

**INTERNATIONAL ENVIRONMENTAL AGREEMENTS
AND STATE COOPERATION:
THE STRATOSPHERIC OZONE PROTECTION TREATY**

BY

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B.S., Stephen F. Austin State University, 1975
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DISSERTATION

Submitted in Partial Fulfillment of the
Requirements for the Degree of

**Doctor of Philosophy
Political Science**

The University of New Mexico
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DEDICATION

For Ralph, whose constant faith and encouragement helped me reach my star.

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ABSTRACT

Using both quantitative and qualitative methods, the research explored the puzzle of why states in the global community consent or refuse to participate in international environmental agreements. The substantive issue was negotiation and ratification of the 1985 Vienna Convention for Protection of the Stratospheric Ozone Layer and the related 1987 Montreal Protocol and its four amendments. Although nearly all nations eventually ratified the Vienna Convention and Montreal Protocol, some countries embraced the agreements almost immediately while others either lagged several years behind or never ratified the treaty. The six to seven years necessary to obtain majority ratification of the Vienna Convention and Montreal Protocol call attention to the need for examining both global and domestic interests of states in negotiating environmental treaties.

Through a large-*n*, cross-national study of time to ratification for 180 nations, the research investigated factors that promote or discourage cooperation among countries in international environmental agreements. The quantitative study indicated that countries that are democratic, industrialized, join many international organizations and institutions, and produce the substance to be restricted by the treaty are more likely to join early in the

life of the treaty. The analysis thus exposed a tension between the desires of democratic leaders to satisfy their citizens by promoting environmental initiatives in their countries while concurrently forcing domestic industries to bear the costs of pollution prevention or cleanup.

The research then utilized a case study to investigate negotiation and ratification of the ozone protection treaty by the United States, which during the 1980s and 1990s was the primary producer of chemicals linked to stratospheric ozone depletion. The case study highlighted the importance of domestic politics in a country's negotiation and ratification process. A state's executive can more readily ensure a smooth domestic ratification process if the concerns of interest groups are addressed when the state formulates its position for international negotiations. The case study also points out the importance of an epistemic community of informed experts in freely providing scientific data to all interested parties.

CONTENTS

Acronyms and Abbreviations	xi
1. Introduction.....	1
<i>Theoretical Framework</i>	<i>3</i>
<i>Dissertation Outline and Research Methods</i>	<i>6</i>
<i>Significance of Research and Conclusions.....</i>	<i>7</i>
 PART ONE: CROSS-NATIONAL STUDY OF TREATY RATIFICATION	
2. Factors Influencing Cooperation in International Environmental Agreements: The Ozone Protection Treaty	10
<i>Theoretical Framework</i>	<i>11</i>
<i>Event-History Analysis of Time to Ratification</i>	<i>17</i>
<i>Results of Event History Analysis</i>	<i>21</i>
<i>Discussion.....</i>	<i>24</i>
<i>Conclusions.....</i>	<i>27</i>
 PART TWO: CASE STUDY.....	
3. American Foreign Policy and Domestic Policy Making: The Ozone Protection Treaty	32
<i>Milner’s Interests, Institutions, and Information</i>	<i>32</i>
<i>Interests, Institutions, and Information in the U.S. Context</i>	<i>37</i>
4. The Executive Branch and Treaty Negotiations	75
<i>The Vienna Convention: Science, Not Regulation.....</i>	<i>76</i>
<i>The Montreal Protocol: The Ozone Protection Treaty Gets Some “Teeth”</i>	<i>96</i>
<i>The London Amendment: Industry Endorses CFC Restrictions.....</i>	<i>122</i>
<i>The Copenhagen Amendment: Ozone Depletion Over North America Prompts Accelerated ODS Phaseout.....</i>	<i>148</i>
<i>The Montreal Amendment: Ozone Backlash Threatens Treaty Progress.....</i>	<i>173</i>
<i>The Beijing Amendment: U.S. Loses Battle for Earlier Methyl Bromide Phaseout ..</i>	<i>203</i>
<i>Conclusions.....</i>	<i>208</i>

5. The Senate and Treaty Ratification	211
<i>The Vienna Convention: Smooth Sailing for a Treaty with No Restrictions</i>	<i>213</i>
<i>The Montreal Protocol: International Restrictions Gain CFC Industry Support</i>	<i>222</i>
<i>The London Amendment: Reservations About the Financing Mechanism for Developing Countries.....</i>	<i>230</i>
<i>The Copenhagen Amendment: The Presidential Baton Passes From Republican to Democrat, But the Amendment Moves Forward</i>	<i>238</i>
<i>The Montreal and Beijing Amendments: Methyl Bromide Controversy and Administration Change Endanger Domestic Acceptance.....</i>	<i>244</i>
<i>Conclusions.....</i>	<i>252</i>
 PART THREE: CONCLUSIONS	
6. Conclusions.....	255
Appendix.....	262
References	269

ACRONYMS AND ABBREVIATIONS

CCOL	(United Nations Environment Programme) Coordinating Council on the Ozone Layer
CFCs	chlorofluorocarbons
DoD	(United States) Department of Defense
EC	European Community
EEC	European Economic Community
EPA	(United States) Environmental Protection Agency
EU	European Union
FDA	(United States) Food and Drug Administration
HBFCs	hydrobromofluorocarbons
HCFCs	hydrochlorofluorocarbons
HFCs	hydrofluorocarbons
IGOs	intergovernmental organizations
MB	methyl bromide
NASA	(United States) National Aeronautics and Space Administration
NOAA	(United States) National Oceanic and Atmospheric Administration
NRDC	Natural Resources Defense Council
ODS	ozone-depleting substances
OMB	(United States) Office of Management and Budget
PIRG	Public Interest Research Group
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
USDA	United States Department of Agriculture
WMO	World Meteorological Organization
WRI	World Resources Institute

1. INTRODUCTION

Our world faces many extraordinary environmental challenges that require international cooperation. The ozone-protection treaty was a landmark agreement, one of the first global environmental agreements accepted by most of the world's governments. Diplomats and scientists have praised the treaty as an international environmental success story, proclaiming, "Extraordinary and unprecedented cooperation has been the hallmark of ozone-layer protection" (Andersen and Sarma 2002, 345). Understanding how this success was achieved may help us understand how we can address other global environmental crises.

Atmospheric scientists began to alert the world in the mid 1970s about the possible relationship between chlorofluorocarbon (CFC) products (e.g., refrigerants and aerosol propellants) and the destruction of the stratospheric ozone layer that protects Earth from the harmful effects of ultraviolet radiation. Throughout the late 1970s and early 1980s the number of scientists sounding the alert grew and their voices became more insistent. Health officials warned of increased instances of skin cancer as a result of ozone-layer depletion. Other researchers warned of climate changes that could cause catastrophic reductions in food crops and seafood production (NRC 1979). By 1984 scientists had found evidence of ozone depletion above Antarctica, with the presence of an "ozone hole" becoming more fully substantiated in 1985 (Farman et al. 1985). The predictions and mounting evidence about stratospheric ozone depletion and its consequences prompted the United Nations Environment Programme (UNEP) to organize international working groups to study the subject.

March 1985 marked the initiation of a formal international effort to control stratospheric ozone depletion. Representatives from around the world met in Austria to

deliberate on the Vienna Convention for Protection of the Ozone Layer. The Vienna Convention, orchestrated by UNEP and signed originally by 28 countries, was a framework agreement with no legally binding controls or targets. The parties to the Convention agreed to cooperate in research, observations, and information exchange, and to adopt policies to control human activities that might modify the ozone layer (UNEP 1985b). Two years later, delegates met again to initiate compliance requirements in the Montreal Protocol, which required the phaseout of CFCs (UNEP 1987).

The Montreal Protocol was designed so that the schedule for phasing out ozone-depleting substances could be adjusted as new information became available. Since 1987, four amendments to the Protocol have been adopted: the London Amendment in 1992, the Copenhagen Amendment in 1994, the Montreal Amendment in 1999, and the Beijing Amendment in 2002. Each amendment tightened either the phaseout schedule or production and usage limits for CFCs or added new ozone-depleting substances to the phaseout list. Industrialized countries were expected to adhere strictly to the schedules. Developing countries had a 10-year grace period in which to make attainment plans and access funding provided through the process.¹ Governments are not legally bound until they ratify the Montreal Protocol; compliance with each amendment relies on ratification of that amendment plus any previous amendments.

Industrialized countries have almost completely phased out ozone-depleting substances controlled by the treaty and have provided funding to encourage developing countries to eliminate their reliance on these substances. Scientists predict that, with full

¹ “Developing countries” were not designated until 1989, at which time developing countries were those countries in the Group of 77 of the United Nations.

implementation of the treaty, ozone depletion will occur for only two more decades and the Antarctic ozone hole will be repaired by the year 2050 (Andersen and Sarma 2002).

Theoretical Framework

Although nearly all nations eventually joined the Vienna Convention and Montreal Protocol, some countries embraced the agreements almost immediately while others lagged several years behind. The Vienna Convention entered into force two and a half years after it was opened for ratification,² but more than seven years elapsed before a majority of the world's nations accepted the agreement (Table 1). The Montreal Protocol entered into force a year and a half after it was opened for ratification,³ yet majority ratification took almost five and a half years. Majority acceptance of the Protocol amendments took even longer. What factors caused the delay in obtaining majority acceptance of the agreements, and why did some countries delay even longer? The answer to this question is important because it may well be a key to understanding how cooperation can be achieved in international agreements.

Systemic theories assume that a nation's foreign policy decisions are based on the role, identity, or interests given to the state through its interactions with the international system (Ikenberry et al. 1988; Barkdull and Harris 2002). Systemic theories often place a nation's executive in the position of being a solitary decision maker in foreign policy actions (i.e., a unitary actor in the international arena).

² A treaty does not enter into force when it is adopted. Typically, the provisions of the treaty determine the date on which the treaty enters into force. The Vienna Convention entered into force 90 days following deposit of the twentieth state's instrument of ratification. At that time, the Vienna Convention entered into force for those states that gave the required consent.

³ The Montreal Protocol entered into force on January 1, 1989, after eleven instruments of ratification were deposited by states representing at least two-thirds of 1986 estimated global consumption of the controlled substances.

Table 1. Important Dates in the History of the Ozone Protection Treaty.

Treaty Element	Open for Ratification	First Ratification	Entry into Force	Majority Ratification (yrs)
Vienna Convention	22-Mar-1985	4-Jun-1986 (Canada)	Sep 1988	7.3
Montreal Protocol	16-Sep-1987	31-Mar-1988 (Mexico)	Jan 1989	5.4
London Amendment	29-Jun-1990	5-Jul-1990 (Canada)	Aug 1992	7.0
Copenhagen Amendment	25-Nov-1992	1-Mar-1993 (Saudi Arabia)	Jun 1994	8.3
Montreal Amendment	17-Sep-1997	27-Mar-1998 (Canada)	Nov 1999	9.1
Beijing Amendment	3-Dec-1999	3-May-2000 (Chile)	Feb 2002	11.3

Some researchers, however, have suggested that two levels of analysis are necessary in understanding a nation's foreign policy decisions. The politics of many international negotiations have been postulated as a two-level game. At the international level, state actors seek favorable terms in agreements that will satisfy domestic interests while minimizing adverse consequences of complying with the terms of the agreements. At the national level, domestic actors pursue their interests by exerting pressure on the government to adopt their viewpoints as policy, and politicians seek power through coalitions with interest groups (Putnam 1988).

Milner's (1997) refinement of the two-level game developed testable hypotheses about when and under what terms states are able to achieve cooperation on international agreements. Milner assumed that states are polyarchical—power or authority over decision making is shared, often unequally. The inequality of sharing causes domestic politics to vary within the polyarchy between the two ends of the continuum (i.e., between hierarchy and anarchy). Where a state is most influenced for any particular decision or international interaction relies on three factors: the policy *preferences* of

domestic actors, the *institutions* for power sharing among them, and the distribution of *information* among them. The relative influences of these factors determine the amount of cooperation a state will pursue in international transactions.

For international monetary and trade agreements, policy preferences of the domestic actors have been advanced as the key factor in understanding international cooperation (Milner 1997). For international environmental agreements, key domestic factors may be twofold: a country's vulnerability toward pollution and the economic costs of pollution abatement (Sprinz and Vaahtoranta 1994). Thus, domestic politics surrounding an international environmental issue becomes a two-sided contest. On one side are environmental interest groups striving to prevent or halt environmental degradation regardless of the cost. On the other side are domestic industries that must either successfully counter environmentalists' claims of industrial pollution or modify their practices, often at considerable cost, to conform to environmental regulations.

The research presented here integrates Milner's (1997) framework with both American foreign policy literature and studies about the role of epistemic communities in facilitating international agreements on issues that are scientifically or technologically complex. The case study further develops Milner's hypotheses about domestic influences on ratification of international agreements. It demonstrates the ways that a nation's executive anticipates domestic treaty ratification by exploring the incorporation of domestic interest group preferences into a nation's negotiating position prior to formal international negotiations.

Additionally, the case study expands Milner's basic hypothesis that incomplete and asymmetric information "creates inefficiencies and political advantages." Epistemic

communities add another dimension to the role of information in achieving treaty ratification. Scientists in epistemic communities provide information as a “service to humanity” and generally believe that the best scientific solution should encourage the best social or political solution. The involvement of an epistemic community in an issue area means that all actors essentially have equal access to scientific information. Information becomes important, not because it is incomplete or asymmetric, but because political and societal actors (i.e., the legislature and interest groups) have an abundance of it that can be used to strengthen their own case or weaken their opponents’ arguments. Having access to scientific information “...does not predict the quality of knowledge or the political or organization inference actors will draw. Choices are made in response to perceived—and changeable—interests, and in obedience to the rules of bargaining” (Haas 1982, p. 242).

Dissertation Outline and Research Methods

This study expands knowledge about cooperation in international environmental treaties through a multi-method research design. First, the study examines patterns of cooperation using a large-*n*, cross-national study of the timing to ratification of the Vienna Convention and Montreal Protocol. Second, it uses the United States as an in-depth case study of domestic factors that influenced the U.S. negotiation position and ratification process for the ozone protection treaty.

Part One (Chapter 2) presents a cross-national study of treaty ratification. Chapter 2 contains an event-history analysis that uses four independent variables to represent global or domestic factors that are hypothesized to affect a state’s time to ratification of the Vienna Convention and Montreal Protocol. The results of the event-history analysis

indicated a tension between a state's desire to provide a common good in the form of an undepleted stratospheric ozone layer and a country's need to protect its private business interests to maintain a healthy domestic economy, a conflict that is best understood by examining domestic policies and politics.

Part Two (Chapters 3 - 5) provides an in-depth qualitative study that investigates the competition between a democratic leader striving to deliver public goods and domestic groups that mobilize to protect vested interests. The U.S. negotiation and ratification process for the Vienna Convention and Montreal Protocol and its amendments provides an excellent example of this competition. Chapter 3 provides the background for an analysis of domestic politics and foreign policy making. Chapter 4 focuses on U.S. efforts to negotiate the Vienna Convention and Montreal Protocol and its four amendments, with the intent of understanding how the executive branch (i.e., the White House administration) formulated its policy stance while balancing the policy preferences of domestic interest groups. Chapter 5 examines the ratification process in the U.S. Senate. While foreign policy theorists focus on the domestic ratification process as key to understanding cooperation in international agreements, the case study illustrates that the ratification process runs smoothly as long as the United States enters negotiations with a position endorsed by domestic interest groups. Negotiating internationally when domestic interests have not reached consensus on the country's position causes major delays in ratification.

Significance of Research and Conclusions

This study investigates factors that promote or discourage cooperation among countries in international environmental agreements. Diplomats have alternately praised

or lamented the degree of cooperation represented by these types of treaties, but research to examine why cooperative efforts occur or fail is in its infancy.

I argue that cooperation in the global arena necessarily depends on the actions of individual states and that these actions, in turn, are influenced by domestic interests. Assuming that states act as unitary actors limits the focus of foreign policy analysis to an interstate level. Domestic interests often have substantial influence on state decisions in international issue areas such as monetary and trade policies and, specifically for the analysis described here, international environmental agreements. Additionally, the epistemic community that naturally forms around international science and technology issues plays an important role in informing domestic interest groups and government. To more fully understand foreign policy making, domestic influences must be considered in foreign policy analyses.

PART ONE. CROSS-NATIONAL STUDY OF TREATY RATIFICATION

2. FACTORS INFLUENCING COOPERATION IN INTERNATIONAL ENVIRONMENTAL AGREEMENTS: THE OZONE PROTECTION TREATY

Milner (1997) focuses on the answers to two key questions in developing her concept of a two-level game to explain a country's foreign policy decisions. The first question addresses the reasons why states decide to cooperate in the international arena based on specific issues: When and under what terms are countries able to coordinate their policies in an issue area? The second question deals with the timing of cooperation: Why are certain countries better able to cooperate at certain times?

Milner argues that these questions can only be answered through an in-depth understanding of a country's domestic politics and policies surrounding a particular issue area and how that country's responses vary over time. While her argument is ultimately valid, there is also value in analyzing key variables in a cross-national, large n study to determine how domestic factors across a range of countries correlate with international cooperation.

Recent research has identified some of the factors that address the question of why countries cooperate in international environmental agreements (DeGarmo 2005). DeGarmo examined the ratification of thirty-eight international environmental treaties between the years 1972 and 2000. Using a statistical analysis, she noted several general trends in decisions to ratify environmental treaties. She found that countries with higher income economies are more likely to become a party to international environmental agreements, countries with a more democratic government were more likely to join international environmental treaties than those with a less democratic government, and countries vulnerable to a particular environmental problem were more likely to join an

international treaty addressing that problem than countries that were less affected. This chapter continues the effort to determine factors that favor participation in international environmental agreements by examining not only which factors were important but also how long countries delayed in joining the ozone protection treaty.

Theoretical Framework

The research reported here addresses the following question: What factors influence states in their decisions about when to join international environmental treaties, in this case the Vienna Convention and Montreal Protocol for protection of the stratospheric ozone layer? Several variables can be used for understanding decisions about cooperation. These variables include a state's economic level, the number of international institutions it has joined, its political regime type, and whether it has a vested economic interest in the production of a substance that is limited or banned by an international environmental treaty.

Economic Level

Developing countries received no special consideration in the Vienna Convention.⁴ It was not until the 1987 Montreal Protocol that special provisions accounted for the developing status of a country, and even then the composition of a "developing country" list was delayed until 1989. During the same time period, the world's developing countries were in the midst of a significant debt crisis that began in 1982 with Mexico's inability to repay its loans and rolled through most developing countries. For debtor countries, the 1980s comprised a decade of economic stagnation.

⁴ In general, developing countries are those designated as such by the World Bank.

Little capital was available to invest in infrastructure, and many domestic issues were sidelined while governments worked through their fiscal problems.

At the time the conference of the plenipotentiaries for the Vienna Convention met in March 1985, no decision had been reached on whether the Convention would contain mandatory compliance provisions. As early as 1982, developing countries voiced their concern in preliminary meetings that joining the Vienna Convention might obligate them beyond the practical means at their disposal and their capabilities to comply with requirements. Representatives proposed during a 1983 meeting that the Convention require treaty members to provide data regarding their production and use of CFCs, a requirement that posed potential problems for many developing countries that had no governmental agencies in place to gather the data and little financial ability to create the necessary agencies. By the end of the March 1985 conference on the Vienna Convention, the only assurances given to developing countries were in the form of a resolution indicating that discussions about the subsequent protocol would consider special provisions concerning the level of industrialization in each country and their respective responsibility for protection of the ozone layer (Andersen and Sarma 2002).

Thus, when the Vienna Convention became available for ratification in 1985, developing countries were in a state of uncertainty concerning their potential future obligations under the Montreal Protocol. The issue of special provisions for developing countries would not be formally discussed again until early 1987. Ultimately, special provisions for developing countries were provided in the 1987 Montreal Protocol. Under Article 5 of the Protocol, developing countries were allowed to delay compliance for ten years after the Protocol's entry into force (i.e., for ten years after September 1987). In

addition, the developed countries in the Protocol would assist developing countries in gaining access to alternative substances and technologies and provide monetary aid for these efforts. However, countries with “Article 5 status” were not designated until 1989, two years after the Montreal Protocol was open for ratification, and a Multilateral Fund to assist developing countries was not in place until 1991. The uncertainty that developing countries encountered over their potential compliance responsibilities suggests that

Hypothesis 1: Developing countries joined the Vienna Convention and Montreal Protocol later than industrialized countries.

Participation in International Institutions

States join international regimes and institutions of all types for many reasons. These institutions and their corresponding organizations are often designed to resolve coordination and collective action problems. Research on cooperation has focused on the role of regimes in special interest areas, specifically the transnational environmental issue of pollution control.

Intergovernmental organizations (IGOs) often become the repositories for great amounts of information generated by epistemic communities of scientists, which can enable cooperative agreements. IGOs increase the likelihood of cooperation maintenance by monitoring agreements, providing data, promoting transparency, and reducing transaction costs. Of these international institutions, most states are moderately or highly involved in financial or trade institutions such as regional or international trade agreements. Participation in these institutions offers its members economic connections and advantages they might not be able to develop individually.

States that are members of many international institutions are “joiners” and have developed an inclination toward involvement in world affairs. The facilitating effect of

international institutions and the advantages of global linkages that these institutions provide suggest that:

Hypothesis 2: States that joined many international institutions joined the Vienna Convention and Montreal Protocol in the early years of the agreements.

Political Regime Type

Little research is available on the relationship between political regime type and cooperation in international agreements; however, a few studies are available on regime type and trade policies. One of the few analyses of the importance of political regime type on international trade relations attempted to determine whether there is a “democratic difference” in foreign economic policy (Mansfield et al. 2002). Although the research was concerned with bilateral trade policies rather than joining international agreements, the results do shed some light on the importance of regime type. According to the analysis, leaders in democracies have a greater incentive to pursue international cooperation than do autocratic leaders. Both democratic and autocratic leaders may want to maximize the international admiration that comes from cooperating in international agreements, but either may lose office if their efforts at cooperation create significant domestic costs associated with compliance.

Pevehouse and Russett (2006) indicate that intergovernmental organizations (IGOs) that have a majority of democratic states as members are more likely to promote peace. They link democratic IGOs to peace through three mechanisms: credible commitments, dispute settlement, and socialization. A corollary of this finding could be that democratic IGOs are also more likely to promote cooperation in international agreements. Democratic states and those on the road to democracy seek to cooperate in

formal international agreements because the IGO overseeing the treaty and the institutions incorporated into the agreement offer them a means to assure other nations that they intend to honor the treaty terms. In addition, inclusion in a democratic IGO provides a formal and legalistic mechanism to settle disagreements among IGO members. Democratic IGOs may also promote peaceful (and cooperative) types of behavior by defining appropriate ways of addressing potential interstate conflicts. Pevehouse and Russett argue that peaceful norms are more likely to evolve “through a process of identity transformation in IGOs that are more homogenously democratic” (p. 979).

The “selectorate theory” adopts as its fundamental premise that political leaders need to hold office in order to accomplish any goal (Buono de Mesquita et al. 2003). To remain in office, leaders must develop a winning coalition that gives them political power over both their supporters and non-supporters. In democracies the winning coalition is the group of voters who elect the leader; in other systems it is the set of people who control enough power to keep the leader in office.

Of the three related sets of decisions that leaders make (i.e., tax rates, revenue spending, and provision of public and private goods), ratification of international environmental agreements falls within the category of public goods. Leaders in democratic regimes are expected to emphasize public policies about common goods such as repair and maintenance of the ozone layer that satisfy their electorate. Conversely, “...leaders working under institutional arrangements correlated with authoritarianism are wise to establish special privileges for their backers... Autocrats can be forgiven bad policy, but they are not likely to survive the elimination of patronage or the corrupt

benefits of cronyism. For autocrats, what appears to be bad policy often is good politics” (Bueno de Mesquita et al. 2003: 19). This premise suggests that:

Hypothesis 3: Because democratic leaders have a greater incentive than autocratic leaders to support public policies that benefit all citizens, democracies joined the Vienna Convention and Montreal Protocol sooner than autocracies.

Economic Vulnerability to Limitations or Bans on Substances

The interdependence of states is a particularly appropriate means for discussing cooperation on international environmental issues. State interdependence has two dimensions: sensitivity and vulnerability. Along the first dimension, “...sensitivity involves degrees of responsiveness within a policy framework—how quickly do changes in one country bring costly changes in another, and how great are the costly effects?” For the second dimension, “...vulnerability can be defined as an actor’s liability to suffer costs imposed by external events even after policies have been altered” (Keohane and Nye 1989: 12-13).

Building on these concepts, states may base their decisions to join and remain involved in international environmental agreements on two factors: a country’s ecological sensitivity toward the particular pollutant relative to other states, and its current and future vulnerability to the economic costs of pollution abatement. In terms of the ozone-protection treaty, countries that produced CFCs had to weigh the global benefits of repairing the ozone layer against the costs incurred by domestic interests such as chemical companies that either had to cease production of CFCs or spend money on researching and developing alternatives to CFCs.

Traditional political science literature proposes that states give their major domestic industries favorable consideration when formulating policy because their

industries' well-being significantly affects a country's overall economy. Thus, if a major industry opposes a policy because it will affect its profits, a country's policy will likely reflect this opposition. Whether called lobbying (in many democratic states) or clientelism (as is often the case in authoritarian countries), the influence of interest groups on state behavior is well documented. In capitalist societies, examination of this influence has been called the theory of economic regulation (Stigler 1971; Peltzman 1976; Becker 1983). According to this theory, interest groups compete for regulatory benefits from politicians by lobbying and applying pressure, and politicians grant regulatory benefits to interest groups in such a way as to maximize their political support. Clientelism, a special form of interest-group politics, is characterized by transactions between politicians and citizens in which material favors are offered in return for political support at the polls (Powell 1970; Lemarchand and Legg 1972). While lobbying takes place in the context of organized competition that generally attempts to affect regulatory actions, clientelism is characterized by the representation of narrow corporatist and local interests. In terms of the ozone-protection treaty, either lobbying or clientelism could cause a state to postpone ratification of the Vienna Convention or Montreal Protocol if the treaty appears to threaten domestic industry interests, suggesting that:

Hypothesis 4: States producing ozone-depleting substances regulated by the ozone-protection treaty were influenced by affected chemical industries to delay joining the Vienna Convention and Montreal Protocol until the later years of the agreements.

Event History Analysis of Time to Ratification

While static regression models such as cross-sectional studies have been used to examine *whether* an event occurs at a specific point in time, event history analysis allows researchers to answer questions revolving around the importance of *when* some event

occurs. The dependent variable in the analysis is time to ratification of the various treaty elements. Four independent variables represent global or domestic factors that are hypothesized to affect a state's time to treaty ratification.

To test the model of states' timing of Vienna Convention and Montreal Protocol ratification, data were collected for the dependent variable (the time from the opening of the Convention or Protocol for ratification to a state's ratification date), and the independent variables based on hypotheses 1 through 4 described above.

Dependent Variable

The empirical analysis focuses on cooperation in international environmental agreements. For the Vienna Convention and Montreal Protocol, a state is considered more cooperative if it ratifies the agreement within the first few years it is open and less cooperative the longer the period until ratification. Thus, the dependent variables in the analysis are duration variables indicating (1) the number of days after March 22, 1985, to the point at which a state ratified the Vienna Convention and (2) the number of days after September 16, 1987, to the point at which a state ratified the Montreal Protocol. The term "ratify" includes accession, acceptance, and approval as determined by the United Nations Environment Programme.

Independent Variables

Four independent variables were used to examine the time to treaty ratification: a country's economic status, how many international organizations and institutions a country had joined, a country's political regime type, and whether a country had produced the restricted chemical, in this case chlorofluorocarbons.

Status as Developing Country

This factor is a dichotomous variable designating a country's development. Data for this indicator variable were based on the World Bank's documentation of development indicators from 1985 to 2002. Data were coded 1 if a developing country and 0 otherwise.

Membership in International Organizations

This factor is a continuous variable denoting the number of international institutions a country has joined. A country was considered to be a participant if it is a member, an associate, or a *de facto* member. It was not considered a participant if it has been suspended from the institution. The data set was constructed by counting listings in the Central Intelligence Agency (CIA) *World Factbook* (Central Intelligence Agency 1985-2002).

Political Regime Type

This factor is a continuous variable ranging from -10 to 10. The data were derived from the Polity IV data set (Marshall and Jaggers 2002), which provides a single summary measure of the institutional characteristics of a country's government on a scale of -10 (purely autocratic) to 10 (purely democratic).

CFC Production

This factor is a dichotomous variable representing whether a country produced ozone-depleting substances (specifically, CFCs) from 1986 to 2002. Data were compiled by UNEP from information provided by the parties to the ozone-protection treaty. For a

CFC producer, data were coded 1 to the year that production ceases, with the remainder of the years as 0. Non-producing countries were coded 0 for all years.

Table 2 summarizes how the independent variables were expected to influence the length of time a state takes to ratify the Vienna Convention and Montreal Protocol and provides summary statistics for the variables.

Table 2. Summary statistics and hypothesized effects on time to ratification of the Vienna Convention and Montreal Protocol for Protection of the Ozone Layer

<i>Variables</i>	<i>Hypothesized Effect on Time to Ratification</i>	<i>Mean*</i>	<i>Standard Deviation</i>	<i>Minimum</i>	<i>Maximum</i>
Dependent Variable: Time to Ratification					
Vienna Convention		Sept 1991		June 1986	Nov 2002
Montreal Protocol		Oct 1991		Mar 1988	Nov 2002
Hypothesis 1: Developing Country	ratifies later	0.8	0.4	0	1
Hypothesis 2: International Institutions	ratifies earlier if many	37.4	14.2	0	91
Hypothesis 3: Political Regime Type	ratifies earlier if democracy	1.6	7.3	-10	10
Hypothesis 4: CFC Producer	ratifies later	0.1	0.3	0	1

*Analysis includes years 1985-2002

Methodology

Event history analysis is ideally suited for estimating the effects of factors on time until ratification. A proportional hazards model was applied to the timing of states' ratification of the Vienna Convention and Montreal Protocol. The proportional hazards model allows estimation of the effects of individual state characteristics on a duration without having to make assumptions about a parametric form for the distribution of the time until ratification, thus imposing fewer restrictive assumptions than do parametric duration models (Cox 1972; Box-Steffensmeier and Jones 1997, 2004). For a state with a vector of characteristics, X , the proportional hazards model assumes a duration (hazard) rate for the i th individual of the form

$$h_i(t) = h_0(t) \exp(\beta' x), \quad (1)$$

where $h_0(t)$ is an unspecified baseline hazard function and $\beta'x$ are the covariates and regression parameters.⁵ The hazard rate may be interpreted as the likelihood that an event occurs at any point, given that the event has not yet occurred.

Results of Event History Analysis

The independent variables were included in the proportional hazards model to assess their hypothesized effect on the timing of states' ratification of the Vienna Convention and Montreal Protocol (see Table 2 for a summary). Results of the duration modeling are presented in Table 3.

Table 3. Factors influencing the timing of state ratification of the Vienna Convention and Montreal Protocol for Protection of the Ozone Layer.

Variables	Coefficients		Standard Error		p-value		Percentage Change in Hazard Rate	
	Vienna Convention	Montreal Protocol	Vienna Convention	Montreal Protocol	Vienna Convention	Montreal Protocol	Vienna Convention	Montreal Protocol
Hypothesis 1: Developing Country	-0.99	-0.97	0.09	0.10	0.00	0.00	-62.79	-62.03
Hypothesis 2: International Institutions	0.07	0.06	0.01	0.01	0.00	0.00	6.96	6.55
Hypothesis 3: Political Regime Type	0.05	0.06	0.01	0.01	0.00	0.00	5.65	5.69
Hypothesis 4: CFC Producer	0.62	0.57	0.51	0.50	0.02	0.04	86.31	77.71

Log-likelihood (Vienna Convention) = -562.585; Chi-square (4) = 105.99; p < .001; number of cases = 1148

Log-likelihood (Montreal Protocol) = -562.073; Chi-square (4) = 104.35; p < .001; number of cases = 927

The overall fit of both models is good; the null hypothesis that the coefficients are jointly zero can be rejected at the 0.001 level. In an event history model, the coefficients indicate the magnitude of the effect and whether a particular variable increases or

⁵ The model assumes the hazard functions of all states differ only by a factor of proportionality (i.e., each state's hazard function follows exactly the same pattern over time, but the proportional hazards model puts no restriction on what this pattern can be). In other words, it puts no restriction on the $h_0(t)$ curve. Thus, the coefficient vector β can be estimated without specifying $h_0(t)$. Also, $h_0(t)$ can itself be estimated nonparametrically and, thus, with substantial flexibility. For comparison, the analysis was also run as a parametric model (i.e., Weibull model), and the results support the Cox model findings in that there was little difference between the results of the two models.

decreases the hazard rate. A positive coefficient means that states with these characteristics are likely to ratify the Vienna Convention and Montreal Protocol earlier, while a negative coefficient indicates later ratification. As is typical in these models, the coefficient divided by the standard error indicates whether the effect is statistically significant, and the p -values give the precise probability values. The signs and p -values from the analysis support Hypotheses 1 through 3 discussed in the previous section, while Hypothesis 4 is rejected by the analysis.

The last major column of Table 3 shows the percentage change in the hazard rate, which provides insight into interpreting the variables. For a dichotomous independent variable, the percentage change in the likelihood of experiencing the event in question is calculated as:

$$100[e^{(\beta_k*1)} - e^{(\beta_k*0)}] / e^{(\beta_k*0)}. \quad (2)$$

The interpretation for a categorical or continuous independent variable is similar:

$$100[e^{[\beta_k*(x+m)]} - e^{(\beta_k*x)}] / e^{(\beta_k*x)} \quad (3)$$

for a m unit change in the independent variable, x .

As shown in Table 3, for the dichotomous variable representing a World Bank developing country, there is more than a 60% decrease in the hazard rate, meaning that these countries are about 60% less likely at any given time to ratify the Vienna Convention and Montreal Protocol than a developed country. This result confirms the expectations from Hypothesis 1 that developing countries ratified the Vienna Convention and Montreal Protocol later than developed countries.

For the first continuous variable in the model, the findings indicate that joining more international institutions increases the hazard rate by about 7% for each new

organization or institution that is joined. An increase of one standard deviation in institutions joined (i.e., 14) results in a 98% increase in the hazard rate. This supports the expectation from Hypothesis 2 that joining more international organizations and institutions improved the likelihood that a state will ratify the Vienna Convention and Montreal Protocol earlier.

For the continuous variable representing political regime type, being a more democratic state increases the hazard rate by about 6% for each increment closer to democracy. An increase of one standard deviation (i.e., 7.3) in the direction of democracy results in a 44% increase in the hazard rate. This confirms the expectation from Hypothesis 3 that democracies tended to ratify the Vienna Convention and Montreal Protocol earlier than autocracies.

For the remaining dichotomous variable, the analysis indicates that states that had been CFC producers tended to ratify earlier than non-producers. Specifically, the hazard rate increases by about 86% for the Vienna Convention and by about 78% for the Montreal Protocol. This means that, at any given time, the instantaneous probability of ratifying the Vienna Convention if the state has produced CFCs is about 86% greater than that of a state that is a non-producer. For the Montreal Protocol, at any given time the instantaneous probability of a CFC-producing state ratifying the Montreal Protocol is about 78% greater than that of a non-producer. This result rejects the expectation from Hypothesis 4 that domestic interests such as chemical companies exerted considerable influence in delaying ratification of the Vienna Convention and Montreal Protocol.

Discussion

The event history model provided considerable substantiation for three of the four hypotheses. In addition, it indicates a possible tension between the hypotheses of satisfying domestic business interests and the actions of political leaders based on political regime type.

World Bank Developing Countries

Developing countries were expected to ratify the Vienna Convention and Montreal Protocol later than developed countries (Hypothesis 1). The event history analysis indicated that a country's lack of development in the global community is a significant handicap to early ratification of international environmental agreements such as the Vienna Convention and Montreal Protocol. Based on the results of the event history analysis, a World Bank developing country is about 60% less likely at any given time to ratify the Vienna Convention and Montreal Protocol than a developed country.

Although the debt crisis of the 1980s may have contributed to later ratification, it is likely that the lack of planning by the framers of the Vienna Convention for early and consistent assistance to developing countries was another major factor. While the Montreal Protocol included such provisions, it but did not specify immediate implementation of the measures. Incorporating a dedicated mechanism for assistance into initial agreement packages may provide sufficient encouragement for developing countries to commit early to the provisions of an international environmental agreement.

Joining International Institutions

Countries that joined many international institutions and organizations were expected to ratify the Vienna Convention and Montreal Protocol earlier than those that joined fewer of these institutions (Hypothesis 2). The findings indicated that the likelihood of early ratification increased by about 6 to 7% for each new organization or institution that is joined. An increase of one standard deviation in institutions joined almost doubled the likelihood of early ratification for both the Vienna Convention and Montreal Protocol.

The increased linkages and advantages of memberships in international institutions allow countries to participate in a variety of global initiatives, and participation in international environmental agreements is often part of membership privileges and responsibilities. This finding was applicable even if the environmental agreement had mandatory compliance requirements, such as those contained in the Montreal Protocol.

Political Regime Type and CFC Producers

The event history analysis also examined two competing hypotheses about the role of domestic politics in time to ratification of the Vienna Convention and Montreal Protocol. States were expected to encounter significant domestic industry resistance to ratification because the agreement initiated a process for later compliance requirements that would require chemical companies to reduce or eliminate production of CFCs in the early years of compliance (Hypothesis 4). However, the event history analysis indicated that states that have been CFC producers tend to ratify earlier than non-producers. This result rejects the expectation from Hypothesis 4 that domestic interests such as chemical

companies exerted considerable influence in delaying ratification of the Vienna Convention and Montreal Protocol.

Although the results of the analysis did not support Hypothesis 4, an underlying reason may be found in the premise of Hypothesis 3, that the actions of democratic leaders to provide good public policy lead them to early ratification of international environmental agreements. Other research has proposed that some of the characteristics of democracy, such as increased transparency, the importance of public opinion, and greater freedom for non-governmental organizations, tend to improve compliance with international environmental agreements (Jacobson and Weiss 1997). The ratification history of the ozone-protection treaty indicates that this may be the case.

During the early 1980s CFCs were being produced by only seventeen companies with operations in 22 countries, and about two-thirds of those countries were democracies or had democratic tendencies. Within the CFC production industry, DuPont, headquartered in the United States, was the world leader. By the late 1970s, when significant public attention had been directed to the possible dangers of CFCs for the ozone layer, several countries, including the United States, banned the use of CFCs as propellants and others passed voluntary limits. Although CFC regulation relaxed during the early 1980s, it was renewed in 1985 with reports of a linkage between a “hole” in the ozone layer over Antarctica and CFCs in the atmosphere. The threatening regulatory environment forced CFC manufacturers such as DuPont to accelerate their research. By mid-1986 DuPont announced that substitute chemicals could be commercialized and marketed at prices that would be affordable for many applications. Industry opposition to

ratification of the Vienna Convention, which contained no compliance requirements, waned (Haas 1992a; Andersen and Sarma 2002).

Although many CFC manufacturers relented in their opposition to the Vienna Convention, resistance began again with the 1987 Montreal Protocol, which contained significant restrictions incorporated into the agreement. This renewed resistance indicates that the efforts of domestic business groups to influence decisions of political leaders strengthens or ebbs depending on the perceived impact on an industry's profit margins. However, CFC producers were unable to impede significantly the ratification of the Montreal Protocol.

Conclusions

The event history results support Milner's arguments that domestic factors play an important role in a country's ratification of an international agreement. The results also highlight the importance of timing in treaty ratification. First, states with more developed economies ratified the Vienna Convention and Montreal Protocol earlier than developing countries. Second, states that joined many international institutions and organizations ratified earlier than countries that joined few international institutions. Third, states with democratic tendencies ratified earlier than countries with autocratic tendencies. Finally, states producing the substance limited or banned by the international environmental agreement, in this case CFCs, ratified earlier than non-producing countries.

The event history analysis results reflect patterns that emphasize the importance of domestic politics in the decisions states make about accepting international environmental agreements. In particular, the results indicate a tension between the objectives of democratic governments to provide public goods and the efforts of business

interests to bend domestic politics to favor their economic needs. In the case of the ozone-protection treaty, the timing of ratification for those countries producing CFCs reflected a turnaround in the chemical industry when companies realized that international compliance that treated all countries equally was preferable to unilateral domestic regulation that might jeopardize their position in the international market. This explanation demonstrates Milner's emphasis on in-depth analyses of a country's domestic politics in order to understand a nation's decisions about international treaties. While event history analysis provides information about trends in quantitative data, it cannot explain *why* the trend exists. It is only through a more qualitative analysis of countries producing CFCs that a substantial reason for this attribute could be ascertained.

Although a connection between a state's domestic interests and its decisions to join international environmental agreements may be inferred from the event history results, the analysis described in this chapter cannot confirm the connection. As Milner has explained, determining the reasons for a nation's ratification of an international environmental agreement requires an in-depth analysis of that country's domestic politics surrounding the treaty acceptance. The next part of the dissertation analyzes this connection by examining the domestic politics surrounding negotiation and ratification of the ozone protection treaty in the United States.

PART TWO. CASE STUDY

When the Vienna Convention and Montreal Protocol were negotiated from 1985 to 1987, the United States was the leading producer of chlorofluorocarbons, the first chemical to be considered for reduction or elimination. Yet the United States ratified the Vienna Convention, a framework document, seventeen months after it was available for ratification and the Montreal Protocol, which contained compliance requirements, seven months after its availability for ratification. Why were the Vienna Convention and Montreal Protocol ratified so quickly? And why did the United States wait four to six years to ratify the final two amendments to the Montreal Protocol?

The three chapters in this section investigate the tension between the desire of democratic leaders to deliver public goods and domestic groups that mobilize to protect vested interests. In addition, the chapters examine the unique role of scientists as information providers for policy issues dealing with science and technology.

Chapter 3 provides the background for an analysis of domestic politics and foreign policy making. It reviews Helen Milner's theories about the influence of domestic politics on foreign policy and examines the results of international policy making from the perspective of domestic policy-making theories derived from the American politics and public policy schools of research. The chapter also introduces the actors that were important in development of the U.S. negotiating positions for the ozone protection treaty and in advancing the domestic ratification process.

Chapter 4 examines the role of the executive branch in treaty negotiations. A key observation derived from this chapter is that, in addition to the strategic role of the President and the State Department in treaty negotiations, other domestic agencies and

processes that at first seem tangential are in play. Formulation of the U.S. position taken to international treaty negotiations often begins several years before the actual diplomats' meeting, with domestic agenda setting and policy formulation and implementation exerting major influences on the eventual details of the U.S. position. The U.S. contingent to the ozone-protection treaty negotiations generally consisted of a chief negotiator from the State Department, along with representatives from such agencies as the Environmental Protection Agency and the National Aeronautics and Space Administration, and occasionally members of the House of Representatives or Senate. In addition, representatives from interest groups such as the Chemical Manufacturers' Association, Friends of the Earth, Greenpeace, International Chamber of Commerce, Natural Resources Defense Council, and World Wildlife Fund often attended as observers.

Chapter 4 is divided into six parts, with each section examining negotiation of one of the six parts of the ozone protection treaty (i.e., the Vienna Convention and Montreal Protocol and its four amendments). The focus of each section is to analyze the contributions of interest groups to the U.S. position in international negotiations. Interest groups maintained contact with key players in both the executive branch and the legislature in their attempts to influence treaty negotiations. The chapter concludes with observations about the importance of interest group participation and scientific information in the negotiation process. The purpose of the research on treaty negotiations is to determine the effects of interest group pressure on the executive branch's desire to provide a public good in the form of a healthy ozone layer.

Chapter 5 examines the role of Congress in treaty ratification. Because of the legislature's (i.e., the Senate in the United States) key role in treaty ratification, it might seem that the executive branch and interest groups would promote their positions by lobbying Congressional representatives that are important to the ratification process. However, the analysis shows that if the executive branch has gained consensus from key domestic interest groups while developing its international negotiating position, Senate ratification is a relatively simple and quick process. Conversely, if the United States enters international negotiations before gaining domestic consensus, the ratification process can take years before all issues are finally resolved.

3. AMERICAN FOREIGN POLICY AND DOMESTIC POLICY MAKING: THE OZONE PROTECTION TREATY

Part One (Chapter 2) examined factors that are correlated with ratification in international environmental agreements. However, the conclusions from that analysis could do no more than speculate on causation related to those factors. This chapter looks behind the scenes of the formal negotiation and ratification processes to provide an overview of the forces that contribute to the position a country takes in international negotiations.

Milner's Interests, Institutions, and Information

In *Interests, Institutions, and Information*, Helen Milner (1997) refines the concept of two-level games previously advanced by Robert Putnam (1988) and others to explain the interdependence of domestic and international politics. She takes as her central argument that “cooperation among nations is affected less by fears of other countries’ relative gains or cheating than it is by the domestic distributional consequences of cooperative endeavors” (p. 9). Thus, she indicates that acceptance of an international treaty depends more on the relative political and economic strengths of those who stand to gain or lose domestically than it does on the actions of other countries in accepting, rejecting, or complying with a treaty.

This argument is key to understanding the actions of nations in cooperative endeavors. If states were unitary actors, they would all make the same decisions in essentially the same time frames given the same circumstances. Yet an examination of treaty acceptance reveals that some nations ratify a treaty almost immediately while others take several years or even decades to make the same decision. A few nations even

become long-term holdouts with little likelihood of ever ratifying. If international negotiations are in fact played at two levels, then examining the process of domestic policy making becomes critical in understanding why nations do or do not cooperate in international agreements.

If the assumption of unitary actors in the international arena is relaxed, as Helen Milner argues, then understanding the issues of treaty acceptance, rejection, and compliance become more complicated. Individual nations are no longer regarded as single units but are ordered in a way that is less than anarchy and different from hierarchy. Milner calls these forms of government polyarchies and indicates that they lie somewhere on the continuum between the two poles of anarchy and hierarchy. Polyarchies are distinguished from forms of government that are anarchies or hierarchies by the sharing of decision-making responsibilities, with that sharing often being unequal.

Milner argues that nations are not actors in the international arena but instead are agents of their domestic politics. While nations in international negotiations may give all appearances of being in complete control of their negotiating positions, this portrayal is skewed because states' actions on the international playing field are influenced and shaped by what they will be able to sell to their citizens on the domestic front. In other words, the negotiating position a nation portrays on the international front is the product of domestic politics. Leaders must take into account domestic agendas, formulated policies, and implementation and evaluation of resulting legislation and regulations when planning their states' position in international negotiations. When acting on the international front, leaders must contend with underlying domestic agendas, legislation, and policies that have lagged behind international agendas in some areas and leaped

ahead in others. Thus, as Milner postulates, a nation's leader must take into account the domestic policy preferences of her country's legislators and interest groups along with the nation's domestic policy institutions in determining what international agendas will sell on the domestic front. Understanding the importance of domestic policy making to international negotiations requires an examination of the ways that policies are crafted in the domestic arena.

Milner relaxes the assumption that states are unitary actors and uses rational choice theory to develop testable hypotheses about when and under what terms countries are able to achieve cooperation on international agreements. The model is based on three factors that determine the level of cooperation that a country can achieve in international negotiations: "...the policy *preferences* of domestic actors, the *institutions* for power sharing among them, and the distribution of *information* among them" (p. 11). Fewer differences in policy preferences among the actors lean the political structure more toward the pole of anarchy in which states are unitary actors. However, a concentration of decision-making authority with a single actor or small group of actors leans the political structure toward hierarchy.

Likewise, anarchic tendencies are tempered by the distribution of information among the groups in the political structure. Within an issue area, information controlled by a single group or only a few groups leans the domestic political structure more toward the pole of hierarchy. A distinguishing feature of polyarchy is that the distribution of interests, institutions, and information interact to prevent total anarchy or hierarchy. Decisions in a polyarchy are the product of a diversity of interests, the institutional

structure of the domestic political arena, and the quality and quantity of information distributed among the relevant actors.

According to Milner, the policy preferences of the domestic actors are key factors in understanding international cooperation. Two conditions describe the structure of preferences: (1) whether the domestic legislature is hawkish or dovish (i.e., less favorable or more favorable to the international agreement) compared to the executive's preferences, and (2) divided government (i.e., the degree of divergence between the executive's policy preferences and those of the legislature). Based on these factors, Milner concludes that "divided government and increasing divisions in it are key problems for any agreement. Greater divisions mean less chance of cooperation" (p. 132).

Political institutions matter because they indicate the relative power that domestic actors have over policy making. The distribution of power between the executive and the domestic legislature on matters such as agenda setting, amendment, ratification or veto, referendums, and side payments is a major determinant in how international agreements are negotiated. Control over these powers gives actors influence in the legislative process. The probability of agreement is greatest when legislative powers are concentrated in the hands of the most dovish actor. Milner concludes that "the interaction of preferences and institutions [may] undermine the possibility of cooperation. In countries or on issues where legislative power is concentrated in the hand of the most hawkish player domestically, cooperation will be least likely. Political institutions also variously affect the probability of successful cooperative agreement....Any change in these domestic institutions during or after the international negotiations spells trouble for the international agreement" (p. 132).

Milner indicates that interest groups perform two functions in the process of international cooperation: (1) as pressure groups with the ability to influence the executive and legislature through campaign contributions and voter mobilization, and (2) as information providers to political actors. In the first role, Milner views interest groups in terms of economics. Interest groups enter the international arena seeking treaty terms that favor them economically—they will pressure the executive and legislature to embrace policies that have a positive effect on members' incomes and fight against those that affect members negatively.

Milner considers the second role of interest groups to be crucial. Interest groups distribute information to political actors, especially legislators, that affects the ways international agreements are negotiated. Information provided by interest groups thus has an implicit role as pressure on political actors. The distribution and content of information provided by interest groups serve as signals to alert legislators to the consequences of the terms of international treaties.

Milner notes that (1) incomplete or asymmetric information among the policy makers about an agreement when no interest groups endorse it makes cooperation less likely and gives the executive an advantage, and (2) endorsement by at least one "respected" interest group is necessary for cooperation when information is incomplete or asymmetric and gives the legislature an advantage. She concludes that "lack of endorsement from at least one major interest group involved in the issue reduces the likelihood of cooperation in that area. The role of domestic information providers is essential" (p. 132).

The major thrust of Milner's *Interests, Institutions, and Information* is a pessimistic outlook about international cooperation in that "domestic politics makes cooperation even less likely than does a pure international game among unitary states" (p. 258). Milner does, however, provide advice for policy makers to help overcome the problems she has noted in achieving international cooperation: study the domestic *politics* in all countries involved in the negotiations, try to understand the domestic *signals* coming from all parties in the negotiations, and determine each country's alternatives to achieving agreement.

Interests, Institutions, and Information in the U.S. Context

Milner identifies three basic sets of actors in domestic politics. The first two groups are dictated by a government's political structure: an executive and a legislature. Interest groups form the third group of actors. In a polyarchy, interest groups serve the function of attempting to influence the first two sets of actors, most importantly by providing key information, including data about the issue itself and their memberships' policy preferences.

The U.S. Constitution served to create a polyarchical form of government in the United States. The three branches of government share power and authority over decision making but do so unequally. For example, the Senate has more authority in foreign affairs because it alone has the Constitutional authority to decide whether the President may ratify international treaties. The House of Representatives and the Senate share the power to make domestic laws, although revenue bills originate in the House of Representatives. The creation of implementing rules derived from Congressional legislation is the responsibility of a department or agency under the President's jurisdiction. Various

interest groups lobby to insert their policy preferences into political decisions. House and Senate committees and subcommittees hold hearings to gain information about a particular issue, but the completeness of the information is often tempered through the selection of witnesses and the nature of the witnesses' preferences about the outcome of Congressional legislation.

Milner (1997) indicates that agenda setting is one of several legislative powers that can be a major determinant in how international agreements are negotiated. Agenda setting, when concentrated in the hands of the most dovish actor, increases the probability of cooperation in international agreements.

Public policy researchers consider agenda setting as part of a framework consisting of several steps or stages that is often used to examine domestic policy making. The most common framework for the policy process encompasses four stages (Lasswell 1951; Easton 1965): (1) agenda setting, (2) policy formulation, (3) policy implementation, and (4) policy evaluation/change/termination. Milner (1997) refers to two of these stages, agenda setting and policy formulation, in discussing legislative powers, emphasizing the ways that the legislature is able to set agendas and formulate policies that are directly related to ratification of international agreements. In the U.S. context for international environmental agreements, however, all four stages play a part in the ways that the United States determines its position for international negotiations.

Kingdon (1997) provides an accounting of the ways that issues become (and do not become) items on the policy-making agenda. Issues reach the decision-making agenda through three separate streams that must come together in a window of opportunity. The *problems* stream depends on salience. Issues are more likely to gain

attention if the problem has increased, is perceived with greater intensity, or can be better identified or addressed with newly publicized technology. The *politics* stream is more dependent on actors. Issues may come to the decision-making agenda because there has been a change in political climate (perhaps induced by interest groups) or a change in political actors. Both types of changes may provide actors with the desire to bring certain issues to the forefront for political (electoral) or personal (status) reasons. The *policies* stream depends on expertise. Issues reach the decision-making agenda if experts indicate that there are potential, viable solutions to the problem. Although Kingdon identifies three separate streams, he indicates that policy is not made unless the streams come together in a window of opportunity, guided by a policy entrepreneur that has been waiting for the opportunity to promote the issue.

Political science researchers have worked for many years on an economics-based, rational-choice model to explain decision-making behavior in policy formulation. Rational decision making follows a process that (1) identifies an actor's goals, (2) identifies alternatives, (3) determines consequences of the alternatives, and (4) within constraints, makes a value-maximizing choice. The rational choice model addresses policy formulation as the product of informed choice—all alternatives are weighed and the option chosen with the best chance of realizing one's goals by taking account of both benefits and costs.

The adaptation of this theory from economics to political science began in the second half of the twentieth century (Buchanan 1967; Riker 1982). A basic premise of rational choice is that a "political person" (or group) and an "economic person" (or group) are embodied in the same entity. The entity that votes is also the consumer of

economic goods and is concerned with opportunity costs. In both roles the entity selects preferences based on rational self-interest and acts purposefully to bring about outcomes that reflect wants and desires (Cochran and Malone 1999). Rational choice theory assumes that individuals are as rational and self-interested in the political sector as they are in the economic marketplace.

In the United States, the Constitution empowers the Senate to oversee the ratification of international treaties. However, legislation to implement international treaty terms is a joint power of the Senate and the House of Representatives. For this reason, the House is an implicit but very important partner in assuring that the United States is able to comply with international treaties it has ratified. Thus, both the House and Senate are likely to be agenda setters and formulators of domestic legislation that directly affects treaty negotiation and ratification.

Although Milner does not address the policy-making stages of implementation and evaluation, in the United States the Environmental Protection Agency (EPA) is directly responsible for promulgating domestic environmental regulations, including those that implement legislation related to international environmental agreements. Implementation has been described as "...the carrying out of a basic policy decision, usually incorporated into a statute but which can also take the form of important executive orders or court decisions" (Mazmanian and Sabatier 1989, p. 20). The central issue in policy implementation concerns what happens between the establishment of a policy and its impact on the world of action (O'Toole 2000). Included in this conception are the actors within the policy arena, along with their motives and incentives.

The Mazmanian and Sabatier framework of policy implementation (1981; 1989) assumes that policy implementation is one of the sequential policy stages. The model is top down, meaning that it focuses on the objectives of the original policy framers as contained in legislation, executive orders, and judicial decisions. Mazmanian and Sabatier originally crafted the framework for regulatory policy, and the model has been commonly used in examining environmental policy implementation.

Eugene Bardach compares policy implementation to “an assembly process.” He views Congressional legislation as the blueprint for a large machine designed to create policies. A significant task for a government bureaucracy is to put the machine together and create a policy “that has to turn out rehabilitated psychotics or healthier old people or better educated children” (Bardach 1971, 36). In the case of the EPA, the task is to create policies based on Congressional legislation that remediate environmental crises or prevent environmental degradation from occurring.

Both the U.S. Congress and the EPA at various times have assumed the task of policy evaluation to determine whether actions should be modified or terminated. According to the advocacy coalition approach to policy making, policy change over time is a function of three sets of processes: (1) interactions of competing advocacy coalitions within an issue area or policy subsystem; (2) changes external to the subsystem in socioeconomic conditions, system-wide governing coalitions, and output from other subsystems that provide opportunities and obstacles; and (3) effects of stable social structures and constitutional rules on the constraints and resources of the subsystem actors. Policy change is a function of both competition within the subsystem and events outside the subsystem (Sabatier and Jenkins-Smith 1993).

Policy termination has been described as “the deliberate conclusion or succession of specific governmental functions, programs, policies or organizations” (deLeon 1977). Political scientists have observed that “...terminating policies...is such a formidable task that most public programs, in spite of intentions to the contrary, become virtually immortal” (Rosenbaum 1998, 54-55). Several reasons have been cited for the difficulty in modifying or terminating policies. Policies come about because they have supporters (both legislators and interest groups and, occasionally, the executive), and often those supporters are so committed to the original policies that reflect their preferences that they resist changes. Conversely, policy critics may not be as committed to policy change or as well organized as the supporters—maintaining the status quo may be easier than fighting for policy change or termination. The authority for implementing a policy may be dispersed through several parts of the bureaucracy, making it difficult to determine how to approach changes or policy termination. In addition, termination has an unpleasant connotation of failure, and few bureaucrats or legislators are willing to be associated with a failed program (Anderson 2000).

While the stages of the domestic policy process are often represented as an orderly and sequential process, in actuality they are not fixed temporally. The stages framework does not accurately describe the observable policy process. Although some researchers using the textbook approach have acknowledged occasional deviations from the generally accepted stages, Jenkins-Smith and Sabatier (1993) indicate that “a great deal of recent empirical study suggests that deviations may be quite frequent: Evaluations of existing programs often affect agenda setting, and policy making occurs as bureaucrats attempt to implement vague legislation” (p. 3). This criticism of the stages framework

becomes apparent in the actions of the U.S. Congress and executive agencies detailed in the following two chapters on negotiation and ratification of the international ozone protection treaty.

Limitations of a Unitary Executive Assumption

Although Milner (1997) relaxes the unitary actor assumption for states acting in the international arena so that the influence of a state's domestic politics may be examined, she maintains a unitary actor assumption for each state's executive. The term "executive" incorporates the entire executive branch of government, which Milner acknowledges as a simplifying assumption: "Politics within the executive branch may be as complex and consequential as politics between it and the other branches" (p. 34).

The executive is assumed to be the only decision maker for international issues. Milner justifies this assumption in three ways: the executive is *primus inter pares* with his cabinet, so cabinet departments need his backing for all actions; each cabinet head is the expert in a particular issue area and is virtually the major (or only) decision maker in that area; and the median cabinet member (i.e., the one that casts the deciding vote on a particular issue) may be considered as representative of the executive. Milner indicates that in her analysis she uses the first justification, so that the executive ultimately allows cabinet members' decisions to proceed.

Milner's portrayal of the executive as a unitary actor omits two features of U.S. domestic politics that are important in the formulation of a U.S. position for international treaty negotiations. First, the State Department may not be the only organization within the President's administration that has a vested interest in the results of international negotiations. Shared governmental interests are especially important in international

environmental agreements. Second, the assumption of an executive as a unitary actor is impacted when the executive changes during the course of treaty negotiations or ratification.

The State Department, the Environmental Protection Agency, and Formulation of U.S. Negotiating Positions

The U.S. Constitution gives the President the "...Power, by and with the Advice and Consent of the Senate, to make Treaties..." (Article II, Section 2). The State Department in the President's cabinet is the lead U.S. foreign affairs agency and is charged with the task of formulating the U.S. position and representing the United States in international treaty negotiations.

In terms of international environmental agreements, Milner's portrayal of the President's role as supporter of State Department decisions does not adequately convey the way that the U.S. position in international negotiations is actually formulated. The State Department represents the United States and its President in international diplomacy concerning economic, trade, and security issues, including representing the United States in all treaty negotiations. International environmental agreements comprise only a small portion of treaty negotiations in which the State Department participates.

Conversely, the EPA's main function is to implement Congressional legislation through domestic environmental regulations. Because compliance with international environmental agreements requires domestic legislation and implementation, the EPA regularly serves as advisor to the State Department in international environmental issues.

The EPA was formed through President Nixon's Reorganization Plan No. 3 of 1970. Nixon's plan was designed to concentrate in a single agency "a variety of research, monitoring, standard-setting and enforcement activities ... scattered through several

departments and agencies” (Nixon 1970). The EPA is responsible for promulgating regulations enforcing domestic environmental laws. For stratospheric ozone protection, the EPA is responsible for regulations based on the Clean Air Act of 1970 and its subsequent amendments.

President Nixon’s 1970 reorganization plan designated the EPA as an independent agency but at the same level as a Cabinet department. One of his cited reasons for this designation, which opposed his usual conviction of not creating new independent agencies, was to have an “impartial arbiter” among federal agencies that had vested loyalties in promoting their primary missions (e.g., transportation, health, defense, or other important missions). He believed that a separate, independent agency was necessary to cut across jurisdictional loyalties and arrest “environmental deterioration ... [in] the quality of life in our country and the world” (Nixon 1970).

The first EPA Administrator, William Ruckelshaus, set the tone for his agency by immediately stating policy preferences. Five days after the EPA was established, Ruckelshaus delivered the keynote address to the International Clean Air Congress in which he declared that he and the EPA had “no obligation to promote commerce or agriculture.” He placed the agency directly in the position of governmental defender of the environment, with an EPA historian noting that Ruckelshaus expected the agency to promote the “‘development of an environmental ethic’ among businessmen and citizens alike” (Lewis 1985). Environmental groups often use the EPA’s policy preferences to justify their crusades against industry over environmental degradation.

The EPA has historically provided technical expertise to the State Department in developing the U.S. negotiating position for international environmental treaties and in

understanding treaty terms involving scientific information. The EPA's Office of International Affairs was one of the original subdivisions established within the EPA in 1970. In 1989 its chief official was elevated to the position of Assistant Administrator, requiring Presidential appointment and Senate confirmation, to acknowledge the office's expanding role in international environmental affairs.

The State Department has a difficult task in formulating U.S. positions for international environmental agreements. The Department has preferences of its own, derived from its extensive experience in negotiating trade agreements and alignment with the U.S. business sector. The State Department's reliance on the EPA for scientific expertise also exposes the Department to EPA's policy preferences, which favor repair and preservation of the environment, often with little consideration for the economic consequences placed on industry.

The President is seldom involved in the day-to-day activities required to formulate negotiating positions and thus relies on briefings by State Department officials to understand how a position is developed. Unless the President has a reason for giving particular attention to an international environmental issue, the U.S. position reflects a melding of State Department and EPA preferences more than it does those of the President. Milner's simplification of the executive as unitary actor misses much of the interactions among government departments and agencies, especially in the formulation of negotiating positions for international environmental agreements.

Changes in Administration

Notwithstanding the fact that treating the executive as a unitary actor omits the byplay among the executive's administration, the assumption also fails to acknowledge

the possibility of a change in administration during treaty negotiation or ratification. A change in administration could mean different preferences, even if the political party does not change. A new President could be more hawkish or dovish than her predecessor. More importantly, a change in administration during treaty negotiations could mean a change in preferences that completely reverses previous hawkish or dovish stances.

Many decisions in negotiating and ratifying an international agreement can be impacted by a change in administration. For example, the executive branch has considerable latitude in executing the ratification process. Once a treaty has been negotiated, the State Department submits it to the President, who in turn determines when to submit it to the Senate for advice and consent. With the President's concurrence, the State Department may choose to withhold submission to the President to address any questions that may arise subsequent to the international negotiations. After the President receives a treaty from the State Department, he may transmit it to the Senate immediately if he believes consent is imminent. If she is uncertain that it will move out of the Senate Foreign Relations Committee or receive a two-thirds Senate majority approval, she may delay submission until conditions are more favorable. Once a treaty receives Senate approval, the ratification instrument must be signed by both the President and the Secretary of State. The President and Secretary of State typically sign the ratification instrument immediately and forward it to the treaty governing body; however, they are under no legal obligation to do so (Congressional Research Service 2001). A condition that might preclude the President from signing and forwarding a treaty instrument would be a change in Presidents between submission of a treaty to the Senate and its subsequent

Senate ratification—an incoming President might not be a proponent of a treaty already submitted to the Senate by an outgoing President.

The assumption of the executive as a unitary actor does not account for the possibility of changes in administration during a lengthy negotiation and ratification process. Transition to another President, regardless of whether the political party changes, means that new chief officials could be installed in the State Department and the EPA. Even if new officials have essentially the same dovish or hawkish tendencies as their predecessors, there is a learning curve that must be overcome before the treaty process can move forward. If the new officials have different policy preferences than their predecessors, the entire treaty process might need to be revisited.

Unified and Divided Government

Milner (1997) indicates that although both executives and legislators have the same basic interest—to retain their political offices—their preferences on policies that will appeal to the voting public and help the politicians accomplish this goal may be decidedly different. Differences between the policy preferences of the executive and the legislative majority create divided government, and the more these preferences diverge, the more divided government is.

Milner notes that divided government is essentially a feature of presidential systems of government. The most obvious occurrence is when the President's political party does not hold a majority in the legislature. Opposing political parties are almost automatically assumed to have different policy preferences, but divided government can also occur if the same political party controls both the executive and the legislature and

either party discipline is low or the two political agents have differing policy preferences because of a difference in constituencies.

Pervasive divisions in government favor the legislature's preferences over the executive's in the terms of international agreements, but deep divisions make cooperation in international agreements less and less likely. Deep divisions in a country's government also undermine the country's international bargaining strength because other nations do not readily trust it to fulfill its international commitments.

Milner describes a country's executive as the agenda setter in the international treaty negotiations and the legislature as a ratifying element (p. 73):

In most countries the executive and the legislature share decision-making powers. The executive branch has the power to initiate policies vis-à-vis other countries; the executive can set the agenda in foreign affairs to a considerable extent. To negotiate agreements with foreign countries and to implement foreign policies, however, the executive often needs a vote of confidence from the legislative branch....

The Constitution specifies the responsibilities of the President and the Senate for U.S. involvement in international treaties. It is less specific about other abilities Congress may have in influencing international treaty negotiation and ratification.

The President and the Senate Foreign Relations Committee

When the President submits a treaty to the Senate for its ratification approval, the first Senate committee that reviews the agreement is the Committee on Foreign Relations. The Senate Foreign Relations Committee is one of the oldest and historically one of the most powerful of the Senate committees. Since its founding in 1816, six U.S. Presidents and nineteen Secretaries of State have served on the Committee (U.S. Senate Committee on Foreign Relations 2000). The Standing Rules of the Senate list nineteen issue areas

over which the Foreign Relations Committee has jurisdiction, including treaties and executive agreements (Rule XXVI.2, Rule 1—Jurisdiction, adopted Feb. 12, 1999).

Until relatively recently, the majority of the Foreign Relations Committee's work involved treaty approval. In recent years, the Senate and consequently the Foreign Relations Committee have considered an average of 50 treaties per Congressional session. However, this number is down from the early to mid-1900s. After World War II, Presidents increasingly turned treaty-like negotiations into executive agreements that did not require Senate approval (U.S. Senate Committee on Foreign Relations 2000).

In general, the Foreign Relations Committee deals expeditiously with treaties after they have been submitted to the Senate. The importance of speedy consideration for submitted treaties is reflected in the Committee's Standing Rules (Rule 9), which state that the Committee should conduct a public hearing on each treaty "as soon as possible after its submission by the President."

During the first 75 years of the twentieth century, the Senate Foreign Relations Committee was considered a driving force in shaping U.S. foreign policy and was one of the premier committees on which to serve in the Senate. In recent years, the Committee has been viewed as having lost its effectiveness. External causes for this loss include the divisive nature of the Vietnam War and Presidential bypassing of Congress during the Iran-Contra events coupled with the increasing use of executive agreements (Lindsay 1994).

While external considerations may have added to the decline in prestige of the Foreign Relations Committee, internal forces may have played a larger role. The 1970s and 1980s ushered in a time of posturing between "dovish" Democrats and "hawkish"

Republicans on the Committee. In addition, the Chair position turned over four times in sixteen years, contributing a lack of leadership to an already unsettled Committee.

Senator Claiborne Pell (D-RI) was able to maintain the Chair position from 1986 to 1994 (during consideration of the Montreal Protocol and London and Copenhagen Amendments), but his tenure has been characterized as weak and ineffective (Lindsay 1994).

In the late 1990s the Foreign Relations Committee became more proactive in regaining its former power. Under Chair Jesse Helms (R-NC), the Committee was instrumental in overseeing the restructuring of U.S. foreign policy institutions to reflect the end of the Cold War. In 2000 Helms and Committee member Joseph Biden (D-DE) brokered a deal in which the United States paid its overdue United Nations payments in return for the U.N.'s agreement to implement structural reforms within its organization. The Foreign Relations Committee made its first-ever visit to the U.N. Security Council in 2000, and in return the Security Council visited the U.S. Congress for a series of informational meetings hosted by the Senate Foreign Relations Committee (U.S. Senate Committee on Foreign Relations 2000).

The Senate Foreign Relations Committee is essentially the “gatekeeper” to the Senate for consideration of international treaties. Thus, the President must anticipate the policy preferences of the Foreign Relations Committee as the first hurdle in achieving treaty ratification. If the President’s preferences are not compatible with the Committee’s, the treaty could remain in the Senate Foreign Relations Committee indefinitely.

The President and the Senate

The U.S. Constitution states that the President “shall have Power, by and with the Advice and Consent of the Senate, to make Treaties, provided two-thirds of the Senators present concur” (Article 2, Section 2). When the Constitution was drafted, the phrase “advice and consent of the Senate” was taken to mean that the Senate should be actively involved in the negotiation process. As the Senate enlarged when more states were added to the Union, Senate participation in the negotiation process became unwieldy and Presidents abandoned the practice of regularly getting the Senate’s advice and consent on detailed questions prior to or during negotiations. Instead, Presidents began to submit treaties to the Senate after negotiations were completed (Congressional Research Service 2001).

Although individual Senators sometimes play a part in the initiation or development of a treaty within the negotiation process, the current Senate role in treaty development is to judge whether the United States should ratify completed treaties. The Senate’s advice and consent pertains to the question of Presidential ratification. When the Senate considers a treaty for ratification it may approve it as written, approve it with conditions, reject and return it, or prevent transmission of the ratification instrument by withholding approval (Congressional Research Service 2001). Rather than formally rejecting a treaty, the Senate has more often allowed a treaty to remain indefinitely in the Foreign Relations Committee if not enough votes were expected to allow its passage. Eventually, unapproved treaties are replaced by other treaties, amended by protocols and then approved, or withdrawn by or returned to the President (Congressional Research Service 2001).

The Senate historically has given its advice and consent unconditionally to the vast majority of treaties submitted to it (Table 4). In some instances, the Senate has approved treaty ratification with conditions, and the President has usually been able to complete negotiations within the Senate stipulations.

Table 4. Fate of Treaties Submitted to the Senate, 1789-1999 (after Lindsay 1994, Table 2)

	Number	Percent of All Treaties
Treaties approved by the Senate that entered into force	1,627	90.1
Treaties that did not enter into force because of Senate action	179	9.9
a. Not acted on by the Senate	(118)*	(6.5)
b. Rejected by the President because of changes made by the Senate	(43)	(2.4)
c. Rejected by Senate vote	(18)	(1.0)

Sources: Congressional Research Service 1987, 2001; U.S. Senate Committee on Foreign Relations Various years.

Note: * Treaties that were withdrawn because the Senate never took action on them or which had been pending more than five years as of 1 January 1993.

The Senate has only rarely rejected a treaty. The most notable instance was the 1920 Treaty of Versailles, which was ultimately rejected because President Woodrow Wilson refused to include the Senate in formulating the U.S. position for treaty negotiations. The Senate also rejected four treaties between 1920 and 1999. The Senate rejected the Treaty on General Relations with Turkey in 1927 because there was controversy following World War I about the status of previous similar treaties with Turkey and whether the new treaty would effectively address the rights of U.S. citizens in Turkey (Turlington 1926). The St. Lawrence Waterway Treaty with Canada was rejected in 1932 because of questions related to states rights (i.e., the State of New York) versus federal rights (Anderson 1932). The Senate refused a treaty in 1935 that would have required the United States to comply with the Permanent Court of International Justice. The rejection came at a time when Congress was exhibiting isolationist tendencies while

conflict in Europe escalated. A majority in Congress believed that the President had too much power in foreign affairs and especially disliked the link between the Permanent Court of International Justice and the League of Nations (Lindsay 1994).

The Senate rejected the Comprehensive Nuclear Test Ban Treaty in 1999, with Democrats attributing the Senate vote itself to partisan politics. Senator Trent Lott (R-MS) indicated that the Senate rejected the treaty because it believed it hindered the United States from maintaining its nuclear arsenal while not providing sufficient safeguards to prevent other nations from developing or improving nuclear weapons capabilities. Democrats, however, insisted that the treaty would have been ratified if the Republican majority had not rushed its consideration in the Senate (Lehrer 1999).

The remaining rejected treaties (14 from Table 4) were of little consequence to U.S. foreign policy (Lindsay 1994).

The President and the Legislature

Milner (1997) indicates that for the President, “bringing home an unratifiable agreement is likely to be costly both domestically and internationally. The executive will thus need to anticipate the reaction of the legislature to any proposal it accepts internationally and make sure that it is acceptable domestically” (p. 73). While the Constitution does not explicitly give the House of Representatives a role in the international treaty process, over the years both houses of Congress have acquired implicit powers over foreign relations that are not clearly articulated in the Constitution. For example, both the House and the Senate have the authority to initiate legislation that would effectively promote or diminish a U.S. position in international negotiations. These powers affect the treaty process in two ways. First, the President’s officials would be

more likely to include certain terms in a negotiating position if they believed Congressional passage of legislation implementing those terms was imminent. Conversely, officials would be less likely to include treaty terms they believed would not be supported by domestic legislation. Second, Congressional endorsement of a U.S. position can have a positive impact on international negotiations. Many nations follow U.S. leadership in international affairs, and Congressional endorsement is a good indication that the United States will follow through on its commitments. Conversely, failure of Congress to endorse a U.S. negotiating position can have a negative effect on U.S. achievement of its goals in an international treaty.

The legislature has control over the U.S. budget and determines funding amounts for both domestic and foreign policies and activities. With the realization that Congress had the ability to shut down any program by refusing to fund it, the White House since World War II has taken an active role in the budget process. The President formally submits a budget to Congress every year and actively campaigns for its approval. Congress has final approval over the budget and has the ability to underfund or refuse funding for foreign policy undertakings, although it seldom directly exercises that power. Instead, Congress may reduce funding for U.S. agencies and organizations that administer foreign relations functions. By controlling the State Department budget, for example, Congress can limit the department's size, duties, expenditures, and activities (Crabb et al. 2000).

Both houses of Congress have oversight functions that allow them to investigate conditions and problems related to their legislative responsibilities. The rationale for Congressional inquiries into U.S. foreign relations is that lawmakers need all available

information to help them evaluate options for their legislative decision making (Crabb et al. 2000).

The Senate and the House of Representatives, separately or jointly, have the authority to state their policy preferences by issuing resolutions concerning any aspect of U.S. foreign policy. The foreign policy topics that Congress has addressed over the years are wide ranging and have weighed in as both approvals and condemnations of Presidential actions as well as admonitions for action or restraint. Although Congressional resolutions are not binding law, they are entered into the official Congressional record. Presidents often view resolutions indicating approval of their policies as ammunition for further action while considering disapproval a possible indicator of lack of public support (Crabb et al. 2000).

James Lindsay (1994) identifies two main viewpoints about the relationship between the executive and the legislature. “Irreconcilables” believe that Congress now has too much authority over Presidential actions and “yearn for the good old days when the President ran the show” (p. 3). “Skeptics” believe that Congress, regardless of its rhetoric on the House and Senate floors, operates only on the margins of American foreign policy and has little effect on U.S. actions in the international arena. Although Congress has a number of implicit means of reining in executive authority, skeptics believe that few Congressional actions taken against the President are authoritative (Hinckley 1994).

Lindsay (1994) believes that the true picture of the relationship between the President and Congress concerning U.S. foreign policy lies somewhere between the two poles of the irreconcilables and the skeptics (p. 3):

Irreconcilables grossly exaggerate the extent and effect of congressional activism. Although members of Congress challenge the White House far more than they did during the heyday of the imperial presidency, they by no means control foreign policy. The president and his subordinates in the executive branch continue to lead in policy making. Skeptics, on the other hand, err by equating influence with the ability to write policy preferences directly into law. Skeptics are right to note that many hotly contested legislative initiatives die on Capitol Hill. Yet even when members of Congress fail to dictate the substance of foreign policy, they frequently influence it indirectly.

Milner's description of divided government does not account for the influential role that both the Senate and the House of Representatives can play in shaping the U.S. position in international negotiations and subsequent domestic ratification. In addition to the Constitutionally delegated responsibility of the Senate for ratification approval, Congress affects efforts to achieve domestic acceptance of an international treaty in several ways. Congress has the ability to pass or deny implementing legislation and to fund or underfund agency efforts to implement an international treaty. Both the House and the Senate can conduct extensive oversight hearings aimed at exerting pressure on the President to elicit desired actions in formulation of U.S. negotiating positions. Both houses of Congress can pass resolutions also intended to exert pressure on the President to achieve desired actions. Milner's portrayal of divided government does not encompass the complicated interactions of the legislature both in development of U.S. negotiating positions and in the subsequent treaty ratification process.

The Role of Interest Groups and Information

Milner (1997) concludes that interest groups have at least two major functions in domestic politics—as pressure groups and/or information providers. The first role has

been widely acknowledged as an important factor in shaping domestic politics. Milner says of interest groups as pressure groups (p. 247):

These actors use their position to influence the preferences of the political actors. Legislators, for example, decide on their preferred policies by taking into account the preferences of various interest groups. They do so out of concern for the electoral consequences of failing to do so. Neglect of interest group preferences can mean the loss of their members' votes, campaign funds, or general support. In this pressure group role, they affect the international negotiations by shaping what agreements the legislature will be willing to ratify. A change in their preferences means a change in the legislature's preferences, and thus a change in which international agreements are ratifiable. The presence of such pressure groups has distributional consequences—both domestically and internationally—since they affect the terms of the agreement made, as well as the likelihood of cooperation.

Milner indicates that the preferences of interest groups depend on the distributional consequences of international agreements. This assumption is valid for the particular issues she examines—monetary and exchange rate, trade, industry, and defense policies. The interest groups involved in these issue areas are largely concerned with economics. They prefer policies “that increase their income over those that decrease it, and most prefer those that maximize their income” (p. 60). The preferences of interest groups involved in international environmental agreements diverge from this portrayal. One “side” in conflicts over international environmental treaties is economics based—business and industry interests that must bear the costs of pollution prevention or remediation. The other “side,” however, has little regard for the economics involved in decision making. Environmental interest groups seek solutions to environmental problems that are efficient but not necessarily cost effective.

In Milner's analysis of the role of domestic politics in achieving international cooperation, she stresses the second function of interest groups—as information providers, saying (p. 248):

If the legislature is uncertain as to exactly what an international agreement means, it can turn to various, well-informed interest groups to hear their opinions. Knowing the interest groups' preferences and hearing their views on the agreement, the legislators can then better comprehend what the agreement might portend for them electorally. This informational role can be critical. It provides a means of constraining the executive's behavior without consuming much time or effort.... This role may account for why legislators often want interest groups to be involved in international negotiations. It may also explain why... governments still seek to obtain interest group endorsements of the international agreement.

A key portion of Milner's argument is that incomplete or asymmetric information can handicap domestic actors and make cooperation in international agreements less likely. Interest groups serve the function of information providers and thus improve the likelihood of cooperation. However, for international environmental treaties, interest groups are not the primary providers of information.

Researchers have noted that epistemic communities generally form around international agreements addressing scientific or technical issues. Epistemic communities are networks of experts, often worldwide, whose members share normative beliefs about the causes and solutions to highly technical problems such as stratospheric ozone depletion (Haas 1992b). Because members of an epistemic community provide information freely and make it available to all who are interested, the role of interest groups as information providers is downplayed in international environmental agreements. Rather, interest groups join the ranks of information receivers. Legislators, the executive, and interest groups receive information from the epistemic community and then process it for their own purposes.

Milner identifies a significant role for interest groups in achieving cooperation in international agreements. However, interest groups that are important to international environmental treaties do not fit the interest-group profile that Milner utilized for economics-based global agreements. The remainder of this chapter adapts Milner's approach to analyze the role of interest groups and information providers in international environmental treaties.

Interest Groups As Pressure Groups

Interest groups can be broadly described as "organizations that are not part of the government they are trying to influence" (Berry 1997, p. 4-5). While interest groups may be broadly categorized as business interests and public interest (citizens') groups, several subcategories are also notable. Interests that involve themselves in environmental policy generally fall into one of three types: business corporations and their trade associations, not-for-profit public interest groups, and professional and research organizations that often form because of a particular environmental issue (Wenner 1990).

In democratic states, the attempt of interest groups to influence a nation's policy making is called lobbying, and this form of pressure on state behavior is well documented. Lobbying takes place in the context of organized competition that generally attempts to affect regulatory actions.

Early attempts to explain why some interest groups are able to have a greater influence on government policy than others examined the role of common goals and membership size as a group unifier (Olson 1965). Olson theorized that an interest group is able to form if individuals have similar interests and want to pursue similar actions. In addition, an interest group is most effective when it is comprised of a small number of

members. A large membership provides more opportunities for individuals to shirk group responsibilities without detection.

Other research indicates that interest groups are inconsistent in influencing government policy. Downs (1972) noted an “issue attention cycle” in public policy that has five stages: (1) pre-problem stage in which the problem is recognized by only a few individuals; (2) alarmed discovery accompanied by euphoric enthusiasm; (3) realization of costs; (4) gradual decline in public interest; and (5) post-problem stage in which, once again, the problem is attended by only a few individuals. Many public policy problems move relatively quickly to the end of the cycle because sustained effort is not forthcoming and the problem is no longer receiving much media attention.

Downs also indicates that environmental policy problems may not move through the cycle as quickly for several reasons: environmental problems, while generally ambiguous, are usually visible and threatening and threaten everyone equally; blame can be attributed; the search for technical solutions is prolonged; costs come in the form of higher prices rather than taxes; and cleanup creates new businesses. Businesses are often the target of environmental regulations because pollution can be attributed to their operations. A continuation of Downs’ thoughts about an issue attention cycle quantitatively showed that public opinion does wax and wane over time (Guber 2001). Public interest depends on whether remediation costs are significant, the economy is prosperous or struggling, and new environmental problems are discovered that are related to previous ones.

A well-researched survey ascertained the most likely targets of the various types of interest groups (Schlozman and Tierney 1986). Congress is the most likely target for

lobbying activities for both business and citizens' interest groups. Nearly all interest groups make extensive use of direct contact with lawmakers to press their issues. For corporations and trade associations, this direct contact often takes the form of personal visits from well-known business constituents or social lobbying in a relaxed environment. Because public interest groups often have a more difficult time gaining access to lawmakers, they try to nurture relationships with Congressional staffers to keep lines of communication open. Public interest groups have also discovered that mobilizing their membership to write their legislators in support of their cause often gains attention from lawmakers. In addition, nearly all interest groups rely on testifying at Congressional hearings as a means of getting their issues on the record.

According to Schlozman and Tierney (1986), corporations and trade associations are more likely to view the executive branch as an important target for their lobbying activities, while public interest groups have indicated that executive branch agencies are their least likely target. However, environmental interests may believe the executive branch's Environmental Protection Agency to be an advocate agency with which they have affinity, making that agency more likely to be targeted for attention by environmental groups. The research about interest groups indicates that they may at times have considerable but unequal access to the executive and legislative branches of Congress.

At various times "rival" interest groups may both claim to have achieved a victory in a public policy issue. Baumgartner and Leech (1993) provide a reason for this seeming inconsistency. While in Congress the vote on an issue is easily viewed as the end result, most of the influence that interest groups exert is in the agenda-setting stage (i.e., during

the committee hearings). Thus there are shades of winning or losing—winning may mean causing a change in the original agenda item. If rival interest groups are able to influence the course of deliberations on an issue at several junctures, all groups may claim a victory, regardless of the shape of the final policy.

Corporations and Trade Associations

Pinpointing the interest a business corporation has in a particular issue is often straightforward. In a strict economic sense businesses need to make a profit, and watching government programs that might impact those profits is a key function of a corporation's financial organization. Understanding the goals of a trade association, however, is less straightforward. Monolithic trade associations such as the American Automobile Manufacturers Association are certain to have members with competing goals, making it difficult to predict how the organization will stand from issue to issue. Trade associations that are more issue specific, such as the Alliance for Responsible CFC Policy, are more predictable in their policy preferences (Wenner 1990).

In capitalist societies, examination of the influence of business interests on government policy has been called the theory of economic regulation (Stigler 1971; Posner 1974; Peltzman 1976). Various versions of this theory reflect concepts about patterns of government intervention in economies. The theory is a “producer protection” view of achieving positive regulations. According to this theory, business interests compete for benefits by applying pressure on politicians, generally in a demand for regulations concerning direct subsidies, control over market entry, substitutes and complements, or price. Politicians in turn grant regulatory benefits to business interests in such a way as to maximize their political support. Stigler maintains that there is an

optimum size for effective coalitions in the political process. A small business group with large per capita stakes prevails over a large group (such as consumers) with diffused interests.

Business interests as influences in domestic politics have often been the focus of public policy research. Several studies indicate that business is likely to be the winner in policy decisions (Lindblom 1977; Mitchell 1997). According to Lindblom, in a market-oriented polyarchy there is a symbiotic relationship between government and big business. However, the constraints on policy makers and business are different and in conflict. Policy makers are constrained by winning elections; business is constrained by making profits and retaining jobs. These constraints are largely independent of each other and often in conflict, thus requiring coordination. Most often, public policy bends to the needs of business.

Mitchell (1997) contends that business has the economic resources to almost always win in the policy arena as long as business interests align with policy-makers' agendas so that business interests contribute to policy-makers' public support. Business loses if it cannot turn its economic resources into political resources and especially if it has a legitimacy problem such as legality, fairness, efficiency, or traditional loyalty.

Vogel (1989) contends that the influence of business on policy making fluctuates depending on the domestic economic climate. In the United States, the 1960s through 1973 were a period of strong economic performance. However, business' ability to influence Congress to achieve favorable public policies declined during this time because citizens were able to focus on social benefits, which they often expected to come from corporate profits. When big business failed to provide social reforms such as substantially

better health benefits for their employees or a cleaner environment for the general public, they were “out-influenced” by public interest groups that appealed to Congress for these improvements. During the period of 1978 through 1981, business was able to regain some of its influence as the public began to perceive of government as interfering in the domestic economy. This short period was followed by a stronger economy in the late 1980s during which business lost ground somewhat with Congress. Some business sectors did gain from President Reagan’s deregulation policies, but these gains were counterbalanced by increasing environmental regulation.

Vogel’s findings about the waxing and waning influence of business interests are relevant to understanding the development of the U.S. position for the stratospheric ozone protection treaty. The passing of the first U.S. laws in 1976 regulating CFCs (i.e., restrictions on the use of CFCs in aerosols) came at a time when environmental groups perceived that big business was not living up to its responsibilities by using its profits to save the ozone layer. After the initial regulation of CFCs, business gained some ability to forestall additional regulation because citizens generally perceived of government as interfering in the domestic economy. In addition, the actions taken in the late 1970s to curb ozone layer depletion satisfied the general public so that the issue did not remain a high-profile topic on the national agenda. However, in 1983 scientists began to unfold the tale of an “ozone hole” in the stratosphere, and business was no longer able to appeal so strongly to citizens’ pocketbooks as a reason not to pursue CFC alternatives.

Two types of business interest groups were in play during the negotiations and ratification of the ozone protection treaty—major corporations and business alliances/coalitions. Two large corporations, DuPont and Allied Signal, produced CFCs

during the last half of the twentieth century and were vocal opponents of the increasing restrictions on CFC production and usage that resulted from the Montreal Protocol and its amendments.⁶ Industrial uses of CFCs in the United States were spread among a large business base ranging from air conditioning manufacturers to foam package and insulation makers. The two CFC producers and many CFC users formed the Alliance for Responsible CFC Policy, which at its peak had a membership of 500 companies that produced or used CFCs. The Alliance's purpose was to present to the federal government the policy preferences of the CFC business interests in the United States.

As regulation of ozone-depleting substances spread in the 1990s to include halons, methyl chloride, carbon tetrachloride, and methyl bromide, other corporations and business coalitions entered into play. The Alliance for Responsible CFC Policy renamed itself the Alliance for Responsible Atmospheric Policy and widened its membership to include producers and users of all potential ozone-depleting substances.

Public Interest Groups

Public interest groups, which have been described as seeking "a collective good, the achievement of which will not selectively and materially benefit the membership or activists of the organization" (Berry 1977, p. 7), have many of the same goal-definition problems as trade associations. Larger public interest groups such as the Sierra Club or Greenpeace have the overall goal of protecting the environment. However, a lack of monetary resources often forces these groups to choose among the interests of their members in applying their lobbying resources. Smaller public interest groups with

⁶ Four additional companies, Kaiser, Penwalt, Racon, and Union Carbide, produced smaller amounts of CFCs but seldom went on record with their views on the ozone protection treaty.

memberships that have fewer specific goals are able to focus on particular issues but usually have fewer resources at their command to do so.

Public interest groups that are mainly professional and research organizations are often “think tanks” or legal entities that form around broad issue areas. The Institute for Energy and Environmental Research and Worldwatch Institute are two examples of think tanks— organizations that are financed primarily by private grants and employ scientists and other professionals to scrutinize data on particular topics and provide analyses to the public and government. The Natural Resources Defense Council works in a similar way, employing lawyers, scientists, and policy experts to challenge environmental issues in the courts, although the Council is funded primarily by its 1.2 million individual members.

Public interest groups contribute in several ways to the domestic policy process, including representing their constituents in Washington; providing opportunities for their members to participate in the policy process; educating the public and Congress about political issues; calling attention to issues that should be on the political agenda (i.e., agenda setting); and monitoring government programs to determine their impacts and effectiveness (Berry 1997).

Membership in U.S. advocacy groups began to grow during the 1960s, with some researchers attributing the growth to increasing citizen involvement in the civil rights movement and antiwar protests. Increased advocacy led to involvement in public interest groups. Although Ralph Nader’s public interest groups and John Gardner’s Common Cause were among the more noteworthy interest groups attempting to influence Congress during the 1970s, other public interest organizations also gained popularity. During this time, membership in environmental groups began to increase. The older environmental

groups such as the Sierra Club substantially increased its membership compared to previous decades (Figure 1), while start-up environmental groups like the Natural Resources Defense Council benefited in later years because of the growing interest in environmental issues (Berry 1997).

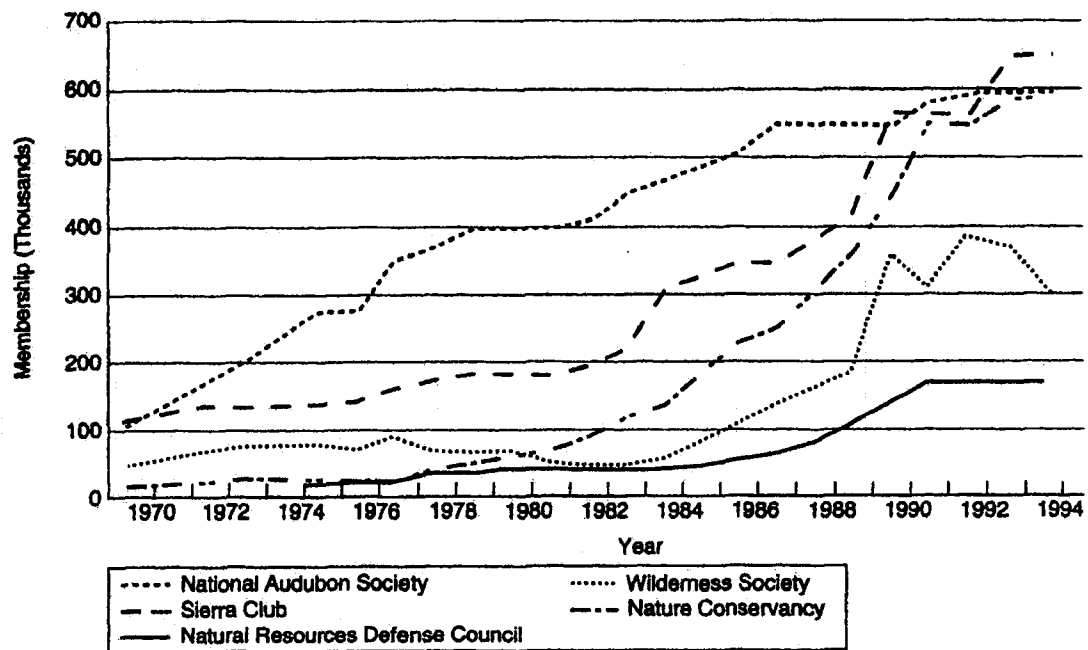


Figure 1. Membership in Environmental Groups (Boerner and Kallery 1994, reprinted in Berry 1997, p. 33).

The 1970s witnessed a growing environmental awareness in the United States with the establishment of the Environmental Protection Agency and several environmental laws fresh on the books. Environmental interest groups noted the increasing scientific research in CFCs as a cause of ozone depletion and selected aerosol uses of CFCs as a vulnerable target for initial action. Public interest groups petitioned the federal government in 1974 to ban nonessential uses of CFCs and stepped up the pressure with a lawsuit in 1975. However, it was not until 1977 that the federal government announced regulations to phase out CFCs as aerosol propellants over the next two years.

By that time, American production of CFCs for aerosol propellants had already fallen to half of its pre-1974 level, due in large part to the public awareness campaign of several environmental groups. Because of the new controls on CFCs used as aerosol propellants, U.S. production of CFC aerosols virtually ceased in 1979. With a lack of additional alarming findings about ozone depletion and a falloff in interest group and media attention, the issue dropped off the public agenda for several years (Clark et al. 2001).

Shortly after Ronald Reagan was elected President in 1980, membership in U.S. environmental groups increased significantly after waning in the late 1970s. Between 1981 and 1983, membership in the eleven largest environmental groups increased by approximately 250,000 or 13 percent. Membership in Friends of the Earth, a citizens' group that was to play a significant role as environmental watchdog in the 1980s ozone depletion controversy, increased by 38 percent. Much of the membership increase during the early 1980s has been attributed to Reagan's announcements of reforms in the social regulatory agencies, one of them the Environmental Protection Agency (EPA). At a time when the American public was becoming more committed to environmental protection, the Reagan administration was "getting government off the backs of the people" by attempting to make environmental regulations less stringent and more favorable to U.S. industry (Waterman 1989).

Although ozone depletion dropped off the American public's agenda in the early 1980s, it remained a significant research topic in both the United States and the international scientific community. While the EPA continued to conduct atmospheric research during the early 1980s, most environmental groups had lost interest in the issue. No U.S. environmental group was represented at the diplomats' meeting for the Vienna

Convention in 1985, and public interest group activities had waned in the United States as well. The single exception was the Natural Resources Defense Council (NRDC).

The NRDC closely monitored the activities of the EPA. When the possible link between CFCs and ozone depletion continued to gain support in the epistemic community, the EPA issued an Advance Notice of Proposed Rulemaking in October 1980 for hearings and comments on regulations that would further limit the production and consumption of CFCs in the United States. However, the effort stalled for several years, during which time the NRDC requested several times that the proceedings be resumed. Their efforts failed to gain action, and in 1983 the NRDC pursued an administrative procedure to compel the EPA to determine whether action was necessary to protect the ozone layer as required by the Clean Air Act. A U.S. federal court ordered the EPA to demonstrate diligence in evaluating the consequences of continued emissions of CFCs. When the EPA evaded the court order, the NRDC gave the EPA official notice in 1984 of its intent to sue to compel protection of the ozone layer. The EPA finally responded with an “Ozone Protection Plan” and a timetable for action (Andersen and Sarma 2002).

Interest in the ozone depletion issue intensified two months after the 1985 Vienna Convention was opened for ratification. Joseph Farman and his team from the British Antarctic Survey reported significant ozone loss over the Antarctic for three consecutive years, coining the phrase “ozone hole” to describe it. For the next year, scientists evaluated the new and subsequent data, and during the months leading up to the 1987 Montreal Protocol, the media began to dramatize the “ozone hole” theories, contributing major news stories for several months. The media attention brought the ozone depletion

issue back onto the public agenda, and the environmental groups once again began to play a significant role in promoting the urgent need to ban CFCs in the United States (Litfin 1994). This role would be maintained during the next two decades of international and domestic activities related to the ozone protection treaty.

The Role of Scientists as Information Providers

By their nature, transnational environmental problems require significant scientific study to estimate global environmental degradation and determine the actions needed to directly bring about solutions. Epistemic communities have often been promoted as having a significant role in advancing cooperation when agreements involve scientific or economic problems or content. The community's scientists are particularly adept at providing information about issues surrounded by uncertainty such as strategies to promote nuclear arms control, the intricacies of monetary policy, or technical plans to address transnational environmental problems.⁷

For example, a study of Mediterranean pollution control showed that an epistemic scientific community played a key role in altering the balance of power within Mediterranean governments. Scientists were involved both in the policy-making process and in enforcing and supervising pollution control measures. As the group became more successful in enforcing compliance, state interests became more closely aligned with their environmental view, and state behavior came to reflect this alignment. This example has been generalized to other global environmental efforts such as European acid rain policies and the Montreal Protocol for protection of the ozone layer. Successes and

⁷ See for example: nuclear arms control (Adler 1992); international environmental issues (Haas 1989, 1992a; Kapstein 1992).

failures were based on the ability of an epistemic community to access policy-making bodies (Haas 1989).

As early as 1970, scientists began to suspect that CFCs could destroy ozone and perhaps affect the stratospheric ozone layer. DuPont, which had a large stake in the outcome of research on ozone layer effects because of the CFCs it manufactured, sponsored CFC seminars and research beginning in 1972 and continuing through the 1980s. Two chemists from the University of California at Irvine further sparked the ozone depletion controversy in 1974 (Molina and Rowland 1974), but within a few years atmospheric scientists from around the world were offering additional information that contributed to better understanding of the issue.

In 1977 the United Nations Environment Programme (UNEP) became involved in organizing the emerging data on stratospheric ozone depletion. Scientists from many countries gathered for a UNEP-sponsored meeting that resulted in a World Plan of Action on the Ozone Layer and established a Coordinating Committee on the Ozone Layer (CCOL). For almost a decade, the world's leading atmospheric scientists continued to share the results of their work through the CCOL, which conducted yearly meetings until 1985. At that point, scientific research was subdivided into three assessment panels (i.e., technology and economic assessment, scientific assessment, and environmental effects assessment) that still meet yearly to share information and research results. In addition, in 1986, UNEP, WMO, and two U.S. agencies (i.e., NASA and NOAA) established an International Ozone Trends Panel to study the reasons for the developing "ozone hole" over Antarctica. More than 100 scientists from around the world continue to contribute data to the Ozone Trends Panel, including scientists employed by industries that

manufacture ozone-depleting substances or uses them in their products (Andersen and Sarma 2002).

Some researchers have criticized proponents of the epistemic community theory for creating the role of scientists as a separate component in developing cooperation in international environmental agreements. Critics of the theory suggest that the description of an epistemic community in fact pegs it as just another interest group (Dimitrov 2006), citing the description of scientists as “coalitions of believers” and “knowledge brokers” (Sebenius 1992; Litfin 1994). Dimitrov (2006) indicates that if scientists in fact are using their knowledge to influence environmental policy, then “what accounts for the outcome is not knowledge but the carriers of knowledge whose political power derives from their status as experts” (p. 31).

Epistemic communities may indeed be some form of interest group, because they seem to fit Berry’s (1977) definition as seeking “a collective good, the achievement of which will not selectively and materially benefit the membership or activists of the organization” (p. 7). If that is the case, its members would consider themselves informed proponents of the best scientific solutions for environmental, technological, and scientific problems rather than proponents of maximizing income or preventing or remediating problems regardless of cost. However, one might also make the case that members of epistemic communities can use the distribution of scientific information to materially benefit their research programs—more publicity equates to more research funding. Epistemic communities would then resemble economics-based interest groups.

Litfin (1994) notes that the motives of scientists are difficult to discern (p. 32):

Experts do not deal simply with facts; they must cultivate their reputations as sources of authoritative knowledge. The ability of experts to reduce

uncertainty depends in part on whether they are perceived as powerful or trustworthy, particularly during crises.... Yet experts also are trusted only inasmuch as they succeed in reducing uncertainty. Thus, power is generated in a circular fashion....

In order to be heard and believed, scientists must develop contacts with public officials, interests groups, and bureaucracies, but they must also be circumspect in how those contacts are used. They must accommodate the general belief that “science is objective and value-free, while political life is ideological and value-laden” (p. 33). This “dichotomy” causes scientists to walk a fine line between science and politics (p. 33):

The fact-value dichotomy and the resultant split between science and politics raise other problems in a policy context. First, if the dichotomy were pure, scientists would never call attention to a problem, for to do so would betray a commitment to certain values.... Second, both scientists and policy makers recognize that not all facts are of equal value, for they vary in their interest and productivity, as well as in their internal robustness. Third, data does not stand on its own; it must be interpreted, and it is frequently interpreted according to preexisting value commitments.

The verdict is still out on whether epistemic communities are interest groups. If they are, they comprise a class of interest group that is hard to categorize with traditional definitions. Regardless, their role in providing information on complicated scientific, technological, and environmental issues has been shown to be important in achieving cooperation in international environmental agreements. The case study described in Chapters 4 and 5 shows that scientists played a significant role in formulating the U.S. position for international negotiations as well as participating in the epistemic community surrounding the ozone protection treaty.

4. THE EXECUTIVE BRANCH AND TREATY NEGOTIATIONS

In the United States, the executive branch is responsible for negotiating international treaties. The U.S. contingent to the ozone-protection treaty negotiations generally consisted of a chief negotiator from the State Department, along with representatives from such agencies as the Environmental Protection Agency (EPA) and the National Aeronautics and Space Administration (NASA), and occasionally members of the House of Representatives or Senate. In addition, representatives from interest groups such as the Alliance for Responsible CFC Policy, Chemical Manufacturers' Association, Friends of the Earth, Greenpeace, International Chamber of Commerce, Natural Resources Defense Council (NRDC), and World Wildlife Fund often attended as observers. The purpose of the research on treaty negotiations is to determine the effects of interest group pressure and the ozone epistemic community on the executive branch's desire to provide public goods in the form of an undepleted stratospheric ozone layer.

The following six sections of this chapter examine negotiation of the six parts of the ozone protection treaty (i.e., the Vienna Convention and Montreal Protocol and its four amendments). The focus of each section is to analyze the interactions of interest groups and atmospheric scientists with the U.S. delegates to the negotiations, administrative agencies in a position to influence treaty negotiations, Congress, and the President. The chapter concludes with observations about the importance of interest group and epistemic community participation in the negotiation process.

The Vienna Convention: Science, Not Regulation (January 1982-March 1985)

When the United States arrived at the threshold of international negotiations on stratospheric ozone depletion in 1982, it was no stranger to ozone science or the regulation of chlorofluorocarbons (CFCs) purported to cause damage to the ozone layer. A series of Congressional hearings in the mid-1970s featured testimony by NASA, the National Oceanographic and Atmospheric Administration (NOAA), and atmospheric scientists about a connection between CFCs in the stratosphere and subsequent damage to the ozone layer. In August 1977 the United States had passed amendments to the Clean Air Act that directed the Administrator of the EPA to take any action the agency deemed necessary to regulate substances that depleted the ozone layer. The EPA responded to the charge in 1978 by banning the use of CFCs as propellants in aerosol cans.

The United Nations Environment Programme (UNEP) became interested in ozone depletion in the early 1970s and held its first international meeting on the subject in March 1977, driven by the mandate of its governing council to convene a meeting of governmental and non-governmental organizations from interested countries “to review all aspects of the ozone layer, identify related ongoing activities and future plans, and agree on a division of labour and a coordinating mechanism” for research activities and related industrial and commercial information (Andersen and Sarma 2002, p. 45). The first diplomatic steps in negotiating an international treaty were taken in 1982.

Although regulation of some CFCs was already a reality in the United States, U.S. participants in the early UNEP meetings were undecided about the position they would take in the debate about ozone depletion. The EPA had become less certain over the intervening years about a link between CFCs and ozone layer depletion and at first would

not even endorse proposals that restricted CFCs in aerosols. It was not until late 1983 that the United States changed its position and supported a worldwide CFC aerosol ban. The change in direction put the United States, along with Canada, Finland, Norway, and Sweden, into a campaign for an international protocol containing restrictions on CFCs. This Toronto Group wielded considerable influence throughout the diplomatic meetings, finding itself in contention mainly with the European Economic Community (EEC), whose representatives campaigned to allow the market to reduce CFC use as alternatives became available. Discussions during the international meetings often centered on the existence of a positive link between CFCs and ozone depletion, with the Toronto Group advocating the existence of a link and the European countries arguing that there was considerable scientific uncertainty.

By early 1984 the United States was adamant about restrictions on non-essential uses of CFCs, although U.S. negotiators did bend to international pressure for a protocol that was separate from the framework convention.⁸ The convention would contain a statement of intentions to conduct scientific investigations and reduce usage of CFCs whenever possible, while a separate protocol would contain the CFC restrictions. However, the United States proposed that states signing the convention would also be required to sign the protocol. Meetings during 1984 failed to elicit a favorable response to the U.S. proposal and became contentious. Ultimately, the UNEP Governing Council decided that in order to move the proceedings forward, future diplomatic meetings would work only toward a framework convention, postponing discussion of a protocol to a

⁸ A framework convention is an international agreement that sets forth general obligations that the parties to the convention are expected to promote within their respective states. Framework conventions contain no mandatory compliance provisions but are instead a means to signal intentions to cooperate on a particular issue. A protocol is an international agreement linked to an existing convention, but as a separate and additional agreement, that typically strengthens a convention by adding new, more detailed commitments.

period after the convention had been accepted. The final diplomatic meeting for a framework convention was held in March 1985 in Vienna, Austria, and produced the Vienna Convention for Protection of the Ozone Layer.

Domestic Interests, Institutions, and Information

During the period from January 1982 when the first UNEP-sponsored Ad Hoc Working Group was held until the plenipotentiary meeting⁹ for the Vienna Convention in March 1985, the U.S. President was Republican Ronald Reagan. Reagan had been voted into office on a platform of “getting the government off the backs of the American people.” The legislative branch of the government was divided: the House of Representatives had a Democratic majority, while the Senate had a Republican majority.

Among President Reagan’s appointees, the nomination of Anne Gorsuch Burford as Administrator of the EPA generated considerable controversy. Environmental groups considered Burford either indifferent or hostile in terms of improving the environment. On the issue of further regulation of CFCs, Burford in her confirmation hearing before the Senate indicated that she believed the ozone depletion theory to be highly controversial in the scientific community and that additional scientific data were needed before further action should be taken (U.S. Senate Committee on Environment and Public Works 1981: 210). She later implied that the ozone issue was a scare tactic she was smart enough to dismiss as unimportant: “Remember a few years back when the big news was fluorocarbons that supposedly threatened the ozone layer?” (Burford 1986: 133).

⁹ A plenipotentiary meeting is a formal meeting of diplomats who have the authority to represent their countries in treaty negotiations.

Burford was appointed EPA Administrator in May 1981, and she did little to improve her image as an enemy of the environment, reportedly having said that she would not meet with environmental groups during her first year in office (Roan 1990). She apparently viewed them with considerable contempt, saying, “The truth about the vast majority of [environmental lobbyists] is that they are not interested in the environment at all. They are interested in power, political power, and the environment is just a platform for them” (Burford 1986: 98). She took no action on further regulation of CFCs, even though the EPA had issued an Advance Notice of Proposed Rulemaking in 1980 during the last few months of the Carter administration that would have extended current regulations to other CFC uses. Burford downplayed the ozone depletion issue and cut back her agency’s funding in this area. Instead, under Burford the EPA pushed the State Department to promote an international treaty to reduce CFCs that agreed with U.S. domestic policy rather than have her agency promulgate additional domestic regulations. Environmentalists seemed to have given up on the EPA as friendly to their cause, with little interaction between environmental groups and the EPA until after Burford resigned amid scandal on other issues in March 1983 (Roan 1990; Benedick 1998).

William Ruckelshaus was appointed Administrator after Burford. The appointment of Ruckelshaus was an interesting move for President Reagan. Ruckelshaus was the EPA’s first Administrator, appointed in 1970 when President Nixon formed the agency. In Ruckelshaus’s first term, he defined the EPA’s mission as being the government defender of the environment. Reagan chose Ruckelshaus as Administrator after Burford in an effort to appease the agency’s most vocal critics—environmental groups and Congress. During Burford’s tenure, the EPA drew fire for an apparent lack of

attention to toxic waste cleanup, with the EPA's Superfund regulations under intense scrutiny following the massive cleanup of leaking toxic wastes at Love Canal, New York, in the late 1970s. As environmentalists continually drew toxic waste problems to the national agenda, the EPA gained a reputation for ignoring toxic waste sites in numerous Congressional districts. The result was a lack of trust in the EPA and morale problems within the agency's ranks (Collin 2006).

When Ruckelshaus resigned to pursue personal interests in January 1985, Lee Thomas was named to the position. Both Ruckelshaus and Thomas were considered more "environmentally friendly" than Anne Burford, and Ruckelshaus has been credited with improving staff morale and public perception of the agency. However, the NRDC filed a lawsuit in November 1984 during Ruckelshaus's term in an attempt to force the EPA to follow through on the 1980 Advance Notice of Proposed Rulemaking. One of the NRDC's lawyers, David Doniger, indicated, "We thought things might change when William Ruckelshaus arrived in 1983. More than a year ago we asked him for action, but he has done no more than Gorsuch [Burford] to protect the ozone layer" (BNA 1984b).

Under the leadership of Ruckelshaus and Thomas, the EPA and the State Department held joint meetings to develop a negotiating position for the international effort on ozone protection that was underway. The State/EPA meetings were often open to interested parties, including chemical industry officials and their representative organizations, and environmental groups. Environmental groups had significant influence in these meetings, supporting measures that would further restrict the production and use of CFCs. Conversely, industry maintained that CFCs were receiving unfair negative publicity as ozone depleters and urged further scientific investigation rather than controls.

The plenipotentiary conference for the Vienna Convention for Protection of the Stratospheric Ozone Layer was held in March 1985 in Vienna, Austria. Prior to the conference, UNEP sponsored seven Ad Hoc Working Group meetings beginning in 1982 that were designed to allow state participants to begin the negotiation process for an international agreement on ozone protection. While interest groups may have had input to domestic discussions about their countries' negotiating positions, these groups were significantly underrepresented in international meetings about ozone layer depletion. Although allowed to attend as observers, very few non-governmental organizations exhibited an interest in the meetings: the International Union for the Conservation of Nature was represented at the December 1982 meeting, and the European Federation of Chemical Industries, the European Federation of Aerosols, and the International Chamber of Commerce were represented at the October 1984 session of the Ad Hoc Working Group. Interest groups from the United States showed little interest in attending the meetings (Parson 2003).

UNEP Meetings Initiate Preparations for Ozone Layer Agreement

The first session of the Ad Hoc Working Group was held in Stockholm, Sweden from January 20-28, 1982. The United States, other major CFC-producer nations, and several developing nations attended the meeting, which was convened as an expert working group rather than an official negotiating body. Since many of the attendees were unfamiliar with the CFC/ozone issue, scientists from the World Meteorological Organization (WMO), UNEP's Coordinating Committee on the Ozone Layer, and NASA provided tutorials on ozone monitoring, atmospheric modeling, UV effects, alternative technologies, and socioeconomic issues. During this meeting, Finland and Sweden

officially submitted the first draft of an international convention for protection of the stratospheric ozone layer. The draft covered all the features ultimately incorporated into the Vienna Convention in 1985 (Andersen and Sarma 2002; Parson 2003).

When CFC limitations were discussed during the meeting, the U.S. delegation did not even endorse an international ban on aerosols containing CFCs that would have paralleled U.S. domestic policy. Informal conversations among EPA officials in the U.S. delegation revealed that if they had known in 1977 that scientists would still be unable to establish a solid link between the presence of CFCs and ozone depletion by 1982, the EPA likely would not have banned CFCs in aerosols. Before the first international Ad Hoc meeting, U.S. industry officials had argued that a convention should only address scientific research, because even discussing potential limitations on CFCs could create regulatory momentum that was inappropriate for the current state of knowledge. Thus, the U.S. delegation to the meeting argued that discussing control measures or the content of a convention was premature and suggested ending the meeting early (Parson 2003).

Although the meeting continued to its previously announced concluding date, it ended without any resolution of major issues because most countries indicated a desire for additional scientific and technical data to be incorporated into what was mainly a legal framework. The UNEP was authorized to prepare a draft framework convention that could be circulated as a basis for discussion at the next meeting (Andersen and Sarma 2002; Parson 2003).

The second meeting of the Ad Hoc Working Group was held December 10-17, 1982 in Geneva, Switzerland. The draft convention from the previous meeting was circulated as a revised control proposal from Norway, Finland, and Sweden, combining a

ban on CFCs in nonessential aerosols with a call for best-available technology requirements to limit CFC emissions from other uses. While the Nordic states and others wanted rapid adoption of a convention, the United States, France, and the UK were more hesitant. Industry representatives conveyed their objections to some of the wording of the proposed convention, such as its objective of “protecting the ozone layer” and singling out of CFCs when other chemicals were also suspected of affecting the ozone layer. They stressed that the language prejudged the debate while a comprehensive assessment of the issue had yet to be completed. The meeting continued the discussion already begun on a draft convention, but more questions and arguments were posed than issues resolved (Andersen and Sarma 2002; Parson 2003).

The third meeting of the Ad Hoc Working Group was held April 11-15, 1983 in Geneva, Switzerland. The head of the U.S. delegation was Thomas F. Wilson of the State Department’s Bureau for Oceans and International and Scientific Affairs (BNA 1983c). At this meeting, the Nordic states again proposed a worldwide ban on CFCs in aerosols and controls on all uses of CFCs but indicated that these requirements should be part of an appendix to the convention. Although the United States had been a leader in banning CFCs in nonessential aerosol uses, the proposal from the Nordic countries, if accepted internationally, would have forced a change in U.S. domestic policy concerning restrictions on CFCs.

U.S. Responds Domestically to Proposed CFC Ban

After the Ad Hoc meeting, the EPA gave due consideration to the Nordic proposal, especially after Anne Burford resigned as EPA Administrator in May 1983. Early in the Ruckelshaus administration, the EPA announced limited support of a

worldwide ban on CFCs in aerosols as a compromise—the U.S. would respond favorably to a ban on CFCs in aerosols. Jim Losey, senior staff officer of the EPA Office of International Affairs, told State Department representatives, “At the very least, we ought to be able to support what we’ve already got” (Roan 1990: 115).

The EPA’s decision to support a worldwide ban on CFCs in aerosols surprised the State Department, which to this point had resisted all proposals containing global controls on CFCs. Basically, the State Department had taken its cue in international negotiations from EPA Administrator Anne Burford, who had dismissed the ozone issue as unimportant. The new EPA Administrator, William Ruckelshaus, had a more realistic approach to the international talks—the EPA should support an international ban on CFCs in aerosols because that regulation was already in place in the United States. Although somewhat embarrassed because of its inflexibility in previous negotiations, the State Department agreed to take the EPA proposal of a worldwide ban on CFCs in aerosols to the next international negotiation meeting.

Meanwhile, the EPA had the unenviable task of trying to convince chemical industry officials of the prudence of the new negotiating tactic. The EPA pointed out that the United States already had this ban, so a worldwide ban would not cost them anything. Chemical manufacturers countered that they had plants overseas that were not affected by the U.S. ban but would be regulated under a worldwide ban. The EPA responded that the U.S. had set a tough precedent in the Clean Air Act and might be liable to lawsuits if it did not pursue a global regulation. Despite industry protests, the new U.S. negotiating position included a worldwide ban on CFCs in aerosols (Roan 1990). The EPA was willing to incur the chemical industry’s enmity in the short term to achieve a global ban

on CFCs in aerosols rather than allow the United States to continue to act unilaterally in enforcing its 1978 aerosol CFC ban.

UNEP Preparatory Meeting Ends in Deadlock

The fourth meeting of the Ad Hoc Working Group was held October 17-21, 1983 in Geneva, Switzerland. The head of the U.S. delegation was Mary Hughes Rose, the State Department's Deputy Assistant Secretary for Environmental Affairs. At the meeting, the United States proposed a separate but integral protocol to the Vienna Convention that would include a worldwide ban on CFCs in aerosols, returning to an earlier position promoted during the Carter administration. The new U.S. position required states that adopted the convention to also adopt the protocol (Andersen and Sarma 2002; Parson 2003).

The Nordic states agreed to back the U.S. proposal to shift controls on aerosols to a separate protocol rather than include them in an appendix, although they still supported limits on other CFC uses. Including the CFC aerosol ban in an appendix to the convention would have meant that states that ratified the convention would also be adopting the CFC aerosol ban. A separate protocol containing the ban meant that states could adopt the convention urging reduction of CFCs but could choose not to ratify the separate protocol banning CFCs in aerosols. The Nordic states and a majority of the other states represented at the meeting wanted optional rather than mandatory adoption of a protocol to the convention. The meeting ended in deadlock over this issue (Parson 2003).

U.S. State Department Counsels Chemical Industry About CFC Ban

Subsequently in November, the State Department held a briefing for interested parties. During the briefing, industry officials voiced their concern about the new U.S.

position on CFCs. They were concerned that other nations would perceive it as a “signal that the U.S. feels CFCs represent a very serious problem, and could result in a ban on their use in other areas.” Industry officials indicated they had heard that in a June 1983 report to Congress, the EPA had indicated that additional study of ozone depletion was needed before any further domestic regulations were proposed. Donald Strobach of the Alliance for Responsible CFC Policy stated that his group supported an international convention that encouraged monitoring of the ozone layer and sharing data with other nations. He stressed that, based on current available data from ozone monitoring, additional regulatory controls were not needed.

Robert Watson, manager of NASA’s upper atmosphere research program, supported the chemical industry’s position on delaying additional regulations, indicating that the scientific community needed three to five years to validate some of the models for the upper stratosphere. Additionally, fifteen years might be needed to validate models of the lower stratosphere (BNA 1983a, 1983b; Parson 2003). As part of the ozone epistemic community, NASA generally weighed in on the side of moving swiftly to restrict CFCs. Watson’s support of the industry position was one of the few instances that a member of the epistemic community urged restraint rather than moving forward with regulations as a precautionary measure.

The proposed changes in the U.S. negotiating position that included a mandatory protocol addressing CFCs alarmed industry officials. They attempted to block further U.S. participation in the negotiations through procedural protests. They argued that the U.S. delegation made the changes with insufficient public notice and without filing an environmental impact statement. Though unsuccessful in preventing changes to the U.S.

negotiating position that had evolved during the fourth meeting of the Ad Hoc Working Group, the chemical industry did force the State Department and the EPA to initiate an environmental impact assessment later in 1984. In December 1983 industry and environmental group representatives asked for a meeting with the U.S. delegation so they could have input into the U.S. position (BNA 1983b; Parson 2003).

EPA, State Department Announce Support of CFC Ban

At a joint briefing held on January 4, 1984, the State Department and the EPA announced that the United States was leaning toward a negotiating position supporting a worldwide ban on non-essential uses of CFCs, to be included as a protocol to the international framework convention for protection of the ozone layer. After hearing comments from industry and environmental group leaders, the two agencies would refine the U.S. position at a private interagency meeting on January 6. Fitzhugh Green, EPA's Associate Administrator for International Activities, posed the paradox that would be created if the United States did not support a worldwide ban that had already been instigated in the United States. He indicated "it wouldn't be more than a few minutes before U.S. industry would come to us and ask why we've imposed a ban here if we don't support it abroad." Industry leaders balked at this, however, indicating that the U.S. negotiating position is "not based on good science" and that a few more years of research and monitoring would yield enough information to provide a more accurate basis for action. John Topping, staff director of EPA's Office of Air and Radiation, said that a worldwide ban was "almost essential" because one country acting alone is ineffective and puts itself at an economic disadvantage. "What we're trying to do is get other nations to purchase an insurance policy that the U.S. already has purchased," he said (BNA 1984c).

UNEP Preparatory Meetings Continue

The fifth meeting of the Ad Hoc Working Group was held January 16-20, 1984, in Vienna, Austria. The draft convention continued to consist of basic statements of principles and a framework for agreement. Although the United States maintained its interest in a mandatory protocol to the convention consisting of a ban on aerosol uses of CFCs, few countries at the meeting strongly supported the position (BNA 1984b). The U.S. delegation was determined to press the issue and circulated an EPA background paper in support of their position. Industry's Fluorocarbon Program Panel, administered by the Chemical Manufacturers Association, conveyed the chemical industry's skepticism of the paper, citing the three to five years of research that NASA's Robert Watson had indicated was needed before moving to additional regulations. The Panel also argued that the U.S. aerosol ban had been costly; that categorizing aerosol uses as "nonessential" was subjective; and that statements about the growth of CFC usage in the future were speculative. Because of the intense international and domestic opposition to a mandatory protocol, the United States withdrew its proposal, although the Nordic states continued the effort to formulate a protocol. The polarization that had occurred caused the revised draft protocol to contain many options to include all sides of the issue, resulting in the delegates' inability to reach any type of consensus (BNA 1984b; Parson 2003).

Based on this result, during their May 16-29 meeting in Nairobi the UNEP Governing Council proposed a compromise they believed would ensure completion of a framework convention. Because of the controversy surrounding the inclusion of a protocol, the Council indicated its desire to move forward initially with a framework convention that promoted additional scientific study of the ozone layer. Kevin Fay of the

Alliance for Responsible CFC Policy took the UNEP announcement as a victory for the CFC industry, saying “Current uncertainties about the direction science will take on the question of CFCs’ effect on the ozone layer make the protocol ‘inappropriate.’” The Alliance reiterated its support for a framework convention that did not require controls on CFCs (BNA 1984d).

State Department, EPA Prepare Draft Assessment of Vienna Convention Effects

The State Department and the EPA held a joint meeting in August 1984 to elicit comments for preparing a draft assessment of the environmental effects of a global ban on non-essential aerosol uses of CFCs. At the meeting, industry again stated its position that a mandatory protocol would be “premature” and “inconsistent with current science.” Donald Strobach of the DuPont Company and representing the Alliance for Responsible CFC Policy stated, “There is no immediate, imminent threat and harm to the ozone layer, and with that there is no need for a regulatory protocol at this time.” While EPA perceives “an urgency to move ahead with further regulation of CFCs, we can well afford to take that risk of studying the issue for an additional five years and then reassessing.” Richard Ward, who chaired industry’s Fluorocarbon Program Panel, said the draft impact statement “should clearly reflect the absence of scientific evidence that CFCs pose an imminent threat to stratospheric ozone.”

Industry representatives and the State Department officials were at odds about the amount of international support there would be for a protocol to ban CFCs. Gerald Hopka, a member of the alliance’s legal committee, said the protocol “seems to us neither needed nor desired by most of our negotiating partners.” But Scott Hajost, legal advisor at the State Department, said it is “not true that there’s no support” for an agreement on

CFCs. He said there is “a significant amount of support from other countries to keep pushing on towards a protocol” (BNA 1984a).

UNEP Meetings Show Polarization Among Countries on CFC Ban

The sixth meeting of the Ad Hoc Working Group was held October 22-26, 1984 in Geneva, Switzerland. The meeting started with a presentation by Robert Watson of NASA, who chaired the UNEP’s international technical working group charged with studying ozone layer modification and its impacts. The conclusion of the group’s report was that “a giant experiment was being performed on the atmosphere. Humanity was perturbing the carbon, nitrogen, and chlorine cycles on a global scale and in an unprecedented manner; the consequences of this experiment for the future could not be known with any certainty” (Andersen and Sarma 2002: 60).

Prior to the meeting, the United States had joined with Canada, Finland, Norway, and Sweden (termed the Toronto Group) in crafting a new draft protocol proposal that had four options for control of the use of CFCs to accommodate all countries in different stages of such control. The new draft also proposed developing technologies to limit emissions from other industries that contributed to CFC production, conducting research for developing CFC substitutes, and providing assistance to developing countries in their efforts to limit CFC emissions. However, the European Economic Community opposed the Toronto Group proposal because they believed market forces would render a sufficient reduction in CFC use without international regulation, citing reports that CFC alternatives in aerosols were cheaper than those using CFCs (Andersen and Sarma 2002).

The meeting had delineated several approaches for controlling CFCs and again polarized the attending countries. The result was an impasse on the content of a protocol, a result that carried through the plenipotentiary conference for the Vienna Convention.

The seventh meeting of the Ad Hoc Working Group was held January 21-25, 1985 in Geneva, Switzerland. Ambassador Richard Benedick headed the U.S. delegation to the meeting. The UNEP had also designated this last meeting before the plenipotentiary conference as an intergovernmental meeting because all attendees were diplomatic agents of governments having full powers to negotiate, in contrast to the working group meetings consisting of attendees with no authority to commit their governments in any way. The format of the meeting consisted mainly of reiterations of the Toronto Group proposal and rebuttals by the EEC delegates. No additional provisions for the Vienna Convention were forthcoming (Andersen and Sarma 2002).

Plenipotentiary Conference on the Vienna Convention

The plenipotentiary conference on the Vienna Convention for Protection of the Stratospheric Ozone Layer was held March 18-22, 1985 in Vienna, Austria. The heads of the U.S. delegation were from the State Department: James L. Malone, Assistant Secretary for Oceans and International Environmental and Scientific Affairs, and Richard E. Benedick, Deputy Assistant Secretary (Acting) for Environment, Health, and National Resources. Additional delegation members were Scott Hajost, Office of the Legal Advisor, Department of State; Stephen R. Weil, Office of Policy Planning and Evaluation, Environmental Protection Agency; and James A. Losey, Office of International Activities, Environmental Protection Agency (UNEP 1985a).

The Toronto Group again attempted to pursue its version of a protocol to be associated with the convention, and the European Economic Community again resisted the proposal. Neither group was able to sway the attending state delegations to its viewpoint. Rather than cause the conference to deadlock, the Toronto Group withdrew its proposal for a protocol banning CFCs in aerosols, and the conference proceeded to address adoption of a framework convention. The convention itself contained little that was controversial, calling for each state “to cooperate in research, observations, and information exchange, and to adopt policies to control human activities that might modify the ozone layer” (Andersen and Sarma 2002).

No representatives from environmental groups, from the United States or otherwise, attended the plenipotentiary conference. Of the three non-governmental organizations that attended, two were from Europe—the European Council of Chemical Manufacturers’ Federations and the Federation of European Aerosol Associations—and one was an international business group, the International Chamber of Commerce. While industry spokespersons were official members of some of the national delegations (and Donald Strobach of the DuPont Company represented the International Chamber of Commerce), no delegates represented environmental non-governmental organizations, even though several groups had been specifically invited (Sand 1985; Benedick 1998; Parson 2003).

Not all State Department officials concurred with the negotiating position the U.S. delegation took to the plenipotentiary conference on the Vienna Convention. Near the end of the negotiations, Under Secretary of State for Economic Affairs Allen Wallis recommended that Secretary of State George Shultz withhold authority for the U.S.

delegation to sign the Vienna Convention. Wallis opposed the agreement because he saw it as a prelude to international regulation, which in fact the United States had supported to some extent since early 1984. The EPA at the very least wanted an international ban on CFC propellants in aerosols that corresponded to current U.S. domestic policy. However, Wallis felt that the EPA would view the Vienna Convention and future international agreements as a means to circumvent President Reagan's deregulation policies. After delegation head Malone quickly alerted private sector Convention proponents of their need to intercede with the Reagan administration to avoid a change in U.S. position, the U.S. delegation was allowed to sign the Vienna Convention (Benedick 1998). This incident was one of the first in a "turf battle" that pitted the EPA—the government "defender of the environment"—against the State Department, which was more attuned to industry arguments about profit margins and competition in the world marketplace.

Discussion

As the first component of the ozone protection treaty, the final product of the Vienna Convention meeting was more of a symbolic gesture of cooperation than a significant test of global will to stop ozone depletion. Nevertheless, the international negotiations over the three years leading to the March 1985 diplomats' meeting provided some contentious moments as the United States, working within the Toronto Group, attempted to impose an international protocol to limit CFCs.

The U.S. government was divided in terms of party alignment, with a Republican President in Ronald Reagan and a divided Congress: the House had a Democratic majority and the Senate a Republican majority. The U.S. negotiating position evolved from requiring no CFC restrictions (the 1982 position) to a protocol banning aerosol

CFCs (the position taken to the final meeting in 1985). Neither the original 1982 U.S. negotiating position nor the 1985 position taken to the Vienna Convention plenipotentiary meeting required further domestic legislation,¹⁰ and Congress remained relatively uninterested in the proceedings.

Atmospheric scientists were just beginning at this point to come together as an epistemic community. The WMO, associated with UNEP, took the international lead in compiling scientific information about ozone layer depletion. Robert Watson, an atmospheric scientist with NASA, spearheaded the information gathering process in the United States. Watson was a key expert witness during State Department and EPA meetings held to formulate the U.S. negotiating position and would soon become prominent in the growing ozone epistemic community.

Although environmental groups had been active during the late 1970s in endorsing U.S. domestic legislation leading to the 1978 ban on aerosol CFCs, these groups did not actively participate in the domestic discussions leading to the Vienna Convention. Many environmentalists believed that the 1978 controls on CFCs had solved the ozone depletion problem, and the media did not give the issue sufficient prominence to bring it to the forefront on the public agenda. Thus, environmental groups did not explicitly endorse the U.S. negotiating position. Corporations producing CFCs and associated trade associations, however, were very vocal in reiterating their position that additional CFC controls were not needed. When the United States began promoting a worldwide ban on CFCs in aerosols to match the existing U.S. ban, the chemical industry resisted the position, citing the need for additional scientific analyses before other nations

¹⁰ The U.S. Environmental Protection Agency promulgated regulations in 1978 to ban CFCs in aerosol applications.

should consider extending the unilateral U.S. ban. The United States entered into international negotiations with an ambivalent environmental sector and a chemical industry that supported additional research but was adamantly opposed to worldwide CFC restrictions.

The end result of the plenipotentiary meeting in March 1985 was a framework convention that promoted the conduct of additional scientific investigations but did not include CFC restrictions. The Vienna Convention was not the package that the United States negotiating delegation had desired, but the result was easier to sell domestically. No new legislation was required, and the chemical industry had managed to preserve the status quo for a few more years.

The Montreal Protocol: The Ozone Protection Treaty Gets Some “Teeth” (March 1985—September 1987)

The United States left the Vienna Convention negotiations without gaining what the EPA wanted most—a ban on CFC production and use. After March 1985, the EPA took the lead domestically in influencing the next round of negotiations on a protocol that would create such a ban. The agency held workshops and conferences to convey the latest findings about ozone layer depletion, testified during Congressional hearings, and attended international conferences where its scientists were considered experts.

The UNEP-sponsored Leesburg, Virginia, workshop held in September 1986 was considered a watershed event in advancing negotiations for a protocol. Workshop participants were persuaded that restrictions on CFCs were imperative after the EPA presented data showing that maintaining the status quo on ozone layer depletion would require an 85 percent reduction in CFC production and usage—a ban on CFCs in aerosols alone would not be adequate. The data were sufficiently compelling that DuPont, the leading producer of CFCs, and the Alliance for Responsible CFC Policy, representing both producers and users, conceded the need for CFC restrictions and asked the EPA to allow industry representatives to assist in the formulation of the U.S. position for the upcoming protocol negotiations.

The United States arrived at the first negotiating session in December 1986 with a plan supported by the Toronto Group, a coalition that had formed during the Vienna Convention meeting. The plan included a near-term freeze on all CFCs, followed by scheduled reductions of up to 95 percent over the long term that would be based on continued scientific assessment. However, two other proposals were on the table, with sufficient differences that the likelihood of swift action on a protocol faded.

During the early months of 1987, the United States signaled its seriousness about a CFC ban when Congress began hearings on legislation designed to implement domestically what it was advocating internationally. The possibility of a domestic ban on CFCs bolstered the U.S. position during the next rounds of protocol negotiations, but the CFC industry expressed dismay that, after the industry gave its support to international CFC restrictions, the United States might unilaterally impose such a ban if it was not included in a protocol. Industry began backtracking on its support, with some industry groups reverting to their earlier position of continued scientific assessment rather than CFC restrictions.

The controversy about a unilateral U.S. ban on CFCs ignited criticism of the Reagan administration. Environmental groups noted mixed signals about the U.S. position on a CFC protocol and domestic policy, especially after one administration official offered an option that included hats, sunglasses, and sunscreen in lieu of domestic or international CFC restrictions. The EPA Administrator quickly indicated that President Reagan supported a strong international agreement and the U.S. maintained its stance during later negotiations on a 95 percent CFC ban implemented incrementally over more than a decade, a position that was reflected in the final restrictions imposed by the Montreal Protocol.

Domestic Interests, Institutions, and Information

During the period from March 1985 when the Vienna Convention became available for state approval until the plenipotentiary meeting for the Montreal Protocol in September 1987, the U.S. President remained Republican Ronald Reagan. The Secretary of State remained George Schultz, and the EPA Administrator was Lee Thomas. The

legislative branch of the government remained divided until January 1987: the House of Representatives had a Democratic majority, while the Senate had a Republican majority. However, for the nine months leading to the plenipotentiary meeting, both houses of the U.S. legislature had a Democratic majority. Although Helen Milner uses the factor of divided government as a disincentive for cooperation in the ratification process, divided government may also be indicative of cooperation problems in terms of formulation of the U.S. negotiating position for the international agreement.

A Louis Harris poll conducted near the midpoint of the period leading up to the plenipotentiary meeting for the Montreal Protocol found that environmental dangers were “close to the top” of the list of issues that concerned the American public. Using the results of a May 1986 poll, Harris indicated that on the basis of environmental issues alone, “pro-environment” national candidates could expect to add five percentage points to their election results. In addition, the poll highlighted the electorate’s major disenchantment with the way environmental issues were being addressed—industry’s handling of environmental issues was disapproved of by 64 percent of the electorate, President Reagan’s by 69 percent of the electorate, and Congress’ by 58 percent (BNA 1986e).

EPA Leads in Domestic Protocol Discussions

Interest in the ozone depletion issue intensified two months after the 1985 Vienna Convention was opened for ratification. Joseph Farman and his team from the British Antarctic Survey reported significant ozone loss over the Antarctic for three consecutive years, coining the phrase “ozone hole” to describe it. For the next year, scientists evaluated the new and subsequent data, and during the months leading up to the 1987

Montreal Protocol, the media began to dramatize the ozone hole theories, contributing major news stories for several months. The media brought the ozone depletion issue back to the public's attention, and consequently environmental groups began to play a significant role in agenda setting by promoting an urgent need to ban CFCs in the United States (Litfin 1994).

The EPA began to take charge of the discussions about CFCs and their impact on the ozone layer early in 1986. The EPA held a U.S. workshop on protecting the ozone layer in March 1986 that was attended by EPA Administrator Lee Thomas, other EPA officials, economists, chemical industry representatives, and atmospheric scientists. During his opening remarks to the participants, Thomas indicated that the EPA was headed in a new direction in engaging the ozone debate, saying, "EPA does not accept, as a precondition for decision, empirical verification that ozone depletion is occurring. Several aspects of the situation suggest we may need to act in the near term to avoid letting today's 'risk' become tomorrow's 'crisis'" (Brodeur 1986). The State Department was included in the workshop through an address by Richard Benedick, Deputy Assistant Secretary for Oceans and International Environmental and Scientific Affairs. Benedick would lead the U.S. delegation in negotiations at the Montreal meeting in September 1987.

By mid-1986, international diplomats and scientists were again poised to tackle the controversial issue of mandatory controls on CFCs. From mid-1986 to the plenipotentiary conference in September 1987, the UNEP sponsored two international workshops and four Negotiations Working Group meetings that allowed states to enter into debates on control measures for CFCs.

The first UNEP-sponsored workshop to address a protocol to the Vienna Convention was held in May 1986 in Rome, Italy, and was attended by both state officials and non-governmental organizations, especially those representing CFC-related industries. The workshop also marked the first environmental group representation at one of the UNEP meetings—a representative from the Environmental Defense Fund served on the U.S. delegation. While the workshop provided a forum for scientists to present the latest information about ozone layer monitoring and modeling, it also served as an arena for continuing debates on the issue of mandatory controls on CFCs. No significant innovations were proposed, and the deadlock from the Vienna Convention negotiations on the issue of mandatory CFC controls carried over to other, less controversial topics. State delegations remained rigidly divided on the issue of mandatory controls on CFCs, and little progress was made in contributing to a viable protocol (Parson 2003).

The EPA held several U.S. conferences during the summer between the first and second UNEP-sponsored workshops. In addition, EPA officials testified in June 1986 before the Senate Environment and Public Works Subcommittee on Environmental Pollution. During these hearings, the EPA continued its campaign to be the government defender of the environment. In a break with other Reagan administration officials, EPA Administrator Lee Thomas testified that over the next year and a half the agency, using its authority under the Clean Air Act, would decide whether to seek a total ban on CFCs. Other Reagan administration officials had indicated that the executive branch preferred to wait and base a decision on further scientific study. James Hansen, director of NASA, advocated a decade-long program of global climate observations (BNA 1986i). Thomas's remarks seemed to reflect the agency's concurrence with the majority of environmental

groups. At the EPA- and UNEP-sponsored International Conference on Health and Environmental Effects of Ozone Modification and Climate Change in mid-June 1986, Gus Speth of the World Resources Institute voiced the expectations of his organization that a lack of scientific proof on the role of CFCs in the depletion of the ozone layer should not delay action to prevent “environmental disaster” (BNA 1986d).

In August 1986, shortly before the second UNEP workshop, the EPA convened its own workshop to hear the views of CFC producers and users. The EPA assured participants that the results of the workshop would be factored into EPA decisions about CFC restrictions. Participants were divided into groups to consider five alternative strategies for addressing the ozone issue: assessment and review; production or capacity limits, use limits, emissions fees, and technology-based controls. Workshop participants indicated their view that the scientific case that CFCs posed a threat to the ozone layer should be very strong before the EPA took any action. One participant said that the United States is “always shooting itself in the economic foot” by marching off alone in pursuit of an ideal (BNA 1986b), a viewpoint that may have been in response to the EPA Administrator’s testimony during the June Senate subcommittee hearings.

The second UNEP workshop was held September 8-12, 1986, in Leesburg, Virginia. The Leesburg workshop has been credited as a major breakthrough in terms of overcoming international resistance to CFC controls that evolved during negotiation of the Vienna Convention. Several state delegations used the meeting as another opportunity to restate their arguments against CFC regulations, and the workshop again provided a forum for atmospheric scientists. However, state delegations gained an impression during the workshop that the United States might be less interested in pursuing a ban limited to

aerosols containing CFCs and more interested in a strategy for addressing all CFCs, especially after the EPA revealed a new analysis of stratospheric chlorine levels.

The EPA provided the results of analyses that modeled ways to keep CFCs in the stratosphere at the current level. The results indicated that achieving this goal would still require an 85 percent reduction in the most prevalent uses of CFCs, not just aerosol uses. Canada responded to the EPA's analysis by proposing a new comprehensive approach to global controls that would allow nations some discretion in distributing their control efforts among chemicals and among uses. The new proposal was well received by most nations; however, European CFC-producers were concerned about complexity and additional paperwork (Parson 2003).

Industry Concedes to Need for Protocol

The first U.S. industry response to the Leesburg proposal occurred four days after the workshop. To that point, the U.S. chemical industry had maintained a united front in its opposition to a ban on CFCs in aerosols; however, accumulating information about the role of CFCs in ozone depletion had begun to erode the industry stance. Although the chemical industry had continued to attack the science associated with ozone depletion, atmospheric scientists in the ozone epistemic community were steadily building a case against CFCs that industry was steadily having more difficulty in disputing. In an abrupt turnaround on September 16 the Alliance for Responsible CFC Policy, a coalition of 500 companies that produced or used CFCs, issued a policy statement indicating its support for a reasonable global limit on future production capacity of CFCs. The Alliance also urged the United States to resist "additional unilateral regulation" that could put U.S. industry at a disadvantage in the global market (BNA 1986a).

A few days after the Alliance issued its statement, DuPont met with EPA officials. According to James Adshead of DuPont's external affairs department, DuPont "verbally proposed to EPA that they initiate the regulatory negotiations process to try to establish the limits on what CFC growth should be." After years of denial about the impact of CFCs on the ozone layer, DuPont had ceased its overt resistance to CFC regulation. By requesting a regulatory negotiations process, DuPont was asking for a seat at the domestic bargaining table in which, according to Adshead, "A neutral party bring[s] together EPA, other departments, and those affected by a rulemaking in face-to-face negotiations on an agreement they all can live with" (BNA 1986a).

Within a month, the State Department asked the Alliance for its views on the best means to negotiate an acceptable protocol to the 1985 Vienna Convention. The Alliance promptly responded, suggesting a global limit on the growth of production capacity for CFCs rather than the total phaseout that various environmental groups had demanded in Congressional hearings and in meetings with the EPA (Barnett 1986).

In a rare concession to a previous opponent, Thomas Stoel Jr. of the Natural Resources Defense Council called DuPont's recent actions "the biggest breakthrough on these vitally important global issues since the United States banned ozone-depleting aerosol sprays in 1978" (BNA 1986h). The Alliance and DuPont announcements, coupled with the results of the Leesburg workshop, were reasons for Richard Benedick to express optimism in mid-September about the upcoming international protocol negotiations, saying, "We're on the road, although it is a difficult road. I am now more optimistic than I was before the meeting in Leesburg that there can be an international agreement. The evolving attitude of U.S. industry is a promising sign" (BNA 1986g).

State Department Leads International Protocol Negotiations

By November 4, the United States had essentially formulated its position for the first round of international protocol negotiations held in Geneva December 1-5, 1986. The State Department notified its embassies that the Reagan administration would propose a “near-term freeze” on manufactured CFCs, followed by a longer term phaseout of the chemicals based on periodic review of scientific assessments about the condition of the ozone layer. The State Department indicated that this position was recommended by EPA Administrator Lee Thomas and supported by the State Department and NOAA (Shabecoff 1986). World Resources Institute (WRI), an environmental research group, timed its latest report on protecting the ozone layer to coincide with the beginning of the Geneva meeting. The report provided supporting documentation for the WRI claim that global CFC emissions could be reduced by one-third during the following five years by using “safe” CFCs, banning aerosols, and recycling CFCs (BNA 1986c; Miller and Mintzer 1986).

Ambassador Richard Benedick, head of the U.S. delegation to the Geneva meeting, laid out the U.S. position to the conference participants on December 1. The proposal, supported by the Scandinavian countries, called for a near-term freeze on CFCs at 1986 levels, coupled with a “scheduled reduction of emissions” of these chemicals over the long term by as much as 95 percent (the remaining 5 percent accounted for emissions from some essential uses for which no viable substitutes had been determined). Two other proposals were on the table at the Geneva meeting: a Canadian proposal, supported by the Soviet Union, for allocation of national emission quotas that would leave countries free to emit CFCs up to a certain level; and an EEC proposal for an

immediate, but interim, freeze and reduction in production of CFCs, to be followed at a later stage by further reductions in emissions.

Richard Benedick indicated that the Canadian-Soviet plan was “theoretically elegant but difficult to put into practice.” He also thought the EEC had not been sufficiently prepared internally to take a stand on the issue, a problem that could delay agreement on a protocol. In contrast, he said the U.S. plan would provide a margin of safety against increasing harm to the ozone layer, allow continued scientific assessment of the link between CFCs and ozone depletion, and allow industry to plan for the costs involved in reducing reliance on CFCs and adjust accordingly. EPA Administrator Thomas, who also attended the Geneva meeting, said he thought the U.S. proposal would get very serious consideration, although additional negotiations would be necessary before the plan was accepted (BNA 1986f).

By early January, officials with UNEP conceded that protocol negotiations were likely to drag on until the third quarter of 1987 and restrictions would be weaker than originally anticipated. According to UNEP’s Peter Usher, there was already a possible consensus with respect to regulation of CFC 11 and CFC 12 but substantial resistance to limiting other CFCs and especially to restricting the use of halons in fire extinguishers. He indicated that he expected consensus on a protocol after two additional meetings to be held in 1987. Usher compared the negotiations to a poker game “where people keep their cards very close to their chests while they try to determine what the other players are doing. This can sometimes be followed by unexpected, rapid movement.” In that regard, the EEC had its own set of problems in reaching internal consensus: the EEC recognized itself as a group of 12 countries having 12 views but with a necessity to act on the basis

of unanimity. Fiona McConnell, head of the international division of the UK Department of the Environment, said that for the Geneva meeting the EEC delegation had not received from its government “the kind of political go-ahead that the U.S. delegation has been given” (BNA 1987j).

Domestic Groups Respond to Geneva Negotiations

A joint hearing of the U.S. Senate Environment and Public Works Subcommittees on Environmental Protection and Hazardous Waste in late January 1987 opened with several scientists urging immediate global action to reduce CFC emissions. John Negroponete, Assistant Secretary of State for Oceans and International Environment and Scientific Affairs, indicated that the imminent resumption of international negotiations signaled that the parties were serious about addressing the problem. He echoed the concern of the domestic chemical industry when he stated that the United States should not adopt unilateral measures to control CFCs, warning that some industries could simply move overseas or that other nations would boost production of CFCs to fill the gap. Craig Potter, the EPA’s Assistant Administrator for Air and Radiation, voiced a softer stance about industry concerns than EPA had promoted in previous months. He said that forcing industries to find substitutes for CFCs through regulations would be “a painful process” and that the EPA wanted such development work to move forward “without going unnecessarily far in economic disruption” (BNA 1987d).

A month later, DuPont reiterated the problems with forcing a ban on CFCs without first addressing the length of time needed to develop CFC alternatives. In one of its industry publications, DuPont laid out its strategy for addressing a CFC phaseout (DuPont Freon Products Division 1987):

Shortly after the ozone depletion hypothesis was proposed in 1974, Du Pont initiated a program to develop alternatives to the suspect chlorofluorocarbons (CFCs)...A particular deficiency [of the alternatives] was the projected higher cost for some of the most promising products. At about [1980], scientific and regulatory concern over CFCs began to decrease. This, in combination with market surveys which indicated little interest in more expensive alternatives, led to a de-escalation of effort.

In 1986, however, the picture changed again. It is now expected that regulation in some form will be announced by the end of 1987. Du Pont believes that regulations could be extensive enough to limit availability of at least some existing CFCs to less than the market demand sometime within the next several years. In this new environment, Du Pont reinitiated an active effort to develop alternative products, with the aim of providing new products if and when there is a clear market demand.

...

Du Pont's active research and development effort is focused on identifying the best processes for commercial manufacture of attractive alternatives for CFC-11, CFC-12, and CFC-113. Based on the results of this work, as well as feedback from customers on market interest, pilot-plant development for alternative products is expected to begin by late 1987... This path forms the basis of Du Pont's estimate of roughly five to six years as the total time required to bring commercial products to the marketplace.

In mid-February 1987, Senator Max Baucus (D-MT) introduced legislation that required a virtual production phaseout of certain CFCs, but he also included provisions that would aid the chemical industry in complying. Senator Baucus deflected criticism about a CFC phaseout that would impair U.S. competitiveness in the global market by suggesting that a phaseout might actually enhance U.S. competitiveness, offering the CFC industry the possibility of replacing profits from CFCs with profits from CFC alternatives. He said that "we will take the lead in developing substitutes. We in America will have a competitive edge." Baucus' bill required CFC manufacturers to reduce CFC production by 95 percent over eight years but allowed the chemical industry to select the order in which specific CFCs would be controlled. Fines were included in the bill for manufacturers that failed to comply with the reduction standards. In addition, the bill

specified import restrictions against CFC-containing products from other nations that refused to adopt production phaseout plans. Senator John Chafee (R-Rhode Island), a co-sponsor of the bill, declared, “We are not going to let other countries move in and fill the gap.”

Separate legislation, a concurrent resolution urging President Reagan to negotiate for global CFC reductions, was also introduced. Representative Bill Richardson (D-NM), who introduced the House version of the resolution, said that it would “give impetus to the [UNEP negotiations] meeting next week” in Vienna (BNA 1987n).

Domestic Legislation Reinforces U.S. Position in Vienna Negotiations...

The next international negotiating session was held in late February 1987 in Vienna. It became apparent early in the session that domestic politics in the United States were having an impact on protocol negotiations. The United States, with the possibility of domestic legislation to freeze CFC emissions and progressively reduce them by 95 percent over a specified time, had the support of Canada and the Scandinavian countries. In addition, the increased domestic support allowed the U.S. delegation to openly criticize European nations and Japan and their respective chemical industries for not moving far enough fast enough in coming up with a protocol that governments could sign. Most delegations agreed that any freeze on CFC production should be at 1986 levels, but there was still dissent about which chemicals should be restricted and whether a total CFC phaseout was needed.

The head of the U.S. delegation, Richard Benedick from the State Department, noted that environmental groups in other countries were not able to influence their governments’ actions on CFC production. Instead, he postulated, large chemical

companies in other countries with an important stake in decisions to limit or ban CFC production were the prime advisors to their governments. The influence of big business on government actions was tempered in the United States because environmentalists had influence with the EPA, the self-proclaimed government defender of the environment. Because Nixon had established the EPA as an independent organization within the President's Cabinet, the agency had considerable latitude in its preferences and actions. In the United States, the chemical industry eventually realized it would have to compromise with EPA's environmental interests and publicly expressed its willingness to work with the government in further control measures. In Europe and Japan, the governments were more narrowly focused on economic self interest. Benedick stressed the pending U.S. legislation, saying, "I think it is important for the world to know that the United States has the strong backing of the Congress. This is a strong signal to the rest of the world" (BNA 1987p).

...But U.S. Position Meets Additional Domestic Opposition After Vienna Meeting

After returning from the Vienna meeting in early March, chief U.S. negotiator Richard Benedick expressed concern about the proposed Congressional legislation, saying that a global agreement on a control strategy for CFCs, even if it is "short of perfection," would be better than unilateral action by the United States. "We are only 30 percent of the problem and I'd rather have that agreement than have the United States legislate controls all by itself." Negotiations were set to continue in late April in Vienna, and Benedick was convinced that a protocol would be ready for a September 1987 diplomatic session in Montreal, where each nation's delegation would be expected to have the authority to sign an agreement. Benedick's testimony before the House Foreign

Affairs Subcommittee on International Organizations explained the relationship between domestic and international actions on the issue. Asked how the global negotiations would be affected if the protocol was not adopted by November 1987, when the EPA was required under court order to issue final regulations for more stringent CFC controls, Benedick replied (BNA 1987b),

We are trying very hard to keep negotiations on a parallel track. There is always the possibility of asking for deferment of that November 1 date. There is no question that the international agreement would be preferable. When we took the action on aerosols several years ago, the rest of the world [except Canada] just sat back. This time, I think the chances of getting an agreement are very good.

The chemical industry voiced its criticism of the U.S. position during the March 12 meeting of the House Science, Space, and Technology Subcommittee on Environment. Robert Orfeo of Allied-Signal, Inc., representing the Fluorocarbon Program Panel of the Chemical Manufacturers Association, testified that “based on research to date, in the judgment of the panel there is no imminent hazard from continued emissions of CFCs at or near today’s rates.” Richard Barnett, chairman of the Alliance for Responsible CFC Policy, told the subcommittee that his group supported an international agreement on global production capacity for fully halogenated CFCs, the development of voluntary CFC conservation programs by user industries, continued development of scientific understanding of the ozone depletion theory, and research and development of alternative CFCs by producers and users (BNA 1987c).

A few weeks later at a two-day meeting sponsored by the Alliance and the Center for Energy & Environmental Management, Joseph Steed, DuPont’s ozone issue manager, accused the U.S. protocol negotiators of being “determined to achieve an almost total phaseout even at the risk of thwarting the chances of reaching any agreement at all.”

Instead of a total phaseout, Steed proposed a five-year production limit and reevaluation of scientific data about ozone depletion after that period, with evaluation results providing policy makers a basis for further CFC restrictions or a continuation of the freeze. Richard Benedick, who also attended the meeting, told attendees that a freeze, “while useful in the near term, would not provide a sufficient stimulus to cause industry to develop alternatives.” Steed replied that a freeze for a few years would permit producers to pursue their search for alternatives to the currently used CFCs. “DuPont has identified a number of possibilities, and we are stepping up our development work. We estimate it will take five to seven years at best to make alternates commercially available. And that availability would, of course, depend on market demand” (BNA 1987f).

The debate about the stringency of the U.S. position on a protocol peaked two weeks before the late April international negotiating session. At a symposium on environmental issues, John Negroponte, Assistant Secretary of State for Oceans and International and Environmental and Scientific Affairs, was asked whether the Reagan administration was backpedaling in its support for a strong international protocol on CFCs. Other agencies in the executive branch had begun to weigh in on the controversy. The White House’s Office of Management and Budget, Commerce and Interior Departments, and NOAA had begun to question whether the risk of stratospheric ozone depletion posed a sufficient risk to human health to warrant strict international controls. The inquiries may have been spawned by Representative John Dingell (D-MI), chairman of the House Energy and Commerce Committee, who had questioned the scope and pace of the international negotiations.

Although the State Department and the EPA had differed in their opinions over the past few years about the need for stringency in CFC regulations, ultimately the State Department and the EPA were able to defend the position they had been crafting since late 1986, and the U.S. delegation went to the Geneva meeting with an initial proposal that would cut global emissions of six ozone-depleting substances by 95 percent over 10-14 years (BNA 1987l, 1987q).

Second Geneva Meeting Results in “Bracketed” Draft Protocol

International protocol negotiations continued April 27-30 in Geneva. Many state delegations agreed from the start of the meeting that a global freeze on the production of CFCs was necessary. Through the course of the meeting, many also seemed to agree that incremental cuts in CFC production might also be needed, based on the results of ongoing scientific evaluations. However, details on the timing and stringency of production cuts and on CFC trade issues remained unresolved.

Although delegations left the meeting with a consensus document for their governments to consider, many paragraphs contained brackets to accommodate a series of options. At the beginning of the meeting, the U.S. delegation pressed for a strong protocol that would at first freeze and eventually eliminate production of all fully halogenated CFCs, including halons. Representatives of environmental groups who had “observer” status at the closed sessions believed that the United States had ultimately compromised so much that the final result might be a weak protocol. Conversely, Kevin Fay, executive director of the Alliance for Responsible CFC Policy, was concerned about the proposal of CFC production cuts, saying “We are very frustrated at the inability to

recognize that the incentive to develop substitutes is there with a freeze. We think it is bad public policy to try to do more than a freeze” (BNA 1987k).

At this point the chemical industry had conceded that some type of restriction on CFCs would result from the international meetings. However, in order to remain competitive, the industry needed time—time to develop CFC alternatives that it could sell, not only in the United States but also to both industrialized and developing countries that did not have their own capacity to produce CFC substitutes.

In a released statement on May 4, the Natural Resources Defense Council continued the criticism of the Geneva outcome, saying, “The result of last week’s negotiation is a document that, if signed and ratified, would obligate countries only to freeze CFC emissions by 1990 and to reduce them 20 percent by 1992.” The NRDC’s David Doniger noted the importance of the U.S. stance in the negotiations (BNA 1987q):

There is a relationship between the domestic and the international that is very subtle. The calculations of the Europeans and the Japanese about what they will agree to is affected by what we will do if there is no agreement. If the United States is going to have a strong program with sanctions, then they must weigh that in the calculations. Mr. Dingell takes the view that we in the U.S. should formally and up front state they we are not going to go unilaterally. As a result of that, he is recommending that U.S. negotiators throw away an important tool in their negotiations.

The NRDC believed that if the United States did not portray a strong and united front concerning its intentions for an almost complete domestic phaseout of CFCs regardless of international outcome, the result would be that the international negotiations would stalemate or produce a much weaker document than the United States wanted.

Reagan Administration Sends Mixed Signals about U.S. Position on Protocol

Discussion about a CFC protocol continued May 13-14 at a joint meeting of the Senate Environment and Public Works Committee's Subcommittees on Environmental Protection and on Hazardous Wastes and Toxic Substances. Richard Benedick indicated that while there had been a "significant narrowing" of positions among the state delegations at the second Geneva negotiations meeting, "it is clear further negotiations will be difficult." EPA Administrator Lee Thomas told the Senate panels that the Reagan Administration was supportive of the draft document that came out of the second Geneva meeting, adding that "we have a process underway to review its components to determine the best way to achieve overall international reductions of these chemicals, as determined to be necessary by the increasing body of scientific information." Anthony Calio, the Commerce Department's Under Secretary for Oceans and Atmosphere, added NOAA's support for the U.S. negotiating position (BNA 1987e).

During the Senate hearings, the chemical industry provided an update on research to identify CFC substitutes. Elwood Blanchard, group vice president of DuPont's chemicals and pigments department, testified that 20 to 30 years would be needed for a complete shift from all currently used CFCs to CFC substitutes. He said that DuPont's efforts to identify substitutes began in the mid-1970s and were completed by 1980 when "it was clear that such products could not be made to compete with the major existing CFCs in the marketplace." In 1986 when DuPont realized that some precautionary limits might be appropriate, the company concluded that "such limits will eventually justify production of more expensive and somewhat less satisfactory alternatives." He indicated that DuPont was concentrating on substitutes for four of the CFCs that might be limited

under an initial protocol and that a minimum of five years would be required to determine whether the substitutes could be commercially manufactured (BNA 1987e).

Although the chemical industry seemed to be acquiescing to some type of limits on CFCs and the State Department had taken a firm stance on the U.S. negotiating position for a CFC protocol, the controversy was far from over. In late May, there were indications that opposition to the proposed protocol was rising within the Reagan administration, especially within the Interior Department where some officials believed the accord would violate President Reagan's doctrine of minimal government regulation. Additionally, White House science adviser William Graham, Jr. indicated that he had concerns about a protocol when there were "substantial uncertainties" about the causes and rate of ozone loss. The rift became apparent in a May 20 meeting of the Cabinet Council on Domestic Policy when Interior Secretary Donald Hodel argued for a protocol alternative—a "personal protection" plan against ultraviolet radiation that included use of hats, sunglasses, and sunscreen (Peterson 1987).

The overall response to the outcome of the May 20 Cabinet council meeting was astonishment from the State Department and environmental groups and backpedaling from the Interior Department. Chief U.S. negotiator Richard Benedick said, "Our negotiating position was authorized last November, and it's hard to imagine that people weren't aware of it. The issue was discussed before the Domestic Policy Council last summer." Environmentalists called the Hodel proposal "the Rayban Plan." The NRDC's David Doniger said (Peterson 1987),

If it costs people \$25 to buy glasses that filter out ultraviolet radiation, plus a hat and two bottles of sunscreen at \$5 each, that's \$40 a person. Take that times 200 million people and you get \$8 billion a year.

Obviously, you cannot protect crops or the marine environment by personal protection. It's very hard to get fish to wear sunscreen.

Leaders of the largest environmental groups in the United States, representing six million members, sent a letter to President Reagan asking him to stand behind the EPA Administrator's efforts to protect the ozone layer. In an attempt to temper Interior Secretary Hodel's remarks, a department spokesperson indicated that Hodel never intended his suggestion to be an ultimate solution to ozone depletion, saying "His concern is that the President not be boxed into a decision based on one option" (BNA 1987h, 1987g). By June 18, the internal administration conflict had apparently been resolved. At the First Pacific Environmental Conference in Nagoya, Japan, John Negroponte, U.S. Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs, addressed the meeting and called for global consensus on a CFC protocol. He said that the Reagan administration was not backing down on its forceful stance for controlling CFCs, calling rumors to the contrary "exaggerated government discord" (BNA 1987m).

EPA Administrator Thomas later said that, despite the controversy, he did not see support for the U.S. position unraveling and, in fact, he believed that the U.S. delegation probably got the strongest support of those attending the negotiations. President Reagan "has given very strong direction to the negotiating team.... We went through a process of debate, but it was a healthy debate and came out with continued very strong U.S. leadership and support on the issue." According to Thomas, President Reagan directed the negotiators to continue to seek "a strong agreement," meaning that the U.S. delegation should push for a protocol that addressed as many ozone-depleting chemicals

as possible, put a production freeze in place as quickly as possible, and provided a schedule for reductions in CFC production levels (Durkee 1987).

United States Firms Position on Montreal Protocol

The next step in formulating a workable CFC protocol occurred June 29-30 in Brussels. UNEP Executive Director Mostafa Tolba brought together representatives from key nations—one representative each from the European Community (EC), Japan, New Zealand, Norway, Sweden, the United States, and the Soviet Union—in informal, closed-door sessions, with a mandate to produce a draft protocol that could be turned into a legal document for the September plenipotentiary meeting in Montreal. After the Brussels meeting, Tolba indicated he was “80 percent confident” that an acceptable protocol would be available for the Montreal meeting, while other participants said that an agreement was “in the bag” and that discussions had turned to “what’s going to happen *after* Montreal” (BNA 1987i).

Although UNEP intended to keep private the results of the Brussels meeting until a draft legal document could be sent to all participants near the end of July, the United States gave some indication of the draft protocol contents when the EPA and State Department published a notice in the *Federal Register* of their intent to prepare an environmental impact statement on a protocol to the Vienna Convention for the Protection of the Ozone Layer. The notice outlined the possible provisions of a draft protocol and said the draft environmental impact statement would be completed in mid-January 1988, while the earliest expected date for entry into force of the protocol was late 1988 (BNA 1987o).

The plenipotentiary meeting for the Montreal Protocol to the Vienna Convention for Protection of the Stratospheric Ozone Layer was held September 14-16, 1987 in Montreal, Canada. The final protocol closely paralleled the United States position on production restrictions, although the restrictions were expanded to include consumption (i.e., use of CFCs in products) as well as production. Developed states were required within seven months after the agreement entered into force (i.e., by July 1989) to freeze production and consumption of five CFCs (CFC-11, -12, -113, -114, and -115) at 1986 levels. Production and consumption of the five CFCs were required to decrease by 20 percent of 1986 levels by June 1994 and by 50 percent of 1986 levels by June 1999. Developed countries were also required within 37 months after the agreement entered into force (i.e., by January 1992) to freeze production and consumption of three halons (halon-1211, -1301, and -2402) at 1986 levels. Developing countries received a 10-year extension of the protocol's time limits (UNEP 2003).

In his closing remarks to delegations at the plenipotentiary meeting, EPA Administrator Lee Thomas commended the spirit of cooperation entailed in the negotiations, saying, "Within the United States and elsewhere, government, industry and the environmental community have come together to safeguard the ozone layer in a manner virtually impossible a decade ago. Clearly, it has not been easy. Curtailing use of economically valuable chemicals that have served mankind well has inherent difficulties." Spokespersons for environmental and industry groups observing the conference said their groups supported the protocol. The executive director of the Alliance for Responsible CFC Policy, Kevin Fay, said that while the chemical industry was not convinced that immediate action was necessary, CFC producers were willing to

cooperate in implementing the protocol. Fay said that the chemical industry understood “the scientific evidence that there is a potential [crisis or eminent threat] in the future. We feel, however, that a freeze alone would have been enough of an economic stimulus to create replacement products” (Menyaszc 1987).

Discussion

The early U.S. position for the next round of international negotiations on ozone layer depletion continued to reflect support for controls on aerosol CFCs, although the EPA began to voice its support for a total ban on the chemical. By the time of the September 1987 plenipotentiary meeting for the Montreal Protocol, the United States supported a 95 percent ban on production of most CFCs, implemented incrementally over more than a decade.

For two of the years leading to the Montreal Protocol, the U.S. government was highly divided, with Republican President Ronald Reagan, a Democratic House, and a Republican Senate. The nine months before the Montreal Protocol meeting saw a change to a Democratic majority in the Senate, so that the United States had a Republican President and a Democratic Congress. It was not until January 1987 when the Democrats controlled both houses that Congress became interested in the ozone depletion issue, with Senate subcommittees holding joint hearings in an effort to understand the U.S. position being formulated for international negotiations. During this time, Max Baucus, a Democrat, initiated legislation in the Senate to phase out most CFCs, and the House and Senate had introduced a concurrent resolution calling for the Reagan administration to negotiate internationally for CFC reductions. Congressional hearings in 1987 continued throughout the months prior to the diplomats’ September meeting in Montreal, with

numerous Democratic legislators going on record in favor of a near phaseout of CFCs. By the time the U.S. negotiating team reached Montreal in September, President Reagan's preferences were in line with the stated Congressional position of an almost complete ban on CFCs.

Business interests entered early 1985 with the position that scientific arguments linking CFCs with ozone depletion were not persuasive enough to warrant constraints on CFC production and usage. By late 1986, however, industry was having a difficult time refuting the mounting scientific evidence. The EPA had implied that the U.S. position in the next negotiating round might support constraints on all uses of CFCs because the agency's research indicated this course of action was the only way to reduce CFCs in the stratosphere. The Alliance for Responsible CFC Policy was the first of the industry interests to acknowledge that some type of controls on CFCs might be needed. Shortly thereafter, DuPont asked to join EPA in developing CFC production regulations. Both the Alliance and DuPont stressed that their support hinged on a U.S. negotiating position in the international talks that reflected what the EPA and industry negotiated domestically.

Industry, however, had less influence on Congressional legislation. The legislation proposed in 1987 was formulated without industry input, and DuPont and the Alliance were concerned about a unilateral ban on CFCs that would collapse the U.S. market for the chemical while other countries would still benefit from CFC sales.

The CFC industry gained a brief respite from the continual deterioration of their position on moderate CFC restrictions when several executive departments and agencies began to question the wisdom of a phaseout based on unanswered questions about the relationship between ozone depletion and health risks. The debate peaked in late May

1987 when a Cabinet council meeting discussion was leaked in which the Interior Secretary mentioned a “personal protection plan” to solve the CFC issue that included sunglasses and sunscreen.

Environmentalists had managed to gain sufficient access in Congress to influence legislation that if passed would virtually ban CFCs in the United States, and the proposed “Rayban plan” gave public interest groups media access that the CFC industry could not overcome. Environmental groups backed strong measures to eliminate CFCs, and the misstep on the part of the executive branch gave the groups ample ammunition to advance their position.

The United States arrived at the diplomats’ meeting for the Montreal Protocol in September 1987 with a negotiating position that was strongly endorsed by environmental groups but only partially endorsed by industry interests. Industry had capitulated to some limited restrictions on CFCs but resisted the almost total ban that was the basis of the U.S. position.

**The London Amendment: Industry Endorses CFC Restrictions
(September 1987—June 1990)**

In the aftermath of the Montreal Protocol negotiations, CFC industry officials alternately urged the EPA to quickly promulgate regulations implementing the protocol's provisions and warned the agency that industry would not support regulations that went beyond the protocol's restrictions. Nevertheless, environmental groups and atmospheric scientists maintained that the Montreal Protocol did not go far enough in restricting ozone depleting substances and targeted additional chemicals for regulation. Additionally, Congress came under pressure to institute a windfall profits tax on the CFC industry because the Montreal Protocol would essentially give the companies currently producing CFCs a monopoly on production for more than a decade before it was eventually phased out. The tax became effective in 1990 and increased incrementally for five years.

Concurrently with the domestic rulemaking process to implement the Montreal Protocol, the EPA and environmental groups began a campaign to shorten the phaseout period for CFCs. Several Senators also took the initiative to confront DuPont on a promise it had made in 1974 to cease production of CFCs if credible evidence indicated they posed a threat to health. The DuPont CEO responded that such evidence was yet to be produced, then changed his position after an international science panel that included several of DuPont's scientists reported a strong link between CFCs and destruction of the ozone layer. In late March 1988 DuPont announced that it would cease production of CFCs as soon as feasibly possible.

Mounting evidence that the ozone layer was being destroyed more rapidly than previously reported and that other chemicals were also linked to the destruction prompted both international meetings and Congressional hearings to strengthen the Montreal

Protocol provisions. The London meeting in June 1990 began with most nations, including the United States, already responsive to more stringent controls on CFCs and gradual controls of other chemicals that had been implicated as ozone depleters. The London Amendment phased out CFCs by 2000 and introduced gradual phaseouts of methyl chloroform, carbon tetrachloride, and halons.

Domestic Interests, Institutions, and Information

The period of discussion and negotiation for the London Amendment stretched from September 1987 to June 1990. For the entire period of London Amendment negotiations, the legislative branch of the U.S. government had a Democratic majority in both houses. The government remained divided, with Republican Ronald Reagan as President until January 1989 when Republican George H.W. Bush gained the office. Based on Milner's arguments, divided government may lead to less cooperation in international agreements.

To comply with his agreement with Congress to slash the federal budget deficit, in February 1988 President Reagan requested an overall cut in EPA funding for fiscal 1989 but at the same time asked that the EPA budget be restructured so that the agency's international environmental activities and its research and development programs received increased funding. Much of the budget increase in these areas was designated for reducing uncertainties in risk assessment and on stratospheric ozone depletion (BNA 1988a). During the remainder of Reagan's administration, the Secretary of State remained George Schultz, and the EPA Administrator was Lee Thomas.

In January 1989 Republican George H.W. Bush took the oath of office for President. In the last stages of the 1988 Presidential election, Republican candidate

George H.W. Bush promoted himself as “the environmentalist candidate,” saying (BNA 1988c),

I am an environmentalist—always have been, from my earliest days as a congressman, when I first chaired the House Task Force on Earth Resources and Population. And I always will be, to my last days as president of this great and beautiful country. That’s not inconsistent with being a businessman, nor is it with being a conservative. In fact, it is an essential part of the thinking that should guide either one.

Taking the newly elected President at his word, 18 environmental groups prepared a *Blueprint for the Environment* that was presented to George H.W. Bush on November 30, 1988. Among its 700 recommendations were an entreaty for recognition of stratospheric ozone depletion and global warming as threats of unprecedented proportions for the world and a call to elevate the Environmental Protection Agency to cabinet-level status (BNA 1988l).

President-elect Bush named William Reilly, who headed the Conservation Foundation for 15 years, as his nominee for EPA Administrator. Reilly was considered a moderate on environmental issues. Under his leadership, the Conservation Foundation usually chose mediation and compromise rather than an adversarial or confrontational approach on environmental issues. In general, the environmental community and industry were favorable to his nomination as EPA Administrator. With the announcement, Reilly indicated his desire to work with Congress to develop a consensus around environmental matters and to operate with “as much as collaboration as possible. We need to do a better job of reconciling economic objectives with environmental goals.” The Senate approved Reilly’s nomination by a 100-0 vote on February 2, 1989 (BNA 1989d, 1989b).

President Bush continued to display an interest in the international aspects of environmental cooperation by nominating a lawyer with experience in international and

environmental issues to a newly created EPA position. EPA Administrator Reilly urged Bush to create the position of Assistant Administrator for International Affairs to emphasize the greater role played by the EPA in global environmental issues. The appointee, Tim Atkeson, indicated in his confirmation hearing that an important issue he would address was defining what the EPA's oversight responsibility would be when the Montreal Protocol was modified to move the phaseout of ozone depleting substances (ODS) to 2010.

Bush also asked Reilly to accompany him to the July 1989 G-7 economic summit in Paris, marking the first time an environmental official from any nation had attended the talks since its 1975 inception. Reilly considered his attendance a demonstration of the importance the United States attached to the environment as an international policy issue. However, the EPA Administrator was not listed as a member of the official U.S. delegation, which included Bush, Secretary of State James Baker, and Treasury Secretary Nicholas Brady (BNA 1989c, 1989g, 1989r, 1989j).

Domestically, President Bush named D. Allan Bromley as his science advisor. During his confirmation hearing, Bromley indicated that his first priority would be to make a study of global climate change (BNA 1989p). The topic looked to be emerging as the environmental issue of the 1990s; however, Bromley did not tie the climate change study with the existing international negotiations on stratospheric ozone layer depletion.

U.S. Congress and Executive Agencies Investigate Need for Further CFC Restrictions

Even though the Montreal Protocol negotiations had been completed, the U.S. Senate continued to evaluate the need for further restrictions on CFCs. At a joint hearing of two subcommittees of the Senate Committee on Environment and Public Works in late

October 1987, scientists testified that 1988 expeditions to Chile and the Antarctic had discovered an ozone decline that was substantially larger than expected. In addition, scientists had strengthened their theories about the link between CFCs and ozone depletion. F. Sherwood Rowland, one of the scientists who first identified a link between chlorine and depletion of the ozone layer, said that the evidence continued to indicate the need for immediate, drastic action in phasing out CFCs. He said, “If atmospheric emissions of CFCs actually reach the full magnitudes permitted by the Montreal Protocol, then a steady, rapid increase in atmospheric chlorine will continue for the rest of this century. We cannot wait until 1994 to put drastic cuts into effect on CFC emissions” (BNA 1987a).

In December 1987, the EPA published its proposed rule for implementing the Montreal Protocol in the United States (52 FR 47486). The EPA held hearings in early January 1988 to solicit comments from concerned parties. Kevin Fay, representing the Alliance for Responsible CFC Policy, indicated his organization’s support of the rule “because it will assure compliance with the Montreal Protocol.” He added that the alliance was “categorically opposed” to any regulations that went beyond those required domestically to implement the Montreal Protocol. Although the CFC industry was developing CFC alternatives, the chemical industry did not expect them to be ready for production for several years. In addition, most CFC user industries (e.g., air conditioning manufacturers) were struggling with adapting their products to use CFC substitutes (BNA 1988d).

Conversely, David Doniger, senior attorney for the Natural Resources Defense Council, maintained that the proposed EPA regulations did not go far enough or fast

enough to protect the ozone layer. “The ozone layer will not be protected until the atmospheric stockpile of CFCs and halons is reduced and ultimately removed. This requires a rapid, near-total phaseout of these chemicals, not merely a 10-year halfway measure.” Instead, Doniger suggested that under the Clean Air Act the EPA was not obligated to merely meet the implementation requirements of the Montreal Protocol but should instead regulate domestic ODS production and usage to the extent required to protect the ozone layer. He also pointed out that because the proposed rule would continue to allow production of CFCs and would prevent development of new domestic CFC sources, the five current U.S. producers of CFCs would have a multibillion dollar monopoly on CFCs that would give them windfall profits (BNA 1988d).

Doniger continued his criticism of the EPA’s proposed rule on CFCs at an EPA-sponsored conference held in mid-January on Substitutes and Alternatives to CFCs and Halons. Robert Watson, program manager of NASA’s Upper Atmospheric Research Program, supported Doniger’s claims, saying the latest research indicated that the provisions of the Montreal Protocol would only slow ozone depletion, not stop or reverse it. Doniger called for the United States and other nations to review the latest ozone layer research as a preliminary to strengthening the Montreal Protocol. Additionally, he called for more stringent domestic regulations, saying, “The EPA has a legal obligation under the Clean Air Act to regulate domestic CFC and halon usage to the extent required to protect the stratosphere, not merely to the extent required by an international agreement.” He argued that failure to provide more stringent regulations would put EPA in “clear violation” of the law. Joseph Steed, environmental manager of DuPont’s Freon products division, defended the lengthy CFC phaseout period, saying the chemical industry needed

additional time to develop CFC alternatives before a complete phaseout. He said that their experience is that “it takes 17 years to develop alternatives. We have spent seven years so far on developing alternatives. We think we may be there in another seven years and, if so, we will have done well” (BNA 1988f).

Senators Confront DuPont on 1974 Promise to Stop CFC Production

In February 1988 Senators Max Baucus (D-MT), Robert Stafford (R-VT), and Dave Durenberger (R-MN) sent a letter to DuPont CEO Richard Heckert reminding him of a 1974 DuPont promise. In testimony to a House subcommittee, then vice-president Raymond McCarthy said that “if credible scientific data developed in this experimental program [of research] show that any chlorofluorocarbons cannot be used without a threat to health, DuPont will stop production of these compounds” (U.S. House Subcommittee on Health and the Environment 1974). In a response to the senators on March 4, 1988, Heckert repeated the CFC industry’s mantra, stating that scientific evidence still did not point to the need for dramatic CFC emission reductions (Heckert 1988). Regardless of DuPont’s protests, ten days later the United States became the first major nation to ratify the Montreal Protocol, which called for a fifty percent reduction in CFC production and consumption by mid-1998.

DuPont was soon to realize that data from the ozone epistemic community was overpowering its arguments about CFC production. A dramatic turnaround in DuPont’s stance came about when its own scientists verified the mounting evidence about ozone depletion. By mid-March 1988, the director of DuPont’s Freon Products Division, Joe Glas, and chemists Mack MacFarland and Joe Steed were receiving more recent data that the international Ozone Trends Panel was disseminating to ozone-treaty parties and the

general public about the relationship between CFCs and ozone depletion. These DuPont scientists were part of the epistemic scientific community that had formed over the years to evaluate ozone science. MacFarland, in fact, was a member of the Ozone Trends Panel and was acutely aware of the importance of the latest data. The three scientists were alarmed that the report provided strong evidence of the role of CFCs as major contributors to reductions in global ozone since 1970 and to an even larger decrease over Antarctica since 1979.

DuPont's CEO had also heard about the report and wanted a quick decision on whether the company needed to change its strategy about CFCs. On March 16, Glas recommended to Heckert and the DuPont board of directors that by 1999 the company stop manufacturing CFCs regulated under the Montreal Protocol (Harvard Business School 1995). In a letter to Senators Baucus and Durenberger dated March 24, 1988, DuPont's CEO reversed his position stated twenty days previously and announced that DuPont "has set as its goal an orderly transition to the total phaseout of ... CFC production. We are encouraging user industries, policy makers and suppliers worldwide to join us in pursuit of this goal" (Heckert 1988).

Heckert's declaration was a signal to the EPA and the State Department that DuPont (and the CFC industry in general, because DuPont was the largest producer of CFCs) would no longer overtly resist international controls on the chemical, although in the years ahead the industry would continue to urge a slower pace than U.S. negotiators desired. John Hoffman, director of the EPA's stratospheric protection staff, used DuPont's announcement to emphasize the U.S. position on CFC controls while addressing a March 24-25 international symposium on the impact of climate change on

Third World countries sponsored by the Climate Institute and The Conservation Foundation. He urged developing countries to sign the Montreal Protocol, saying that DuPont's assertion was an "indication that the [CFC] technology won't be around in the future." He argued that it was a "myth that joining the Montreal Protocol will cost your nations money. It's the opposite. Hanging onto CFC production will lead to obsolete technology." The symposium also marked one of the early attempts to link ozone depletion with global climate change. Scientists warned that increased atmospheric concentrations of carbon dioxide, methane, CFCs, and nitrous oxide could be expected to warm the Earth through an increased greenhouse effect (BNA 1988g).

Congressional Hearings Continue on Possible CFC Ban

Two subcommittees of the Senate Committee on Environment and Public Works held additional hearings on March 30 to continue their assessment of the need for more stringent limits on CFC emissions. Atmospheric scientist F. Sherwood Rowland again testified before the committee that there were "compelling reasons for moving rapidly toward the 95 percent phaseout of chlorofluorocarbons in much less than a decade, which was the official U.S. position a year ago and which is called for by legislation currently being considered by this committee."

Environmental interests were well represented during the hearings. The NRDC's David Doniger again pressed for more stringent CFC regulations and a shorter timetable for phaseout. He provided specific actions that the United States should take with regard to CFCs. Citing the fact that the Senate had voted for ratification of the Montreal Protocol, he called on Secretary of State Schulz to press the EC and the Soviet Union for prompt ratification. Doniger also called on the United States to petition UNEP for a

reassessment of the Montreal Protocol shortly after the agreement entered into force, specifically to strengthen its provisions and shorten its timetable for compliance. Meanwhile, he said, the EPA should implement a domestic CFC and halon production fee “to prevent DuPont, Allied-Signal, and a handful of other producers from reaping monopoly profits off the sale of CFCs as supplies are limited” (BNA 1988n). Legislation to prevent CFC producers from profiting from their monopoly on CFCs was enacted in 1990.

The subcommittees also heard from representatives of business interests. Testifying at the same hearing, Marilyn Montgomery, an official of Allied-Signal, the second-largest U.S. producer of CFCs, stated concerns about a rapid U.S. move to ban CFCs, saying: “The U.S. produces only one-third of the CFCs used in the world. There would be little, if any, environmental benefit. Whatever minimal environmental benefits might be achieved would be at the expense of domestic producers, users, and consumers. Because almost one million jobs in the United States are CFC-related, this could create severe economic dislocations” (BNA 1988n, 1988b).

EPA Urges Prudence in CFC Phaseout Schedule

As late as April 1988, however, EPA Administrator Lee Thomas was holding firm on the EPA’s original proposed CFC rules, saying that the EPA was “not going to be able to get anything done quicker than what we are doing now.” EPA’s Eileen Claussen, Acting Deputy Assistant Administrator for Air and Radiation, added, “It is a question of strategy—how the United States should play it. I think we agreed before not to do anything unilaterally but to push the countries as far as we could.” She noted that the

protocol was not a static document and was open for reassessment as new scientific data became available (BNA 1988m).

The EPA published its final rule for implementing the Montreal Protocol in the United States on August 1, 1988. The rule had met with very little domestic resistance. Although the EPA had offered to hold a public hearing on June 7 if requested, the agency received no requests. The final rule went no farther than the U.S. commitment for domestic implementation of the Montreal Protocol and was scheduled to take effect on the same day the Montreal Protocol entered into force on January 1, 1989 (BNA 1988r, 1988h).

Once the EPA issued its final rule to implement the Montreal Protocol in the United States, EPA Administrator Thomas began a campaign to convince the international environmental community of the need to strengthen the protocol provisions. In early September he indicated that he had written to both UNEP and his international counterparts urging them to push for an early meeting of the parties to the protocol to consider strengthening the CFC restrictions, saying, "I think we've got to [go] ahead and set a phaseout goal. It may be that we ought to phase it out 50 percent in 10 years and 95 percent in 15 years, or it may be that we ought to hit 95 percent in 10 years." Looking ahead to the presidential election in November 1988, he said that stratospheric ozone protection should be high on the priority list for the president: "I'd tell the new president, I'd tell the new environmental administrator that you need to think globally, you need to think internationally" (BNA 1988p).

The Environmental Policy Institute, an environmental interest group, published a September 1988 report calling for the phaseout of CFCs and other forms of chlorine by

2000. The report stressed in particular the need to address methyl chloroform and carbon tetrachloride as other ozone-depleting substances that should be controlled under the Montreal Protocol (BNA 1988i). According to EPA Administrator Thomas, the EPA's September 1988 report on stratospheric ozone trends indicated the need for an almost complete phaseout of CFCs and other ozone-depleting substances such as methyl chloroform (BNA 1988k).

It was not until late September 1988 that the Alliance for Responsible CFC Policy, a business coalition, endorsed a complete phaseout of CFCs. While CFC producers such as DuPont and Allied Signal were important members, the Alliance also included in its membership almost 500 companies that used CFCs in their products or processes. These companies needed to develop a strategic plan for obtaining and using CFC substitutes before they were willing to endorse a CFC phaseout. In a letter to EPA Administrator Thomas, the Alliance said "responsible policy dictates that the parties to the Montreal Protocol work to develop additional control measures beyond 1998, with the ultimate objective of phasing out the production of the fully halogenated CFCs." Almost concurrently, DuPont announced that it was accelerating its program to find suitable CFC substitutes, saying that it would be able to commercially produce substitutes in a shorter development and testing period than previously. The new timetable would allow DuPont to produce some CFC substitutes commercially by 1990 rather than 1992 as the company had first indicated (BNA 1988e).

UNEP Meeting Considers Additional Restrictions for Ozone Depleting Chemicals

In response to the growing support for additional restrictions on ODS, the UNEP held a two-day conference for the ozone epistemic community in The Hague

October 17-18 that was attended by 70 scientists from 20 countries. In addressing the conference, UNEP's executive director, Mostafa Tolba, stressed the need based on accumulating scientific evidence to reduce CFC emission levels by at least 85 percent and more probably to completely phase out their usage. During the meeting, the World Meteorological Organization added its voice to those calling for additional CFC emission reductions. The WMO cited its studies indicating CFC emissions not only were damaging the stratosphere but also were contributing 10 to 15 percent of the total greenhouse effect in the global atmosphere each year (BNA 1988j, 1988q). The WMO's observations were a clear indication that stratospheric ozone depletion was becoming linked with the greenhouse effect and global warming debates, a theme that would continue through the remaining negotiations of Montreal Protocol amendments.

After the international meeting, Tolba commented that (BNA 1988q)

there has been a major shift of nearly 180 degrees from September 1987 to October 1988. There now appears to be a broad agreement that we must phase down not 50 percent but 80 to 90 percent of the controlled CFCs before the end of the century....Consumer societies, Friends of the Earth, Greenpeace, Natural Resources Defense Council, were speaking the same language, calling for the same thing as governments and ministries of environment.

Tolba's remarks highlighted the fact that business and environmental interests along with national governments were accepting the data provided by the epistemic community and moving forward with recommendations for further CFC restrictions.

In early January 1989, Tolba announced that a meeting of the parties to the Montreal Protocol would be held May 2-5, 1989, in Helsinki, Finland. The chief purpose of the meeting would be to begin discussions on ways in which the Montreal Protocol could be further strengthened. He said the meeting was necessary because "there was a

distinct shift in emphasis in the 15 months that followed [the Montreal Protocol's] signing. Governments are really concerned about the deterioration of the ozone layer" (BNA 1989o).

Congress, Executive Agencies Explore Need for Additional CFC Restrictions

Senate inquiries continued on February 23, with the Commerce, Science, and Transportation Subcommittee and the Science, Technology, and Space Subcommittee holding joint hearings about the need for strengthening CFC restrictions. The subcommittee members had the opportunity to benefit from a joint data-gathering effort of the ozone epistemic community, national governments, and business interests. Members of the Airborne Stratospheric Expedition, a scientific expedition sponsored by the U.S., British, and Norwegian governments and the Chemical Manufacturers Association to examine the stratosphere over the Arctic for signs of an ozone hole, testified before the subcommittees. Scientists from the expedition indicated that, while no ozone "hole" had appeared over the Arctic as had been documented over the Antarctic, they had detected disturbances in the stratosphere over the Arctic that could be early signs of impending ozone depletion.

Robert Traflet, president of the fluorine products division of Allied-Signal Inc., took the opportunity to encourage the Senate committee to endorse a U.S. position that called for further reductions of CFCs. Although he did not mention the line of research and development that his company was pursuing, the truth was that his company's development of CFC alternatives was proceeding at a rapid pace. He did say, however, that early in the next century would be soon enough to allow producers, users, and consumers a transition period. He strongly urged that the United States not consider

unilateral elimination of CFCs, saying that this would put U.S. firms at a competitive disadvantage. However Senator Al Gore Jr. (D-TN), chair of the Senate subcommittee on Science, Technology, and Space, was intent on moving forward with a ban on CFCs. Less than a week after the subcommittees' hearing, Gore introduced legislation calling for a complete phaseout of CFCs (BNA 1989q).

For environmental issues being examined in Congress, Gore often served the role of policy entrepreneur. According to Kingdon (1997), issues reach the national agenda when the problems, politics, and policies streams come together in a window of opportunity, which occurred when ozone protection became an important international topic. However, for issues to move forward on the agenda, a policy entrepreneur such as Senator Al Gore is necessary, an important actor that has been waiting for the opportunity to promote a particular issue. Gore served as policy entrepreneur in Congress for both stratospheric ozone protection and, later, greenhouse gas and climate change issues. He was particularly effective when the Democrats were the majority party in Congress, using his position as chair of the Senate subcommittee on Science, Technology, and Space as a forum for promoting his views.

As a prelude to the May Helsinki meeting, Great Britain hosted an international conference on the protection of the ozone layer in early March. In preparation for the meeting, the new EPA Administrator, William Reilly, proposed to the White House Domestic Policy Council a U.S. position that called for international action to strengthen the Montreal Protocol provisions. Although the Council did not immediately endorse Reilly's proposal and sent it to the President with several options, President Bush ultimately authorized the EPA Administrator to push at the meeting for a stronger

protocol that would eliminate all CFC and halon uses by 2000 (BNA 1989f). Reilly introduced this position to the international representatives at the London meeting and indicated that the United States would “press” the national delegations for inclusion of the shortened deadline at the May meeting in Helsinki. By the end of the meeting, which was attended by 124 nations, there was widespread consensus that emissions of five CFCs and three halons were a major danger to the stratospheric ozone layer. There was less agreement, however, on how soon these chemicals should be phased out, with delegations agreeing to further discussion at the May Helsinki meeting (BNA 1989n, 1989l).

The relationship between CFC emissions and global warming was a topic of EPA Administrator Reilly’s testimony before the Senate Environment and Public Works Committee on March 17. Reilly told the committee that finding substitutes for CFCs was important, not only to address the problem of ozone depletion but also to deal with global warming. He reiterated the U.S. position from the recent London meeting: President Bush supported a complete phaseout of CFCs by 2000 but believed that the United States should not take unilateral action because ozone depletion was a global problem (BNA 1989t).

As the debate over CFC phaseout continued in Congress and internationally, the environmental coalition was broadening and becoming more adamant in its demands. Four environmental groups joined the campaign in late April to influence both U.S. domestic and foreign policy concerning ozone layer depletion. The groups, consisting of the National Toxics Campaign, Greenpeace, the Clean Water Action Project, and the U.S. Public Interest Research Group (PIRG), announced that they would work through a

“Campaign for Safe Alternatives to Protect the Ozone Layer” to unite grassroots groups and reach millions of Americans in an effort to win support for a rapid phaseout of all ODS. John O’Connor, executive director of the National Toxics Campaign, said that “this new nationwide grassroots environmental alliance is beginning a fight that will take us to Congress and to the chemical polluters themselves.... We must ban these chemicals soon, not 11 years from now.” Dave Rapaport, toxics campaign director for Greenpeace, said the U.S. position on ODS has “been based more on what Washington insiders believe is politically achievable than on what is necessary...” The U.S. PIRG called for a prohibition on production and importation of CFCs and halons in excess of 50 percent of 1986 levels by 1991; elimination of production of CFCs, halons, and carbon tetrachloride by 1995; elimination of production of methyl chloroform by 1995; and establishment of criteria for identifying all other ODS and development of timetables for rapid phaseout of all ODS (BNA 1989h).

Environmental groups, in an attempt to influence the results of the May 2-4 Helsinki meeting, unified as an international coalition on May 1 to produce a joint resolution calling for strong, immediate steps to eliminate ODS emissions. The joint statement, released by the U.S. NRDC and signed by seventy-four organizations from Africa, North and South America, Asia, and Eastern and Western Europe, called for a total phaseout of the five CFCs and three halons currently regulated by the Montreal Protocol no later than 1995; a total phaseout of methyl chloroform, carbon tetrachloride, and methyl chloride; and an immediate, absolute ban on the use of any ODS in aerosol products (BNA 1989k).

Nations Sign Helsinki Declaration to Further Restrict CFCs; U.S. House Responds with Bill

Although the London meeting in March did not end with decisive resolutions, the May Helsinki meeting began on a more optimistic note. On the first day of the meeting, eighty nations signed the Helsinki Declaration, a non-binding statement of intent to promote stronger restrictions on CFCs. The eighty nations agreed to discuss a phaseout of five CFCs to occur no later than 2000; a phaseout of three halons and other ODS as soon as possible; and the great need to find alternative chemicals, products, and technologies as substitutes for CFCs in refrigeration, aerosols, and packaging. Environmental groups in attendance criticized the non-binding aspects of the declaration as well as the length of time to achieve CFC phaseout. Andrew Kerr of Greenpeace said, "It is unacceptable in a crisis situation....The international agreements and the political discussion are not respecting the science and the environmental imperative that demand tougher action." NASA's Robert Watson, head of the science panel of the Montreal Protocol working group and a key U.S. member of the ozone epistemic community, called for further consideration of a phaseout of all chlorine compounds. He said that scientific data indicated carbon tetrachloride and methyl chloroform also contribute to ozone depletion and that they should be targeted for elimination along with CFCs and halons (BNA 1989m).

Domestically, Rep. Jim Bates (D-CA) introduced legislation on June 21 that would speed up the timetable for phasing out production and consumption of ODS. Bates said that, if the legislation passed, which he said was supported by 65 members of the House, it would immediately freeze production of the five CFCs and three halons addressed by the Montreal Protocol at 1986 production levels and then cut their

production by 50 percent by July 1, 1993. The legislation would also force producers of carbon tetrachloride and methyl chloroform to meet the same schedule for phaseout as CFCs and halons. Bates' proposed legislation would have eliminated production of all these chemicals by July 1, 1996 (BNA 1989a).

UNEP, United States Consider CFC, Other ODS Restrictions

A UNEP steering committee met in late September to set a tentative agenda for the meeting in 1990 of contracting parties to the Montreal Protocol. The steering committee recommended that the next full meeting of the parties should begin negotiations on a 50 percent reduction in production and consumption of CFCs by 1994 or 1995, followed by an 85 percent reduction by 1998 and a complete phaseout by 2000; a 50 percent reduction in production and consumption of methyl chloroform and carbon tetrachloride by 1992 or 1993, followed by an 85 percent production by 1998 and a complete phaseout by 2000; and an expedited study of essential uses of halons so that a target could be set for their complete phaseout (BNA 1989s).

Robert Watson, an atmospheric scientist for NASA, started a new round of debate during his address to an international conference on CFC alternatives in early October. Watson said that HCFCs, which were then being developed as replacements for CFCs, would eventually have to be banned as well. He indicated that, while HCFCs are less damaging to the ozone layer than CFCs, they still are ozone depleters and would eventually need to be phased out (BNA 1989e).

An indication that the official U.S. position on an earlier phaseout of ODS was not fully formed by late 1989 came at a working group meeting of the parties to the Montreal Protocol in Geneva November 13-17. At the meeting, three options were

proposed for phaseout of CFCs: a 50 percent reduction in CFC production by 1992-1994, with an 85 percent reduction by 1998; a 50 percent reduction in CFC production by 1991-1992, with an 85 percent reduction by 1995-1996, and a 50 percent reduction in CFC production by 1993, with an 85 percent reduction by 1996. Four options were offered for a phaseout of halons: a 50 percent reduction in production by 1995-1996 and complete phaseout by 2005; a 50 percent reduction in production by 1995-1996 and complete phaseout by 2000; a 50 percent reduction in production by 1995-1997, with production ceasing as soon as feasible; and a 10 to 50 percent reduction in production by 2000.

Despite the growing rhetoric in the United States for more stringent reductions and earlier phaseouts of CFCs and halons, at the meeting the United States took no position on these issues. The NRDC's David Doniger told the meeting he was encouraged by the growing numbers of scientists and others who were saying that halons, methyl chloroform, and carbon tetrachloride must also be phased out. However, Kevin Fay of the Alliance for Responsible CFC Policy again echoed the mantra of the chemical industry by stating his organization's desire to stay with the original terms of the Montreal Protocol to avoid severe impact to nations' economies, and said, "It is also the best means of minimizing the impact on the U.S. economy and protection U.S. jobs" (BNA 1989i).

The United States imposed an excise tax on the five CFCs and three halons restricted by the Montreal Protocol in the Omnibus Budget Reconciliation Act of 1989 (PL 101-239). Effective January 1, 1990, a gradually rising excise tax was imposed, beginning with a tax of \$1.37 per pound of ODS in 1990 and 1991, and continuing with

increases to \$1.67 in 1992 and to \$2.65 in 1993 and 1994. Beginning in 1995, the amount increased at the rate of 45 cents per year over the 1994 amount (BNA 1990h).

NRDC Adds Methyl Chloroform to ODS Debate

The NRDC renewed its campaign in January 1990 to encourage the United States to phase out methyl chloroform. David Doniger, senior staff attorney for the NRDC, said that his organization had published a new report indicating that methyl chloroform accounted for 16 percent of the total ozone-destroying chlorine in the stratosphere. Paul Cammer, president of the Halogenated Solvents Industry Alliance, agreed that methyl chloroform emissions needed to be cut but also noted that the chemical was one of the chief, interim substitutes for CFCs. If methyl chloroform was no longer available, then the solvent industry would need to rely on HCFCs, which are also an interim substitute for CFCs. The NRDC report also stated that methyl chloroform and another solvent, carbon tetrachloride, individually had contributed more to current ozone depletion than the five CFCs and three halons restricted by the Montreal Protocol taken together (BNA 1990j).

Congress, EPA Move Forward on ODS Restrictions

By late January, the U.S. Senate had taken action on a domestic phaseout of CFCs and methyl chloroform by the year 2000. The Senate approved the provision (S 1630) as part of the changes to the Clean Air Act that was currently being considered by Congress. The House version of the bill, passed on May 23, contained provisions to phase out CFCs by 2000, methyl chloroform by 2005, and HFCs by 2035, with an exemption for the use of these products for fire suppression. However, President Bush had not wanted the provisions added to the Clean Air Act amendments because he believed they would

undercut U.S. negotiators in the new ozone treaty negotiations scheduled for June in London. Although the Bush administration was working on similar ODS restrictions in developing its position for the next round of international negotiations, Bush believed that Congressional action prior to completing the negotiations would jeopardize U.S. influence on the treaty results. While the President and Congress had similar preferences in terms of earlier phaseout dates and restrictions on additional chemicals, they differed in approach and timing. The President wanted the new restrictions included in the international treaty; Congress was willing to legislate unilateral domestic restrictions. Ultimately, the House-Senate conference committee meetings to reconcile the two versions did not occur until after the July recess (BNA 1990i, 1990l, 1990b).

The EPA, meanwhile, was preparing to examine two CFC substitutes, HCFC-133a and HCFC-133b. As newly created chemicals, the CFC substitutes were not governed by existing EPA regulations. The EPA wanted to document use of the two HCFCs as well as collect data about the toxicity of four additional HCFCs and two HFCs (BNA 1990k).

Countries Tentatively Agree on CFC Phaseout, Freeze on Halon Production

A technical meeting of the parties to the Montreal Protocol was held in Geneva the first two weeks in March 1990. At the conclusion of the meeting, UNEP director Mostafa Tolba announced that, informally, the parties had agreed to phase out all CFC production and usage by the end of 2000. Also agreed upon was a freeze on halon production by 1993, with further controls expected in the near future. Noting the recent NRDC report that highlighted the detrimental effects of methyl chloroform and carbon tetrachloride on the ozone layer, the working group discussed the possibility of

eliminating production and use of the two chemicals by bringing them under the Montreal Protocol provisions. Tolba said that the results of the technical meeting were very encouraging for a “Declaration of London” at the meeting of the parties to the Montreal Protocol in June (BNA 1990m).

Nations Craft London Amendment to Montreal Protocol

The parties to the Montreal Protocol met in London June 20-29. Most national delegations arrived at the meeting with an understanding that the goal was to amend the protocol to provide more stringent regulations. The parties agreed to a 50 percent reduction in CFCs by 1995, an 85 percent reduction by 1997, and total phaseout by 2000. They also agreed to a 70 percent reduction in methyl chloroform by 2000, followed by total phaseout by 2005; an 85 percent reduction in carbon tetrachloride use by 1995, with phaseout by 2000; and a 50 percent reduction in the use of halons by 1995, with total phaseout in 2000 except for use in fire suppression systems. While not issuing any restrictions, the meeting participants included a warning against unrestrained use of HCFCs as substitutes for CFCs. The warning was intended as a signal to the chemical industry that the search must continue for CFC substitutes that offered no threat to the ozone layer (BNA 1990f).

Discussion

The U.S. Presidency changed hands mid-way through the London Amendment negotiations, from Republican Ronald Reagan to Republican George H.W. Bush (i.e., from a President who wanted to “get the government off the backs of the citizens” to a President that had declared himself the “environmental President”). The change in

Presidents made little difference in the forward momentum of the administration and Congress to further restrict CFC production and use.

The Democrats maintained a majority in both houses of Congress, so that the government remained divided. Divided government also made little difference in the momentum for further CFC restrictions. Congress continued to voice its concerns about ozone layer depletion and held numerous hearings designed to determine what other measures the U.S. should take domestically to regulate ozone-depleting chemicals.

The only significant difference in President Bush's and Congress' policy preferences for CFC restrictions was in terms of approach and timing. During the first half of 1990, both the Senate and the House had passed amendments to the Clean Air Act that would phase out CFCs by 2000. However, the Senate and House bills differed in phaseout dates for additional ozone-depleting chemicals. Although the Bush administration was working on similar ODS restrictions in developing its position for the next round of international negotiations, Bush believed that Congressional action prior to completing the negotiations would jeopardize U.S. influence on the treaty results. The President wanted the new restrictions included in the international treaty; Congress was willing to legislate unilateral domestic restrictions. Ultimately, in deference to the President's wishes the conference committee meeting to reconcile the Senate and House bills was not held until after the Congressional July recess, which was also after the diplomats' meeting in June 1990 that produced the London Amendment.

While three Senators may be credited for providing an impetus, the contributions of the ozone epistemic community were crucial in gaining industry acceptance of the U.S. position for the London Amendment negotiations. In early 1988 the Senators

challenged DuPont CEO Richard Heckert to honor his company's 1974 promise to stop producing CFCs if scientific evidence indicated they were hazardous. The timing of the Senators' challenge was fortuitous. One month later the international Ozone Trends Panel released its report linking CFCs more definitively to ozone depletion, and three of DuPont's scientists were members of the epistemic community that developed that report. While the DuPont scientists probably would have eventually passed the information up the corporation's chain of command, Heckert's query about new information on ozone depletion accelerated the dissemination of the Ozone Trends Panel's findings. DuPont, the largest CFC producer, announced immediately that it would begin to phase out its CFC production and called on other CFC producers and on CFC user industries to do likewise. The CFC industry ultimately endorsed the U.S. position for the London Amendment negotiations (the Alliance for Responsible CFC Policy endorsed a complete phaseout six months after DuPont issued its CFC phaseout statement) but continued to insist that Congress should not pass legislation that forced the United States into a unilateral CFC phaseout.

Environmental groups were very active in the interval leading to the London Amendment negotiations. Not only did they call for a more accelerated schedule for CFC phaseout than the United States and its CFC industry had proposed, but they also introduced data about several new chemicals, including halons, methyl chloroform, and carbon tetrachloride, that they believed should also be restricted. Environmental groups wanted a 1995 CFC, halon, methyl chloroform, carbon tetrachloride, and methyl chloride phaseout; the United States entered the London negotiations with a proposal to phase out CFCs by 2000 and methyl chloroform by 2005, with no stated preference for restrictions

on other chemicals. While environmental groups were underwhelmed by the U.S. lack of commitment to phase out additional chemicals, they realized they were better off giving a lukewarm endorsement than actively opposing a negotiating position that could change the status quo and give them at least part of what they wanted.

**The Copenhagen Amendment:
Ozone Depletion Over North America Prompts Accelerated ODS Phaseout
(June 1990—November 1992)**

After negotiations on the London Amendment, the CFC industry, and especially DuPont, embarked upon a multi-year program to enhance its development of alternatives to CFCs. DuPont invested heavily in hydrofluorocarbons as major alternatives to CFCs and downplayed production of HCFCs that had been an interim alternative to CFCs but were also ozone depleters. Congress passed the Clean Air Act amendments implementing the London Amendment in late 1990, and the EPA proposed the associated regulations in September 1991.

Congressional hearings on a more rapid phaseout of CFCs reached a critical point in late 1991 when scientists reported ozone depletion over regions of Earth that had previously been unharmed. At the same time the EPA was in the rulemaking process to implement the London Amendment in the United States, the agency was campaigning on Capitol Hill to accelerate the CFC ban even further. Environmental groups urged the EPA to use its rulemaking authority under the Clean Air Act to impose earlier bans on ozone depleting substances than Congress had mandated in legislation.

In early February 1992, NASA confirmed ozone depletion over parts of North America, prompting President Bush to announce a ban on production of CFCs, halons, carbon tetrachloride, and methyl chloroform beginning in 1996. Surprisingly, the CFC industry concurred with Bush's actions, citing a significant acceleration in the industry's self-imposed phaseout schedule. Two months later at a UNEP international meeting, national representatives tentatively agreed to the same phaseout schedule as the United States proposed domestically.

The United States also initiated hearings in 1992 on a phaseout of methyl bromide, a chemical used worldwide as a crop fumigant. While the United States reached no major decisions on methyl bromide before the diplomats' meeting in Copenhagen to finalize the mid-decade phaseout of CFCs, halons, carbon tetrachloride, and methyl chloroform, the topic did reach the agenda of the international meeting and was tabled as too controversial to address at that time.

Domestic Interests, Institutions, and Information

The period of discussion and negotiation for the Copenhagen Amendment extended from June 1990 to November 1992. Republican George H.W. Bush remained President throughout the entire period and the legislative branch of the government had a Democratic majority in both houses, a situation of divided government that should have discouraged cooperation. The Secretary of State remained James Baker and the EPA Administrator was William Reilly.

A Roper public opinion poll conducted for S.C. Johnson Wax Company and released in mid-1990 indicated that more Americans were likely to act to help the environment in 1990 than in the previous one-year period. However, the "environmentalists" were still outnumbered by those who said they would do nothing. Burns Roper, head of the polling organization, said that "the public sees business and industry as the primary cause of our environmental problems." The four problem areas perceived as most serious—water pollution, oil spills, chemical waste disposal, and industrial pollution—were directly ascribed to industrial sources. The poll showed that 81 percent of the respondents blamed manufacturing for industrial pollution and 71 percent said products that businesses used were at fault. According to the poll, 79 percent said the

government did not enforce anti-pollution laws strongly enough (BNA 1990g). Public opinion was clearly on the side of the environmentalists, making it more likely that the Congressional agenda would include legislation designed to impose environmental restrictions on business.

Some international environmental problems were taking on a new significance as important for more than environmental issues. An article in the winter 1991 issue of *The Washington Quarterly* noted that transboundary air and water pollution problems posed significant environmental challenges to a nation's security. Ian Rowlands, author of the article and editor of the London School of Economics' *Millennium*, said that "...[environmental degradation] can destabilize the political structure by disrupting the normal way of life and so threaten security." Rowlands indicated that a key issue on the international agenda was CFCs and substances being developed to replace CFCs. A common perception was that HCFCs, which were considered a second generation replacement for CFCs, would eventually be replaced because they, too, were linked to ozone depletion. The continuing cycle of replacements for ODS was perceived as expensive and could stall cooperative efforts to end ozone depletion (BNA 1990e).

Shortly before his State of the Union address in January 1992, President Bush made a point of highlighting to the press his budget request for the EPA for fiscal year 1993. Bush said that he was providing significant increases in several environmental areas, including implementation of the Clean Air Act amendments. EPA Administrator William Reilly, speaking to reporters after the President's EPA budget proposal was presented, portrayed the Bush administration as generous to the environment, stressing a more than 50 percent increase for EPA operating programs since Bush became President

in 1989. Reilly's observation was not universally accepted, however. A congressional Democratic aide, speaking on condition of anonymity, said that although the Bush administration appeared to pay more attention to EPA in the budget process than the Reagan administration did, the effect of other Bush administration actions had damaged the agency. "What's going on is that they are avoiding the mistakes of the Reagan people, but they are having the same effect. Instead of bringing the agency to its knees through the budget, they are bringing it to its knees through their risk assessment practices, their regulatory reviews, the Council on Competitiveness."¹¹ The aide added that the Bush administration "is killing environmental protection with a smile" (BNA 1992a).

President Bush was not creating the very public debacle that President Reagan had with his appointment of Anne Gorsuch Burford as EPA Administrator. However, Bush did not appear to be living up to his "environmental President" title, either. The congressional aide pointed out one of the facts of a bureaucracy—it is relatively easy to use established practices such as cost/benefit analyses or risk assessments to slow or halt agency actions. Lack of cooperation in a bureaucracy often does not have a public face.

President Bush received considerable pressure to attend the U.N. Conference on Environment and Development (UNCED), better known as the Earth Summit, to be held in June 1992 in Rio de Janeiro. The meeting was designed to bring together the nations' leaders to develop formal agreements on ways to deal with the most pressing international environmental issues. In late January 1992 Senator Gore introduced a resolution in the Senate and 25 representatives co-sponsored a resolution in the House

¹¹ In his second term as EPA Administrator (1983-1985), William Ruckelshaus initiated the process of risk-based decision-making for environmental issues subject to EPA regulation. This process uses cost/benefit analyses and statistical methods based on probabilities to guide EPA regulatory decisions. Risk assessments do not explicitly account for intangible elements such as the aesthetic benefits of cleaning up pollution sites.

that urged the President to attend. Representative John Porter, one of the co-sponsors, said that “the president’s attendance at the [Earth Summit]...would send a strong message about America’s commitment to the vital environmental and resource issues that are on the UNCED agenda.” In March, a Bush administration source said that “the president’s decision whether or not to go to Rio will be influenced by whether or not there are specific, acceptable, fleshed out agreements to be signed.” In April, President Bush responding to criticism of his delay in announcing whether he would go to the Earth Summit, said that he would be “proud” to take the U.S. environmental record to the Rio summit. An administration official said that the White House was delaying an announcement as part of its negotiating strategy on substantive measures to deal with climate change and other issues. The House and Senate passed additional resolutions in early April, again calling on President Bush to attend the Earth Summit (BNA 1992x, 1992w, 1992k, 1992n, 1992r).

In the end, President Bush did attend the Earth Summit, although afterward U.S. legislators and environmental groups expressed dismay over the U.S. positions taken there. Leaders of major U.S. environmental groups criticized the Bush administration for isolating the United States and passing “the torch of leadership” on environmental issues to Western Europe and Japan. Fred Krupp, executive director of the Environmental Defense Fund, said, “While the whole world sees economic opportunity in environmental protection, the administration doesn’t get it yet. Where it sees obstacles, the world sees opportunity.” NRDC executive director John Adams said, “The tragedy of the position coming out of Washington is that they have politicized the environment” (BNA 1992t).

According to one polling group, the general public in the United States largely ignores most summits and international meetings. However, the Wirthlin Group, a Republican polling group, found in the aftermath of the Earth Summit that nearly 4 out of 5 Americans were aware that the summit was held and that many could correctly identify the major issues discussed there. The poll also found that 80 percent of Americans agreed that “protecting the environment is so important that requirements and standards cannot be too high, and continuing improvements must be made regardless of cost.” Richard Wirthlin, head of the polling group, said that the meaning for the presidential candidates was that “Americans don’t like extremes,” referring to President Bush’s recent position at the Rio summit in which he decided not to sign the biodiversity treaty and weakened the climate change convention in what had been framed as a choice of jobs over the environment. Wirthlin said that in the coming months before the election Bush had to show that he was not “more pro-economy than pro-environment” while Democratic presidential candidate Bill Clinton and running mate Al Gore had to show they were not environmental extremists (BNA 1992q).

Domestic Probes Continue Evaluation of Ozone-Depleting Substances

By mid-1990, DuPont had made a major commitment to developing commercial HFCs as substitutes for CFCs. The company announced that it would spend \$1 billion to research, develop, and produce HFCs. DuPont intended to build four new HFC plants, two in the United States and two overseas. The company also indicated it would not expand current production of HCFCs until the U.S. Congress signaled its intentions about possible HCFC restrictions (BNA 1990c).

The House and Senate conference committee reached agreement in early August on Clean Air Act amendments that were begun in early 1990. The compromise section of the Clean Air Act amendments required a production phaseout of CFCs, halons, and carbon tetrachloride by 2000, and production of methyl chloroform was to be eliminated by 2002. Production of HCFCs would be frozen in 2015 and banned in 2030. Both houses of the legislature approved the Clean Air Act Amendments package in late October, and President Bush signed the measure into law on November 15 (BNA 1990a, 1990d).

In early January 1991, a congressionally mandated advisory committee to the Department of Defense (DoD), consisting of representatives from the military, industry, and the EPA, heard recommendations on the costs and feasibility of DoD compliance with the Montreal Protocol. David Berteau, Deputy Assistant Secretary of Defense for Production and Logistics, said that the DoD was in a good position to become a leader in the development of substitutes for halons, one area of chemical industry compliance that was lagging in replacing ODS. Berteau indicated that the DoD purchased 35 percent of halons sold in the United States, giving them an incentive to develop replacements in order to shift away from the ozone-depleting halons (BNA 1991i).

Sixty years after DuPont first marketed the CFC Freon[®], the company was able to announce in January 1991 that HFCs were commercially available as replacements for Freon. HFCs -134a and -123, which were believed to pose no danger to the ozone layer, were replacements for CFCs previously used in commercial, industrial, and private refrigeration and air conditioning systems (BNA 1991b).

EPA Administrator Reilly mounted a campaign to end CFC production and usage more rapidly than required under the recent London Amendment to the Montreal Protocol. During a speech in early April to a rotary club in St. Paul, Minnesota, Reilly used data recently acquired by NASA and the epistemic community to bring the ozone depletion problem more closely to home. The NASA data suggested that 4 to 5 percent of the ozone layer over the United States had been depleted since 1981, which was twice as much as previously believed. Reilly said that “the implications for policy are unavoidable,” indicating that the Bush administration might be considering the European Community recommendation for a 1997 CFC phaseout.

Elizabeth Cook, ozone campaign director for Friends of the Earth, said that the data indicated that “...plans to wait until 2000 to stop production of certain ozone-depleting chemicals are dangerously slow,” and added that the chemical industry should halt plans to use HCFCs as substitutes for CFCs because they also deplete the ozone layer. Dwight Besole, business director for DuPont Fluorochemicals, acknowledged the criticism but said, “The limiting factor is the user. There is \$135 billion worth of equipment in the U.S. that needs to be corrected before CFC alternatives can be used in them.” Michael Oppenheimer, an atmospheric physicist and senior scientist with the Environmental Defense Fund, noted that levels of ozone loss detected by NASA were about five times as high as those predicted six years ago before the discovery of the ozone hole. “If we had started eliminating chlorofluorocarbons in 1974 when their ozone-depleting ability was first suggested, we wouldn’t be facing millions of additional cancers today” (BNA 1991j).

The Senate continued its probes into the dangers posed by ODS. In his role as policy entrepreneur, on April 9 Senator Al Gore (D-TN), along with 30 other senators, wrote to President Bush urging him to adopt a more aggressive policy “both here and in the international community.” The senators also wrote to EPA Administrator Reilly, urging him to use his authority under the Clean Air Act to accelerate the phaseout schedule for ODS. Additionally, Gore introduced a Senate resolution calling on Bush to urge the United Nations Environment Programme to convene a special session to consider earlier phaseout of ODS.

In mid-April, the Senate Commerce Subcommittee on Science, Technology, and Space, chaired by Senator Gore, heard more about NASA’s recently acquired data on ozone depletion. NASA’s Robert Watson told the subcommittee that “the ozone layer over 90 percent of the world has been decreasing at an average rate of 3 percent over the past 11 years.” Atmospheric scientist F. Sherwood Rowland, who with fellow scientist Mario Molina began the CFC controversy in 1974 by postulating a link between CFCs and destruction of the ozone layer, told the subcommittee that “while the new data were both “startling and ominous in their own right, they do not represent the total ozone loss” because the NASA data began with 1978 and did not include ozone loss that had been occurring since the late 1960s (BNA 1991g).

Nations Mandate Evaluation of 1997 CFC and Halon Phaseouts

The parties to the Montreal Protocol approved special assessment panels within the Montreal Protocol framework to investigate the ramifications of phasing out CFCs and halons by 1997, with the results to be available for the fourth meeting of the parties to the protocol in 1992. The United States, which along with several other countries

blocked a 1997 CFC phaseout proposal at the London meeting in 1990, was among those that agreed to the request through consensus of the parties. Stephen Seidel, deputy director of the EPA's global change division, indicated that the assessment request was not a change in U.S. position, saying, "We have no position on this issue at this time. We'll cross that bridge when we come to it." However, other nations, including several Nordic countries, Austria, Germany, and Switzerland, were adamant about their desires to complete a CFC and halon phaseout by 1997 or earlier. Conversely, representatives from the Soviet Union were strongly opposed to any proposal that would phase out the chemicals sooner than the original 2000 phaseout deadline (BNA 1991e, 1991f).

United States Evaluates Earlier ODS Phaseout

The EPA published its proposed rules on September 19 for implementing the Montreal Protocol and London Amendment under the Clean Air Act. Under the proposed rules, production of CFCs, halons, carbon tetrachloride, and methyl chloroform would be reduced by 10 percent per year beginning in 1992. Production of these ODS would be ended by 2000 except methyl chloroform, which would be phased out by 2002. HCFCs would also be phased out but on a different schedule that would end their production by 2030. Individual U.S. states would be allowed to set more stringent standards (BNA 1991k).

When a panel of UNEP atmospheric scientists confirmed on October 22 that ozone depletion was occurring over the central regions of the northern and southern hemispheres rather than only over the polar regions, the EPA announced it was considering speeding up the phaseout schedule for CFC production in the United States. Although the EPA had published a notice of proposed rulemaking the previous month,

Eileen Claussen, Director of the EPA's Office of Atmospheric and Indoor Air Programs, indicated she thought the deadline ought to be moved up. However, she also indicated that she would prefer the United States not make unilateral restrictions on CFCs, saying, "We've always taken the position that these things are best done if they are done internationally because it's not just our problem." Claussen did not, however, specify a particular year that was being considered as the deadline (BNA 1991n, 1991l).

Officials of the chemical industry acknowledged that the new information provided an incentive for the EPA to move more rapidly on the CFC phaseout. David Stirpe, legislative counsel for the Alliance for Responsible CFC Policy, said the U.N. study would "motivate policy makers to move even more quickly." The chemical industry was attempting to meet earlier deadlines. Almost concurrently with the U.N. report, DuPont announced it would stop production of CFCs by 1996 and phase out halons by 1994 (BNA 1991h, 1991a).

In defense of U.S. business interests, Stirpe said that the phaseout was more problematic in the United States. More than a quarter of all CFCs produced in the United States at that time were used to service existing refrigeration equipment and auto air conditioners. Stirpe said, "We can find other countries in the world saying, 'accelerate, accelerate, let's get rid of production.' They don't have the existing base of air conditioning and refrigeration equipment that the United States has." Kevin Fay of the Alliance estimated that \$135 billion in equipment relied on CFCs. For the auto industry alone, industry officials estimated that 145 million vehicles had already been produced with air conditioners that operated on CFCs. Some industry spokespersons estimated that changing from CFCs to CFC substitutes could cost from \$300 to 1000 per vehicle.

However, the auto industry had made a commitment to begin phasing out auto air conditioners using CFCs in model year 1993 and complete phaseout in model year 1996. Catherine Andriadis, a DuPont spokesperson, said that about 4500 chillers, or giant commercial air conditioning units, were made each year at a cost of several hundred thousand dollars and having lifetimes of 30-35 years. The chemical industry was still working to develop CFC substitutes that could replace CFCs in currently operating units rather than forcing replacement of the units when CFCs became banned substances (BNA 1991h, 1991a).

EPA Administrator Reilly testified before the House Energy and Commerce Subcommittee on Health and the Environment on November 14 that he wanted to accelerate the phaseout schedule for CFCs and other ODS to eliminate their production earlier than 2000 as specified by the 1990 Clean Air Act amendments. As the head of an independent White House agency, he stressed that the opinion he expressed was his own and he was “not representing the administration at this time.” He also reiterated the EPA position that Eileen Claussen, EPA’s Director of Atmospheric and Indoor Air Programs, stated earlier in mid-October. Although the EPA believed the phaseout date should be moved up, the United States should move multilaterally by joining other nations in amending the Montreal Protocol (BNA 1991m, 1991d).

The Senate Commerce Subcommittee on Science, Technology, and Space, chaired by Senator Gore, met on November 15 to consider the results of the U.N. stratospheric ozone study. Again acting in his role as policy entrepreneur, Gore criticized President Bush for not acting more rapidly to phase out CFCs and other ODS, saying, “While George Bush is celebrating the first anniversary of the 1990 Clean Air Act

amendments, he is standing in violation of them.” Gore was referring to a section of the amendments that required the EPA to accelerate the phaseout of ODS if significant new data showed the threat to the ozone layer was greater than when the law was enacted. He said that the Bush administration had been “stonewalling” attempts to move up the phaseout date. While the EPA indicated a possible move to phase out CFCs and other ODS in 1997, Senator Gore thought the phaseout date should be 1995 (BNA 1991m).

In early December 1991, several environmental groups petitioned the EPA to take “emergency action” and accelerate the phaseout of ODS. The petition, signed by officials of the NRDC, the Environmental Defense Fund, and Friends of the Earth, urged a 60 percent reduction in CFCs by January 1, 1992, and a complete phaseout in 1995. The petition also asked for phaseout of halon and carbon tetrachloride production by January 1, 1992. This date would have given the EPA less than a month to promulgate new emergency rules and even less time for the chemical industry to conform to the new regulations. Citing the “unspeakably bad news” from recent scientific reports on the state of the ozone layer, David Doniger, senior attorney for the NRDC, indicated that the EPA had the authority to issue emergency provisions under the 1990 Clean Air Act amendments. The petition also asked for a 50 percent reduction in methyl bromide production by 1992 and a complete phaseout of methyl bromide and methyl chloroform by 1993 (BNA 1991c).

The EPA proposed new rules on January 8, 1992, to ban ODS in applications that could be considered “non-essential,” such as party streamers and noise horns and certain cleaning fluids for non-commercial photographic and electronic equipment. The ban was scheduled to begin by November 15, 1992. Aerosols and some plastic foam products

containing HCFCs would be banned by January 1, 1994. Although the EPA proposed the new rules because the 1990 Clean Air Act amendments required the EPA to do so, EPA officials indicated their continuing desire to accelerate the phaseout schedule. Eileen Claussen, EPA's Director of Atmospheric and Indoor Air Programs, indicated that some of the dates called for by the December petition from the NRDC and other environmental groups were aggressive and "some we just have to do our best." Claussen said the petition target dates for CFC and methyl bromide phaseout would be hard to reach. She did agree, however, that moving the phaseout schedule for CFCs and halons from 2000 to 1995 or 1997 was feasible. She noted that phasing out CFCs would not be without a cost because of the 150 million vehicles already in service that use CFCs in air conditioners. "Industry is working on retrofits; we think they can do it cheaply, though industry says it would be expensive" (BNA 1992s).

Several reports released by UNEP in January 1992 indicated "a dramatic worldwide drop" in CFC and halon production since 1986. The reports, which would form the basis for proposed amendments to the Montreal Protocol when the parties met later in 1992, indicated it would be technically feasible to phase out these substances by 1995. Tony Vogelsberg, environmental manager of DuPont Fluorochemical, questioned some of the findings of the reports. He noted that "the economics are just not dealt with. I think the reports make it clear that phaseout of all new uses can be built in by the 1995 time frame. The real issue is how fast can society retrofit" equipment that was already using CFCs (BNA 1992d).

Scientists Report Record Ozone Depletion Over North America; United States Responds

In early February, NASA released the results of a study indicating that the chemical reaction previously demonstrated to be responsible for ozone destruction over the Antarctic had been observed at record levels over Eastern Canada and northern New England. Senator Gore was quick to respond to the news, saying, “Now that there is a hole centered above Kennebunkport [Maine, where President Bush had a summer home], maybe we’ll have some action” from the president. The new findings did indeed prompt a series of meetings between the White House and the administration’s agencies to discuss an earlier phaseout of ODS, but White House and EPA officials stated that discussion of accelerating the phaseout timetable did not represent a change in policy. Rather, the phaseout schedule being discussed approximated that predicted by the EPA for agreement at the next meeting of the parties to the Montreal Protocol (BNA 1992I).

The Senate passed a non-binding amendment to an energy proposal on February 6 that urged the President to accelerate the phaseout of CFCs and other ODS. The amendment, sponsored by Senator Gore, passed 96-0. The amendment directed the President to promote a position with other Montreal Protocol parties that addressed methyl bromide and HCFCs in protocol amendments. A White House source said that the Senate vote “simply ratifies what we’ve been doing already” in advocating ODS phaseouts. Senator John Chafee (R-RI) wrote a personal letter to President Bush urging him to direct the EPA to accelerate phaseout deadlines for CFCs and other ODS before the next meeting of the Montreal Protocol parties in April 1992. Lester Brown, president of Worldwatch Institute, indicated he had “a feeling the United States position is going to start to shift....The administration’s withdrawal of opposition for the [CFC] amendment

to the Senate energy bill is one of the early indications that this is going to happen” (BNA 1992i).

One week after NASA reported its latest findings about the extent of ozone depletion, President Bush announced that the United States would ban the manufacture of CFCs, halons, carbon tetrachloride, and methyl chloroform by December 31, 1995. Bush also urged U.S. chemical producers to reduce production of these ODS to 50 percent of 1986 levels by the end of 1992. Although the Bush administration had previously indicated it would not take unilateral action to accelerate the phaseout schedule, the EPA indicated that the accelerated U.S. schedule was expected to be reflected in the next amendment to the Montreal Protocol when the parties met later in the year. Producers and users of ODS generally supported Bush’s announcement, with most companies well ahead of the phaseout schedule required by the Montreal Protocol. Both DuPont and Allied-Signal approved of the accelerated schedule, with Allied Signal indicating it “wholeheartedly” supported the plan. The Alliance for Responsible CFC Policy also came out in favor of the phaseout schedule. Kevin Fay, the Alliance’s executive director, said that industry had been moving so fast that “for the most part, [the Clean Air Act] is chasing industry,” although he also cautioned the administration that there would be a high cost to retrofit equipment that was already in use (BNA 1992p, 1992f).

Although President Bush announced the accelerated phaseout of most ODS, he did not specifically address HCFCs, leaving the decision about phaseout of this ODS to the EPA. However, Representative Pete Stark (D-CA) proposed in early March to tax HCFCs in much the same way an excise tax was placed on CFCs beginning in 1990. In announcing his bill on the House floor, Stark stated that a tax on CFCs had encouraged

the chemical industry to stop producing those substances, and taxing HCFCs would have the same effect. He said, "HCFCs should not be counted on as a solution by industry to the CFC problem. They should be seen as a temporary substitute that must pay a price for being an ozone destroyer as well." Jim Wolf, vice president of government affairs for American Standard, Inc., one of the largest manufacturers of air conditioning equipment, agreed that the tax on CFCs was effective in making industry stop production of CFCs. However, he said that the halt in CFC production occurred because HCFCs were available as substitutes. He indicated that there were few substitutes for HCFCs, so a tax on them would not discourage their use and could actually cause industries to reintroduce CFC usage. David Doniger, senior attorney for the NRDC, countered that "these taxes are not of the magnitude that makes them prohibitively expensive for companies that have no other choice" (BNA 1992h).

Nations Tentatively Agree to 1996 CFC Phaseout

Representatives of 56 countries met as a working group in Geneva in mid April 1992 to draft an ODS phaseout proposal that would be considered at the ministerial meeting of the parties to the Montreal Protocol in Copenhagen in November. The resulting draft proposal called for the phaseout of CFCs by January 1, 1996. The delegates also met in a closed-door session to consider phasing out HCFCs and hydrobromofluorocarbons (HBFCs). While the meeting did not result in specific recommendations about the phaseout of these ODS, a general consensus was that they must be phased out earlier than had previously been contemplated. Environmental organizations criticized the Geneva proposals as too little, too late. Elizabeth Cook, a spokesperson for Friends of the Earth, U.S.A., said the United States was proposing that

even if CFCs are phased out, HCFC usage should be allowed to continue until the years 2020-2030. She said that “governments must seize the opportunity to speed the phaseout. The public will not tolerate a weak response” (BNA 1992j).

Congress, EPA Continue Efforts for CFC Phaseout

The Senate Governmental Affairs Ad Hoc Subcommittee on Consumer and Environmental Affairs in mid-May 1992 examined the role of industry in developing and producing refrigeration and other systems that could use CFC replacements. According to John Beaty, senior program manager for Thermo Electron Technologies Corporation, “The technology is well-established, but it has not entered the market because of the cost of the materials to manufacture it.” The physics division at Los Alamos National Laboratory, funded mainly by the federal government, had also been studying several different technologies for cooling systems that avoided the use of CFCs or their replacements. Gregory Swift of the laboratory said that acceptance of these new systems could be advanced by financial incentives such as tax credits that would encourage industry to work toward using these developing technologies. He indicated that, in general, U.S. industries did not take an interest in new technologies unless they could visualize a profit in a few years. Senator Joseph Lieberman (D-CT), chair of the subcommittee, responded, “I wonder if Japan has taken an interest” (BNA 1992c).

The EPA issued its final rule on July 29, 1992, implementing the London Amendment to the Montreal Protocol for phasing out CFCs by 2000. The rulemaking was based on the EPA’s proposed rules of September 19, 1991, and therefore did not consider the President’s February 1992 call for an accelerated phaseout schedule (BNA 1992u).

Some Congressional Members Call Ozone Depletion a “Hoax”

In early August 1992 the first efforts began among Republicans in Congress to reverse the CFC phaseout. Representative William Dannemeyer (R-CA), the ranking minority member on the House Energy and Commerce Subcommittee on Health and Environment, introduced a bill during a subcommittee meeting calling for a presidential commission on ozone depletion. Dannemeyer, claiming that the movement toward banning CFCs was an ozone “hoax” based on “faulty data and faulty science,” presented a list of 22 scientists who supported his position. In a demonstration of partisan politics, Representative Henry Waxman (D-CA), chair of the subcommittee, indicated that he probably would not let the bill out of the committee. However, Dannemeyer’s efforts were some of the first over the next few years in what environmental groups called an “ozone backlash” (BNA 1992v).

Exemptions Requested to CFC Ban

The makers of metered asthma inhalers began seeking an exemption from an accelerated CFC phaseout even before the parties to the Montreal Protocol met in Copenhagen in late November 1992. At the First National Conference on Asthma Management held in mid-October, pharmaceutical companies debated a course of action, realizing that the early CFC phaseout would make it extremely difficult to produce inhalers. Major companies that produced CFCs were rapidly reducing production, and the small amount of CFCs needed for producing inhalers might not provide a viable incentive for smaller companies to make them. Additionally, new technologies were expected to take years to develop and would likely be expensive. Makers of asthma inhalers in the United States were not as concerned as their international counterparts because the EPA

had allowed exemptions for the inhalers since the 1978 CFC aerosol ban because the Food and Drug Administration had deemed them an essential CFC use. However, even U.S. makers were concerned about the possibility that the EPA might eventually ban CFC use in metered inhalers (BNA 1992g).

U.S. Agriculture Department Enters Debate on Methyl Bromide As Ozone Depleter

A controversy that was to take on greater importance through the remainder of the 1990s in the United States began in 1992 as a debate over banning methyl bromide. Atmospheric scientists from several nations indicated that ozone depletion would persist as long as emissions of methyl bromide continued because the chemical, used as an agricultural fumigant, caused ozone depletion in the first years after it was released. The largest portion of methyl bromide used in the world at that time—42 percent—occurred in the Americas north of the equator. Another 28 percent was used in Europe, and an additional 22 percent was used in Asia. Early disagreement centered on the EPA's proposed rule, sent to the OMB in late 1992, to phase out production of methyl bromide by 2000. The EPA immediately faced opposition from the Agriculture Department and the two U.S. companies that produced methyl bromide, the Ethyl Corporation and Great Lakes Chemical Corporation, all of which maintained that not enough scientific evidence existed to show that the chemical depleted the ozone layer. At the same time, environmental groups¹² released a report, *Into the Sunlight: Exposing Methyl Bromide's Threat to the Ozone Layer*, calling for manufacture of methyl bromide to cease by 1997. David Doniger, senior attorney for the NRDC, indicated that the EPA also faced

¹² California Action Network, Californians for Alternatives to Toxics, California Institute for Rural Studies, Friends of the Earth, National Coalition Against the Misuse of Pesticides, Natural Resources Defense Council, and the Pesticide Action Network-North American Region.

opposition from the OMB in which “outgoing White House officials are using their remaining clout to protect a dangerous chemical instead of the health of the American people.” USDA spokesperson Roger Runningen confirmed that the Agriculture Department was working with the OMB on the draft EPA proposal, saying, “It would have a very serious and potentially crippling effect on wide segments of agriculture. It would virtually stop international trade in agriculture.” EPA Administrator William Reilly, however, indicated that the EPA expected “to move forward on it. It is a requirement of the Clean Air Act” (BNA 1992i, 1992e).

Parties to the Montreal Protocol Meet in Copenhagen, Denmark

Not only did the United States begin a move toward phasing out methyl bromide, but the issue was an international agenda topic when more than 80 countries met in the fourth meeting of the parties to the Montreal Protocol in Copenhagen November 23-25. The results of the three-day meeting mirrored the U.S. stance on ozone-depleting substances and addressed many of the issues that had been debated internationally for a number of years. One of the more controversial decisions was a reduction in the production and use of methyl bromide, with a 25 percent reduction by 1995 based on 1989 levels. Negotiators also agreed to an accelerated phaseout of CFCs, moving the deadline from 2000 to end of 1995; phaseout of carbon tetrachloride in 1995; phaseout of methyl chloroform in 1996 rather than in 2005 as had previously been determined; and phaseout of halons in 1994 rather than in the previously designated 2000. The delegates set a timetable for the phaseout of HCFCs, with phaseout to begin in 1996 and conclude in 2030. The stepdown in production of HCFCs over the intervening years was tied to a formula weighted on the ozone depletion potential of both CFCs and HCFCs, with a 3.1

percent cap beginning in 1996 based on the amount of CFCs and HCFCs produced in 1989 (BNA 1992m).

EPA Administrator William Reilly was pleased with the outcome of the Copenhagen meeting, saying that the United States achieved most of the objectives it set out for in the negotiations. But Reilly was also displeased with the opposition of both industrialized and developing countries to the U.S. position on methyl bromide, saying, “We felt disappointed not to get [a complete phaseout by the year 2000]. We felt disappointed not to get that. But there was a lot of opposition to our position. So at least it is listed now as a controlled substance and the phaseout will begin.” Reilly also indicated that the Copenhagen agreement would not deter the EPA’s plans to phase out production and use of the chemical in the United States by 2000. But he also said that nations that shipped agricultural products treated with methyl bromide to the United States would not face an import ban (BNA 1992m).

In general, the chemical industry expressed satisfaction with the results of the Copenhagen meeting, especially with respect to the HCFC phaseout schedule. Joseph McGuire, a representative of the Air Conditioning and Refrigeration Institute, said, “We believe the HCFC agreement is good for the environment and will encourage use of HCFCs in the transition period away from CFCs.” James Wolf, chairperson of the Alliance for Responsible CFC Policy, praised the results of the meeting, saying that the HCFC phaseout schedule would promote ozone protection while “recognizing the delicate balance with the economic issue pertaining to their use” (BNA 1992m).

Environmental groups, however, expressed disappointment with the results, and especially with the lengthy phaseout schedule for HCFCs. Bill Hare, an atmospheric

scientist with Greenpeace, said that “the U.S. government has led moves to extend the use of ozone destroying HCFCs until 2030, pushing back UNEP’s original proposal by 25 years. Governments have ignored science, forgotten their promises, and put the world at renewed risk from ozone depletion just to please the chemical industry” (BNA 1992m).

The exemptions for essential uses of CFCs and other ODS controlled under the Montreal Protocol were a subject of extensive debate during the Copenhagen meeting. The outcome of the debate was a list of preliminary guidelines that were expected to be made final at the next meeting of the parties to the protocol. Eileen Claussen, director of atmospheric and indoor air programs for the U.S. EPA, said inhalers for asthma patients were the only suitable candidate for essential uses of CFCs as far as the United States was concerned (BNA 1992y).

Discussion

The U.S. government remained divided during the Copenhagen Amendment negotiations, with Republican George H.W. Bush as President and a Democratic majority in both houses of Congress. Soon after the House-Senate conference meeting to reconcile the two versions of the Clean Air Act Amendments, Congress passed and President Bush signed the CAA Amendments in late 1990. As President Bush wanted, the Clean Air Act was amended to contain the ODS restrictions that resulted from the London Amendment negotiations. During the period leading to the Copenhagen Amendment in November 1992, President Bush found Congress continually admonishing him to live up to his campaign promise of being “the environmental President,” not only in addressing ozone layer depletion issues but also in other areas such as attending the 1990 Earth Summit in Rio de Janeiro. Bush and Congress may have been moving toward the same

environmental goals, but Congress, with the Democrats in the majority, had every appearance of racing toward those goals while dragging a slower-moving administration behind it.

Environmentalists found themselves more closely aligned with the EPA, Congress, and the ozone epistemic community than previously in promoting accelerated schedules for phasing out ozone-depleting substances, with CFCs seen as foremost in needing immediate elimination. Although Congress passed amendments to the Clean Air Act in mid-1990 that addressed the phaseout of CFCs, halons, and carbon tetrachloride by 2000 and methyl chloroform by 2002, Congressional hearings in 1991 and 1992 featured witnesses that were proponents of earlier phaseout deadlines. F. Sherwood Rowland and NASA's Robert Watson were among prominent members of the epistemic community testifying in favor of accelerated phaseout schedules based on the continued message from atmospheric research that stratospheric ozone depletion was rapidly increasing. The EPA promulgated implementing regulations in late 1990 to enforce the London Amendment requirements, but at the same time several of the agency's officials, speaking for themselves rather than representing the administration viewpoint, indicated their desire to phase out CFCs and halons by 1995 or 1997. Congress and environmentalists pressured President Bush to direct the EPA to accelerate phaseout schedules, and in mid-February 1992 Bush announced that the U.S. phaseout deadline for the chemicals previously addressed by the London Amendment would be accelerated from 2000 to 1995, a position that was taken to the Copenhagen Amendment negotiations in late 1992 with the full endorsement of environmental groups.

The chemical industry was now under attack from several domestic fronts, with not only the CFC industry but also other chemical producers being targeted for restriction and elimination of the chemicals they manufactured. A weak attempt by House Republicans to call the findings of atmospheric researchers into question failed to garner support, although this tactic was the first in a wave of attempts over the next few years to discredit ozone science. The CFC industry was rapidly moving forward in developing CFC substitutes but emphasized that the United States was extremely reliant on air conditioning and refrigeration equipment that would require CFC substitutes that had yet to be commercially produced. The CFC industry no longer overtly opposed new U.S. regulations of their products, but the debate over eliminating ozone depleters was far from over. In the future, opposition to regulation would come from a different sector, the users of the fumigation chemical methyl bromide.

**The Montreal Amendment: Ozone Backlash Threatens Treaty Progress
(November 1992—September 1997)**

The United States began formulating its position for the next round of negotiations in early 1993. The EPA continued to promulgate rules for the complete phaseout of CFCs by 1996, even while domestic rhetoric increased about the cost of banning CFCs and other implicated chemicals versus perceived scientific uncertainties of whether the substances were actually harming the ozone layer.

Significant resistance to further restrictions on chemicals implicated in ozone layer depletion came from the U.S. agricultural sector. By early 1995, U.S. agribusiness was engaged in an intense effort to halt a phaseout of methyl bromide, a chemical used widely as a fumigant. Although the issue had been tabled during the Copenhagen Amendment negotiations as too controversial to address at that time, UNEP pre-negotiation meetings for the next round of ODS reductions would almost certainly call for reductions if not a complete phaseout of methyl bromide.

Congress was attentive to the complaints of the domestic agricultural sector. A bill in the House in mid-1995 attempted to overturn the EPA's 2001 unilateral ban on production and importation of methyl bromide. The EPA responded to the criticism with a plan that entailed requests for blanket "essential use" exemptions for a large segment of domestic agriculture. Environmental groups were dismayed that the United States was contemplating circumvention of its own regulations. Agricultural interests turned to the argument that developing countries would have at least a decade and probably longer to use methyl bromide after the United States ceased usage, giving Mexico, the United States' neighbor to the south, an economic advantage in agriculture.

International discussions in late 1995 centered on methyl bromide restrictions. While the United States maintained its position on a complete phaseout by 2001, most nations wanted a much longer phaseout period to 2010.

The EPA continued to promote the promulgated 2001 domestic phaseout date for methyl bromide. However, the agency was faced with the likelihood that, without an international agreement, the EU and Japan would set their domestic phaseouts at 2015 or even later. The Montreal Amendment negotiated in late 1997 reflected a compromise. Industrialized nations agreed to phase out methyl bromide by 2005; developing countries would phase out the chemical by 2015.

Domestic Interests, Institutions, and Information

The period of discussion and negotiation for the Montreal Amendment extended from November 1992 to September 1997. From the beginning of the period until the mid-term elections of November 1995, the legislative branch of the government had a Democratic majority in both houses. The November 1995 elections brought a Republican majority to both legislative branches.

Democrat William Clinton, who became President two months after the Copenhagen Amendment was negotiated, remained President throughout the discussion and negotiation period for the Montreal Amendment. Prior to Bill Clinton taking office as President, environmentalists expected his administration to strongly support international environmental issues such as curtailing climate change and halting stratospheric ozone depletion. In policy documents issued as President-elect, Clinton said he supported domestic efforts to curtail carbon emissions and international efforts to accelerate the timetable for phasing out chemicals that destroy the stratospheric ozone layer. His choice

of Al Gore as his vice president was widely seen as a signal that he would actively address environmental issues (BNA 1992o).

Warren Christopher began his tenure as Secretary of State at the beginning of the Clinton administration and remained in the office until late January 1997, when Madeline Albright was appointed to the position. Newly elected President Clinton made some key changes in the State Department that were hailed by environmentalists. Clinton named former Senator Timothy Wirth (D-CO) as the State Department's counselor on global issues, with the intention of elevating the position to a new undersecretary post on global issues, including international environmental issues. Wirth was a member of the Senate delegation to the 1992 Earth Summit, co-chaired the Clinton-Gore campaign with a focus on environmental issues, and maintained a close working relationship with Vice-President Gore (BNA 1993p).

President Clinton nominated Eileen Claussen, former Director of the EPA's Office of Atmospheric Programs, as Assistant Secretary of State for Oceans, Environment, and International Scientific Affairs in mid-July 1995. However, she had not received Senate confirmation by the end of the first session of the 104th Congress. President Clinton named her to the position in mid-January 1996 through a presidential recess appointment between the first and second Congressional sessions, and the Senate confirmed her appointment later that month. In her State Department role, Claussen represented the United States in Montreal Amendment negotiations, a role not afforded her in her previous position with the EPA. Although Claussen participated as chief negotiator at UNEP meetings throughout 1996 and part of 1997, she left the State Department in September 1997, prior to the official negotiations for the Montreal

Amendment, to join a consulting firm that worked with industry on atmospheric issues (BNA 1995f, 1996d, 1997d, 1997b).

In 1996 the State Department announced plans to integrate environmental issues into U.S. diplomacy, with special emphasis on climate change, chemical trade, and forests on a global, regional, and bilateral basis. The plan marked a major change in State Department duties with respect to the environment, with Secretary of State Christopher saying, “[the Clinton] administration has recognized from the beginning that our ability to advance our global interests is inextricably linked to how we manage the Earth’s natural resources.” The State Department also supported its efforts with a conference on compliance and enforcement of international environmental agreements “to ensure that those agreements yield lasting results, not just promises” (BNA 1996c).

Madeleine Albright was named Secretary of State in late January 1997. By April 1997 she had announced her intention to build on her predecessor’s environmental initiatives, naming climate change, persistent organic pollutants, species extinction, deforestation, and marine degradation as emphasis issues. In a State Department document released April 22, the goals of her climate change initiative were to negotiate a new climate change treaty that included greenhouse gas emission controls for industrialized countries and gain commitments by the developing world to adopt similar controls in the future. There was little to indicate a commitment to the stratospheric ozone issues still under consideration through the Montreal Protocol (BNA 1997a.)

Carol Browner, appointed EPA Administrator when Clinton took office, remained EPA Administrator during the entire discussion and negotiation period for the Montreal Amendment. In order to fund a separate U.S. Global Change Research Program, an

agency for environment-related research on energy conservation and alternative energy sources, Clinton cut EPA funding in his FY 1997 budget by \$500 million. The following year, Clinton proposed a 12 percent increase in the EPA budget for fiscal 1998, with the majority of the additional funding going to the toxic waste cleanup program (i.e., Superfund) and research to promulgate additional air quality standards (i.e., ground-level ozone and particulate matter limits).

A key issue in the EPA during the Clinton administration was the proposed elevation of the agency to a cabinet-level position. Senator John Glenn (D-Ohio) introduced legislation to convert the EPA into the Department of Environment in early 1993 that paralleled a similar failed attempt in 1991. Glenn indicated the action as one of his legislative priorities in 1993, saying the change “would strengthen the agency’s management effectiveness and ability to execute environmental policy.” President-elect Clinton had indicated that he would support the legislation (BNA 1993l, 1993d; Porter and Silverman 1996). Glenn introduced the bill in January 1993, and debate continued in both the Senate and the House until February 1994. The House failed to pass the bill on a roll call vote. Its opponents were concerned that the legislation would give a Department of Environmental Protection too much authority over U.S. industry in regulating pollution.

Discord over the roles of the State Department and the EPA in negotiating international environmental agreements became apparent even before Clinton took office in January 1993. After EPA Assistant Administrator Timothy Atkeson’s exit interview in early December 1992, he insisted that the State Department was not the best agency to represent the United States in international environmental negotiations. Atkeson, who had

been chief of the EPA's Office of International Activities since 1989, complained that "EPA does all the work, all the judgments, all the battling, all the funding, and State directs the U.S. delegations. It's stupid." Atkeson noted the previous efforts to elevate the EPA to a cabinet-level position, saying that President-elect Clinton would have to decide whether he wanted a Department of the Environment: "I think the issue is: shall the Department of the Environment be the equal of the State Department on international environmental issues?" Otherwise, he indicated, the EPA would continue to serve State by offering technical expertise (BNA 1992b).

By early 1994, environmental groups began to voice their concern over what they considered EPA Administrator Browner's lack of interest in international affairs. They noted that Browner failed to attend key international environmental meetings such as a meeting of the U.S.-Russian Joint Commission on Energy and Space, chaired by U.S. Vice-President Al Gore and Russian Prime Minister Chernomyridin, held in mid-December 1993 in Russia to negotiate an environmental agreement on the Arctic. They also indicated that the Clinton administration had not appointed a new Assistant Administrator for the EPA's Office of International Activities, implying that Browner had allowed the position to remain unfilled for almost a year. In fact, Clinton waited until June 1994 to name William Nitze, then president of the Alliance to Save Energy, to the position, with the Senate finally confirming the nomination in late August.

Several reasons were suggested for Browner's apparent lack of interest in international environmental affairs. One environmental group official suggested a turf battle existed between the EPA and State Department, saying that some in the White House and State Department wanted EPA to discontinue its involvement in international

policy issues and concentrate domestically on technical work such as control and prevention of pollution. A Browner aide acknowledged that historically there had been “lots of friction between EPA and State.” An EPA staff member indicated that comparing Browner with her predecessor, William Reilly, was perhaps somewhat unfair because Reilly was “a very sophisticated global thinker” (BNA 1994c, 1994f, 1994g).

During the period of discussion and negotiation of the Montreal Amendment, the paradox concerning U.S. policies on protecting the stratospheric ozone layer and addressing global warming became apparent. Many of the chemicals that were being used as replacements for ODS to satisfy the Clean Air Act amendments (and the Montreal Protocol) were being identified as greenhouse gases, which scientists claimed were causing global warming. The chemicals industry attempted an early reconciliation of the interconnected problems, with the Alliance for Responsible CFC Policy changing its name in October 1993 to the Alliance for Responsible Atmospheric Policy and its focus to both the Montreal Protocol and the UN Framework Convention on Climate Change. James Wolf, chair of the Alliance, said that the group would not only continue to encourage policies that “facilitate the cost-effective phase-in of ozone-protecting technologies” but also work to ensure that policy makers “consider energy efficiency gains that new technologies make for the purpose of climate change initiatives around the world” (BNA 1993o).

During this time period, distinguishing between U.S. policy on stratospheric ozone protection and on climate change became more difficult. In April 1994 at a White House Conference on Climate Action, Vice President Gore called climate change “the world’s most important environmental threat.” Administration officials and leaders of

environmental groups previously dedicated to reducing production and use of ODS now more often spoke about greenhouse gases such as those from power plants powered by fossil fuels and promoted emissions reductions through energy efficiency and renewable energy sources. The Antarctic ozone hole, the quintessential symbol of stratospheric ozone depletion, continued to enlarge, but the issue seemed to have slipped in priority next to global warming. Policy entrepreneur Al Gore had shifted his attention to climate change issues. Quite often, even the dual role of ODS that both depleted the ozone layer and contributed to greenhouse gases went unnoticed or at least unmentioned (BNA 1994d).

The State Department also cast stratospheric ozone protection as a lesser priority than other environmental issues. At a meeting in late June 1994 with environmental and industry groups to gain more input into the development of international environmental policy, the State Department failed to discuss ozone depletion. Instead, Elinor Constable, Assistant Secretary of State for Oceans, Environment, and Science listed the main environmental priorities of her section as climate change and biodiversity (BNA 1994e).

A Republican majority rolled into both houses of Congress in 1995, bringing its own philosophy about the way that government should be run. Representative Newt Gingrich (D-GA) introduced the Republican “Contract with America” during the 1994 mid-term elections. Touting a new version of Reagan’s “getting the government off the people’s backs,” the “Contract with America” challenged such issues as unfunded mandates and government size and bureaucracy.

On Earth Day 1995 (April 21), President Clinton took a stand against some of the Republicans’ “Contract with America” actions that he saw as affecting environmental

issues. In his Earth Day address, he vowed that his administration “would not allow lobbyists to rewrite...environmental laws in ways that benefit polluters.” Vice President Gore spoke against initiatives contained in the “Contract with America” that would undermine bipartisan legislation such as the Clean Air Act. Clinton was especially concerned with bills such as a moratorium on public health and safety regulations and passage of risk assessment legislation that would block the administration’s ability to address important environmental problems. He said that the moratorium “would stop good regulations, bad regulations, all regulations” and that the risk assessment provisions “would let lawyers and special interests tie up the government forever with lawsuits and petitions” (BNA 1995b).

EPA Announces Proposals, Rules on ODS; Environmentalists Label Industry Non-Responsive

In early January 1993, a ban on certain consumer and industrial products containing CFCs went into effect. The EPA rule, proposed a year earlier, banned all aerosols and pressurized dispensers containing CFC-propellants. It also prohibited production of cleaning fluids containing CFCs used for non-commercial electronic and photographic equipment and flexible and packaging foams containing CFCs. The rule took effect with little or no resistance from the chemicals industry, which was well on its way to ceasing production of all CFCs (BNA 1993c).

In late February, Greenpeace leveled accusations against the chemicals industry, calling the companies “unwilling” to invest in and produce environmentally safe alternatives to CFCs. The latest Greenpeace report, *Climbing Out of the Ozone Hole: A Preliminary Survey of Alternatives to Ozone Destroying Chemicals*, indicated that CFC producers were touting HCFCs and HFCs as environmentally safe replacements for

CFCs, when these chemicals either add to ozone layer depletion or global warming. Greenpeace officials pointed to work done at U.S. national laboratories as well projects funded by the EPA and the Department of Energy that have developed environmentally safe alternatives to CFCs, HCFCs, and HFCs. They said that “the U.S. has everything it takes to burst onto the international market of environmentally safe CFC refrigeration alternatives except the will to do so.” DuPont responded that its efforts had been misinterpreted, saying that HCFCs and HFCs were indicated only for existing refrigeration systems for which no other viable alternatives had been found (BNA 1993n).

The EPA on March 18 announced a proposed rule that would move the United States toward a total ban on production and use of halons, carbon tetrachloride, methyl bromide, hydrobromofluorocarbons, and all CFCs. The agency proposal fulfilled a promise made by then-President George W. Bush in February 1992 to accelerate the phaseout of certain ODS. The proposal specified a phaseout of halons and a 50 percent reduction in production and use of the remaining chemicals by January 1, 1994, with a total phaseout of all except methyl bromide by January 1, 1996. The phaseout of MB was scheduled for January 1, 2000. The EPA proposed a ban on HCFC-141b by January 1, 2003, and a near-phaseout of HCFC-142b by January 1, 2010. The EPA also proposed to limit trade with countries that had not become a party to the Montreal Protocol. The proposed rule was intended to fulfill the requirements of the Copenhagen Amendment, which the Senate would examine for ratification later in 1993. The final rule, announced in late November 1993, retained the proposed deadlines for all the chemicals except

methyl bromide. The final rule allowed production and imports of MB for an additional year, with phaseout scheduled for January 1, 2001 (BNA 1993h, 1993k).

In early April 1993, the EPA addressed government procurement of ODS. The proposed rule warned federal agencies that many ODS would be unavailable by 1994 or 1996, so that new contracts and purchasing agreements as well as renewals would need to be formulated with these dates in mind. The proposed EPA rule also required government organizations to develop procedures to reduce use of existing systems containing or manufactured with ODS. Once the rule became final, the Office of Management and Budget would have to certify that each organization's procurement regulations conformed with the EPA rule (BNA 1993i).

EPA, Industry Find Essential Use Exemptions a Hard Sell Internationally

In May 1993 the EPA began what would become a long series of deliberations about exemptions to the upcoming bans on ODS. The exemptions, based on individual companies' contentions that the need was essential and could not be met with an alternative substance, were a problematic issue. In the United States, the EPA was required to rule on their validity and then submit the subsequent list to UNEP at least nine months before the parties to the Montreal Protocol met to evaluate the requests. A key problem with the system was that dates for meetings of the parties were often not set much earlier than six to nine months before the meetings occurred (BNA 1993g).

In addition, once the EPA forwarded its proposed exemptions to UNEP, the U.S. agency had only limited ways of encouraging their acceptance in the meeting of the parties. Automakers in the United States brought the issue forward when they announced in late June that they might seek an essential use exemption for CFCs in auto air

conditioners that were on the road prior to the 1994 model year when CFC alternatives began to be used in new cars. DuPont had already announced that it would cease production of CFCs at the end of 1994, and techniques had yet to be perfected for retrofitting approximately 140 million older cars for CFC alternatives. Robert McFadden, an official with the American Automobile Manufacturers Association, indicated that many parties to the Montreal Protocol were not sympathetic to the U.S. auto industry's problems with CFC alternatives, saying "it's a hard sell internationally because mobile air conditioners are more prevalent in this country. Other countries have not been sympathetic to this problem" (BNA 1993b).

The United States also faced opposition to essential use exemptions for halons. In July 1993, the Halons Technical and Economics Assessment Panel recommended that no exemptions be allowed for the chemical, which was scheduled for global phaseout by January 1, 1994. The panel indicated that their survey showed an ample supply of halons remaining in existing equipment that could be recycled within the framework of the Montreal Protocol. However, at the Open-Ended Working Group meeting in early September in Geneva, fifteen nations requested essential use exemptions for halons for 1994. After debating the issue during the meeting, nine countries withdrew their requests, and the remainder indicated they would contact UNEP later with their decisions. After consulting with their exemption applicants, the United States also withdrew its request after determining that domestic halon supplies would be adequate for their needs (BNA 1993e, 1993a, 1993m).

One area in which there was considerable international support for an essential use exemption was for metered dose inhalers, which used CFCs to propel the correct

amount of drug into a patient's lungs. The U.S. pharmaceutical industry had applied to the EPA in early 1993 for an essential use exemption, and in late September the EPA relayed the request to UNEP. In a rare instance of an industry coming before UNEP to state its case, officials of the American Lung Association and the International Pharmaceutical Aerosol Consortium joined forces at a closed session of a UNEP committee hearing in Washington, D.C. in mid-October 1993. The officials indicated that about 340 million metered dose inhalers were made worldwide in 1991, including 90 million for use in the United States, and that there was little likelihood an alternative to CFCs for these devices would be found before the January 1, 1996, CFC phaseout. They said that the United States, Japan, and the European Community, three major markets for the inhalers, had requested essential use exemptions. The officials also indicated that any granted exemption would be temporary, in effect until a suitable alternative was discovered (BNA 1993j).

EPA, Clinton Administration Weaken U.S. Resolve on ODS Phaseout

The end of 1993 brought puzzling actions from the Clinton administration that appeared to contradict its publicized commitment to the environment. Although the EPA had promoted an accelerated phaseout schedule for ODS, the agency continued to discover the need for exemptions to the rapidly multiplying rules on ODS phaseout. Congress had established in the 1990 Clean Air Act amendments a ban on non-essential uses of HCFCs by January 1, 1994. At the end of 1993, the EPA granted exemptions to the Congressional ban for HCFCs used in certain medical devices; lubricants, coatings, and cleaning fluids used in aircraft maintenance; mold release agents used in production of plastic materials; lubricant-cleaning sprays used in the production of synthetic fibers;

document preservation sprays; commercial portable fire extinguishers; wasp and hornet sprays for use near high-tension power lines; and foam insulation products (BNA 1993f).

Even more startling, the Clinton administration asked DuPont to continue production of CFCs past the company's self-imposed deadline of January 1, 1995, citing the need to stockpile extra CFCs to service automobile air conditioners through 2000. In a November 29, 1993, letter from DuPont Chairman and CEO Edgar Woolard Jr. to President Clinton, Woolard said, "We are now receiving strong indications that your administration has concluded that because of the fragile condition of the U.S. economy, inventories [of CFCs] should be provided for a longer period so that consumers will not abandon their support of the overall transition" from CFCs to alternative chemicals.

The response of the environmental community was predictable. Joe Goffman of the Environmental Defense Fund labeled the administration's action in approaching DuPont "a terrible decision." Goffman said the request for DuPont to rescind its voluntary CFC phaseout made environmentalists wary of the Clinton administration's policy approach to climate change, which relied heavily on voluntary industry reductions in greenhouse gas emissions. Jacques Rosas, an official of Greenpeace, pointed to the EPA's November 1993 final rule that extended the deadline for phaseout of methyl bromide to January 1, 2001, one year later than originally proposed, as additional evidence that the Clinton administration was not serious about addressing stratospheric ozone depletion. He charged that the United States was "backtracking" on environmental protection (BNA 1994b).

Environmental Backlash Begins

Environmentalists began to express concern in mid-1993 over political and economic conditions in the United States that seemed to be fostering an “environmental backlash.” Roger Selbert, publisher of *FutureScan*, warned attendees of a session of the Competitive Advantage Through Environmental Technology Conference on May 6 that dire scenarios forecasted by environmental groups coupled with new and expensive environmental regulations might take a toll on consumer commitment to the environment. Selbert, publisher of a weekly newsletter that tracked economic, social, and marketing trends, warned that “the straw that breaks the camel’s back could well be chlorofluorocarbons....Coolant prices are already skyrocketing. Have you priced having your car air conditioner retrofitted yet? There are going to be shortages as bad as the gasoline lines for retrofitting all air conditioners and refrigerators and it’s going to cost billions of dollars” (BNA 1994a).

Atmospheric scientists were concerned about the possibility that global and domestic efforts to curb ozone depletion might be derailed. At an annual meeting of the American Chemical Society in late June 1994, F. Sherwood Rowland and Mario Molina, who first sounded the scientific alarm about ozone depletion, joined several other scientists in a panel discussion about the skepticism. Alan Miller, executive director of the Center for Global Change at the University of Maryland, postulated that the reasons for trying to refute that ozone depletion occurs are political: “If they can convince the public that even the ozone depletion issue is exaggerated, then they can take on all environmental policy” (BNA 1994h).

Chemical Industry Campaigns Against Methyl Bromide Restrictions

The mid to late 1990s saw resistance from U.S. producers of methyl bromide that rivaled the CFC producers' protests of the late 1970s through the mid 1980s. One of the first coherent attacks came in January 1995 in the form of a letter written by Peter Sparber, director of the Methyl Bromide Working Group, to rally the U.S. agricultural sector. The letter indicated that methyl bromide producers expected to find a means of halting any ban on the chemical, saying that users stood "an increasingly good chance of being able to use methyl bromide well beyond the year 2001." The letter cautioned its audience to be "very careful what you say publicly about methyl bromide alternatives" because the EPA could ban MB if it ruled that an alternative existed for its use or that it was not an essential agricultural pesticide. The letter was in response to an October 1994 International CFC and Halon Alternatives Conference in which panelists discussed numerous existing and potential alternatives to MB. Sparber indicated that the alternatives to MB that environmentalists were "trumpeting" were not in wide use and were ineffective (BNA 1995g).

The environmental group Ozone Action released a report in late March 1995 calling for a tax on MB and a ban on its use in the United States by 1997. The report, *Out of the Frying Pan, Avoiding the Fire: Ending the Use of Methyl Bromide*, cited data indicating that MB was 50 times more destructive to the stratospheric ozone layer than CFCs. The report also cited the conclusion of UNEP's Methyl Bromide Technical Options Committee that commercially available alternatives or technologies in an advanced state of development existed for more than 90 percent of MB uses.

Environmental Groups See Weakening of U.S., International Resolve to Ban ODS

In early April 1995 environmental groups again called for accelerating the ODS phaseout, with methyl bromide as a particular target. Kalee Kreider of Ozone Action continued the group's campaign for a methyl bromide phaseout, saying that the ozone-layer protection issue had "been taken over by the chemical manufacturers." She blamed the chemical industry for manipulating phaseout deadlines based on its ability to produce ODS alternatives rather than on any concern for environmental harm (BNA 1995o).

The eleventh meeting of the parties to the Montreal Protocol in May 1995 fell victim to what some observers called an old enemy—politics and vested interests. A proposed ban on methyl bromide caused a rift between industrialized and developing countries, with the developing countries demanding monetary aid before even considering a methyl bromide phaseout. The United States, which planned to phase out production and use of MB by 2001, was the world's largest user of the pesticide. The EU, the second biggest user, planned a phaseout by 2015, and Japan, the third largest user, had no plans for a phaseout. The developing world used only about 18 percent of the world's MB, but it was important as a soil fumigant for their large exports of cash crops. It was even rumored at the meeting that Kenya planned to set up a MB plant with Israeli assistance to capitalize on the growing demand among developing nations for the pesticide (BNA 1995j).

Although Congress would maintain a Democratic majority until the November elections, Republicans in Congress began to respond to the growing controversy over a methyl bromide ban. Representative Dan Miller (R-FL) introduced a bill in the House in early August 1995 to overturn the EPA's January 1, 2001, ban on production and importation of MB. Miller indicated he was taking the action because "unilaterally

banning methyl bromide without an alternative will seriously damage” U.S. agriculture. He said that a “unilateral phaseout by the United States will only shift production to countries that permit methyl bromide use.” In response, Ozone Action cited the UNEP report listing several technically feasible alternatives to methyl bromide, saying that “ending domestic production of methyl bromide in no way hurts the competitiveness of U.S. farmers,” The bill was referred to both the House Agriculture and Commerce Committees (BNA 1995a; U.S. House of Representatives 1995).

The House Commerce Subcommittee on Oversight and Investigation held hearings in early August 1995 on the EPA’s methyl bromide ban. Representative Joe Barton (R-TX), who chaired the subcommittee, noted that U.S. farmers were concerned about the effect the ban would have on trade, especially if farmers in Mexico and other developing countries were allowed to continue their use of methyl bromide. In her testimony, Mary Nichols, EPA Assistant Administrator for Air and Radiation, said that the Clinton administration would work toward the development of a “safety valve” in the form of essential use exemptions for methyl bromide. Officials of several environmental groups expressed concern over the possibility of exemptions that covered a large segment of methyl bromide use. Annie Petsonk, international counsel for the Environmental Defense Fund, made the point that “it’s really important for governments to send the proper signal in order to stimulate industry to generate alternatives. U.S. industry has shown that switching to ozone-friendly compounds is good for business and creates jobs” (BNA 1995d).

Environmental groups were also concerned about a perceived weakness in the U.S. ban on CFCs after December 31, 1995. While three of the four U.S. producers of

CFCs had indicated they would cease CFC production at the end of 1995 (and DuPont had announced on September 13 that it no longer produced CFC-11 and CFC-12), production of CFCs was allowed for use by developing countries. Of the four companies, only AlliedSignal said it was evaluating its options. Under the terms of the international Montreal Protocol and the domestic Clean Air Act amendments, the United States was allowed to produce up to 60,000 tons of CFCs for export, but the environmental group Ozone Action wanted a strict prohibition on the production of CFCs. The production allowances were put in place by Montreal Protocol negotiators who wanted to discourage developing countries from constructing their own CFC production facilities. Ozone Action noted that the four U.S. producers held production allowances they could exercise until 2005, and they could trade the allowances to other companies and countries (BNA 1995n, 1995e).

Ozone Backlash Gains Momentum in Congress

A hearing of the House Science Subcommittee on Energy and Environment in mid-September 1995 turned into a Republican challenge of the science underlying stratospheric ozone depletion. Representative John Doolittle (R-CA) testified that he would soon introduce legislation to push back the U.S. ban on CFCs from December 31, 1995, to 2000, saying that the current state of atmospheric science did not justify the early CFC ban. Majority Whip Tom Delay (R-TX) also told the subcommittee that he questioned the role of CFCs and other chemicals proposed for a U.S. ban. When Representative Lynn Rivers (R-MI) questioned whether their conclusions were derived from UNEP or other peer-reviewed research, Doolittle stated that he would not “get caught up in the mumbo-jumbo of peer-reviewed articles” (BNA 1995c).

Rivers' concern stemmed from the inclusion of another scientist to testify before the subcommittee, S. Fred Singer, an atmospheric physicist and university professor whose academic accomplishments included few articles published in well-known, peer-reviewed journals. Singer testified that his role was to point out cases "where the science has been twisted" and policy makers were being "misled and bamboozled" and said that the conclusion of many in the scientific community that emissions of chlorine, bromine, and other chemicals caused ozone depletion was by no means certain. Robert Watson, who had moved from NASA to be associate director of environment in the White House Office of Science and Technology Policy, rebutted Singer's testimony, saying that the relationship between emissions of CFCs, methyl bromide, and other related chemicals and ozone depletion was believed by "the very, very large majority of the international scientific community," notwithstanding "the views of single individuals with few, if any, relevant publications in peer-reviewed journals." Industry groups also testified about the merit of the CFC ban, saying their own experts, who at first questioned the science, had now found it to be credible (BNA 1995c).

Environmental Groups Continue Campaign for Retaining Methyl Bromide Ban

Environmental groups sought to strengthen their case for a methyl bromide ban at the 1995 International CFC and Halon Alternatives Conference in late October. The conference, sponsored by the Alliance for Responsible Atmospheric Policy, moved from discussions about CFC and halon substitutes to a panel discussion on the availability of methyl bromide alternatives. Edward Ruckert, attorney for the Crop Protection Coalition, said that no acceptable alternatives exist for methyl bromide and that a 2001 phaseout would put agricultural users at a competitive disadvantage, particularly with foreign

agricultural interests. David Doniger, who had moved from the NRDC to become senior advisor in the EPA's Office of Air and Radiation, reiterated the testimony of EPA's Mary Nichols before the House Commerce Subcommittee on Oversight and Investigation in August 1995 when he stated that the Clinton administration was working on creating a "safety valve" to allow essential use exemptions for methyl bromide. Joe Passacantando, head of Ozone Action, said that such a policy would deter efforts at finding alternatives: "If you're told six years before the phaseout date that you won't have to phase out if there are no alternatives, there's no incentive to find alternatives." Doniger and Passacantando agreed that they were opposed to Representative Miller's House bill to overturn the EPA's 2001 MB phaseout date. Doniger said the bill would prevent the United States from phasing out a compound unless it was also being phased out by most other countries. Such a provision would essentially allow the United States to phase out methyl bromide on the delayed schedule the Montreal Protocol provided for developing countries rather than the schedule likely to be negotiated for industrialized countries at the next Montreal Protocol meeting (BNA 1995h).

Environmental groups continued their defense with the release of a new book, *Mending the Ozone Hole: Science, Technology, and Policy*. The authors, Arjun Makhijani and Kevin Gurney from the Institute for Energy and Environmental Research, recommended the elimination of methyl bromide as an agricultural fumigant by 1996, saying, "Industry too often favors a post-mortem approach to environmental protection, show us the injured and dead, before we take action" (BNA 1995k).

Greenpeace International cautioned nations such as the United States that were considering longer phaseout periods for ODS than negotiated in the Montreal Protocol

that the risk of using the chemicals as well as the cost of substitutes should be considered in the deliberations. In its November 1995 report, Greenpeace said “the parties to the Montreal Protocol have begun to indulge in cost-benefit analysis” but have failed to quantify the risks from continued use of ODS (BNA 1995i).

Parties to the Montreal Protocol Arrive at Tentative Agreement on Methyl Bromide

The Seventh Meeting of the Parties to the Montreal Protocol was held in Vienna in early December 1995. The United States delegation brought a position on the phaseout of methyl bromide that was to prove unpopular with other nations. Most countries were not ready to support a phaseout schedule, while the United States pushed the January 1, 2001, phaseout date that the EPA had instituted in its November 1993 final rule with no interim reductions but substantial exemptions for essential uses. After considerable debate, the delegates tentatively agreed on a 25 percent reduction in methyl bromide production and use by 2001, a 50 percent reduction by 2005, and a phaseout by 2010. However, the delegations were not ready for a total commitment to the methyl bromide provisions and delayed final agreement until the UNEP Technology and Economics Advisory Panel reviewed them in 1997 (BNA 1995I).

EPA Moves Forward with Request for Methyl Bromide Essential Use Exemptions

Although the results of the December 1995 Montreal Protocol meeting indicated that the parties to the protocol would likely set the methyl bromide phaseout date at 2010, in the United States the EPA remained committed to the 2001 phaseout date set forth in its November 1993 final rule. Because Title VI of the Clean Air Act required the phaseout of MB by 2001 and the Government Accounting Office had recently indicated

the EPA did not have the authority to grant essential use exemptions for the chemical, the EPA began a congressional campaign to amend the act to allow essential use exemptions.

Discussions about methyl bromide continued in 1996, with Congress now having a Republican majority. The EPA's Mary Nichols told the House Commerce Subcommittee on Health and Environment in late January 1996 that the EPA fully recognized "that there is no guarantee that acceptable alternatives will be available for all uses of methyl bromide before 2001." Larry Elworth, special assistant for pesticide policy in the Department of Agriculture, told the subcommittee that the legislative "fix" would be "limited to resolving the concerns for the competitiveness of U.S. agriculture and trade by assuring the continued availability of methyl bromide where it is needed because of the lack of acceptable alternatives." Some of the subcommittee members were concerned about the proposed agreement at the December 1995 meeting of the parties to the Montreal Protocol. Representative Brian Bilbray (R-CA) said that the 2010 phaseout date for other countries would put U.S. agriculture at an international disadvantage. Environmental groups were concerned about what they viewed as the Clinton administration's attempt to circumvent federal regulations and disappointed in President Clinton's stance on the issue. They blamed "election-year politics" and noted that methyl bromide is heavily used in California and Florida, which are major agricultural states with many electoral votes (BNA 1996h, 1996a).

Scientists, Environmental Groups Continue Assault on ODS Production and Use

Atmospheric scientists reported the results of an analysis of four years of satellite data on stratospheric ozone depletion in an article in *Nature* in early February 1996. In the article, the scientists from NASA and the University of California indicated they were

able to rule out all natural influences on ozone depletion, stating “conclusively that chlorofluorocarbon releases—rather than other anthropogenic or natural emissions—are responsible for the recent global increases in stratospheric chlorine concentrations.... Altogether, these results implicate the chlorofluorocarbons beyond reasonable doubt as dominating ozone depletion in the lower stratosphere” (Russell III et al. 1996). In the same issue of *Nature*, Pennsylvania State University meteorologist William Brune said the additional scientific evidence was important because “a few vocal skeptics are working to undo the Montreal Protocol.” The skeptics “ignore the weight of scientific evidence, parrot misconceptions that have been thoroughly scrutinized and discredited, [and] focus attention only on the few studies that support their position” (BNA 1996f; Brune 1996).

Members of the scientific community met with congressional staff members in mid-February 1996 in an attempt to stem the growing concern of some members of Congress who were considering legislation to change the methyl bromide phaseout date to 2010. Arjun Makhijani of the Institute for Energy and Environmental Research and a member of the EPA’s Science Advisory Board, called the 2001 deadline under the Clean Air Act a “sound proposition.” He and other atmospheric scientists, including Mario Molina who first announced a link between CFCs and ozone depletion, indicated that methyl bromide was not only an ozone depleter but also a highly toxic chemical that had killed eighteen people in California during the previous five years. Makhijani said the “humane, moral, and rational response” to the methyl bromide issue was to stop its manufacture and use as quickly as possible (BNA 1996g).

Representatives of eighty environmental, labor, public interest, and health groups sent a letter to President Clinton in late May 1996 asking the President to enforce the 2001 ban on methyl bromide, including not allowing exemptions to the ban for any reason. Corinna Gilfillan, director of the ozone protection campaign for Friends of the Earth, said that if the United States maintained its 2001 deadline for MB production and use, it could convince other industrialized countries to move up their own dates for MB phaseout. She indicated that the EU was already considering phaseout of MB sooner than the 2010 deadline proposed in the most recent meeting of the parties to the Montreal Protocol (Hogue 1996).

Scientists Paul Ehrlich and Anne Ehrlich called “special-interest scientists” into question in their September 1995 book, *Betrayal of Science and Reason: How Anti-Environmental Rhetoric Threatens Our Future*. In the book, the authors labeled attempts to minimize environmental problems as “brownlash” because they fuel a backlash against “green” policies. In commenting on the book, Paul Ehrlich said that a few scientists were afforded significant coverage in the media despite the fact that their views were based on “junk science.” The book indicated that some of the “brownlash” scientists received financial support “from anti-environmental elements,” compromising their views. Ehrlich pointed to one scientist in particular, S. Fred Singer, an outspoken critic of the science surrounding stratospheric ozone depletion and climate change. The book indicated that Singer had at one time been paid by oil companies such as ARCO, Exxon, Shell, Sun, and Unocal, and that “he is on record for telling these companies that they had better stand up for their interests” (BNA 1995m; Ehrlich and Ehrlich 1996).

Nations at UNEP Meetings Defer Many Decisions

Nations represented at the November 1996 Conference of the Parties to the Montreal Protocol again deferred the final decision on the phaseout date for methyl bromide for another year. In addition, they delayed consideration of controlling trade in MB with countries that are not parties to the Montreal Protocol to the 1997 meeting of the parties. The issue of methyl bromide phaseout was considered too controversial to attempt a discussion until additional scientific data were available in 1997 (BNA 1996e).

A key area where a decision was forthcoming during the November 1996 meeting concerned essential use exemptions for CFCs used in metered dose inhalers. Previously, manufacturers had indicated that no acceptable alternatives to CFCs in the inhalers were available, and the use of CFCs had risen to 13,000 tons over the years. More recently pharmaceutical companies indicated that several dozen products using CFC substitutes would be available by 2000. The delegates approved a recommendation from UNEP's Technology and Economic Assessment Panel that the exemption for these devices be eliminated by 2005 (BNA 1996b).

The methyl bromide issue continued to dominate the agenda for UNEP meetings during 1997, with a preparatory meeting in Nairobi in June 1997 failing to reach any form of consensus on a phaseout date for the substance. While the United States, the biggest user of MB, planned for a 2001 phaseout, the EU set its MB phaseout for 2015. Japan, the third biggest user of MB, had no plans to reduce or phase out methyl bromide. Developing countries, which used 18 percent of the world's MB, contended that they could not afford to stop using MB unless they received substantial funds to help find alternatives (Newham 1997).

U.S. Congress Questions Cessation of Essential Use Exemptions for CFCs in Inhalers

A hearing of the House Commerce Subcommittee on Health and Environment in late July 1997 turned into an education session on the issue of CFCs in metered-dose inhalers. First, the director of EPA's Office of Atmospheric Programs defended the need to complete the phaseout of CFCs in the United States, testifying that the 4000 tons of CFCs used in metered-dose inhalers in the United States were more than the CFCs used for all purposes in more than 100 countries. Next, the Food and Drug Administration described their proposed process for a transition to CFC-free, metered-dose inhalers and indicated that the move was endorsed by the American Lung Association and the Asthma & Allergy Foundation of America. Then, the Deputy Assistant Secretary of State for Environment and Development testified that under the Montreal Protocol, industrialized countries had phased out the production and use of CFCs except for essential use exemptions. He also said that nations had voted to end all essential use exemptions for CFCs in their November 1996 meeting of the Montreal Protocol parties, with a likely phaseout in 2005 (BNA 1997e).

However, Representatives Clifford Stearns (R-FL) and Christopher Smith (R-NJ) introduced a bill on July 22 that would prohibit the FDA from issuing a final rule phasing out the use of CFCs in metered-dose inhalers (U.S. House of Representatives 1997). Representative Stearns was concerned that the FDA would ban CFCs in inhalers before viable substitutes were on the market, which he indicated would be four to five years. Murray Lumpkin, deputy director of the FDA's Center for Drug Evaluation and Research, stated that "patient-acceptable products" must be on the U.S. market before the FDA banned CFC-containing inhalers. The chief objective of the FDA proposed rule, he

said, was to provide a plan and schedule for the ultimate phaseout of CFCs in the devices (BNA 1997e).

Nations at Ninth Conference of the Parties to the Montreal Protocol Agree on New Amendment

After days of debate in mid-September 1997 between industrialized and developing countries concerning the phaseout of methyl bromide, nations attending the Ninth Conference of the Parties to the Montreal Protocol reached a compromise agreement. Industrialized countries agreed to move up their phaseout date for MB to 2005, with interim reductions of 25 percent by 1999, 50 percent by 2001, and 70 percent by 2003. Developing countries that had argued against an early phaseout because it could harm agricultural trade agreed to a phaseout by 2015. The United States and Canada had wanted a methyl bromide phaseout by 2001, but opposition from southern European countries forced the 2005 compromise for industrialized countries (Blassnig 1997).

At the meeting, the EU proposed to move the phaseout date for HCFCs from 2030 to 2015. The United States responded that the economic and social costs to meet an earlier deadline did not warrant a change from the agreement in the Copenhagen Amendment. However, a group of 38 countries provided a declaration that enabled UNEP to put the issue of changing the HCFC phaseout deadline on the agenda for the 1999 meeting of the Montreal Protocol parties (Blassnig 1997).

Another issue of importance was the final phaseout of CFCs by eliminating essential use exemptions for metered-dose inhalers. The delegates concluded that, while most essential uses of CFCs in the devices could be completed by 2000 to allow a complete phaseout by 2005, not all countries could be sure of the conversion to CFC

substitutes. Ultimately, the nations were unable to establish an exact timeline for complete phaseout (Blassnig 1997).

Discussion

For the first three years of the Montreal Amendment negotiations the U.S. government was undivided, a situation that had not occurred before in the history of the ozone treaty negotiations. Democrat William Clinton was President, and both houses of Congress had a Democratic majority. That situation changed in January 1995, however, when the Republicans claimed a majority in both houses. Regardless of which party was in the majority in Congress, however, U.S. environmental policy experienced some significant setbacks during the entire period leading to the Montreal Amendment negotiations as the U.S. economy stalled and Republicans saw economic hardship as an acceptable reason to soften environmental restrictions for U.S. industry. Environmentalists, who had welcomed Clinton's election as finally fulfilling their desire for a true environmentalist President, were dismayed when the Clinton administration granted numerous exemptions to the EPA ozone protection regulations. From the environmental groups' perspective, Clinton's ultimate betrayal to the cause of halting ozone depletion was his administration's request for DuPont to continue manufacturing CFCs past the date that the company had set for itself to end production.

Although still a topic of discussion, the production of CFCs was not a critical issue during the five years leading to the Montreal Amendment negotiations. Instead, the use of methyl bromide, an ODS used as a crop fumigant, embroiled Congress and the Clinton administration in a controversy that would last for more than a decade. The EPA had promulgated regulations in early 1993 that phased out methyl bromide by 2001. By

January 1995, methyl bromide users had organized to oppose both domestic and international restrictions on the chemical, and their support had a broad base in both the agricultural sector and Congress. House Republicans used oversight hearings to consider testimony from agribusinesses that would be harmed by a methyl bromide ban and to call into question the science behind linking methyl bromide (or any other chemical) to ozone depletion. Methyl bromide users and the Republican majority in Congress were adamant in their resistance to both domestic and international restrictions on methyl bromide.

Atmospheric scientists and environmental groups responded to opposition to the 2001 methyl bromide ban with a direct appeal to President Clinton to resist pressure from Congress both on the 2001 methyl bromide deadline and on issuing exemptions to the ban. With the promise of endorsement by U.S. environmental groups, the U.S. delegation took the 2001 methyl bromide ban as their position in the late 1997 Montreal Protocol negotiations. The methyl bromide issue had been contentious in the Copenhagen Amendment negotiations, where it had been tabled for future consideration. While still problematic, negotiators in Montreal were able to reach a compromise that fixed the methyl bromide phaseout deadline at 2005.

The Beijing Amendment: U.S. Loses Battle for Earlier Methyl Bromide Phaseout (September 1997—December 1999)

The period of discussion and negotiation for the Beijing Amendment extended from September 1997 to December 1999. No significant changes occurred in relevant elected and appointed government positions in the United States during this period. The legislative branch of the government had a Republican majority in both houses. Democrat William Clinton remained President, Madeline Albright remained Secretary of State, and Carol Browner remained EPA Administrator.

In the State Department, Timothy Wirth, who had been Undersecretary of State for Global Affairs since the beginning of the Clinton administration, left the position in December 1997 to administer Ted Turner's \$1 billion gift of support to the United Nations. Wirth had been a key negotiator for both the stratospheric ozone treaty and the Kyoto Protocol climate change meetings (BNA 1997f). Meanwhile, in late October 1999 David Sandalow became Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs. The assistant secretary in this position was typically the head of the delegation to the international ozone protection treaty meetings. However, the Montreal Protocol and its amendments appeared to no longer be a priority for the State Department, with Sandalow saying, "Our goal for this year is to complete work under the Buenos Aires plan of action" for the climate change treaty. He also mentioned a second goal, "to promote meaningful participation of key developing countries" in the Kyoto Protocol (BNA 1999c). For the climate change treaty, Sandalow became the second most senior member of the negotiating team, with Undersecretary of State for Global Affairs Frank Loy being the head of the delegation.

An indication that the U.S. Congress viewed the provisions of the climate change treaty in a different light than those of the stratospheric ozone treaty came in the form of a Senate bill in late April 1998 to prevent “back-door implementation” of the Kyoto Protocol (U.S. Senate 1998). A similar bill was introduced in early May in the House (U.S. House of Representatives 1998). According to the Senate bill’s sponsor, John Ashcroft (R-MO), the legislation barred federal agencies from spending money on “rules, regulations, or programs” related to implementation of the global climate change treaty. Ashcroft said that because the United States had not ratified the Kyoto Protocol, such expenditures would “subvert the Constitution of the United States.” In contrast, in the past the EPA, NASA, NOAA, and other federal agencies were granted substantial funding for programs, planning, and research related to implementing the Montreal Protocol and its amendments, in many instances long before the ozone treaty provisions were examined by the Senate Foreign Relations Committee for ratification. Ashcroft cited great economic hardship on the U.S. public as his reason for introducing the bill, saying that it was important “that the world perceive the United States as a strong nation of great capacity.” He continued that implementing a treaty that exempted “many of our fiercest competitors” would not further that goal. Both bills died in committee (BNA 1998a).

Clinton Administration, EPA Plan Changes to Methyl Bromide Phaseout Provisions

Almost immediately after the meeting of the Montreal Protocol parties in September 1997 that produced the Montreal Amendment, the EPA indicated it would begin to develop plans to move the methyl bromide phaseout date in the United States from 2001 to 2005 to conform to the new Protocol amendment. The Clinton

administration intended to push for changes to the Clean Air Act that would allow the later phaseout date. Bill Thomas, director of the EPA's methyl bromide phaseout program, indicated that the agricultural sector in the United States might be more receptive to a phaseout of the chemical than previously because developing countries were also subject to a phaseout schedule, although in unspecified increments and over a longer period leading to complete phaseout by 2015. He said that as methyl bromide production was phased out in the United States, the amount of the chemical available worldwide would shrink and prices would go up. Growers in developing countries might not be able to afford using the chemical, which hopefully would cause them to push harder for substitutes. Thomas noted that once the phaseout took place in the United States, "our growers will be on a far more level playing field" than had been previously portrayed (Hogue and Broderick 1997).

Looking even further into the future for methyl bromide, EPA's Steven Andersen warned methyl bromide users in mid-November 1997 that they should start planning immediately if they expected to seek an essential-use exemption to the expected 2005 phaseout. He indicated that proving an exemption was needed would rely on a demonstration that the methyl bromide user had minimized use of the pesticide and had supported research and development of alternatives but had not found a viable substitute (BNA 1997c).

By October 1998, the United States was acting to extend its domestic deadline for a methyl bromide phaseout to 2005. The fiscal 1999 omnibus appropriations law changed the 2001 deadline in the Clean Air Act and ordered the EPA to promulgate rules to agree with the recent Montreal Amendment. In addition, the law detailed the requirements for

methyl bromide essential-use exemptions after the 2005 phaseout deadline.

Environmentalists such as Kert Davies, science policy director with Ozone Action, believed the new essential-use exemption regulations would make it too easy for farmers to obtain exemptions. Conversely, Ed Ruckert, a Washington attorney representing the methyl bromide interest group Crop Protection Coalition, indicated the exemption process could be difficult. He outlined a possible process in which exemption requestors might have to appear before a UNEP special panel. He said that “most farmers probably would rather come up with alternatives to methyl bromide than to approach an ‘august international body’ that may not grant an exemption” (BNA 1998b).

The EPA proposed the new rules for methyl bromide phaseout in late February 1999, although the agency continued to campaign at interim UNEP meetings for the current U.S. phaseout date of 2001 (BNA 1999d; Parson 2003). After realizing that the EU and many other countries were adamant about a 2005 phaseout date, the EPA finalized its new rules in June. The regulations matched the Montreal Amendment requirements, which called for a 2005 phaseout deadline for methyl bromide with intermediate cutbacks of 25 percent in 1999 and again in 2000 (BNA 1999a).

Delegates to the Eleventh Meeting of the Parties to the Montreal Protocol met in Beijing in early December 1999. The EU had tacit control of the meeting, gaining approval of provisions that froze production of HCFCs in 2004 at 1989 levels for developed countries and in 2016 at 2015 levels for developing countries. This provision enhanced the Copenhagen Amendment, which called for developed countries to phase out HCFCs by 2020 and by 2040 for developing countries. The Beijing Amendment also banned trade in HCFCs with countries that had not ratified the Copenhagen Amendment

and phased out the use of bromochloromethane for all countries by 2002 (BNA 1999b; Parson 2003).

Discussion

The U.S. government remained divided during the Beijing Amendment negotiations, with Democrat William Clinton as President and a Republican majority in both houses of Congress. Although controversy over the methyl bromide phaseout in the United States continued during the late 1990s, Congress was unwilling to extend the deadline past what had been negotiated internationally in Montreal in late 1997. Congress amended the Clean Air Act in early 1999 to extend the methyl bromide phaseout to 2005 in agreement with the Montreal Amendment.

The EPA attempted at several UNEP meetings to convince other nations to rescind the Montreal Amendment phaseout deadline for methyl bromide at the next round of international negotiations and embrace the 2001 deadline that was currently a regulation in the United States. When EPA officials realized that they would not be successful in achieving international consensus, the agency promulgated new regulations six months before the Beijing Amendment negotiations that extended the methyl bromide phaseout deadline to 2005. The EPA then turned its attention to advising U.S. methyl bromide users about the process to obtain exemptions from the new regulation.

Although concerned about the ramifications of phasing out methyl bromide by 2005, users began to adjust to the four-year extension gained over the previous EPA regulations. In much the same way that CFC producers took on the task of finding viable CFC substitutes in the 1980s, methyl bromide users realized that they would have to

make a determined effort both to reduce their use of the chemical and to search for alternate methods of preventing crop infestations.

Conclusions

In formulating its position for international environmental treaty negotiations, whether a nation's government is divided is not as crucial in achieving consensus among the relevant groups as to how that division is constructed. During formulation of the U.S. position for the ozone protection treaty, the government was divided in all six periods leading to treaty negotiations except for the first three years of the pre-Montreal Amendment negotiations, yet the division itself did not impact position formulation.

Instead, a general trend emerges from the periods of position formulation. In terms of divided government, when the President is a Republican and at least one house of Congress has a Democratic majority, the President receives considerable pressure from Congress to move forward more rapidly than his own strategy (or his advisors') prescribes. Republican President Reagan had to contend with the fallout from Interior Secretary Hodel's "sunglasses and sunscreen" plan; George H.W. Bush had a Congress that was willing to unilaterally commit the country to CFC restrictions that had yet to be mandated by the international ozone protection treaty.

Conversely, when the President is a Democrat and at least one house of Congress has a Republican majority, Congress restrains the President from promoting domestic policies that are more restrictive than international action. For example, Democratic President Clinton's EPA staff wanted an earlier phaseout of methyl bromide than Congress was willing to accept and the participants in the ozone protection treaty were willing to mandate.

On one side in the domestic interest group battle over restrictions on ozone-depleting substances were industries that either were heavily invested in producing restricted chemicals (i.e., DuPont and Allied Signal in the case of CFCs) or used restricted chemicals in their daily operations (i.e., the Alliance for Responsible CFC Policy for CFCs and agribusiness for methyl bromide). In the case of CFCs, industry entered the debate in 1982 already constrained by 1978 legislation that prohibited CFCs as aerosol propellants. The CFC industry opposed the U.S. position for the Vienna Convention because the U.S. delegation attempted to impose the domestic 1978 CFC ban internationally. By the time of the Montreal Protocol, industry was willing to support international action that paralleled the U.S. 1978 ban on CFC propellants but withheld its endorsement of an almost total ban on CFCs. However, within two years industry realized that additional CFC restrictions were inevitable and joined the EPA in developing input to the U.S. international negotiating process for the London and Copenhagen Amendments.

With the Montreal Amendment, industry resistance focused on methyl bromide restrictions, and they found an ally in the U.S. Congress and especially in the House of Representatives. The previous Copenhagen Amendment had imposed only a 25 percent restriction on methyl bromide by 1995, yet the EPA in 1993 promulgated a regulation that eliminated the chemical in the United States by 2001. House Republicans used oversight hearings to focus testimony on the economic hardships that would be experienced with a methyl bromide phaseout, but the U.S. position entering the Montreal Amendment negotiations retained the 2001 methyl bromide phaseout deadline.

Agribusinesses, the primary users of methyl bromide, were adamantly opposed to any phaseout, but especially one that would occur in 2001.

The opposing view in the struggle consisted of environmental groups. These groups endorsed the U.S. position in all six of the international negotiating rounds. While environmentalists consistently voiced their desire for accelerated phaseout deadlines and restriction of additional chemicals, they were willing to endorse a U.S. position that changed the status quo even slightly in favor of tighter restrictions.

5. THE SENATE AND TREATY RATIFICATION

This chapter traces the six parts of the ozone protection treaty (i.e., the Vienna Convention and Montreal Protocol and its four amendments) through the Senate ratification process. In providing a detailed narrative of the final stage of executive and legislative actions, the chapter demonstrates that, contrary to some theories of international relations, the domestic ratification process is seldom the most important step in treaty acceptance.¹³ More often than not, as in this case study, the ratification process does not involve a process whereby interest groups have to be placated. Likewise, the process does not involve long and contentious deliberations among various political actors. As this study has explained, contentious politics over treaties involving interest groups and other actors take place in other political arenas, prior to the formal ratification process.

In the case of the ozone protection treaty, ratification of the Vienna Convention, Montreal Protocol, London Amendment, and Copenhagen Amendment occurred in a year and a half or less (ratification of the Montreal Protocol occurred in eight months). Ratification of the final two amendments, the Montreal and Beijing Amendments, took considerably longer and is a study in the ways that treaty ratification can be delayed while interest groups and politicians wrangle over domestic implementing regulations.

Because much of the domestic wrangling occurs prior to formal international treaty negotiations, the ratification process has the appearance of being a “rubber stamp” on the negotiation process. The executive branch of U.S. government is not likely to

¹³ For example, Helen Milner (1997) explores the question of whether “international negotiators [are] focused on obtaining domestic approval for what they negotiated internationally” (p. 204). Thus, the focus of her study is on what she terms “the ratification game” rather than on the *domestic* negotiations that occur prior to formal international negotiations.

submit a treaty to the Senate for ratification if treaty approval is not relatively certain. By the time negotiations are complete, an international treaty likely reflects the majority of what the State Department and the President wanted when they negotiated the provisions of the treaty. In the case of environmental treaties, a lack of domestic implementing legislation and regulations is usually the only obstacle that impedes ratification. Thus, although the House of Representatives has no formal role in the international treaty process, its actions on implementing legislation coupled with those of the Senate become important in determining when and whether a treaty is submitted to the Senate for ratification. These constriction points in the ratification process are normally dealt with before the State Department and the President send the treaty to the Senate. Thus, ratification is generally a swift process. The ratification process slows only when there are significant disagreements over domestic implementing legislation.

**The Vienna Convention: Smooth Sailing for a Treaty with No Restrictions
(March 22, 1985 – August 27, 1986)**

Very little controversy surrounded the ratification of the Vienna Convention in the United States. By November 1983 the chlorofluorocarbon (CFC) industry had announced its support for an international convention that encouraged monitoring of the ozone layer and sharing data with other nations. In essence, that was the purpose of the Vienna Convention. Environmentalists and some members of Congress, although desiring a protocol with restrictions on CFCs, would not oppose the first evidence of international concern about the ozone layer. Except for some procedural details such as a minor delay to conduct an assessment of possible impacts on the environment in the United States from its implementation, the Vienna Convention sailed through the ratification process in a short seventeen months.

Vienna Convention Ratification Event	Date	
U.S. signature at UNEP meeting	March 22, 1985	153 days
State Department submittal to President	August 22, 1985	13 days
Presidential transmittal to Senate	September 4, 1985	5 days
Senate referral to Foreign Relations Committee	September 9, 1985	226 days
Reported out of Foreign Relations Committee	April 23, 1986	92 days
Senate approval	July 24, 1986	34 days
Presidential transmittal of ratification instrument to UNEP	August 27, 1986	

Procedures Delay State Department Submittal to President

The Vienna Convention was opened for ratification at the UNEP plenipotentiary meeting March 22, 1985, and the United States signed it on that day. Five months later on August 22, the State Department transmitted the Convention to President Reagan.

The delay in submitting this first international action to protect the ozone layer to the President arose from several fronts. Ken Dam, the number two official in the State Department with responsibility for presenting the treaty to the President, resigned his position in early June to become a vice president at IBM. John Whitehead, a recently retired Wall Street investment banker, assumed the position and ultimately transmitted the Vienna Convention to the President on behalf of the State Department (Schultz 1993, 566).

Immediate transmission of the Vienna Convention to President Reagan apparently met with resistance within the State Department itself. Key officials in State had made a last-minute attempt to keep the United States from signing the Convention on March 22. Near the end of the negotiations, Under Secretary of State for Economic Affairs Allen Wallis recommended that Secretary of State George Shultz withhold authority for the U.S. delegation to sign the Vienna Convention. Wallis opposed the agreement because he saw it as a prelude to international regulation. He believed that the EPA would view the Vienna Convention and future international agreements as a means to circumvent President Reagan's deregulation policies. After delegation head James Malone, the State Department's Assistant Secretary for Oceans and International, Environmental and Scientific Affairs, alerted U.S. private-sector Convention proponents of their need to intercede with the Reagan administration to avoid a change in U.S. position, the delegation was allowed to sign the Convention (Benedick 1998). Malone's "defection" caused concern within the State Department, and on March 25 President Reagan announced the nomination of John Negroponte to replace Malone (Reagan Library 1985).

However, the most important reason for the delay was procedural. Under the 1970 National Environmental Policy Act, any action by the U.S. federal government pertaining to the environment required at a minimum a general assessment of its impacts. The environmental assessment for the Vienna Convention, which concluded that ratification of the Convention would not have a significant adverse environmental impact and could have significant environmental benefits over the long term, was completed on August 15 after review by officials from the State Department, EPA, NASA, and NOAA (U.S. Senate 1985, 20).

John Whitehead's August 22 submittal letter to President Reagan reflected State Department support of the international purpose of the Vienna Convention (U.S. Senate 1985, v-vi), noting that "a multilateral undertaking such as the Convention is the only way to promote the global coordination and harmonization necessary for protection of stratospheric ozone." With respect to the U.S. role in the process, he wrote, "Early United States ratification is important to demonstrate to the rest of the world our commitment to protection and preservation of this critical resource and will encourage the wide participation necessary for full realization of the Convention's goals." Also noteworthy is the emphasis placed on the lack of domestic ramifications of the framework Convention, saying that "ratification of the Convention is consistent with our foreign policy and economic and environmental interests" and that "the obligations of the Convention can be satisfied without additional legislation and without additional appropriations in the near term."

On September 4, 1985, two weeks after receiving the Vienna Convention from the State Department, President Reagan transmitted it to the Senate for ratification (U.S.

Senate 1985, iii). Reagan's transmittal letter reflected a change in his overall outlook on international environmental issues. Stuart Spencer, senior political advisor to President Reagan, said of Reagan's overall position on the environment (Strober and Strober 2003, 134-135):

There was vision; there was understanding of issues that he was interested in. He had no interest in reforestation programs in this country; he had no interest in dams being built; he didn't have any major interest in the infrastructure of the country, which was the whole basis, to a degree, of Lyndon Johnson's and Eisenhower's presidencies.

His concern was, government is too big. We have to get it off our backs.

The public perception of Reagan's doctrine was that in international environmental issues he supported industry and stonewalled environmentalists. To this end, he was perceived as having a simple formula for achieving these goals, one that he was purported to have used against CFC regulation: "New domestic controls had to await international action, while, at the same time, the United States—whose cooperation was essential to any meaningful international agreement on CFCs—opposed international controls" (Cagin and Dray 1993, 253).

Because the Vienna Convention was a framework document that required no further regulatory efforts in the United States, President Reagan could publicly support it without engendering significant industry animosity. In his September 4 letter of transmittal to the Senate, President Reagan indicated that the Vienna Convention would "be an important step toward protecting and enhancing public health and the quality of the global environment." He echoed the State Department by noting the leadership role of the United States in the treaty process, indicating that "expeditious ratification by the United States will demonstrate our continued commitment to progress on this significant environmental issue" (U.S. Senate 1985, iii).

Little Controversy at Senate Foreign Relations Hearing

On September 9, the Vienna Convention was read in the Senate and immediately referred to the Committee on Foreign Relations.¹⁴ The Foreign Relations Committee held a public hearing on March 18, 1986, to receive testimony about U.S. ratification of the Vienna Convention (U.S. Senate Committee on Foreign Relations 1986).

The first witness during the March 18 hearing, John Negroponte, the State Department's Assistant Secretary for Oceans and International Environmental and Scientific Affairs, urged the Senate Foreign Relations Committee to move rapidly to approve the convention so that the Senate could ratify the treaty "expeditiously." He stated (U.S. State Department 1986, 2):

As far as [the State Department is] aware, there is no domestic opposition to the convention. Both the U.S. chemical industry and interested environmental organizations... support the convention because of its potential contribution to the development of better scientific data. There is general agreement that it is desirable that any possible future regulatory measures be considered on the basis of sound scientific and economic data rather than emotion.

Environmental groups promoted the Vienna Convention. Representing the World Resources Institute, Alan Miller stressed that "only an international response can be effective. The United States is now responsible for only about 20 percent of global CFC emissions. The other 80 percent comes primarily from Japan and Western Europe. All concerned parties in the U.S.—EPA, industry, and environmentalists—therefore focus quite properly on the importance of an international approach" (Miller 1986).

¹⁴ The Senate Foreign Relations Committee consisted of Chair Richard Lugar (R), 8 Democratic members (Joseph Biden, Alan Cranston, Christopher Dodd, Thomas Eagleton, John Kerry, Claiborne Pell, Paul Sarbanes, and Edward Zorinsky), and 8 Republican members (Rudy Boschwitz, Daniel Evans, Jesse Helms, Nancy Kassebaum, Charles Mathias, Frank Murkowski, Larry Pressler, and Paul Trible).

Representing the Natural Resources Defense Council (NRDC) and the National Clean Air Coalition, David Wirth said his organizations believed that atmospheric science had advanced far enough to establish the need for additional CFC regulations. The two organizations endorsed ratification of the Vienna Convention because they were confident that the scientific analysis called for by the Vienna Convention would reach the same conclusion (BNA 1986j).

Conversely, Richard Barnett, chair of the chemical industry's Alliance for Responsible CFC Policy, indicated that his organization was opposed to CFC regulations that went beyond those to regulate CFCs in aerosols. He commented that international agreements to protect the ozone layer "should not single out one substance or one family of chemicals, such as CFCs, for scrutiny and regulatory control." He continued that the Alliance did not have reservations about the goals of the Vienna Convention itself but rather about "efforts in the international community to view the ozone convention only as a precursor to an international regulatory scheme" (BNA 1986j).

The Senate Foreign Relations Committee considered the Vienna Convention at its business meeting on April 10 and ordered it reported favorably to the Senate for ratification. Senator Richard Lugar (R-IN) reported the Vienna Convention out of the Foreign Relations Committee on April 23. He summarized the results of his committee's investigation into ratification of the Vienna Convention as non-controversial (U.S. Senate Committee on Foreign Relations 1986, 2):

There is no apparent controversy surrounding the Convention itself. Controversy arises when addressing the next step. Environmental groups feel that the Convention is a good start, but argue that the evidence is sufficient to warrant international regulation. The CFC industry argues that the evidence is far from clear, and that if there is a problem, it is far greater than just CFC emissions. Thus they support the Convention

because it would lead to further study. However, they oppose proceeding with any protocol which would have regulatory impact. The United States has continued to seek a protocol involving international regulation.... Negotiations are currently suspended in favor of “fact finding.”

The Senate Foreign Relations Committee sent the Vienna Convention to the full Senate on April 23, 1986, with a recommendation for ratification.

Full Senate Deliberations Mirror Lack of Controversy about Vienna Convention

The full Senate considered the Vienna Convention on July 24, 1986. While the original proposal was for a vote without floor debate, Senator Robert Byrd (D-WV) requested that discussion of the ratification resolution be allowed because a number of Senators wanted to voice their support of the treaty (U.S. Senate 1986).

Senator Al Gore (D-TN) took the opportunity to acknowledge that “the proposed treaty is not controversial” and that he had been informed it was “not opposed by any Member of this body.” However, he wanted to make clear that scientific evidence indicated a link between ozone depletion, the production of greenhouse gases, and the use of CFCs, and that the next step in an international agreement should be to “control chlorofluorocarbons as immediately as possible.” Senators Lincoln Chafee (R-RI), Robert Stafford (R-VT), and Max Baucus (D-MT) echoed Senator Gore’s sentiments, with Senator Baucus saying that “ratification of the Vienna Convention for the Protection of the Ozone Layer is a significant first step. The next step is for the convention to serve as a framework for protocols involving international regulation of the ozone layer” (U.S. Senate 1986).

Senator Daniel Evans (R-WA), who had chaired the March 18 Foreign Relations Committee hearing, indicated that “the Ozone Convention is supported by the

administration, by affected industries, and by the environmental community” (U.S. Senate 1986). On July 24, 1986, the Senate approved the treaty by division vote.¹⁵

The Vienna Convention was sent to President Reagan on August 6 for ratification. Two weeks later, on August 27, 1986, the United States deposited its ratification instrument with UNEP.

Discussion

Although the U.S. government was not divided during the Vienna Convention ratification process, divided government would not have been a problem for the framework ozone protection treaty. Because the Vienna Convention did not require any domestic legislative or regulatory action, its ratification drew bipartisan support and was easily moved through the Senate ratification process.

Both industry and environmental groups endorsed ratification of the Vienna Convention. While environmentalists might have wanted a stronger treaty, they believed it was a good first step in the process. The CFC industry had not endorsed the position that the U.S. delegation took to the Vienna Convention negotiations because the United States wanted to include restrictions on CFC production in the framework document. However, the United States was overruled in the international meeting, and the final Vienna Convention with no restrictions was a document the CFC industry could endorse for ratification.

The ozone epistemic community was an important entity to the Vienna Convention, but not because its members contributed to the Senate ratification process. Rather, the Vienna Convention essentially gave the epistemic community a job to do in

¹⁵ A division vote requires Senators to either stand or raise their hands to be counted. The numbers of ayes and nays are not announced and the names are not recorded.

conducting atmospheric research and reporting the findings to the international community.

**The Montreal Protocol: International Restrictions Gain CFC Industry Support
(September 16, 1987 – April 21, 1988)**

The United States had gotten most of what it wanted in terms of CFC restrictions during the Montreal Protocol negotiations. In September 1986 the chemical industry had conceded to the need for a protocol and expected controls to be placed on CFC production. Although the United States had not expected the same controls to be put on consumption (i.e., usage in consumer products) of CFCs, there was little opposition to the restriction. Passage of the Montreal Protocol through the ratification process was swift. Only seven months separated the availability of the treaty for ratification and the U.S. submission of its ratification instrument. The United States became the second nation to ratify the Montreal Protocol—Mexico had ratified the treaty three weeks earlier.

Montreal Protocol Ratification Event	Date	
U.S. signature at UNEP meeting	September 16, 1987	
State Department submittal to President	November 21, 1987	35 days
Presidential transmittal to Senate	December 21, 1987	30 days
Senate referral to Foreign Relations Committee	December 21, 1987	0 days
Reported out of Foreign Relations Committee	February 19, 1988	60 days
Senate approval	March 14, 1988	23 days
Presidential transmittal of ratification instrument to UNEP	April 21, 1988	38 days

State Department, President Swiftly Advance Protocol to Senate

The Montreal Protocol was opened for ratification at the UNEP plenipotentiary meeting September 16, 1987, and the United States signed it on that day. One month later on November 21, the State Department transmitted the Protocol to President Reagan. State Department Secretary George Schultz's letter of submittal to President Reagan showed no hint of division among the department's staff. In fact, Schultz went to

considerable lengths to indicate that ratification of the Montreal Protocol was almost universally accepted within the United States (U.S. Senate 1987, v-viii):

In negotiating the Protocol, the Department of State coordinated with all relevant federal agencies and consulted closely with the Congress, industry and environmental organizations. Signature of the Protocol by the United States are [sic] endorsed by all interested agencies and the Domestic Policy Council staff. Congressional support is also broad. While some would have preferred that the Protocols' [sic] provisions be more stringent or less stringent, there is widespread agreement among these groups that multilateral rather than unilateral measures are necessary for effective control of ozone-depleting substances, that adoption of the Protocol is a significant achievement, and that the United States should ratify the Protocol.

Secretary Schultz acknowledged that there were some administrative details still to be resolved before the Protocol could be enacted in the United States. The obligatory environmental impact statement required by the 1970 National Environmental Policy Act was in the final stages of completion. Additionally, the EPA had yet to issue the required implementing regulations, although the agency expected to propose regulations during the next few weeks and issue final regulations by August 1, 1988. Assuming the United States ratified the Montreal Protocol, the EPA regulations would be effective with international entry into force of the Protocol, which was expected to occur in January 1989. The speed with which the State Department forwarded the Montreal Protocol to the President was evidence that the treaty was non-controversial within the United States.

On December 21, 1987, one month after receiving the Montreal Protocol from the State Department, President Reagan transmitted it to the Senate for ratification. His half-page transmittal letter was brief and concise (U.S. Senate 1987, iii):

In this historic agreement, the international community undertakes cooperative measures to protect a vital global resource. The United States played a leading role in the negotiation of the Protocol. United States

ratification is necessary for entry into force and effective implementation of the Protocol. Early ratification by the United States will encourage similar action by other nations whose participation is also essential.

Reagan's stance on the need for the Montreal Protocol contradicted environmentalists' perception of his doctrine of "industry first." If he did indeed in other environmental issues "support industry and stonewall environmentalists," his transmittal statement indicated both his realization that the chemical industry supported the Protocol and a reconciliation of his overall philosophy of "getting government off the people's backs" with the need for the United States to be among the first to ratify the Montreal Protocol.

Foreign Relations Committee Hearing Demonstrates Chemical Industry Supports Protocol

On December 21, the Montreal Protocol was read in the Senate and immediately referred to the Committee on Foreign Relations.¹⁶ The Foreign Relations Committee held a hearing on February 17, 1988, to receive testimony about U.S. ratification of the Montreal Protocol (U.S. Senate Committee on Foreign Relations 1988). As members of the Foreign Relations Committee, Senators Claiborne Pell (D-RI) and Helms (R-NC) provided opening statements supporting the Protocol, with Senator Helms saying that ratification of the Montreal Protocol had "the support of members from both sides of the aisle" (p. 7). Senators Chafee (R-RI), Stafford (R-VT), and Baucus (D-MT) also testified in support of the Montreal Protocol, but the key witness during the hearing was EPA Administrator Lee Thomas.

¹⁶ The Senate Foreign Relations Committee consisted of Chair Claiborne Pell (D), 9 Democratic members (Brock Adams, Joseph Biden, Alan Cranston, Christopher Dodd, John Kerry, Daniel Moynihan, Terry Sanford, Paul Sarbanes, and Paul Simon), and 9 Republican members (Rudy Boschwitz, Daniel Evans, Jesse Helms, Richard Lugar, Nancy Kassebaum, Mitch McConnell, Frank Murkowski, Larry Pressler, and Paul Trible).

Administrator Thomas began his testimony by recapping the role that the United States played both in leading the first actions on regulating CFCs by unilaterally banning non-essential uses of the chemical in 1980 and in the strong negotiating position it took at Montreal (U.S. Senate Committee on Foreign Relations 1988, 13-15). He believed that the United States got what it wanted from the negotiations, crediting “the administration’s strong commitment to get a global agreement; strong support from Congress; strong support from U.S. industry and U.S. environmental organizations.” The remainder of his testimony reinforced this conviction, ending with the belief that “ratification by the United States will send a very strong signal to the rest of the world and particularly the developed countries, Japan, Common Market, Soviet Union, that the [international] ratification process will move quickly if they will move as quickly as we are moving....Rapid ratification, I think, will continue to demonstrate U.S. leadership in this area.”

The Alliance for Responsible CFC Policy and the Polyisocyanurate Insulation Manufacturers Association submitted written statements for the hearing. The statements of these two coalitions indicated that the chemical industry had accepted U.S. ratification of the Montreal Protocol but were addressing a time when the United States might champion more stringent regulations than the Protocol. The Alliance, which represented the five U.S. producers of CFCs and several hundred users of the chemical, stated it believed “the Montreal Protocol to be an important achievement that balances the need for environmental protection and the desire for global economic growth and competitiveness. The agreement should be ratified promptly” (U.S. Senate Committee on

Foreign Relations 1988, 64-68). However, remembering the 1978 U.S. ban on CFCs in aerosols, the Alliance added a caveat about support of further regulation of CFCs:

Efforts to take additional unilateral action in the United States, in the name of global leadership, should...be discouraged. Efforts to lead by action, such as the unilateral ban in the U.S. of the use of CFC aerosol sprays, will only disadvantage our negotiating leverage. History has shown that our greatest leverage is as a participant in the process...

Further unilateral action by the United States will produce little or no significant environmental benefit, more than double the current estimated costs of implementing the Montreal Protocol, and have the tendency to deemphasize the significance of the Protocol itself and its ongoing process of scientific, economic and technology assessment...

While endorsing ratification of the Montreal Protocol, the Polyisocyanurate Insulation Manufacturers Association, representing industries that produced foam wall sheathing and roof insulation, also demonstrated its concern about U.S. regulation beyond the Montreal Protocol (U.S. Senate Committee on Foreign Relations 1988, 69-72):

This Association has always favored regulation of CFCs at the international level, and we, therefore, support ratification of the Montreal Protocol. We believe there is no need for greater restrictions than those set forth by the Protocol. We also believe the timetable mandated by the Protocol is more than adequate for prudent action given the scientific data currently available.

PIMA does not support any additional unilateral action by the United States, if the Montreal Protocol is not ratified by the member countries of UNEP. The failure of the rest of the world to follow the lead taken by the United States in banning the use of CFCs in aerosols is proof positive that such action is truly ineffective in dealing with this global issue. In addition, any further unilateral action will only...[place] this country at an unfair competitive disadvantage in competing within the global market.

Immediately following the February 17 hearing, the Senate Foreign Relations Committee considered the Montreal Protocol at its business meeting. Senator Pell reported it favorably to the Senate on February 19 for ratification.

No Opposition to Protocol in Full Senate

The Senate considered the Montreal Protocol on March 14, 1987. During the floor debate (U.S. Senate 1988), Democratic Senators Pell, Baucus, George Mitchell, Timothy Wirth, Brock Adams, and John Kerry and Republican Senators Helms, Chafee, and Stafford rose to offer their support for ratification of the Montreal Protocol, with Senator Helms noting that the Protocol “has the overwhelming support of both sides of the aisle.” In fact, no Senator mounted opposition to ratification of the Protocol. However, the proviso the chemical industry foreshadowed in their written statements for the Senate Foreign Relations Committee hearing was prevalent in the Senate debate: All Senators who went on record in support of Montreal Protocol ratification also insisted that the Protocol did not go far enough in regulating CFCs, with some even promoting unilateral action if more stringent measures were not pursued internationally. Because the subsequent vote could only consider ratification of the Montreal Protocol, no action was taken on proposals of additional CFC restrictions. However, the Senators were on record and the CFC industry had been warned that the United States could consider pursuing more stringent regulations in the future, even to the point of unilateral action.

On March 14, the same day as the floor debate on ratification of the treaty, the Senate approved the Montreal Protocol by a roll call vote of 83 - 0 and sent the Montreal Protocol to President Reagan for his signature.

Reagan Signs Protocol Without Objection

President Reagan signed the instrument of ratification for the Montreal Protocol on April 5, 1988. Reagan’s swiftness in signing the ratification instrument has been attributed to his personal connection with the effects of ozone depletion. He had several

cancerous skin lesions removed from his nose in 1985, and he had at least partially accepted scientific data about the link between skin cancer and ozone layer depletion. After his last surgery in July 1987, he remarked to a group of visitors to the White House that the bandage on his nose “was a ‘billboard’ that says, ‘Stay out of the sun’” (Boffey 1987; Cagin and Dray 1993, 331).

Speaking on the occasion of Reagan’s signing of the Montreal Protocol ratification instrument in Santa Barbara where the President was vacationing, Marlin Fitzwater said, “The protocol marks an important milestone for the future quality of the global environment and for the health and well-being of all peoples of the world.... We consider this agreement a monumental achievement” (BNA 1988o). Secretary of State Schultz signed the ratification instrument shortly after his return from a visit to the Middle East. On April 21 the United States deposited its ratification instrument with UNEP, becoming the second nation to ratify the Montreal Protocol.¹⁷

Discussion

Ratification of the Montreal Protocol occurred expeditiously in the United States. Although the U.S. government was divided, with a Republican President and a Democratic majority in the Senate, the Montreal Protocol moved through the ratification process in only six months. Mirroring the ratification of the framework convention, the Montreal Protocol received bipartisan support, and its ratification was unopposed on a Senate roll call vote.

The CFC industry had conceded the likelihood of restrictions on CFCs prior to the Montreal Protocol negotiations. The Alliance for Responsible CFC Policy endorsed

¹⁷ Mexico was the first ratifying nation on March 31.

ratification of the Montreal Protocol during the Senate Foreign Relations hearing.

Environmental groups, while not officially entering testimony for the record, found their spokespersons in the form of Senators who testified in favor of the Montreal Protocol during the Senate floor debate.

The EPA issued an Advanced Notice of Proposed Rulemaking in December 1987, during the Senate ratification deliberations, for regulations to implement the Montreal Protocol in the United States. Although the regulations were not finalized during the ratification process, the Senate had assurances that the EPA expected to have the rules in place by the time the Montreal Protocol entered into force internationally in January 1989. Thus, the Senate was also assured that the United States would implement domestically the provisions of the treaty that the Senate ratified.

**The London Amendment: Reservations About the Financing Mechanism
for Developing Countries
(June 29, 1990 – December 18, 1991)**

The U.S. ratification process for the London Amendment took just under a year and a half to complete. The major delay occurred at the beginning of the process when the State Department withheld submittal of the Amendment to President George H.W. Bush at his request. The United States had changed its position on the financing mechanism for assisting developing countries in achieving compliance with the Montreal Protocol during the final moments of negotiation, and it was not at all clear to President Bush that the United States had not overcommitted on the amount it was willing to pay. Once the State Department had abated these concerns, the London Amendment moved through the remaining ratification steps with relative ease.

London Amendment Ratification Event	Date	
First date available for ratification	June 29, 1990	
State Department submittal to President	May 3, 1991	309 days
Presidential transmittal to Senate	May 14, 1991	11 days
Senate referral to Foreign Relations Committee	May 14, 1991	0 days
Reported out of Foreign Relations Committee	November 15, 1991	154 days
Senate approval	November 26, 1991	11 days
Presidential transmittal of ratification instrument to UNEP	December 18, 1991	22 days

Bush Queries State About U.S. Commitment to Developing Countries' Treaty Compliance

The London Amendment was opened for ratification at the UNEP plenipotentiary meeting June 29, 1990. More than ten months later on May 3, 1991, the State Department submitted the Protocol to President George H.W. Bush. Because the text of the London Amendment indicated that the earliest the amendment could enter into force was January

1, 1992, the State Department was not facing an immediate deadline during the remainder of 1990 and early 1991. Having a longer time to submit the London Amendment to President Bush became crucial because Bush had indicated that he would not sign the Amendment.

The problem Bush had with the London Amendment was not with the restrictions on chemicals but rather with the financing mechanism for assisting developing countries in complying with the Montreal Protocol. Relying on advice from his chief-of-staff, John Sununu, President Bush had indicated his desire prior to the London Amendment negotiations for developing countries to access existing funds from the World Bank or other international lending institutions for phasing out CFCs and other ozone-depleting chemicals. He was opposed to the creation of a new funding mechanism, a Multilateral Fund, within the ozone-protection treaty for those purposes (Shabecoff 1990).

However, before the London Amendment negotiations were completed, the media praised Bush for reversing his earlier position. In a last-minute concession, the United States agreed to provide monetary and technological aid to developing nations within the ozone treaty framework (Browne 1990; Wicker 1990). The change came in a “deal” that was worked out between the United States and Norway. The U.S. delegation was willing to concede to an ozone trust fund for developing countries if text were added to the London Amendment to stress that establishing an ozone trust fund did not set a precedent for future environmental agreements. Sununu was particularly concerned about upcoming negotiations on global climate change, expecting developing countries to demand a similar trust fund for reducing greenhouse gas emissions. Norway was the main opponent to the language required by the United States but also was a fervent proponent of a ban

on methyl chloroform, which the United States had opposed. With the U.S. delegation's realization that an international ban on methyl chloroform was clearly in the best interests of the United States (the new Clean Air Act Amendments were expected to call for such a ban) and that the language concerning precedents was important to the Bush administration, the deal was struck (Litfin 1994).

President Bush was apparently not pleased with the ultimate package that came out of the London Amendment negotiations, especially the fact that the U.S. delegation had implied that the United States would provide \$40 to \$60 million to the Multilateral Fund, with one set of historians commenting (Cagin and Dray 1993, 358):

The commitment made to this fund by U.S. negotiators in London caused an ugly policy scuffle back in Washington, however, when President George Bush announced that he would not honor it. Ironically, it was the CFC industry lobby that ultimately forced Bush's hand, pressuring the administration to contribute \$25 million to the development fund—a remarkable indication of the seismic shift in ozone politics.

The CFC industry in the United States stood to gain from the need in rapidly developing countries for CFC substitutes. For example, India and China, with about 40 percent of the world's population and recent purchases of Western goods such as refrigeration units, was expected to provide a substantial market for U.S. producers of CFC alternatives (Browne 1990).

After a substantial delay on the part of the State Department, Secretary of State Baker submitted the London Amendment to President Bush on May 3, 1991. By then, questions about the U.S. contribution to the Multilateral Fund had been resolved, with Secretary Baker making special note in his submittal letter that “the Amendment explicitly provides that the funding mechanism is ‘without prejudice to any future arrangements ... with respect to other environmental issues’” (U.S. Senate 1991b, v-viii).

Baker noted that “early ratification by the United States is important to demonstrate to the rest of the world our commitment to protection and preservation of the stratospheric ozone layer and will encourage the wide participation necessary for full realization of the Amendment’s goals.”

Just eleven days after receiving the Amendment from the State Department, President Bush transmitted it to the Senate for ratification. In the transmittal letter, Bush encouraged rapid consideration of the agreement and gave no more importance to the provisions for financial and technical assistance to developing countries than he did to the new restrictions on additional ozone depleting substances (U.S. Senate 1991b, iii).

Foreign Relations Committee Also Raises Questions About Financing Mechanism for Developing Countries

On May 14, the London Amendment was read in the Senate and immediately referred to the Committee on Foreign Relations.¹⁸ The Foreign Relations Committee held a public hearing on July 24, 1991, to receive testimony about U.S. ratification of the London Amendment (U.S. Senate Committee on Foreign Relations 1991b). As chair of the Foreign Relations Committee, Senator Pell provided an opening statement supporting the Amendment. Another member of the Committee, Senator Kerry, provided the closing supporting statement. Senators Baucus and Gore also testified in support of the London Amendment, with both stressing that the Amendment provisions were a necessary step in preventing ozone depletion but that new scientific evidence indicated that the restrictions did not go far enough. As with the Montreal Protocol, ratification of the London

¹⁸ The Senate Foreign Relations Committee consisted of Chair Claiborne Pell (D), 10 Democratic members (Joseph Biden, Alan Cranston, Christopher Dodd, John Kerry, Daniel Moynihan, Charles Robb, Terry Sanford, Paul Sarbanes, Paul Simon, and Harris Wofford) and 8 Republican members (Hank Brown, Jesse Helms, James Jeffords, Nancy Kassebaum, Richard Lugar, Mitch McConnell, Frank Murkowski, and Larry Pressler).

Amendment was almost a surety because scientists, government officials, and Congress were already calling for more stringent measures. Senator Gore said:

There is no doubt that we have to act quickly to phase out the use of chlorofluorocarbons and other chemicals tearing away at our protective ozone shield...Indeed, you and 30 of our colleagues joined me in sending a letter on this to Administrator Reilly the very first day that we came back from the Easter Recess and the new findings were available from the scientists. And, I appreciate you also joining me, as did others, in introducing a resolution here in the Senate to accelerate the phaseout of CFC's and HCFC's both domestically and internationally.

Rather than examine domestic policy concerning chemical phaseouts as was done with the EPA Administrator in the Montreal Protocol ratification hearing, during the London Amendment hearing the Committee called a State Department official as a key witness. Richard Smith, Principal Deputy Assistant Secretary of State, Bureau of Oceans and International Environmental and Scientific Affairs, was mainly called on to recap the London Amendment provisions and answer questions from the Foreign Relations Committee members about the financial mechanism (i.e., the Multilateral Fund) that was set up for developing countries. Senator Pell asked about the types of activities the Multilateral Fund would support, whether the fund would continue to be available after the initial three years, and what types of monitoring systems would be established to avoid misuse of funds. Deputy Secretary Smith was quick to assure the Committee that the U.S. commitment amounted to no more than \$13.3 million in 1991, with additional payments not likely to exceed those of 1991. The fund was established to assist developing countries with incremental costs of meeting the Montreal Protocol restrictions. The initial Interim Multilateral Fund was established for three years, but a permanent fund could be established in future amendments to the Montreal Protocol. UNEP was developing a mechanism to monitor use of the funds.

Interestingly, chemical industry representatives were not requested to speak during the hearing, nor did they submit written statements for the record. Industry had supported the London Amendment negotiations and may have seen no need to intervene during the ratification hearing. The chemical industry coalitions apparently did not realize that the hearing would digress into a call for more stringent restrictions than those of the London Amendment.

On July 30, the Senate Foreign Relations Committee met to consider the London Amendment and voted unanimously to report it favorably to the Senate for ratification. Senator Pell reported the London Amendment out of the Foreign Relations Committee on November 15. While he did not make specific comments about the London Amendment restrictions on ozone depleting substances in his executive report to the Senate (U.S. Senate Committee on Foreign Relations 1991a), he did attach for the record the executive summary of the October 1991 *Scientific Assessment of Ozone Depletion* that recommended more stringent restrictions on ozone depleting substances than did the London Amendment (WMO 1991).

Full Senate Deliberations Urge President Bush to Accelerate Ozone Protection Actions

The full Senate considered the London Amendment on November 26, 1991. During the floor debate (U.S. Senate 1991a), Senators Pell, Mitchell, Burdick, Lieberman, Baucus, Gore, and Chafee rose to offer their support for ratification of the London Amendment, with Senator Mitchell noting that “while it is necessary that we ratify this amendment, it is already outdated.” Senator Baucus submitted for the record the April 29 letter that he and 29 other Senators sent to President Bush outlining a four-point plan for the United States “to demonstrate our leadership in protecting the Earth’s

ozone layer.” The plan proposed accelerated phaseout schedules for all ozone depleting substances already covered by the Montreal Protocol; inclusion of recapture and recycling provisions; limits on HCFCs currently promoted as CFC substitutes; and continuation of financial aid and technical assistance to developing countries in phasing out ozone depleting substances. Senator Baucus pointed out that all industrialized countries with the exception of the United States and Japan had already begun working toward implementing these actions, saying that “the United States should do no less.”

On November 26, the same day as the floor debate on ratification of the treaty, the Senate approved ratification of the London Amendment by a division vote and sent it to President Bush for his signature.

Mirroring executive action on the Montreal Protocol, President Bush and Secretary of State Baker immediately signed the instrument of ratification for the London Amendment. On December 18, 1991, the United States deposited its ratification instrument with UNEP.

Discussion

The U.S. government was divided during the domestic ratification process for the London Amendment, with a Republican President and a Democratic majority in the Senate. The Senate had no reservations about the restrictions placed on chemicals by the London Amendment; indeed, the chief concern was that the President and the EPA were not moving quickly enough in phasing out CFCs domestically, regardless of the terms of the international treaty.

The CFC industry had endorsed the U.S. negotiating position on CFC restrictions prior to the London meeting, and they continued their endorsement of the London

Amendment terms. Environmental groups, which advocated accelerating the CFC phaseout schedule even further, provided the impetus for the Senate to urge that action on President Bush.

Despite endorsements by both the CFC industry and environmentalists, the London Amendment did not move through the ratification process with the speed of the Montreal Protocol, and the impediment had nothing to do with restricted chemicals. The international body wanted industrialized countries to establish a fund to be accessed by developing countries to assist in complying with the ozone treaty, a provision that President Bush opposed on the grounds that funding could be made available through the World Bank. Although Bush capitulated to the provision after a round of bargaining, he was not satisfied afterward with the funding amount the United States might need to provide. However, he was persuaded to agree when the CFC industry reminded him that developing countries would provide a ready market for the CFC substitutes that U.S. companies were currently developing. Bush delayed transmittal of the London Amendment to the Senate for almost a year before deciding that the treaty terms were acceptable.

**The Copenhagen Amendment: The Presidential Baton Passes
From Republican to Democrat, But the Amendment Moves Forward
(November 25, 1992 – March 2, 1994)**

The set of circumstances surrounding U.S. deliberations on the Copenhagen Amendment represents one of the quirks in the U.S. democratic system—the Amendment was negotiated during the last days of President George H.W. Bush’s administration but ushered through the ratification process by President Clinton’s incoming administration. While many of the lower-level bureaucrats remained the same in the State Department, incoming senior officials had to deal with a learning curve on the U.S. negotiating position and resulting international commitments before they could submit the Amendment to President Clinton. Ultimately, the terms were acceptable and the ratification process reached completion in a little over a year.

Copenhagen Amendment Ratification Event	Date	
First date available for ratification	November 25, 1992	
State Department submittal to President	June 23, 1993	210 days
Presidential transmittal to Senate	July 20, 1993	27 days
Senate referral to Foreign Relations Committee	July 20, 1993	0 days
Reported out of Foreign Relations Committee	November 19, 1993	122 days
Senate approval	November 20, 1993	1 day
Presidential transmittal of ratification instrument to UNEP	March 2, 1994	103 days

Administration Change Initially Slows Ratification Process

The Copenhagen Amendment was opened for ratification at the UNEP plenipotentiary meeting November 25, 1992. More than seven months later on June 23, 1993, Secretary of State Warren Christopher submitted the Amendment to President William Clinton. The delay in this instance was more a matter of procedure and partisan politics than any misgivings the State Department or the President might have had over

the content of the Copenhagen Amendment. The Amendment was negotiated during the last days of Republican President George H.W. Bush's administration. The negotiating team was Bush's, yet U.S. ratification would be the responsibility of incoming Democratic President Clinton and his new executive staff.

The results of the Copenhagen negotiations provided several issues that incoming Secretary of State Christopher needed to consider before submitting the Amendment to President Clinton. International ratification of the Copenhagen Amendment would create a permanent Multilateral Fund in 1993 rather than the interim fund that had been operating since the London Amendment was ratified. However, negotiators failed to agree on the overall funding amount for the years 1994 through 1996, with an estimated range of \$340 to \$500 million that could ultimately be considerably larger than the \$113 million for each of the three previous years (Andersen and Sarma 2002). While contributions from individual countries were not expected to change significantly from previous yearly contributions, there was nonetheless an uncertainty about the amount that the United States would be asked to pay in upcoming years.

In addition, the Copenhagen Amendment called for a freeze in 1995 on production and use of methyl bromide, but proposed EPA regulations to implement the Copenhagen Amendment were opposed by U.S. producers and users and even by the U.S. Department of Agriculture. The White House Office of Management and Budget (OMB) delayed the consideration of the proposed EPA regulations until 1993. The EPA proposed the methyl bromide regulations again in January 1993 before Bush left office, but incoming OMB officials immediately froze their implementation. After the EPA had consulted with the Department of Agriculture on the extent of methyl bromide

restrictions, the EPA proposed the regulations yet again in March 1993, and they were finally promulgated in December 1993 (BNA 1992e; Parson 2003).

When the State Department had satisfied itself that payments to the Multilateral Fund would not be excessive and had some assurances that the EPA could promulgate regulations that implemented the Copenhagen Amendment, the State Department was able to submit the Amendment to President Clinton. In fact, in his submittal letter Secretary Christopher did not mention the Multilateral Fund or payments that the United States would make to the fund. However, he did note that implementing regulations had yet to be promulgated, saying, “existing regulations will not be sufficient for the United States to carry out its obligations under the Amendment. As such, administrative rulemaking pursuant to the Environmental Protection Agency’s statutory authority under the Clean Air Act, as amended, will be required” (U.S. Senate 1993b, 5-7).

Less than a month after receiving the Amendment from the State Department, President Clinton transmitted it to the Senate for ratification. As his predecessor Presidents also noted, Clinton said that “early ratification by the United States is important to demonstrate to the rest of the world our commitment to protection and preservation of the stratospheric ozone layer and will encourage the wide participation necessary for full realization of the Amendment’s goals” (U.S. Senate 1993b, 3).

Senate Deliberations Reveal Little Opposition to Copenhagen Amendment

On July 20, 1993, the Copenhagen Amendment was read in the Senate and immediately referred to the Committee on Foreign Relations.¹⁹ The Foreign Relations Committee held a public hearing on October 26 to receive testimony about U.S. ratification of the Copenhagen Amendment (U.S. Senate Committee on Foreign Relations 1993b). Richard Smith, Special Negotiator for the Bureau of Oceans and International Environmental and Scientific Affairs for the State Department, was the sole witness before the Committee. Smith outlined the Copenhagen Amendment's provisions, indicating that the EPA had proposed regulations that would implement the Amendment in the United States. He urged "expeditious ratification of the Copenhagen amendment to demonstrate our commitment to protection and preservation of the stratospheric ozone layer and to encourage the wide participation necessary for full realization of the amendment's goals."

On November 18, the Senate Foreign Relations Committee considered the Copenhagen Amendment at its business meeting (U.S. Senate Committee on Foreign Relations 1993a). Senator Pell reiterated his and the Committee's concerns about ozone depletion and said, "In light of these concerns, the Committee strongly endorses prompt Senate advice and consent to ratification...as another step in strengthening the international response to the threat of ozone depletion." He noted the receipt of a letter from the Alliance for Responsible Atmospheric Policy (formerly the Alliance for Responsible CFC Policy) supporting the Amendment as a representative of producers and

¹⁹ The Senate Foreign Relations Committee consisted of Chair Claiborne Pell (D), 10 Democratic members (Joseph Biden, Christopher Dodd, Russell Feingold, John Kerry, Harlan Matthews, Daniel Moynihan, Charles Robb, Paul Sarbanes, Paul Simon, and Harris Wofford) and 9 Republican members (Hank Brown, Paul Coverdell, Judd Gregg, Jesse Helms, James Jeffords, Nancy Kassebaum, Richard Lugar, Frank Murkowski, and Larry Pressler).

users of CFCs, HCFCs, and HFCs. Pell also noted that the Committee “has not received any expressions of opposition to the amendment.”

The Foreign Relations Committee voted unanimously to report the Copenhagen Amendment favorably to the Senate for ratification. Senator Pell reported the Copenhagen Amendment out of the Foreign Relations Committee on November 19, 1993.

The full Senate considered the Copenhagen Amendment in executive session on November 20 (U.S. Senate 1993a). The treaty was one of a number of issues addressed during the session. No floor debate was offered, and the Senate approved ratification of the Copenhagen Amendment by a division vote on November 20 and sent it to President Clinton for his signature.

President Clinton and Secretary of State Christopher signed the instrument of ratification for the Copenhagen Amendment within three months of Senate approval. On March 2, 1994, the United States deposited its ratification instrument with UNEP.

Discussion

The U.S. government was undivided during the domestic ratification process for the Copenhagen Amendment, and the period represents the only time during the almost twenty years of international consideration of the ozone treaty that both the President and Congress were in the hands of the Democrats.

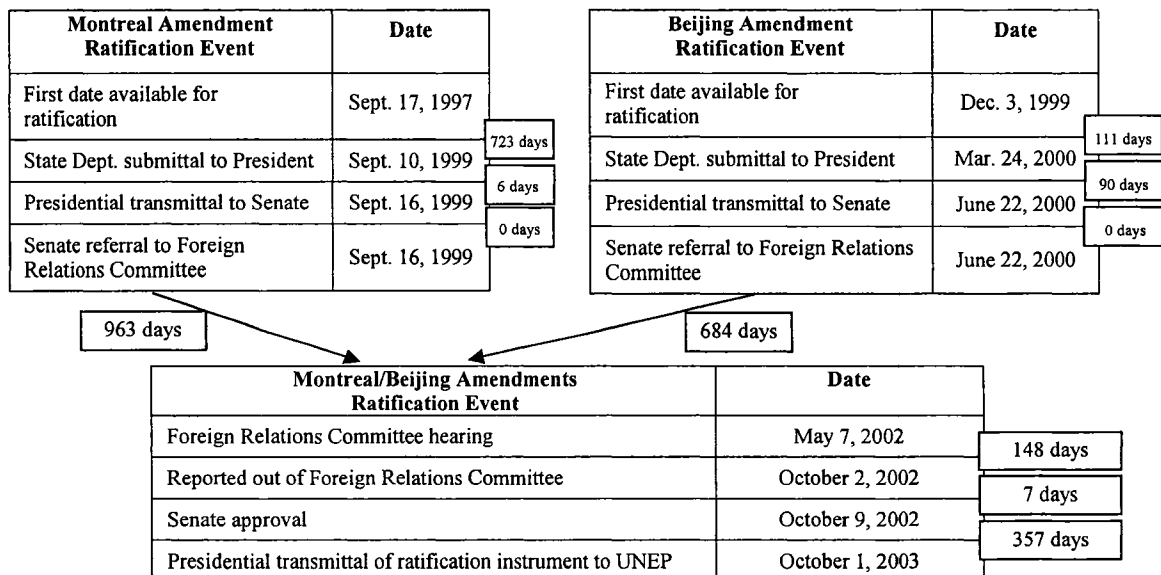
The delay caused by the change in administration from Republican George H.W. Bush to Democrat William Clinton accounted for seven of the fifteen months of the entire ratification process. Although Democrats had consistently indicated they favored more stringent ozone protection measures than Republicans, it was still necessary for the

President and incoming Cabinet officials to review the provisions of the Copenhagen Amendment before submitting it to the Senate for ratification approval. In addition, the EPA had already proposed rules during the Bush Administration to implement the Copenhagen Amendment in the United States, and industry and even the government's own Agriculture Department had been opposed to the methyl bromide restrictions contained in the EPA's proposed rules. Thus, although the President was a Democrat and Congress had a Democratic majority, it was possible that the White House administration itself would become divided over the methyl bromide issue. However, by mid-1993 the newly appointed officials in the Department of Agriculture were able to reconcile to the new methyl bromide regulations.

The Senate Foreign Relations Committee and the full Senate continued their roles as advocates of ODS restrictions that had begun with the original Montreal Protocol. Environmental groups remained endorsers of further ODS restrictions, and even the Alliance for Responsible Atmospheric Policy sent a letter to the Foreign Relations Committee that supported the Amendment, although only as representatives of producers and users of CFCs and CFC substitutes. The most vocal group against the Copenhagen Amendment, methyl bromide users, had not found a way to plead their case with the Senate and prevent ratification.

The Montreal and Beijing Amendments: Methyl Bromide Controversy and Administration Change Endanger Domestic Acceptance
(September 17, 1997 – October 1, 2003
December 3, 1999 – October 1, 2003)

The ratification process for the Montreal and Beijing Amendments had the dual distinction of occurring during a change in President (from Democrat Bill Clinton to Republican George W. Bush) and across a heated debate about the merits of a ban on methyl bromide. Unfortunately, the ozone-protection treaty required countries to ratify the Amendments in the order in which they were negotiated, so that ratification of the Beijing Amendment, which met with little domestic opposition because it did not address methyl bromide, was delayed while Congress wrangled over domestic regulations for the chemical. The ratification process was also contentious because the incoming Bush administration appeared to want less environmental regulation rather than the progressively restrictive requirements that the outgoing Clinton administration had negotiated for the ozone-protection treaty. Ultimately, the United States ratified the Montreal Amendment in six years and the Beijing Amendment in four years, long after the two Amendments had entered into force internationally.



Producer, User Opposition to Methyl Bromide Ban Slows Final Amendments

The Montreal Amendment was opened for ratification at the UNEP plenipotentiary meeting September 17, 1997. However, the State Department did not submit the Amendment to President William Clinton until two years later. At the time the Montreal Amendment negotiations were completed in 1997, the United States had legislation and regulations in place through the 1990 Clean Air Act Amendments that phased out methyl bromide by the year 2001, but both producers and users of methyl bromide were firmly opposed to the deadline. The Montreal Amendment moved the methyl bromide phaseout date to 2005, which producers and users still insisted was too soon. It was not until January 2001 that the EPA issued a final rule that conformed to the 2005 deadline (BNA 1999a).

While a first impression might be that in 1997 the United States would have no qualms about ratifying the Montreal Amendment because its domestic regulations called for an even earlier phaseout of methyl bromide than required by the Amendment, the State Department withheld its submittal to President Clinton until September 1999. In truth, the methyl bromide phaseout was becoming as controversial in the late 1990s as the CFC phaseout had been in the 1980s. Two of the three producers of methyl bromide were located in the United States, and neither the producers nor farmers using methyl bromide believed that viable substitutes would be available by the 2005 phaseout deadline.

Although the EPA did not promulgate a final rule until 2001, Congress in October 1998 virtually assured that the EPA would set a new methyl bromide phaseout deadline at 2005. The fiscal 1999 omnibus appropriations law changed the 2001 deadline in the Clean Air Act and ordered the EPA to promulgate rules to agree with the recent Montreal

Amendment. Even with this assurance, the State Department waited almost a full year before submitting the Montreal Amendment to President Clinton. Thomas Pickering, State Department Undersecretary for Political Affairs, submitted the Montreal Amendment to President Clinton on September 10, 1999 (U.S. Senate 1999, v-vi). A week after receiving the Montreal Amendment from the State Department, President Clinton transmitted it to the Senate for ratification (U.S. Senate 1999, iii).

The Beijing Amendment was opened for ratification at the UNEP plenipotentiary meeting December 3, 1999. The Beijing Amendment, which contained no additional provisions for methyl bromide phaseout, was deemed less controversial than the Montreal Amendment. The Beijing Amendment froze production of HCFCs in 2004 at the 1989 level and imposed a ban on bromochloromethane beginning in 2002. Although the EPA had yet to promulgate regulations to enforce domestically the requirements of the Beijing Amendment, little controversy had developed on the proposed restrictions. On March 24, 2000, Strobe Talbott, Deputy Secretary of State, submitted the Amendment to President Clinton (U.S. Senate 2000, v-vi). Talbott was forced to note that the United States had yet to ratify the 1997 Montreal Amendment and that the U.S. could not submit its ratification instrument for the Beijing Amendment without first or concurrently doing so for the Montreal Amendment. Three months after receiving the Beijing Amendment from the State Department, President Clinton transmitted it to the Senate on June 22, 2000, for ratification approval (U.S. Senate 2000, iii).

Methyl Bromide Controversy Erupts, Delays Montreal and Unrelated Beijing Amendment Ratifications

The Montreal Amendment was read in the Senate on September 16, 1999, and the Beijing Amendment was read in the Senate on June 22, 2000. In both instances, the

Amendments were immediately referred to the Committee on Foreign Relations.²⁰ On May 7, 2002, two and a half years after receiving the Montreal Amendment and more than a year and a half after receiving the Beijing Amendment, the Foreign Relations Committee held a public hearing to consider both amendments (U.S. Senate Committee on Foreign Relations 2002b). The delay is explained by what was occurring in the House of Representatives concerning domestic implementation of a ban on methyl bromide.

Of the two amendments, the Montreal Amendment had become the most controversial in the late 1990s and early 2000s with its restrictions on methyl bromide. During the same time period that the Senate Foreign Relations Committee was being asked to consider ratification of the Montreal Amendment that required international phaseout of methyl bromide by 2005, the House was conducting hearings to determine whether the United States should move its own deadline farther into the future than 2005. A key example was the hearing of the House Agriculture Subcommittee on Livestock and Horticulture in mid-July 2000 (U.S. House of Representatives Committee on Agriculture 2000), which invited several agricultural groups to testify while omitting representatives from the EPA, Agriculture Department, and environmental groups, an obvious attempt to forestall testimony that would rebut the arguments of the methyl bromide industry. Testimony ranged from a strawberry farmer with 88 acres to Carl Loop, president of the Florida Farm Bureau Federation. Loop testified that “the loss of methyl bromide [to U.S. farmers] will mean more acres for Mexico and no net environmental gain since Mexico will produce tomatoes on land fumigated with methyl bromide.” The statement

²⁰ The Senate Foreign Relations Committee consisted of Chair Joseph Biden (D), 9 Democratic members (Barbara Boxer, Christopher Dodd, Russell Feingold, John Kerry, Bill Nelson, John D. Rockefeller, Paul Sarbanes, Robert Torricelli, and Paul Wellstone) and 9 Republican members (George Allen, Sam Brownback, Lincoln Chafee, Michael Enzi, Bill Frist, Chuck Hagel, Jesse Helms, Richard Lugar, and Gordon Smith).

demonstrated the frustration of methyl bromide users such as farmers in the United States who would be required to cease usage of methyl bromide in 2005 while in Mexico, a developing country, farmers would have at least ten additional years before methyl bromide was phased out. Loop also indicated that there were currently no viable substitutes for methyl bromide and that once an alternative was determined, it would take several years to gain EPA approval.

During the May 7, 2002, Senate Foreign Relations Committee hearing (U.S. Senate Committee on Foreign Relations 2002b), Senator George Allen (R-VA) was clearly concerned about developing countries' compliance with the ozone protection treaty. He questioned John Turner, Assistant Secretary of State, Bureau of Oceans and International Environmental and Scientific Affairs, at considerable length and at times contentiously about compliance enforcement and whether the ozone layer was being restored because of the Montreal Protocol and its amendments. Senator Allen remarked:

I would like to encourage advancing of the compliance provisions for underdeveloped states which currently do not fall under the Beijing Amendment until the year 2016, at which point the time table for decreasing use and production will apply. The benchmark for that time table is the level of production and consumption in the year 2015, which seems to be a far distant point if we are engaged in serious and deliberate efforts to control these substances which are threats to our ozone layer... (pp. 3-4).

...I think it would be helpful to get the specific objective data to show [how much restoration of the ozone layer has occurred]. Obviously, everything you say is very logical, but I think that as we move forward, the more empirical scientific data we can get, the better. I think the citizens of this country deserve it, and I think it also will help us as well in the future in making determinations and also sharing that objective data. Especially if you have a country that has a relative democracy, the people of those countries will demand their leaders to act as well. If you have objective data rather than sentiments, it usually bolsters people's instinctive sentiments to have that evidence (pp. 15-16).

Senator Allen's line of questioning paralleled a controversy about international environmental treaties that was growing during President George W. Bush's administration. With respect to the Kyoto Protocol for controlling climate change, the Bush administration stated, "The U.S. opposes the protocol because it exempts many countries from compliance and would cause serious harm to the U.S. economy" (BNA 2001). Specifically, the administration was concerned about developing countries such as China and India that were expected eventually to produce more greenhouse gas emissions than developed countries but would not be required to comply with the restrictions. This controversy clearly had a "spill-over" effect for many environmental treaties and elicited questions about provisions of the ozone protection treaty.

The dissent about methyl bromide that affected Senate Foreign Relations Committee consideration of the ratification of the Montreal Amendment also affected the fate of the Beijing Amendment, but for entirely different reasons. Although the Beijing Amendment had sparked little controversy when it became available for ratification in 1999, the terms of the Montreal Protocol stipulated that countries could not ratify a later amendment without first ratifying all those that preceded it. Thus, the United States could not ratify the Beijing Amendment without first or concurrently ratifying the Montreal Amendment.

Despite the concerns raised by Senator Allen during the Foreign Relations Committee hearing, the two amendments to the Montreal Protocol moved forward in the ratification process. On August 1, 2002, the Senate Foreign Relations Committee considered the Montreal and Beijing Amendments at its business meeting (U.S. Senate Committee on Foreign Relations 2002a). The Foreign Relations Committee voted

unanimously to report both amendments favorably to the Senate for ratification.

However, Senator Pell felt obliged to append a comment to the committee report that emerged from the business meeting. Reflecting Senator Allen's concerns, he indicated that

while some limited grace period measured from the time of signature of the amendment may be justified [for developing countries], the establishment of a baseline period 15 years into the future is longer than the decade-long grace periods established in the original Protocol and the London amendment. Moreover, the grace periods in the original Protocol and the London amendment included limits on the baseline—either averages of production and consumption in future years, or per capita limits. The establishment of a baseline year far into the future without any upper limits on the baseline consumption or production opens the door to unwarranted increases in production and consumption, which, if significant, would thereby undermine the purpose of controlling the substances in question. The Committee urges that this practice not be continued in subsequent amendments to the protocol.

Senator Pell reported the Montreal and Beijing Amendments out of the Foreign Relations Committee on October 2, 2002.

The full Senate considered the Montreal and Beijing Amendments in executive session on October 9, 2002 (U.S. Senate 2002). No floor debate was offered, and the Senate approved ratification of the Montreal and Beijing Amendments by a division vote on October 9 and sent it to President Bush for his signature.

Domestic Rule Making Delays Final Signatures

Although the Senate had approved ratification of the Montreal and Beijing amendments, President Bush withheld signature of the ratification instruments until the EPA promulgated a last final rule implementing one of the amendments' provisions. The EPA did not finalize prohibitions required in the Montreal Amendment on trade in methyl bromide with countries that were not parties to the Copenhagen Amendment until

July 25, 2003. Once the trade restrictions in methyl bromide were in place, President Bush and Secretary of State Colin Powell signed the instruments of ratification for the Montreal and Beijing Amendments.

On October 1, 2003, the United States deposited both ratification instruments with UNEP. While the United States had to this point led most nations in ratifying the elements of the stratospheric ozone protection treaty, it failed to lead in ratification of the last two amendments to the Montreal Protocol. The Montreal Amendment entered into force in November 1999, three and a half years before the United States deposited its ratification instrument. The Beijing Amendment entered into force in February 2002, more than a year and a half before the United States deposited its ratification instrument.

Discussion

The ratification process for the Montreal Amendment began with Democrat Clinton as President and a Republican majority in Congress. Within fifteen months, Republican George W. Bush became President, and the Senate gained a Democratic majority while the House maintained its Republican majority. In both instances, government was highly divided and environmental policy stagnated.

Methyl bromide users finally gained access to Congress and especially to House Republicans during the late 1990s. House committee hearings allowed Republicans to continue the assault on ozone science they had begun in mid-1995. In addition, methyl bromide users testified about a ban on the chemical that would hurt U.S. agribusiness while favoring Mexican agricultural imports. Agribusiness was able to find a Congressional audience for its complaints that the CFC industry never had. Congressional access allowed business to “win” in two ways. First, Congress passed

legislation that forced the EPA to move the domestic ban on methyl bromide from 2001 to 2005. Second, agribusiness was able to maintain Republican concern over the negative economic implications of a methyl bromide ban so that the ratification process for the Montreal Amendment took six years.

The two years that the Montreal Amendment languished within the State Department are a good indication that President Clinton believed he could not obtain ratification approval from a Republican Senate. However, Clinton finally submitted the Amendment to the Senate in late 1999, where it remained on the Senate Foreign Relation Committee's calendar for another two and a half years before the Committee held a hearing. By then, Republican George W. Bush had been President for over a year and the Senate had a Democratic majority. The United States in 2002 was still addressing the September 11, 2001, terrorist attacks, and President Bush and the Senate as the main foreign policy legislative body had many other issues to consider. The Senate ratified the Montreal Amendment five months after the Foreign Relations Committee sent it to the full Senate. However, President Bush did not forward the ratification instrument to UNEP for more than a year after Senate approval.

Conclusions

Examination of the ratification process for the elements of the ozone protection treaty validates Milner's theory that a nation's executive must anticipate the ratification process when formulating the state's position for international negotiations. In all instances except the Montreal Amendment, U.S. ratification of the ozone protection treaty elements was a relatively smooth and quick process because the executive had worked with domestic interest groups and had their endorsement of the U.S. negotiating

position. Divided government, although it occurred with the Montreal Protocol and the London and Copenhagen Amendments, did not affect the ratification process in these instances.

In the case of the Montreal Amendment, not only was the U.S. government divided but the President also did not have business endorsement for his administration's international negotiating position. Methyl bromide proved to be a contentious issue for agribusiness, especially when methyl bromide users believed the EPA's proposed phaseout of the chemical would hurt them economically and favor Mexican agricultural imports. Although the Amendment eventually gained Senate approval for ratification, agribusiness was able to delay the process for six years.

PART THREE. CONCLUSIONS

6. CONCLUSIONS

This study was designed to examine the puzzle of why some countries cooperated in international environmental agreements more readily than others, with cooperation determined by the length of time a country needed to ratify an international environmental treaty. The core hypothesis guiding the study was that, although states may assemble in an international forum to negotiate a treaty, their bargaining positions are determined as much by domestic institutions and agendas as they are by their positions in the world order and their relationships with other countries. Domestic factors must be considered and reconciled into a unified position prior to entering into international negotiations and subsequently fought for during those negotiations if the final terms of the treaty are to be successfully promoted and accepted back home.

At the international level of analysis, the research explored four factors that were hypothesized to influence the length of time a country needed to ratify an international environmental agreement. First, states with more developed economies ratified the ozone protection treaty earlier than developing countries. Second, countries that joined many international institutions and organizations ratified earlier than countries that joined few international institutions. Third, states with democratic tendencies ratified the ozone protection treaty sooner than states that had a more autocratic form of government. Fourth, states producing CFCs, which were limited or banned by the ozone protection treaty, ratified sooner than countries that did not produce the substance.

The fact that democratic states ratified the ozone protection treaty in its early stages coupled with the early ratification of states that produced CFCs indicates the balancing act that democracies and their leaders must contend with. Executives in some democratic countries found themselves wanting to provide a common good, in this case

an undepleted ozone layer, but also needing to regulate the very industries that produced the CFCs accused of causing ozone depletion in order to comply with the international treaty. The ways that democracies cope with this dilemma are not found in factors that correlate with cooperation at the international level of analysis. Rather, a detailed study is needed to identify the *domestic negotiations* that influence a state's position in international negotiations. Just how the United States, a leading producer of CFCs in the 1970s and 1980s, addressed the tension caused by opposing environmental and business interests provides a case study at the national level of analysis.

Research at the national level examined Helen Milner's (1997) conclusions about the domestic circumstances that promoted or discouraged a state's cooperation in international agreements. These findings were applied to the deliberations in the United States about cooperation in the ozone protection treaty, with cooperation measured in the length of time needed for the domestic ratification process.

Milner found that divided government (i.e., an executive from one political party and a legislature with a majority from an opposing political party) discourages cooperation in international treaties. Additionally, if the preferences of the executive and legislature were extremely opposed, the possibility of cooperation was even further reduced. Another situation that Milner identified as discouraging cooperation was shared decision-making powers. If the executive had to make his decisions in tandem with the legislature and their preferences were even slightly different, the likelihood of a state's cooperation in ratifying an international treaty was reduced.

In terms of the ozone protection treaty, divided government seldom discouraged cooperation. During the ratification process for the six treaty elements, the government

was divided in four of five instances.²¹ When government was not divided (during ratification of the Copenhagen Amendment), the ratification process took about sixteen months. In three instances of divided government (Vienna Convention, Montreal Protocol, and London Amendment), the treaty ratification process averaged thirteen months, with the shortest time period at six months (Montreal Protocol) and the other two intervals at about seventeen months.

In only one instance of divided government did the ratification process take considerably longer. The ratification process for the Montreal Amendment lasted six years, and the government was divided for the entire period, although a switch in parties occurred almost midway through the period. From September 1999 until January 2001, the President was Democrat William Clinton and the Senate had a Republican majority. From January 2001 through ratification of the Montreal Amendment in October 2003, the President was Republican George W. Bush and the Senate had a Democratic majority.

Milner indicated that one way the likelihood of a state's cooperation can be increased lies in accounting for the preferences of domestic interest groups. International treaties generate both potential winners and potential losers. If opposing domestic interests both endorse an international treaty during the ratification process, the likelihood of a state's cooperation is increased. Milner's focus with societal groups, however, was on economics—which businesses stand to win or lose. In international environmental agreements, there are two main interest groups: business interests (i.e., individual corporations and business coalitions) that stand to gain or lose economically; and

²¹ The Beijing Amendment, which was considered a non-controversial treaty element, is not considered in this analysis because its ratification depended on the prior ratification of the Montreal Amendment, which was extremely controversial.

environmental groups that are not concerned about economic gains or losses—monetary concerns rarely influence their stance.

In every instance, environmental interest groups endorsed the U.S. position in international negotiations on the ozone protection treaty. While they always believed that the U.S. position was not stringent enough, environmental groups could not afford to shun the U.S. position on ODS phaseout terms because they believed that achieving any type of constraints was better than the status quo. Thus, arriving at the international negotiations with a unified front always depended on the chemical industry's endorsement.

The U.S. position for international negotiations for the Vienna Convention, Montreal Protocol, and the London and Copenhagen Amendments was fully or almost fully endorsed by both sets of domestic interest groups, and ratification occurred relatively easily. When the U.S. delegation arrived at the international negotiations with a position that was not endorsed by both environmental and industry interest groups, the President subsequently encountered significant difficulty with ratification. This situation occurred with the Montreal Amendment, and the ratification process lasted six years. Methyl bromide users were adamant both before the international negotiations and during the time leading to consideration of the Amendment in the Senate that domestic legislation and regulations needed to provide longer phaseout periods than specified by the Montreal Amendment.

Milner gave interest groups a second role in the formation of cooperation in international agreements, that of information provider. She noted that interest groups provide information “to political actors, especially legislators, who have their own

preferences but are not completely informed about the ramifications of policies” (p. 60). Because interest groups are more likely to provide information to legislators who are more sympathetic to their causes, information across the policy arena is often incomplete and asymmetric, which “creates inefficiencies and political advantages.” However, for international scientific and technological issues, an epistemic community comprised of knowledgeable scientists emerges in the role of information provider. The epistemic community serves as a free provider of information, so that interest groups become information receivers along with legislators.

Milner noted that agenda setting is one of several legislative powers that can be a major determinant in how international agreements are negotiated. Agenda setting, when concentrated in the hands of the most dovish actor, increases the probability of cooperation in international agreements. Kingdon (1997) indicated that the decision-making agenda is set by three factors: problem salience, favorable political environment, and the likelihood of problem resolution. For the stratospheric ozone treaty, the issue reached the U.S. policy-making agenda because ozone depletion was a major issue in the international arena, one that would likely be solved through international negotiations. Kingdon also indicated that an issue moves forward on the domestic agenda because it has a champion, a policy entrepreneur. Al Gore, a Senate Democrat (and later Vice President) filled the role of ozone policy entrepreneur. As chair of an influential Senate subcommittee, he was able to promote ozone protection legislation and address concerns of both business interests and environmental groups.

Milner’s study concentrated on the results of the ratification process, what she termed “the ratification game.” In the United States, domestic interest groups were able

to influence the U.S. treaty process in three major ways. First, domestic interests contributed to the State Department's position prior to the United States entering into negotiations of the Vienna Convention and the Montreal Protocol and its four amendments (business interests were more influential than environmental groups). Second, domestic interest groups were able to influence the formulation of U.S. implementing legislation in both the House of Representatives and the Senate after international treaty negotiations were concluded. Third, interest groups were able to influence the Environmental Protection Agency during the rulemaking process when implementing regulations were promulgated to anticipate or enforce domestically the requirements of the international agreement (environmental groups were more influential with the EPA).

Milner indicated that the executive enters international negotiations with a position that anticipates the ratification process, although she provides little in the way of specific actions that the executive can take. My analysis of the ozone treaty process indicates that the President can smooth the path to the ratification process by "frontloading" the negotiations process. The executive can try to craft a position for international negotiations that demonstrates a unified front of domestic interests. This tactic not only anticipates the domestic ratification process but also, in the case of a powerful state such as the United States, provides the U.S. negotiators with additional ammunition for pushing the state's position during the international negotiations (i.e., it allows the negotiator to say, "I have the full backing not only of my President but also of the domestic interest groups in my country").

The results of my research agree with Milner's basic contention that domestic politics dictate a nation's cooperation in international agreements. However, my research provides additional detail about the ways that domestic politics guide the treaty process. My research indicates that a nation's cooperation in international environmental treaties can in many instances be preordained before the nation enters into international negotiations. Assuming a nation goes into international negotiations with a set of preferences that has been negotiated domestically with its interest groups and then gets what it wants in the international negotiations, the ratification process is an easy one. Divided government becomes less of an issue; instead, domestic interest groups move the process forward because they are able to endorse a treaty that reflects due consideration of their preferences.

**APPENDIX:
ORGANIZATIONS AND THEIR REPRESENTATIVES ACTIVE IN THE OZONE PROTECTION TREATY**

Environmental Protection Agency

Treaty Element	Office	Title	Name
Vienna Convention	Administrator	Administrator	Anne Gorsuch Burford
	Administrator	Administrator	William Ruckelshaus
	International Activities	Associate Administrator	Fitzhugh Green James A. Losey
	Air and Radiation	Staff Director	John Topping
	Policy Planning and Evaluation		Stephen R. Weil
Montreal Protocol	Administrator	Administrator	Lee Thomas
	Air and Radiation	Assistant Administrator	Craig Potter
London Amendment	Administrator	Administrator	Lee Thomas
	Administrator	Administrator	William Reilly
	Stratospheric Protection	Director	John Hoffman
	Air and Radiation	Acting Deputy Assistant Director	Eileen Claussen
Copenhagen Amendment	Administrator	Administrator	William Reilly
	Global Change Division	Deputy Director	Stephen Seidel
	Atmospheric and Indoor Air Programs	Director	Eileen Claussen
	International Activities	Assistant Administrator	Tim Atkeson
Montreal/Beijing Amendments	Administrator	Administrator	Carol Browner
	International Activities	Assistant Administrator	William Nitze
	Air and Radiation	Assistant Administrator	Mary Nichols

Department of State

Treaty Element	Office	Title	Name
Vienna Convention	Secretary	Secretary	George Shultz
	Bureau for Oceans and International and Scientific Affairs	Assistant Secretary	Thomas F. Wilson James L. Malone
	Environmental Affairs	Deputy Assistant Secretary	Mary Hughes Rose
	Legal Advisor		Scott Hajost
	Environment, Health, and Natural Resources	Ambassador and Deputy Assistant Secretary (Acting)	Richard Benedick
	Economic Affairs	Under Secretary	Allen Wallis
Montreal Protocol	Oceans, Environment, and International Scientific Affairs	Ambassador and Deputy Assistant Secretary	Richard Benedick
		Assistant Secretary	John Negroponte
London Amendment	Secretary	Secretary	George Shultz
	Secretary	Secretary	James Baker
Copenhagen Amendment	Secretary	Secretary	James Baker
Montreal/Beijing Amendments	Secretary	Secretary	Warren Christopher
	Secretary	Secretary	Madeline Albright
	Global Issues	Counselor	Timothy Wirth
	Oceans, Environment, and International Scientific Affairs	Assistant Secretary	Eileen Claussen
	Oceans, Environment, and International Scientific Affairs	Assistant Secretary	Elinor Constable

Business Interests

Treaty Element	Chemical	Corporation or Coalition	Title	Name
Vienna Convention	CFCs	Alliance for Responsible CFC Policy		Donald Strobach Kevin Fay Gerald Hopka
		Fluorocarbon Program Panel (Chemical Manufacturers Association)	Chair	Richard Ward
		DuPont		Donald Strobach
Montreal Protocol	CFCs	Alliance for Responsible CFC Policy	Chair Executive Director	Richard Barnett Kevin Fay
		DuPont	External Affairs Department Ozone Issues Manager Group Vice President	James Ahead Joseph Steed Elwood Blanchard
		Allied Signal; Fluorocarbon Program Panel (Chemical Manufacturers Association)		Robert Orfeo
London Amendment	CFCs	Alliance for Responsible CFC Policy		Kevin Fay
		DuPont Freon Products Division	Environmental Manager Technical Director Director Chemist Chemist	Joseph Steed Raymond McCarthy Joe Glas Mack MacFarland Joe Steed
		DuPont	CEO	Richard Heckert
		Allied Signal	President, Fluorine Products Division	Robert Traflet
	methyl chloroform	Halogenated Solvents Industry Alliance	President	Paul Cammer

Business Interests (continued)

Treaty Element	Chemical	Corporation or Coalition	Title	Name
Copenhagen Amendment	HCFCs and CFCs	DuPont Fluorochemicals	Business Director Environmental Manager	Dwight Besole Tony Vogelsberg
	CFCs	Alliance for Responsible CFC Policy	Legislative Counselor Executive Director Chair	David Stirpe Kevin Fay James Wolf
		DuPont	Spokesperson	Catherine Andriadis
		American Standard (air conditioning equipment) Pharmaceutical companies (metered dose inhalers)	VP of Government Affairs	Jim Wolf
	HCFCs	Air Conditioning and Refrigeration Institute		Joseph McGuire
	methyl bromide	Ethyl Corporation		
Great Lakes Chemical Corp.				
Montreal/Beijing Amendments	ozone depleting substances	Alliance for Responsible Atmospheric Policy	Chair	James Wolf
	CFCs	American Automobile Manufacturers Association		Robert McFadden
		American Lung Association (metered dose inhalers)		
		International Pharmaceutical Aerosol Consortium (metered dose inhalers)		
		DuPont	CEO	Edgar Wolard Jr.
		FutureScan (journal)	Publisher	Roger Selbert
		Asthma and Allergy Foundation of America (metered dose inhalers)		
	U.S. Food and Drug Administration (metered dose inhalers)			
	methyl bromide	Methyl Bromide Working Group	Director	Peter Sparber
		Crop Protection Coalition	Attorney	Edward Ruckert
U.S. Department of Agriculture		Special Assistant for Pesticide Policy	Larry Elworth	

Environmental Interests and Think Tanks

Treaty Element	Chemical	Group	Title	Name
Vienna Convention	CFCs	Natural Resources Defense Council	Counselor	David Doniger
Montreal Protocol	CFCs	World Resources Institute		Gus Speth
		Natural Resources Defense Council		Thomas Stoel Jr. David Doniger
London Amendment	CFCs Halons methyl chloroform carbon tetrachloride methyl chloride	Natural Resources Defense Council	Senior Staff Attorney	David Doniger
	CFCs	Environmental Policy Institute		
	ozone depleting substances	National Toxics Campaign	Executive Director	John O'Connor
		Clean Water Action Project		
		Greenpeace	Toxics Campaign Manager	David Papaport Andrew Kerr
U.S. Public Interest Research Group				
Copenhagen Amendment	ozone depleting substances	Friends of the Earth	Ozone Campaign Manager	Elizabeth Cook
	CFCs halons carbon tetrachloride	Environmental Defense Fund	Senior Scientist	Michael Oppenheimer
	CFCs halons carbon tetrachloride methyl bromide	Natural Resources Defense Council	Senior Attorney	David Doniger
	CFCs	Worldwatch Institute	President	Lester Brown
	HCFCs	Greenpeace	Scientist	Bill Hare

Environmental Interests and Think Tanks (continued)

Treaty Element	Chemical	Group	Title	Name	
Montreal/Beijing Amendments	CFCs HCFCs HFCs methyl bromide	Greenpeace		Jacques Rosas	
	CFCs	Environmental Defense Fund	International Counsel	Joe Goffman Annie Petsonk	
	ozone depleting substances	Center for Global Change	Executive Director	Alan Miller	
	methyl bromide	Ozone Action		President	Joe Passacantando Kalee Kreider
		Institute for Energy and Environmental Research			Arjun Makhijani Kevin Gurney
		Friends of the Earth		Director, Ozone Protection Campaign	Corinna Gilfillan

Epistemic Community

Treaty Element	Organization	Office	Title	Name
Vienna Convention	World Meteorological Organization (WMO)			
	National Aeronautics and Space Administration (NASA)	Upper Atmosphere Research Program	Manager	Robert Watson
Montreal Protocol	NASA		Director	James Hansen
London Amendment	NASA	Upper Atmosphere Research Program	Program Manager	Robert Watson
	DuPont		Director Chemist Chemist	Joe Glas Mack MacFarland Joe Steed
	WMO			
	University of California, Irvine (UC-Irvine)	Department of Chemistry	Professor Professor	F. Sherwood Rowland Mario Molina
Copenhagen Amendment	NASA			Robert Watson
	UC-Irvine	Department of Chemistry	Professor	F. Sherwood Molina
Montreal/Beijing Amendments	UC-Irvine	Department of Chemistry	Professor Professor	F. Sherwood Rowland Mario Molina
		White House Office of Science and Technology Policy	Associate Director of the Environment	Robert Watson
	NASA			
	Pennsylvania State Univ.		Professor of Meteorology	William Brune
				S. Fred Singer
				Paul Ehrlich Anne Ehrlich

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