washington, D.C.
 The Conservation Fund, Arlington, VA
 Conservation International, Washington, D.C.
 The Council for Planning and Conservation, Beverly Hills, CA
 The Cousteau Society, Norfolk, VA
 Defenders of Wildlife, Washington, D.C.
 Earth Island Institute, San Francisco, CA*
 The Ecology Center, Berkeley, CA*
 Environment Watch, Burnaby, British Columbia
 The Environmental Action Foundation, Washington, D.C.
 The Environmental Defense Center, Inc., Santa Barbara, CA
 The Environmental Defense Fund, New York, N.Y.
 The Environmental Law Institute, Washington, D.C.*
 The Federation of Alberta Naturalists, Edmonton, Alberta*
 Friends of Animals, New York, N.Y.
 Friends of Clayoquot Sound, Tofiono, British Columbia
 Friends of the Earth, Environmental Policy Institute, The Oceanic Society,
 Washington, D.C.
 The Fund For Animals, New York, N.Y.
 The Global Tomorrow Coalition, Washington, D.C.
 Greenpeace USA, Inc., Washington, D.C.
 The Idaho Environmental Council, Idaho Falls, ID
 The International Ecological Society, Saint Paul, MN
 The Isaac Walton League Of America, Inc., Arlington, VA
 The Isaac Walton League of America, Inc. (California Chapter), Anaheim, CA
 The John Muir Institute for Environmental Studies, Inc., Napa, CA
 The Keystone Center, Keystone, CO
 Kyuquot Economic and Environmental Protection Society, Kyuquot, B.C.*
 The Lilloet Tribal Council, Lilloet, British Columbia
 The League of Conservation Voters, Washington, D.C.*
 The League of Women Voters of the U.S., Washington, D.C.
 The Marin Conservation League, San Rafael, CA
 The Mono Lake Committee, Lee Vining, CA
 The Mount Shasta Area Audubon Society, Mount Shasta, CA
 The Mountaineers, Seattle, WA
 The National Audubon Society, New York, N.Y.
 The National Coalition Against the Misuse of Pesticides, Washington, D.C.*
 The National Education Association, Washington, D.C.
 The National Geographic Society, Washington, D.C.*
 The National Parks and Conservation Association, Washington, D.C.
 National Wildlife Federation, Washington, D.C.*
 The NWF Pacific Northwest Natural Resources Center, Portland, OR
 The Natural Resources Council of America, Washington, D.C.
 The Natural Resources Defense Council, Washington, D.C.
 The Nature Conservancy, Arlington, VA*
 The Nature Conservancy of Canada, Toronto, Ontario
 The North American Association for Environmental Education, Troy, OH

The North Coast Environmental Center, Arcata, CA*
 The Northwest Renewable Resources Center, Seattle, WA
 Oregon Wildlife Federation, Portland, OR*
 The Oregon Environmental Council, Portland, OR
 The Oregon Natural Resources Council, Portland, OR
 Oregon State Public Interest Research Group, Portland, OR
 The Pacific Fisheries Management Council, Portland, OR
 The Pacific Whale Foundation, Kihei, HI*
 Planned Parenthood Federation of America, New York, N.Y.
 Pollution Probe Foundation, Toronto, Ontario*
 Project Lighthawk, Santa Fe, NM*
 The Public Interest Research Group, Washington, D.C.
 The Rainforest Action Network, San Francisco, CA
 The Rene Dubos Center for Human Environments, New York, N.Y.
 Renew America, Washington, D.C.
 Resources for the future, Washington, D.C.
 The Save-the-Redwoods League, San Francisco, CA
 The Save San Francisco Bay Association, Berkeley, CA
 Sea Shepherd Conservation Society, Redondo Beach, CA
 The Sierra Club, San Francisco, CA*
 The Sierra Club of Western Canada, Victoria, British Columbia*
 The Sierra Club Legal Defense Fund, San Francisco, CA
 The Stanford Environmental Law Society, Stanford, CA
 The Steelhead Society of B.C., Vancouver, British Columbia
 The Student Conservation Association, Charleston, NH
 Treepeople, Beverly Hills, CA
 The Trust for Public Lands, San Francisco, CA
 The Union of Concerned Scientists, Cambridge, MA*
 The Washington Environmental Council, Inc., Seattle, WA
 The Washington Wildlife Federation, Pullman, WA
 The Washington Wildlife Heritage Foundation, Federal Way, WA
 The Water Pollution Control Federation, Alexandria, VA
 The West Coast Environmental Law Association, Vancouver, British Columbia
 Western Canada Wilderness Committee, Vancouver, British Columbia
 The Whale Center, Oakland, CA
 The Wilderness Society, Washington, D.C.
 The Wildlife Society Oregon Chapter, Corvallis, OR
 The Wildlife Society Washington Chapter, Benton City, WA
 The Wisconsin Wildlife Federation, Reeseville, WI
 The World Environment Center, New York, N.Y.*
 The World Resources Institute, Washington, D.C.
 The WorldWatch Institute, Washington, D.C.
 Worldwide, Washington, D.C.
 The Xerces Society, Portland, OR
 Zero Population Growth, Inc., Washington, D.C.

Businesses:

3M, St. Paul, MN*
Apple Computer, Cupertino, CA
Ametek, Paoli, PA
Atlantic Richfield, Los Angeles, CA
Ben and Jerry's Ice Cream, Waterbury VT*
Betz Labs, Travosa, PA
Burnham Service, Columbus, GA
Chambers Development, Pittsburg, PA
Chronar Corp., Princeton, N.J.
Coleman Company, Wichita, KS
Co-op America, Washington, D.C.*
Corning Glass, Corning, N.Y.
InterNetwork, Del Mar, CA
JanSport International, Appleton, WI*
Koppers Industries, Pittsburg, PA
Mailman Brothers, New York, N.Y.
Microsoft Corp., Redmond, WA
Mountain Equipment Co-op, Vancouver, British Columbia*
Nike, Beaverton, OR
Nordstrom, Seattle, WA
Patten Corp., N. Adams, MA
Polaroid, Cambridge, MA
Proctor and Gamble, Paper Products Division, Cincinnati, OH

* = respondents (26/151 = 17.2%)

Thanks to Evelyn Seguela, Chris Rose, and Liam Sherlock for help in the mailing.

APPENDIX D

SURVEY RESPONSES

The following are excerpts from responses received to a survey sent out through the Western Natural Resources Law Clinic at the University of Oregon. Quotes are presented where they are relevant and illustrative of commitment. The quantitative data received in the survey has been converted to the number of cases of paper a group uses per year (the number of cases used is a common denominator in many of the letters). This is converted to a tonnage amount at the end of this section. For many respondents, the amount of paper used represents a minimum amount, as all uses are not accounted for.

Additional comments on the information provided by the respondents are given in some cases. Responses are presented in no particular order. See the text of Chapter IV for more comments on the results of this survey.

1. Darlene Carroll
The Ecology Center
2530 San Pablo Avenue
Berkeley, CA 94702
415-548-2220

- expressed a "strong interest in purchasing non-chlorine bleached recycled paper for in-house use as well as for retail sales."

- aware of and concerned about the problems caused by organochlorines

- they use approximately 4 cases (5000 sheets per case = 20,000 sheets) per month of recycled paper, and sell 1-2 cases; hoping to expand this

- although price is certainly a consideration, their foremost concern is in supporting environmentally sound practices

- minimum 48 cases/year used

2. Robert R. Bland, Development Director
Union of Concerned Scientists
26 Church St.
Cambridge, MA 02238
617-864-9405

- "We have specified the use of non-chlorine bleached, post-consumer recycled stock for all paper purchases for over a year, at least whenever large quantities were involved. We are now giving preference to unbleached altogether and expect the supply thereof to increase over the next few months."

- they find the 2-5% cost increases which this involves acceptable
- although they specify these conditions to their printers, they are not always met due to supply and availability problems. The paper they use seems to be Glatfelter's Recycle 100.

- direct mail campaigns total approximately 3 million packages per year, most of which involve two envelopes and five sheets of paper. In addition their newsletter runs about 400,000 copies per year and they use approximately 30,000 sheets of stationery.

- minimum 3,486 cases per year used

3. Harold Sokolsky, Assistant to the Chief Scout Executive
Boy Scouts of America
National Office
1325 Walnut Hill Lane
P.O. Box 152079, Irving, Texas 75015-2079
214-580-2000

- "we are considering ways to use chlorine-free paper in our organization and this determination is under review."

- "We are also prohibited by our charter and bylaws from participating in perceived political actions, and we hesitate to engage in actions that have clearly defined battle lines..."

- amount of paper used not given

4. Alric H. Clay, Senior Vice President, Administration
National Wildlife Federation
1400 Sixteenth St., N.W.
Washington, D.C. 20036-2266
202-797-6800

- "98% of all printed matter produced internally is on recycled stock, much of which is 100% unbleached."

- from January 1, 1990 through July 31, 1990, the NWF used approximately 1,135,500 pounds of paper considered to be recycled under the current standard put forth by the EPA.

- minimum 1,254 cases of recycled, unbleached paper used per year:
they also use a larger quantity of bleached recycled paper in various sizes

- these sheets are used in various sizes, the majority of which are in 8.5 x 11", with other specialty sizes specially cut.

5. Ann Stefan for Rob Gardner, Past President
Federation of Alberta Naturalists
Box 1472
Edmonton, Alberta
Canada T5J 2N5

- "As an environmentally concerned organization we would much prefer to use recycled paper for all our office and printing needs. If the paper production could be produced by a chlorine-free process we would be even more in favour of its use."

- "If the paper were available we would be willing to pay more, up to 10% if we have to."

- minimum 16 cases per year used

6. Debby Leopold, Marketing Coordinator
Coop America, Inc.
2100 M St., N.W. Suite 403
Washington, DC 20063

- "we currently mail 1.5 to 2 million pieces of mail each year."

- estimating that one piece is at least two sheets of paper, then an estimated 3 - 4 million sheets of paper a year for mailings alone, not including intraoffice use or their quarterly catalogue. 3.5 million sheets of paper is equivalent to 700 cases of paper.

- "For our Direct Mail and Special Appeals, we have been using Glatfelter 100" (which is 100% recycled, unbleached paper). The number of sheets this represents is unknown.

- "I have been trying to locate paper that is unbleached or chlorine-free and contains a high percentage of post-consumer waste."

- "We understand that products may cost more but we believe that everyone should put their money where their values are and help save the environment and our health."

- minimum 700 cases/year used

7. Lotte Dyhrberg, Secretary
Executive Office
Sierra Club
730 Polk Street,
San Francisco, CA 94109
415-776-2211

Unfortunately the Sierra Club's only response to the survey was to include a copy of their "Update on Recycling at the Sierra Club" report. This report explains that the Sierra Club is attempting to integrate recycling into all facets of their operation, but it does not mention use of unbleached or chlorine-free paper. A statement in the Update made in reference to recycled paper is indicative of the central problem we are dealing with in promoting unbleached

products: "Currently available recycled stock is less white ("dirtier") than virgin, and more porous. This means poorer highlights and brightness, weaker reflective quality, and ink-dot spread that leads to loss of detail in shadow areas and reduction in clarity overall. The technology is not yet available for the high quality reproduction of photographs that has become the Sierra Club standard." Maintaining this standard is at the heart of many of the pollution problems that are associated with the pulp and paper industry. Chlorine-free papers imported from Europe can achieve the qualities the Sierra Club desires.

8. Laura Lee S. Dooley
WRI Recycling Committee
World Resources Institute
1709 New York Avenue, N.W.
Washington, D.C. 20006
206-638-6300

Presently WRI is much more interested in finding suitable recycled paper for its office and mailing needs, and concerning unbleached paper they state: "We understand the concern over chlorine bleaching in the paper making process and would prefer that paper be manufactured using non-dioxin bleaching processes. WRI does not expect to purchase unbleached paper for its letterhead and xerographic needs *at this time.*" (italics added)." WRI does use a large amount of paper; approximately 150 reams of xerographic paper every two weeks and approximately 40,000 sheets of letterhead every 6 months, plus paper for press releases and publication use.
-minimum 406 cases/year used

9. Sue Kelley, Publications and Marketing
Pacific Whale Foundation
Kealia Beach Plaza, 101 N. Kihei Rd. Suite 21
Kihei, Maui, HI 96753-8833
808-879-8860

"Pacific Whale Foundation members do not want to use dioxin-contaminated paper for our -interoffice paperwork, our correspondence, our educational publications or our promotional materials."

"We have an annual print budget in excess of a quarter million dollars. In addition, we use 250 reams of copy paper ...a year. As with our recycled paper use, we are willing to pay whatever it takes for alternatively bleached or virgin unbleached products."

"We want the pulp mills and the paper industry to stop using a chlorine-based bleaching process."

-minimum 25 cases/year used

10. Dale Adams
Managing Editor
Environmental Law Institute
1616 P St. N.W.
Washington, DC 20036
202-328-5150

"Our suppliers know of our interest in environmentally safe paper and that we are willing to pay more for it."

"I would like to see a rating system for paper that takes into consideration not only recycled paper content, but also the paper's ability to be recycled, what pollution results from its production, and other factors."

"The Environmental Law Institute publishes books, a monthly Environmental Law Reporter, and two bi-monthly publications, and our 60-person staff uses its share of xerox paper, computer form paper, and stationery. It is in our interest to use paper products whose production causes the least harm to the environment."

-no amount of paper used given

11. Sharon Chow, Conservation Coordinator
The Sierra Club of Western Canada
314-620 View St.
Victoria, B.C. V8W 1J6
604-386-5255

"...yes, we would be willing to use chlorine-free stationery and paper for office work and high volume mail."

"We do not use a whole lot of paper...1 or 2 reams a year or less for correspondence, but lots for xeroxing... possibly 15000 sheets/year or more."

-minimum 3.2 cases/year paper used

12. Una Murphy, Assistant to the Director
Pollution Probe Foundation
12 Madison Ave.
Toronto, Ontario M5R 2S1
416- 926-1907

"As an organization dedicated to the protection of the natural environment we would be interested in using non-chlorine bleached paper as soon as it was available in quantity on the market. We would certainly be willing to pay a higher rate for this type of product."

-no numbers given

13. Tom Pater
 Kyuquot Economic and Environmental Protection Society (KEEPS)
 Kyuquot, B.C.
 V0P 1J0

"Were it readily available today [chlorine-free] paper would be the choice of KEEPS. We already pay a premium for recycled paper, and unless chlorine-free paper was expensive, we would not hesitate to purchase it."

"For correspondence and our more-or-less quarterly newsletter, 4 reams covers our annual needs. But there are many small groups like ours in British Columbia, ready to use the most environmentally wise products, including chlorine-free paper."

-approximately 0.4 cases/year used

16. Michael M. Stewartt, Executive Director
 LightHawk
 P.O. Box 8163
 Santa Fe, NW 87504-8163
 505-982-9656

"Lighthawk is very interested in using chlorine-free paper; we already purchase recycled paper for about half of our office paper usage."

"We also checked out the quality of the second sheet example of non-chlorine treated paper, and found it to be just fine as far as professional look and texture." (Mr Stewartt is referring to a sheet of dioxin-free paper bleached with hydrogen peroxide which was obtained in Sweden and used as the second page of our survey).

"Lighthawk would be willing to spend an additional 10-15% on costs to use unbleached recycled paper products."

approximately 136 cases/year used

15. Sarah R. Sullivan, Operations Coordinator
 National Coalition Against the Misuse of Pesticides
 530 7th Street SE
 Washington, DC 20003
 202-543-5450

"We would like to find and use alternatively bleached paper products."

"Even though NCAMP is a low-budgeted organization, we are willing to pay more for our paper but can only afford about a 10% increase."

NCAMP uses 312 reams/yr of office paper, and for outside printing (brochures etc, including legal sized paper) they use another 236 reams/yr.

-approximately 55 cases/year used

16. Ray M. Cutler, V.P., Director of Administration
The Nature Conservancy
1815 North Lynn Street
Arlington, Virginia 22209
703-841-1283

"The Nature Conservancy...would be very interested in exploring the opportunities of using chlorine-free paper. Admittedly, the Conservancy has never explored this opportunity since it was never brought to our attention. We continue to explore the increased use of recycled paper, but are thwarted by volatile supplies and excessive costs."

In terms of the amount of paper that The Nature Conservancy uses, it is quite large, although they did not give any figures. They have regional offices in 4 cities, their National office, and 50 state offices, for a total of 1110 employees. They do not have a central buyer or distributor for their supplies. A best estimate is given for paper use at their headquarters of approximately 2 million dollars, not including their magazine.

"While I would hesitate to predict what premium we would be willing to pay to eliminate chlorine bleached paper, it would be safe to say that we would consider an immediate phase-in if costs are competitive."

The Nature Conservancy letter illustrates three of the problems we face in attempting to increase the amount of unbleached and/or alternatively bleached paper available:

1) lack of awareness of the problem - but, as in the marketing of other paper products, once people are made aware of the problem they express a desire to help the situation through their buying power

2) volatile supplies - this has been a problem with all of the alternative paper products - the supply has not met demands and therefore consistency in availability has suffered. This has not helped in terms of customer satisfaction.

3) excessive costs - as with any product which either is considered a specialty product, the supply is low, or a monopoly exists, the costs are liable to be high.

17. Brent Mitchell, Director Special Projects
Atlantic Center for the Environment
Quebec -Labrador Foundation
39 South Main Street
Ipswich, Mass. 01938
508-356-0038

"Many paper companies now recognize the vast market for recycled lines and are racing to exploit them....I see no reason why a similar move towards 'organochlorine-free' paper could not be catalyzed by groups such as ours. If there were any sources available in the U.S. or Canada, we would pursue a policy of using only those papers not bleached with chlorine. Further, we would announce this policy to our constituents and counterparts throughout New England and eastern Canada."

"We currently consume in excess of 350 reams of office paper and almost two tons (5.2 lbs = 1 ream; 4000lbs/5.2 = approx 770 reams, which equals approx 77 cases) of paper for publishing per year."

"To do our part, we would be willing to absorb an increase in price of up to 50% initially, until demand convinces industry of the existence of the market."

-approximately 112 cases/year used

18. Andy Alm, *ECONEWS* coordinator
The Northcoast Environmental Center
879 Ninth St.
Arcata, CA 95521
707-822-6918

"We try to use recycled, minimally bleached paper whenever possible for in-house copying and outside print jobs, and we generally pay 40% to 50% more for these materials than for conventional bleached virgin paper. We use only minimally bleached, 100% recycled paper for our letterhead and most of our copy paper, even though it is getting harder to find and we pay a premium for shipping since we are so far from suppliers. In addition, our annual toilet paper consumption here at the NEC is about 150 rolls, and we've switched to paper made from 100% recycled, never-bleached, post-consumer corrugated cardboard that is wrapped in paper, which costs about 100% more than its plastic-wrapped competition."

NEC publishes 8,000 copies of a tabloid newsletter 11 times/yr, averaging 24 pages per issue. They are currently researching sources of newsprint which do not bleach with chlorine; a planned newsprint mill in Klamath Falls by Westbrook Wood Products of Crescent City, California, "may hold some hope."

-paper consumption averages 40 reams per month for office use, and half of this has been recycled unbleached paper for the past two years. This equates to approximately 48 cases per year of paper.

19. Gail Mayville
Environmental Program Development
Ben and Jerry's
Vermont's Finest All Natural Ice Cream
Route 100, P.O. Box 240
Waterbury, Vt. 05676
802-244-5641

"Not only are we willing [to buy and use chlorine-free stationery for our offices], we do. We use a 100% recycled, unbleached paper for our copier and stationery needs."

"We have switched the packaging on our novelty products from virgin bleached paperboard to unbleached, recycled paperboard. We are also switching our bags in our gift shops to unbleached, recycled paper as soon as our existing inventory runs out. We also use toilet tissue and paper towels that

are unbleached and recycled. Our coffee filters...are bleached with the oxygen process..."

Ben and Jerry's currently use 100 cases of copier paper every 6 months, (200 cases/yr) and they pay a premium of \$2.00 per case over virgin paper.

Of great interest, Ben and Jerry's is working with Patagonia to form a buying cooperative to bring pressure to bear on mills to provide recycled and unbleached paper products of all types.

-minimum 200 cases/year paper used

20. Paul Delorey, President
JanSport, Incorporated
2425 West Packard Street
P.O. Box 1817
Appleton, WI 54913-1817
414-734-5708

"As part of the largest apparel manufacturing firm in the United States, we are constantly looking for ways to be environmentally and ecologically responsible....If they [pulp mills] don't understand that this [organochlorine pollution] is a major concern to all corporations today, they have their head in the sand."

-no numbers given

21. Tom Herbst, General Manager
Mountain Equipment Co-op
428 W. 8th Ave.,
Vancouver, B.C. V5Y 1N9
604-872-8247

"In response to your letter ...let me state that of course MEC wants to use papers which do the least possible harm to the environment. For this reason we currently use recycled and unbleached paper wherever possible. We currently pay anywhere from 10 to 20% extra for these papers."

Current paper use is approximately 60 tons of coated stock (for their quarterly catalogue), 15 tons of uncoated bond, and 300 reams (30 cases) of office paper per year.

22. Antony G. Marcil, President and CEO
World Environment Center
419 Park Avenue South, Suite 1404
New York, NY 10016
212-683-4700

The World Environment Center functions to bring together government and industry for the worldwide exchange of technical expertise and information on environmental issues. It is important, in the context of this survey, to understand that this is essentially a group of industry representatives; their

Board of Directors is comprised of such companies as GM, Northern Telecom, 3M, as well as some academics and government representatives. The International Environment Forum, facilitated by WEC, contains such companies as James River Corp., Johnson and Johnson, Monsanto, Exxon, Black and Decker, as well as many more. With this background in mind, the following comments seem to take on increased significance:

"We do believe that chlorine-free and may be (sic) even unbleached paper will go into widespread use in future. It will be brought about by consumer demand."

WEC did not give any numbers pertaining to paper usage, but they clearly are a fairly large organization.

23. Donald Frenette, Executive Director Public Relations
3M Corporation
Building 225 - 5N-04, 3M Center
St. Paul, Minn. 55144-1000
612-733-0800

"As you may be aware, 3M has a strong commitment to environmental protection and a reputation as an environmental leader. We would be willing to expand our usage of non-chlorine-bleached paper as the supply increases, providing it meets reasonable criteria. I understand that major paper producers are working on alternative bleaching methods and intend to expand production of alternative product."

-no numbers given for current paper usage.

24. James P. Kelley, Vice President
National Geographic Society
Washington, D.C. 20036
202-857-7575

"The National Geographic Society's commitment to environmental problems is original and ongoing as you are probably aware. We have had an active paper recycling program for over forty years and we work constantly with our paper and printing suppliers to improve air and water quality."

Unfortunately, the letter did not refer to either their paper usage, or any commitment to use dioxin-free paper products. Interestingly, their reply was on paper which has been tinted to a tan color; the same color as Glatfelter's Recycle 100.

24. Rick Foss
League of Conservation Voters
1150 Connecticut Avenue, N.W., Suite 201
Washington, D.C. 20036
202-785-8683

"We do indeed prefer to use chlorine-free paper, and if at all possible, recycled paper."

Paper usage:

- 3-4 reams/wk of copier/laser printing paper (approx. 182 rms/yr)
- fundraising and communication function: roughly 500 reams quarterly (approx. 2000 rms/yr)
- plus mailings for the press and certain organizations
- minimum of approximately 218 cases/year used

"We are already paying a slightly higher rate for recycled paper. We would be willing to spend a bit more money for non-chlorine paper, though again we currently use, and expect to continue to use, recycled products." It should be noted that being recycled and being non-chlorine bleached are not mutually exclusive. Already such products are being imported from Germany for sale here in the U.S.

25. Steve Alf, 1st Vice President
Oregon Wildlife Federation
P.O. Box 67020
Portland, OR 97267
503-659-9024

"If we could find chlorine-free paper we would most assuredly use it."

"What price can you put on clean air and water - Oregon Wildlife Federation wants chlorine-free paper and will buy it."

Paper usage:

- 4 rms/mnth office use plus envelopes
- newsletter - average 12 pages per month to 3500 members = 84 rms/mnth
- total of approximately 109 cases/year used
- at present OWF is reorganizing and expect to triple their membership within the next two years
- as with some of the other responses to our survey, OWF responded on paper which was tinted brown - the more 'natural' color of paper. Again, this is the color which unbleached products characteristically are available in - without tinting.

26. John Knox, Co-director
Earth Island Institute
301 Broadway
San Francisco, CA
415-788-3666

Earth Island did not respond to the survey on paper, but I talked to John Knox in July 1990 and he stated that they would support any efforts to expand the usage of unbleached paper. He said that they are now using all recycled (and paying a premium) and would be willing to look into the same policy for unbleached paper. He did not have ready numbers in terms of their paper usage.

TOTAL NUMBER OF CASES REPRESENTED BY RESPONDENTS =

6846.6 cases

= 68466 reams (10 reams per case); 50# offset paper is 5.2 lbs /rm:

= 356,023.2 lbs (2000 lbs/ton)

= 178.01 tons - this number represents the absolute minimum, and does not include the many respondents who did not give figures for paper use but who did express a willingness to use organochlorine-free paper.

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