# Ethics of Du Pont's CFC Strategy 1975–1995

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ABSTRACT. The ethics of Du Pont's CFC strategy from 1975 to 1995 are analyzed using a Potter's Box framework. This approach includes an examination of relevant facts, prioritization of stakeholder loyalties, selection of a mode of ethical reasoning, and a world view. Du Pont's approach to ethical reasoning reflects changing facts and changing interpretation of the facts, a focus on shareholders as the primary and most important stakeholder, and ends-based reasoning, which views creating shareholder value as the primary end. An alternative approach is proposed, based on analysis of Du Pont's and stakeholders' needs.

## Introduction

The Montreal Protocol on substances that deplete the ozone layer was a groundbreaking international environmental treaty, bringing together the members of the United Nations to solve a problem of the global commons (United Nations, 1987).[1] For the first time in international environmental treaty-making, multinational corporations such as Du Pont were parties to the treaty-making process, helping to shape the form of the final treaty and the deadlines to which the member nations committed themselves. It could even be said that the participation of firms like Du Pont made the Protocol possible, for without their assurance that technical substitutes were available or could be produced, nations may not have been willing to sign and ratify the Protocol.

Du Pont's behavior throughout the process of development, signing and ratification, and implementation of the Protocol appeared inconsistent to government and environmental constituencies, and is difficult to understand. Moreover, Du Pont explained its behavior in different ways to different stakeholders, so that it is difficult to determine its actual strategy. While environmentalists applaud the positive role that Du Pont played in enabling the development of the Protocol, they are suspicious of Du Pont's motives and some of the positions that Du Pont has taken before and after its ratification.[2] Legislators have publicly pointed out the inconsistency of Du Pont's public statements and behavior. Du Pont's peers in the Alliance for Responsible CFC policy felt betrayed by Du Pont's abandonment of their publicly developed group position. However, shareholders and members of the business community see Du Pont's strategy as a wise, long-term profit-maximizing strategy.

An examination of Du Pont's ethical reasoning is important because the Montreal Protocol is being used as a model for subsequent international environmental treaty-making, both in terms of North-South cooperation, and in terms of business-government cooperation. If we can understand the ethical reasoning that Du Pont used to develop its political strategy, which shaped the Montreal Protocol, it will be possible to anticipate the political strategies of firms whose interests are served by participating in the development of the Framework Climate Change

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Convention and other international environmental treaties.

This paper will examine the reasoning behind Du Pont's behavior over the period 1975 to 1995, trying to find a consistent ethical model to understand Du Pont's apparently changing business and political strategy. It will begin by briefly describing the distinct phases of Du Pont's strategy. It will then present an ethical reasoning model within a Potter's Box framework, and describe how that methodology appears to explain Du Pont's inconsistent behavior over time. Finally, it will examine where the ethical reasoning of various stakeholders differs from that of Du Pont, and describe an alternative method of ethical reasoning that Du Pont could have employed to better satisfy the various stakeholders. This method would have avoided the negative public relations associated with Du Pont's CFC strategy, assuming that this is one of its objectives.

## Du Pont's behavior – three distinct phases

Du Pont's CFC strategy had three distinct phases.[3] Figure 1 illustrates these three phases. The first covers the period from 1975 to 1986, while the Framework United Nations Vienna Convention for the Protection of the Ozone Layer was developed and agreed upon (United Nations, 1985). Du Pont during this period led industry opposition to further CFC control, set up an industry group for that purpose, and made public statements denying that scientific evidence supported the need to reduce CFC outputs. Du Pont's behavior during this phase is similar to that of several petroleum companies in the 1990s with respect to the greenhouse effect.

The second phase of Du Pont's strategy covers 1986 to 1988 when the Montreal Protocol was developed, signed and ratified. During this time, Du Pont lobbied the international policy making process not only to come quickly to a binding agreement, but also to strengthen the existing agreement and make more aggressive commitments to reductions than had originally been planned. Congressional hearings on the topic clearly illustrate Du Pont's new position (U.S. Congress, 1990): (italics added)

> Not much more than about a year ago, the Du Pont Corporation presented much of its research and announced that they thought the Montreal Protocol results were inadequate, that we could not wait until the end of the century to cut CFC production by half, that we *ought to cut it out entirely, and do it now.* (italics added)

The third phase was from 1988 to 1995, when further amendments to the Protocol tightened deadlines and targets, and nations and firms around the world began and, in many cases completed phasing out the use of CFCs in their operations. During this phase Du Pont continued to manufacture CFCs in both developed and developing countries, while trying to introduce substitute products.

At each stage, Du Pont's CFC strategy had several important components. Its political strategy comprised its lobbying and public policy activity, provision of information to policy making processes, participation in industry associations set up to influence the policy making process, and its contribution to reducing the scientific uncertainty associated with the effect of CFCs on the ozone layer. Its business strategy included its manufacturing strategy (investment in plant and equipment, production and phase-out of production of CFCs and their various substitutes) and its research and development strategy of developing substitutes and product enhancements.

Management at Du Pont at both the business unit level and at the board and senior management level was consistent over phases 1 through 3, so the apparent changes in strategy cannot be attributed to internal management changes.

## A Potter's box analysis of Du Pont's decision making

Given the complexity of these strategies, it is helpful to parse out the different components of Du Pont's ethical reasoning. Potter (1969) suggests a framework where all relevant decision making factors can be mapped into four possible

| Phase | Dates | Events |
|---|---|---|
| I | 1940s | • CFC patents expire. |
| | 1972 | • DuPont invests in basic ozone science, helps to form the Fluorocarbon Program Panel under the auspices of the Chemical Manufacturers Association to pool funds for science and to oversee industry research on ozone depletion.<br>• Total DuPont expenditures on atmospheric science, aimed at a better understanding of the ozone depletion problem rather than at any immediate commercial advantage, averaged $1M per year throughout the ensuing decade. |
| | 1974 | • Rowland and Molina theory, but no evidence.<br>• DuPont CFC After Tax Operating Income (ATOI) 1.6% of sales 74–79.<br>• Spent $3–$4M per year in developing substitutes.<br>• Policy position – science too weak to justify the widespread regulation of a whole class of demonstrably useful chemicals.<br>• Public statement in advertisements from chairman, "should reputable evidence show that some fluorocarbons cause a health hazard through depletion of the ozone layer, we are prepared to stop production of these compounds".<br>• Testify in Congress "if credible scientific data . . . show that any chlorofluorocarbons cannot be used without a threat to health, DuPont will stop production of these compounds." |
| | 1978 | • EPA ban for "non-essential" uses, i.e. aerosol, U.S. consumption falls 50%, substantial over capacity remains in the industry, DuPont loses 1/3 of its business.<br>• Continue to sell to aerosol applications in non U.S. markets, real list prices drop 20%. |
| | 1980 | • DuPont helps form the Alliance for Responsible CFC Policy. |
| | 1980–1986 | • DuPont leads industry opposition to further CFC controls, urges that any further controls should be international, not U.S. only. |
| | Early 80s | • Refinement of computer models – effect had been overstated.<br>• DuPont CFC ATOI 3% of sales, spend nothing on developing substitutes.<br>• CFC business not earning its keep, therefore cost reductions, yield and operating improvements – goal to become U.S. low cost producer.<br>• Discover ozone hole over antartica in 1985.<br>• $5M on research for substitutes. |
| II | Mid 1986 | • More evidence, new DuPont press release.<br>• "It would be prudent to limit worldwide emissions of CFCs while science continues to work to provide better guidance to policy makers."<br>• Support development of the Montreal Protocol. |
| | Sept. 1987 | • Montreal Protocol on Substances that Deplete the Ozone Layer. |
| | Dec. 1987 | • EPA implementing regulations.<br>• DuPont doesn't price gouge in an attempt to retain customers for substitutes. |
| III | Feb. 1988 | • Senators write to DuPont – request and urge cessation of CFC production.<br>• DuPont states its public position – scientific evidence does not point to the need for dramatic CFC emission reductions, severe cutbacks would be unwarranted, counterproductive and irresponsible. |
| | 1990s | • DuPont continues to produce CFCs. |

Fig. 1.

elements, which when applied to business decision making can be described as follows.

1. *Facts.* An empirical definition of the situation.
2. *Stakeholder loyalties.* A hierarchy of the importance of various stakeholders.
3. *Mode of ethical reasoning.* A selection of either ends- or means-based reasoning.
4. *World view.* Basic beliefs about the way the world does or should work.

Du Pont's CFC strategy can be explained in terms of these factors.

## Facts

Throughout the period described, Du Pont was the world's largest manufacturer of CFCs. In 1985, Du Pont held 50% of the large U.S. market and a 27% global market share, and was the only major producer to have a significant market position in all three major markets, the United States, Europe and Japan. Du Pont's market power assured it of its position at the table at the international negotiations which resulted in the Montreal Protocol, along with ICI, Allied Signal, Atochem, and Montefluos. Du Pont was also heavily involved in developing the U.S. position as the U.S. approached the international negotiations and developed implementing legislation.

While Du Pont was the most significant player in the global CFC business, the $600M CFC business was not particularly significant to Du Pont, representing only 2% of sales. In fact, in its 1992 Environmental Annual Report Du Pont explained that while it continued to produce some CFCs, "to cease manufacture of CFCs would have no meaningful impact on our financial results." Before concern over the impact of CFCs on the ozone layer became an issue, the Freon division produced commodity chemicals, at low margins with high capital intensity, in an industry with significant over capacity. Patent protection for the chemicals had long expired and the industry was mature and highly concentrated. While these industry characteristics had the potential to change with the advent of a new regulatory environment, the Freon division did not become of critical strategic importance to Du Pont.

Other facts, however, changed considerably over time. The most important of these was the scientific uncertainty associated with the role of CFCs in destroying the ozone layer. Rowland and Molina, in 1974, published a theory that CFCs would break down in the stratosphere and catalyze chain reactions leading to the destruction of massive quantities of stratospheric ozone (Brodeur, 1986). At the time, this effect was a theory that could not be verified empirically. Furthermore it was not clear what damage to human and plant health would result from this theoretical effect, even if it did occur in practice.

Nevertheless, this proposed effect, once it reached the popular press, was enough to persuade consumers to change their purchasing behavior and switch to non-aerosol packaging for many common household products. As a result, CFC sales in the U.S. decreased steadily from a 1973 peak. The U.S. Environmental Protection Agency (EPA) followed up with a 1978 ban on CFCs for non-essential uses. Despite scientific uncertainty, consumer behavior and the regulatory environment changed in the United States, reflecting the precautionary principle.

Du Pont did not accept the Rowland and Molina hypothesis, and pursued a strategy of trying to reduce scientific uncertainty. Along with other CFC makers, it formed the Fluorocarbon Program Panel (FPP) under the auspices of the Chemical Manufacturers Association, to oversee research and to pool funds for peer reviewed scientific research on ozone depletion. Total Du Pont expenditures on atmospheric science, aimed at a better understanding of the ozone depletion problem, averaged $1M per year from 1972 to 1982.

In the mid 1970s, Du Pont made a public promise, both in newspaper advertisements and in Congressional hearings, that, "should reputable evidence show that some fluorocarbons cause a health hazard through depletion of the ozone layer, we are prepared to stop production of those compounds." At this point, Du Pont's public position rested on the idea that theories proposing ozone depletion were unsubstantiated.

At first, Du Pont appeared to have been proved

right. Peer reviewed science developed in the late 1970s and early 1980s produced different models which demonstrated that the ozone effect was not as dramatic as Rowland and Molina's hypothesis suggested.

In 1985, however, British scientists reported a dramatic decrease in springtime stratospheric ozone concentrations across Antarctica. The size of this ozone hole empirically demonstrated that Rowland and Molina might actually have underestimated the ozone depletion effect. This new scientific evidence acted as a catalyst for change in the international community. The EPA quantified the considerable damage to human and plant health that could result from damage to the ozone layer and the Montreal Protocol was rapidly developed from the earlier framework Vienna Convention.

Du Pont responded to the changed facts by moving to Phase 2 of its strategy. Du Pont publicly supported regulation of CFC production. The overwhelming consensus of scientific opinion that CFCs destroy stratospheric ozone, and that this is potentially harmful to human health developed through Phase 3 (Service, 1995) and (Drake, 1995). However, from 1988 to 1995 Du Pont continued to produce CFCs, despite public requests from members of Congress to cease production in light of evidence that CFCs produced harm to human health. Eventually they announced a phase out of production, but in 1995, continued to produce CFCs.

Another important set of facts that is relevant to Du Pont's CFC strategy is the existence of CFC substitutes. The existence of substitutes is a fact which Du Pont was able to influence. Consistent with its Phase 1 position that there was no reason to cease production, Du Pont argued that there were no effective substitutes for refrigeration and electronics manufacturing applications. When they were urging the development of the Montreal Protocol in Phase 2, Du Pont claimed that there were substitutes, or that they would be able to develop the substitutes in the foreseeable future. In Phase 3, Du Pont stated that economically viable substitutes had not been developed for all uses and continued production of CFCs. A technically sophisticated science based company, Du Pont changed the facts with respect to its ability to produce substitutes in each phase. (Mathews, 1991).[4]

Du Pont is able to select the facts that it chooses to use in its ethical reasoning, and in the case of the existence of substitutes, interpret the facts as it wills. Despite advances in scientific understanding, and a reduction in scientific uncertainty, Du Pont did not cease production as it publicly committed to do. In order to understand Du Pont's ethical reasoning in its CFC strategy, it is important to consider other aspects.

## Stakeholder loyalty

Firms have a variety of stakeholders to whom they are accountable. According to Milton Friedman (1989), shareholders are of paramount importance and the objective of firms should be to maximize profits, and thus returns to their shareholders. It would appear that Du Pont subscribes to the perspective that shareholders are the most important stakeholder. The Du Pont shareholder profile was in no way unusual for a U.S. based Fortune 500 company.

Other stakeholders might include customers, and regulators. Without pleasing customers it is difficult to maximize shareholder returns, while without regulatory support shareholder returns cannot be assured. Employees, suppliers, industry peers, the general public and the environment appear to have been regarded by Du Pont as less important stakeholders than shareholders, customers and domestic and international regulators. The letter from the chairman in the 1990 Du Pont Annual Report advocates the primacy of shareholder interests and financial rewards, while recognizing the importance of other stakeholders.:

> Fundamentally, we must improve performance in the eyes of our constituencies: shareholders, customers, employees and society. For you, our shareholders, a strong financial performance is a prerequisite – the first benchmark on the road to greatness. . . . However, to consistently achieve outstanding financial results, we must serve all of our constituencies in a superior way: by becoming the preeminent global partner with our customers; by tapping the full potential of our people; and by

> maintaining the confidence of the public in the societies where we operate.

With a significant amount of capital invested in CFC producing plant and equipment, it was not in Du Pont shareholders' interests to phase out production of CFCs immediately, even when it became apparent that CFCs might harm the atmosphere and therefore human health. A mature business should be harvested, not abandoned. While scientific uncertainty was high in Phase 1, Du Pont scaled back investment in R&D in substitutes, or in the Freon business as a whole, to less than one third of firm averages. In the early 1980s Du Pont focused its attention on reducing costs through backward integration into raw materials, and process improvements to increase yields, to become the low cost producer of CFCs in the U.S. Du Pont intended to continue to make CFCs, even if other players dropped out of the industry. Both of these actions were consistent with Du Pont's interpretation of the facts, and a strategy of maximizing shareholder value.

In Phase 2, while Du Pont claimed that it could produce substitutes, spending on R&D to develop substitutes was less than half firm averages as a percent of sales. It was not until 1988, after the Montreal Protocol was signed and a regulatory monopoly assured, that R&D spending increased to firm average levels and Du Pont made a concerted effort to develop substitutes. During this phase Du Pont chose to maintain prices rather than realize the regulatory rent which developed as the supply of CFCs was constrained before demand had the opportunity to adjust. Du Pont explained this decision as consistent with maintaining long term customer relationships, and wanting to retain customers rather than realize short term profits.[5]

In Phase 3, Du Pont invested heavily in the development and production of substitutes, as explained in its 1993 Annual Report,

> Du Pont is leading the transition away from production of ozone depleting chlorofluorocarbons (CFCs), having invested more than $500 million to develop a full line of alternative products. Today, Du Pont Fluorochemicals produces alternative products at eight plants in North America, Europe and Asia Pacific. One of these is Corpus Christi where the world's largest hydrofluorocarbon (HFC)-134a (Du Pont "Suva") facility started up last fall.

The Montreal Protocol provided Du Pont with the opportunity to develop a new high margin business, and capitalize on their considerable research and development capability, to replace a mature commodity business. Despite this, Du Pont did not follow the absolute action of ceasing production of CFCs.

Du Pont argued, in justification of its Phase 3 behavior, that the general public, society, the U.S. government and major customers have asked Du Pont to continue to produce CFCs. As Du Pont explained in its environmental annual reports and annual reports:

> Du Pont would cease production of CFCs immediately if substitute products and equipment were broadly available. To cease manufacture of CFCs would have no meaningful impact on our financial results. But we, along with the governments of the world who could ban production of CFCs, *recognize that these materials are required to meet societal needs.*
>
> Du Pont regularly assesses its phase out program. We feel that it is the responsibility of governments and users to decide whether CFCs continue to be essential, and that *it would be irresponsible to disregard the considered positions of international bodies and world governments through a unilateral decision to cease production*.
>
> We have reduced production of CFCs for sale by 75% since 1986, have ceased production in Europe and Canada, and have produced less than allotted under the Montreal Protocol for the past four years. As reported last year, *we will continue to produce CFCs for sale in 1995 as requested by the U.S. Government*. (italics added)

Customer requests derive either from a perceived lack of substitutes, or from a desire to postpone making new capital investments to accommodate substitutes, such as in the case of auto manufacturers who do not wish prematurely to redesign the air-conditioning systems of their vehicles. The considered position of international bodies and world governments, broadly speaking, is to phase out CFC production. Du Pont makes

money for shareholders through its continuing production and sale of CFCs, but the needs of customers and government requests take precedence over the well being of the planet and the ozone layer in Du Pont's decision making. If the explicitly stated needs of these less important stakeholders coincides with Du Pont's desire to maximize shareholder returns through continued use of its mature equipment and technology, it will reverse the behavior expected from its publicly stated goal of phasing out and ceasing to produce CFCs as soon as possible.

Du Pont's public commitment, in Safety, Health and the Environment states that,

> We affirm to all our stakeholders, including our employees, customers, shareholders and the public, that we will conduct our business with respect and care for the environment. We will implement those strategies that build successful businesses and achieve the greatest benefit *for all our stakeholders* without compromising the ability of future generations to meet their needs.

This appears inconsistent with Du Pont's strong focus on shareholders as its primary stakeholders. It is also inconsistent with Du Pont's actual behavior. The continued production of CFCs in light of clear scientific evidence compromises the ability of future generations to meet their needs.

To understand the seeming inconsistency of Du Pont's public statements and actual behavior, the clarification of the hierarchy of stakeholder loyalties is helpful, yet it is also important to examine the mode of ethical reasoning employed by Du Pont.

## Mode of ethical reasoning

Du Pont is a proponent of the teleological mode of ethical reasoning, emphasizing the ends to be achieved for shareholders, and perhaps for other stakeholders. Its reasoning is relatively unconcerned with the means used to reach those ends.

Consistency in its statements and between its words and deeds appears to be relatively unimportant to Du Pont. When Du Pont made a public promise to phase out CFC production if it was proved to be harmful to human health, it gained some credibility and the right to continue to produce CFCs. It also stalled the regulatory trend toward banning CFCs. All of these benefits led to continued sales of CFCs and continued contribution to shareholder returns. When proof and scientific evidence materialized in the form of the ozone hole, Du Pont was slow to react, despite EPA estimates that the benefit of ceased CFC production would be of the order of $6500 B. Du Pont continued to produce the compounds in 1996, albeit in reduced quantities. It did not make a decisive step and close down plants, refusing to follow up on its previous commitment. Ceasing production would not have been consistent with its primary end – maximizing shareholder value. By 1994, as the major producer of substitute products, Du Pont has still been unable to convert all of its facilities. In 1994, Du Pont was only able to report that, "We have made *substantial progress* in converting Du Pont facilities."

While Du Pont made some effort to appear consistent with its earlier position, by declaring in 1988 that scientific evidence was still insufficient to justify ceasing CFC production, this statement was undermined by Du Pont's lobbying to urge faster phase-outs. Once Du Pont decided it could gain strategic advantage from a faster phase-out, it abandoned its peers in the Alliance for Responsible CFC policy, an organization that it had helped to form, and its public position that scientific evidence was insufficient to reduce production, and pushed for aggressive phase out of production on a worldwide basis under the Montreal Protocol.

The deontological duty of doing no harm to the planet appears to have been unimportant to Du Pont in Phase 3. At a time when many firms involved in the industry were banding together to find substitutes and share the results of their innovation with suppliers, peers and customers, Du Pont stuck to its traditional mode of technology transfer; selling substitutes as proprietary products, licensing rights to which would only be available to developing countries once the substitutes were becoming obsolete in developed countries. While innovating with respect to its participation in the international regulatory

process, Du Pont did not share in the innovations in technology cooperation around the CFC issue.

In U.S. Congressional hearings, Richard Smith, Acting Deputy Assistant Secretary of the Department of Environment, Health and Natural Resources, explained the attitude of other members of industry:

> I am very encouraged by what I see as the dynamic of what is happening in the private sector and the development of substitutes, the eagerness I see on the part of the concerned industry to address this problem and to work with developing countries and others to achieve it.

The Industry Cooperative for Ozone Layer Protection (ICOLP) is an industry-funded organization of electronics companies that provides information on the reduction of use of CFC solvents in the manufacture of electronic components. Its membership includes AT&T, IBM, Northern Telecom, and the U.S. EPA. Members agreed to make available a wide range of non-proprietary CFC information through technology transfer workshops, an on-line electronic database, and guide books which have been jointly published with the EPA. The guidebooks are freely available for copy and use. These firms decided not to make this technology a source of competitive advantage, but instead an area of cooperation in which all could share for the health of the planet. Du Pont chose not to participate in this enlightened approach. Its only public statements with respect to dissemination of substitutes relate to implications for firm profitability:

> While we have significantly reduced our production of CFCs, we continue to be disappointed by the market's slower than anticipated transition away from CFCs to the more environmentally acceptable alternatives.

It would appear that the mode of ethical reasoning employed by Du Pont in developing and implementing its CFC strategy was an extreme case of ends-based reasoning, with very little concern for process, internal consistency, or truth. Motivated towards the end of maximizing shareholder wealth, Du Pont was willing to vacillate in its commitment to the common position established with its peers, to reverse its commitment to a previous public position, and to sacrifice the precautionary principle regarding environmental harm. This is even more surprising given the fact that CFCs represented an almost insignificant fraction of Du Pont's revenues.

## World view

To finish an analysis of Du Pont's ethical reasoning, it is necessary to consider the world view of the corporation. Du Pont's world view was colored by its previous experience with the ban of aerosol production by the U.S. EPA. Given Du Pont's sales in the U.S. market, it was important that the U.S. not impose any further unilateral legislation which would differentially hurt its producers. The best solution, once the facts changed and regulatory change seemed inevitable, was an international regulatory regime.

As a large player, used to being the largest in its industry, Du Pont doesn't favor unbridled atomistic competition, but rather a regulatory regime which allows considerable industry consolidation and concentration of power. Du Pont thus supports changes in regulations that favor entrenched interests. It is thus important for Du Pont to be able to shape the timing and form of regulatory change. Du Pont states its public policy goal to:

> Build alliances with governments, policy makers, businesses and advocacy groups to develop sound policies, laws, regulations and practices that improve safety, health and the environment.

Du Pont further explains that it will, "promote open discussion with our stakeholders about the materials we make, use and transport and the impacts of our activities on their safety, health and environments." This open discussion will always be aimed at shaping policy such that Du Pont can continue to make profit once the regulations have changed.

In summary, Du Pont's changing CFC strategy through the 1970s, 1980s and 1990s, reflects changing facts and interpretations of the facts, a

focus on shareholders as the primary stakeholders, ends-based reasoning and a world view which emphasizes strong business – government partnership. Only in light of these factors, would Du Pont's CFC strategy appears to be well-reasoned and ethically consistent over time.

## Other stakeholder perspectives

Shareholders and the business community, with the exception of peer members of the Alliance for Responsible CFC Policy, appear to consider Du Pont's strategy rational and morally sound. This agreement derives from the alignment between this stakeholder group and Du Pont's primary loyalty to shareholders. Shareholders argue that if they want to diversify out of the CFC business, they can do so by selling Du Pont shares. They choose not to take this action because it is less important to them than the returns they derive from owning Du Pont shares. Du Pont's share performance did not suffer as a result of its CFC strategy, which indicates that this important stakeholder group agreed with Du Pont.

The ethical reasoning of industry peers differs with Du Pont's on several fronts. First, Du Pont's partners in the Alliance for Responsible CFC Policy differed from Du Pont in Phase 2 in their interpretation of the facts. The other members of this coalition held to their position that there was insufficient evidence to warrant dramatic changes in CFC production and consumption, and that effective substitutes had yet to be produced. Secondly, they disagreed with Du Pont in the means it used to make its decision. Rather than working from within the alliance to change position and revise its interpretation of the facts, Du Pont abandoned the alliance and publicly took an opposing position. Du Pont at this point also abandoned the coalition it had brought together, and the world view implicit in that coalition, that industry collaboration was important to influence policy development.

Later, in Phase 3, the actions of other players in the CFC industry, particularly major electronics users, indicate that they do not agree that they owe their primary loyalty to shareholders. They did not make non-use of CFCs a major source of strategic advantage or differentiation, but rather chose to share their technical innovations with one another, with suppliers and government bodies. This action shows the importance these firms attach to the general public, and the global environment as stakeholders. It also demonstrates a difference in the mode of ethical reasoning employed.

Environmentalists disagree with the ethical reasoning employed by Du Pont in several respects. First, environmentalists disagreed at times with Du Pont with respect to the facts. In Phase 1, consumers, environmentalists and the EPA agreed that under the precautionary principle, there was sufficient cause for concern regarding stratospheric ozone depletion to reduce CFC usage and begin work to develop substitutes. This was at direct variance with Du Pont, which did not adhere to the precautionary principle and did not believe that scientific evidence supported environmentalists' claims. Later, however, Du Pont's interpretation of the facts aligned with that of environmentalists', as Du Pont agreed that a rapid phase out of CFCs was prudent in Phase 2.

Generally, environmentalists disagree fairly energetically with Du Pont's ordering of stakeholder loyalties. Environmentalists are convinced of the importance of stratospheric ozone to the planet, and some within the environmental movement would like to see irreversible environmental damage raised above the interests of shareholders, customers and suppliers. Environmentalists applauded the actions of major users, who surpassed their own aggressive phase-out schedules, and participated in technology sharing programs. Most environmentalists disapprove of Du Pont's continued CFC production in the 1990s and lack of decisive action. This inconsistency in the ordering of stakeholder loyalties is the most fundamental disagreement between environmentalists and Du Pont.

Moves by environmentalists to align the interests of shareholders with environmental goals have had limited success. Following the strategy of the Sullivan Principles (Kline, 1991), the CERES Principles have been developed to bring pressure on companies to behave in an environ-

mentally progressive way through shareholders actions (Parrish, 1994).[6] It would appear that the general population of shareholders are more interested in monetary returns than other goals. This fundamental disagreement between firms and environmentalists is thus likely to remain for the foreseeable future.

Members of government disagree most fundamentally with Du Pont in its selection of a teleological mode of ethical reasoning. Du Pont's reversal of a public promise, specifically of a promise before Congress, violate the system which is used to develop trust between firms and legislators. Legislators expect that firms will tell the truth in Congressional hearings, and that they will honor the commitments made to this forum. Furthermore, government believes that firms have a duty to do no harm to the planet and to its constituents. Du Pont violated this duty with its continued production of CFCs.

In summary, it would appear that other interested parties disagree with almost every aspect of Du Pont's ethical reasoning, from facts, to ordering of stakeholder loyalty, to mode of ethical reasoning. Each of these interested parties also has some area of agreement with Du Pont, for example surrounding the fact of scientific uncertainty in the early phases or the importance of shareholder returns. This divergence in norms of ethical reasoning helps to explain the varied reactions to Du Pont's strategy over time.

## An alternative approach

Du Pont missed an important opportunity to simultaneously please shareholders and other stakeholders in its CFC strategy. The approach that Du Pont adopted alienated important constituencies unnecessarily. An alternative approach is outlined, which would have achieved shareholder benefits through positive publicity while maintaining the trust of other important stakeholders.

Du Pont should adopt the precautionary principal with respect to scientific facts. When there is reasonable uncertainty associated with the global environmental harm associated with the consumption of one of its products, it should prepare to stop producing that product, and invest in reducing scientific uncertainty. It should develop objective standards of proof of scientific certainty, make these public, and stand by its decision to stop production should these standards be met. Such a system of accountability would do much to repair the trust of many stakeholders.

Du Pont should reprioritize stakeholders, and balance the needs of human life on the planet with shareholders, rather than hold shareholders above all others. Further, it should search for solutions where the needs of both can be satisfied simultaneously. In this instance, CFCs were a very small portion of Du Pont's sales and profits, and considerable positive public relations could have been generated through an earlier and more decisive phase out of CFCs.

Du Pont needs to pay more attention to the means it uses to achieve its goals. With a track record of inconsistent and unpredictable behavior, its credibility will decrease and it will have fewer options in the future. Du Pont could have adopted this alternative method of ethical reasoning, with positive results in terms of public perception, and limited cost in terms of satisfying any major stakeholder. Environmentalists and the government would have been considerably more satisfied, and Du Pont's relationship with these groups far better preserved.

## Conclusion

Du Pont's changing CFC strategy through the 1970s, 1980s and 1990s, can be explained as the consistent result of a particular ethical approach. The strategy includes both business and political decision making, and the approach reflects: changing facts and interpretations of the facts; a focus on shareholders as the primary stakeholders over the environment and other stakeholders; and ends-based reasoning, with shareholder value the primary end.

Other concerned stakeholders do not necessarily share this framework for ethical decision making, which is why many have reacted negatively to Du Pont's strategy over time, and declared it unethical. Du Pont would have reaped

considerable benefits from an alternative ethical approach.

## Notes

[1] The Montreal Protocol entered into force on January 1, 1989. It establishes a phase-out of production of ozone depleting chemicals, and states have agreed to phase out the production of specific chemicals by specific dates. Under the Protocol, industrialized states have committed to progressively phase out production of these chemicals from current levels.

[2] Du Pont has been both praised and criticized by environmental groups for its chlorofluorocarbons (CFC) strategy over time. While Du Pont's support of a CFC phase out has been praised by environmentalists, lobbying to prevent CFC regulations over 15 years prior to the Montreal Protocol and the move to extend production until 1995, reversing previous commitments to phase out by the end of 1994 have brought criticism by environmental groups such as Greenpeace.

[3] I draw from Harvard Business School case 9-389-111 for the business strategy in the first and second phases, and from Du Pont's recent annual reports and environmental annual reports for evidence of the third phase strategy.

[4] CFCs are stable, nonflammable, non toxic and non corrosive – qualities that make them extremely useful in varied applications: coolants for refrigerators and air conditioners; propellants in spray containers; energy efficient insulators; manufacture of rigid and flexible foam materials; solvents for cleaning microchips and telecommunications equipment. While similar CFC compounds can be used for all of these applications, a variety of substances and processes need to be used as substitutes. When the Protocol was ratified, substitutes for different applications were at varying stages of development. Alternative propellants had been compulsory in the United States since the ban of CFCs as propellants in 1978, so both the alternative products and processes were clearly available and proven. Substitutes for refrigeration and air conditioning had not been developed at the signing of the treaty. Those that have subsequently be developed are not "drop in" substitutes, i.e. they can not replace CFCs in existing equipment, the equipment must also be redesigned. No substitute for cleaning electronic circuit boards was available at the signing of the treaty, but a substitute derived from citrus fruit was developed soon after, and first announced by AT&T. Foam products can be generated using substitutes or foam can be replaced in different packaging applications. While substitutes were available for some applications, others required technical innovation after ratification of the Protocol.

[5] Customers were willing to buy the potentially harmful products in cases where functionally equivalent substitutes were not yet made commercially available. Where substitutes were available, as in the case of aerosol propellants, customers quickly made the transition.

[6] CERES advocates control $150 billion of corporate stock, and launched shareholder resolutions to have the principles signed at many Fortune 500 companies, forcing dialogue about the principles and the companies' environmental performance. Du Pont rejected a shareholder proposal at its 1991 annual meeting recommending that Du Pont sign the Valdez Principles.

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