

**EFFECTIVENESS OF TRADE & POSITIVE MEASURES IN MULTILATERAL ENVIRONMENTAL
AGREEMENTS: LESSONS FROM THE MONTREAL PROTOCOL**

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TERMS & ABBREVIATIONS

Annex	Substances and products governed by the Montreal Protocol are listed in a series of five annexes to the Protocol. Annex A contains CFCs and halons; Annex B, other fully halogenated CFCs, carbon tetrachloride, and methyl chloroform; Annex C, transitional substances, including HCFCs and HBFCs; Annex D, <i>products containing controlled substances</i> ; and Annex E: methyl bromide
A5 Party	Article 5 Party. A party that is a developing country and that has an annual per capita consumption of controlled substances (CS) of 0.3 kg or less, and which therefore qualifies for deferential treatment pursuant to Article 5 of the Protocol.
CFCs	Chlorofluorocarbons
Complying non-party	A state not party to the Protocol which has been determined by a meeting of parties to be in compliance with the Protocol's control measures, trade controls, and reporting requirements.
CS	Controlled substance(s). Those ozone depleting substances which are subject to control measures and trade measures under the Protocol.
Consumption	For purposes of complying with control measures and reporting requirements, each party must calculate its consumption according to the following <i>consumption equation</i> : consumption equals production plus imports minus exports. ($C = P + I - E$) Exports to states not party to the Protocol may not be subtracted.
MF	Multilateral fund.
NA5 Party	Non-Article 5 Party. A party that does not qualify for status as an article 5 party.
Non-Complying non-party.	A state that is neither a party to the Protocol, nor in compliance with the Protocol.
ODS	Ozone depleting substance. Any substance that destroys stratospheric ozone.
ODP	Ozone depleting potential. The relative efficiency with which a particular substance destroys stratospheric ozone, compared with an equal amount of CFC-11.
Party/Non-Party	For purposes of the Article 4 trade measures, a state is considered a non-party with respect to a particular substance if it hasn't agreed to the control measures in effect for that substance. For example, a party to the original Protocol that has not also ratified the London Amendments is considered a non-party with respect to Annex B and C substances.
PCCS	Products containing controlled substances. Six categories of PCCS are listed in <i>Annex D</i> and therefore subject to trade restrictions under the Protocol: automobile and truck air-conditioning units; domestic and commercial refrigeration and air-conditioning/heat pump equipment; non-medical aerosol products; portable fire extinguishers; insulation boards, panels and pipe covers; and pre-polymers.
Production	For purposes of complying with control measures and reporting requirements, each party must calculate its annual production of controlled substances by multiplying the amount of each controlled

substance produced by the *ozone depleting potential* of that substance, then adding the sums for all substances.

UV-B

High energy ultraviolet radiation harmful to human health and the environment but normally dissipated by the stratospheric ozone layer.

A NOTE ON SOURCES

Wherever possible, we have relied on treaty texts, reports from meetings of the parties, and other official materials of the United Nations and member governments. Where primary materials were unavailable, however, and the need significant, we have used reliable secondary sources. We have cited Richard Benedick's Ozone Diplomacy (Harvard Univ. Press 1991) with sufficient frequency that we feel it proper to include an explanatory note. Ambassador Benedick headed the United States delegation during negotiation of the Vienna Convention and the Montreal Protocol. Ozone Diplomacy presents a comprehensive discussion of those negotiations, the scientific, political, and economic contexts in which they occurred, and the agreements which emerged from them. Because Ambassador Benedick provides extensive supporting documentation, including interviews with other participants in the negotiations, and because the facts he presents are in close agreement with those from official sources, we consider his work authoritative.

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INTRODUCTION

The Problem of Ozone Depletion

1. Encircling the Earth at a distance of 10-50km above the surface lies a thin layer of diffuse gases, known as the stratospheric ozone layer. The ozone layer is named for the molecules of weakly bound oxygen (O₃ or ozone) which are concentrated there. At ground level, ozone is a volatile, toxic pollutant. In the upper reaches of the atmosphere, however, ozone dissipates high energy ultraviolet (UV-B) radiation from the sun. Without the shield afforded by the stratospheric ozone layer, this extremely harmful form of radiation would constantly bombard the Earth's surface.¹
2. Chlorofluorocarbons (CFCs) and certain other widely-used chemicals, known collectively as "ozone depleting substances" (ODS), are damaging the stratospheric ozone layer. Unlike ozone itself, ODS are non-volatile and highly stable. At ground level, this stability is beneficial; most ODS are non-flammable, non-toxic, and relatively inexpensive to produce. As a result, they have been put to a tremendous variety of uses: as refrigerants, solvents, foam-blowing agents, aerosol propellants, fire extinguishers, and fertilizers. Because of their non-volatile nature, ODS do not break down when they are released into the environment. Instead, ODS molecules migrate slowly into the upper reaches of the atmosphere. Once they reach the stratosphere, however, the ODS molecules are broken down by high energy radiation from the sun, releasing chlorine or bromine ions in the process. These ions, in turn, catalyze a chemical reaction that breaks down ozone molecules. Because chlorine and bromine are catalysts, rather than reagents, the ions are not destroyed in these reactions. Thus, each chlorine or bromine ion can destroy tens of thousands of ozone molecules. Between 1940 and 1988, the use of CFCs and other ODS expanded rapidly, particularly in industrialized countries. This widespread ODS use dramatically increased the amounts of chlorine and bromine in the atmosphere. As a result, stratospheric ozone is being destroyed more quickly than it can be replaced by natural processes.
3. As the ozone layer is destroyed, increased amounts of UV-B radiation strike the Earth's surface,² endangering human health and the environment. In humans and some terrestrial animals, increased UV-B radiation causes skin cancer and cataracts, and suppresses the body's immune response system.³ Increased UV-B radiation also inhibits growth and photosynthesis in certain terrestrial plants, including important crop species like cotton and beans. Not only could this impair the viability of crop varieties, it may alter the

¹ World Meteorological Organization, Global Ozone Research and Monitoring Project--Report No. 37, Scientific Assessment of Ozone Depletion: 1994, at xxv [hereinafter "Ozone Assessment"].

² Ozone Assessment, at xxv.

³ See UNEP Environmental Effects Panel, Environmental Effects of Ozone Depletion: 1994 Assessment, at iv (Nov. 1994) [hereinafter "Ozone Depletion Effects"].

biodiversity of terrestrial ecosystems.⁴ In aquatic environments, UV-B radiation causes developmental abnormalities in fish, shellfish and amphibians. It also reduces the productivity of phytoplankton, which lie at the base of aquatic food webs.⁵ Moreover, by reducing the productivity of marine and terrestrial ecosystems, increased UV-B radiation may reduce the size of the natural sinks for carbon dioxide, thereby contributing to climate change.⁶

The Montreal Protocol

4. In growing recognition of such dangers, the world's major ODS consuming nations concluded a framework convention for the protection of the ozone layer in 1985,⁷ and embarked on the development of a substantive protocol to that convention. The Montreal Protocol on Substances that Deplete the Ozone Layer opened for signature on September 16, 1987, and entered into force on January 1, 1989.⁸
5. In the original preamble to the Montreal Protocol, the Parties declared that the agreement was designed to protect the ozone layer, and thereby human health and the environment. At the Second (London) Meeting of the Parties in 1990, the parties appended the following words to the Protocol's objective: ". . . taking into account technical and economic considerations and bearing in mind the developmental needs of developing countries."⁹ This, then, is the primary objective of the Protocol: to reduce and eventually eliminate global emissions of controlled substances in a manner which is equitable, and which respects developmental needs of developing countries.
6. The Montreal Protocol is designed to protect the ozone layer, and thereby human health and the environment, by establishing "precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge."¹⁰ The Protocol establishes a complex and integrated system of measures to achieve that objective. At the center of this system lies a series of control measures requiring each party to reduce its production and consumption of ozone depleting substances over time. The stratospheric ozone layer encircles the globe; thus, the environmental consequences of a nation's ozone policy cannot be confined to that nation alone. When a nation reduces its consumption of ozone depleting substances every nation benefits. When a nation increases its consumption of ozone depleting substances, every nation suffers.

⁴ Ozone Depletion Effects, at v.

⁵ Ozone Depletion Effects, at v-vi.

⁶ Ozone Depletion Effects, at vi-vii. Ozone depleting substances are also significant greenhouse gases; however, destruction of the ozone layer has an offsetting cooling effect on climate.

⁷ See Vienna Convention for the Protection of the Ozone Layer, *opened for signature* 22 March 1985, 26 I.L.M. 1529 (entered into force 22 Sept. 1988) [hereinafter "Vienna Convention"].

⁸ Montreal Protocol on Substances that Deplete the Ozone Layer, 16 Sept. 1987, 26 I.L.M. 1550 [hereinafter "Montreal Protocol" or "Protocol"].

⁹ London Amendments, art. 1(A)(1).

¹⁰ Montreal Protocol, preambular para. 6.

7. Originally, the reduction requirements applied only to certain classes of CFCs and halons,¹¹ and required parties to reduce non-essential uses of these substances to fifty percent of 1986 levels by 1998. As new evidence of the scope and severity of the ozone crisis has emerged, the parties have adopted several adjustments and amendments to the Protocol, accelerating the phase-out schedules for listed substances, requiring more significant reductions, and adding new substances to the list. The Protocol now governs 95 “controlled substances” (CS) in four Annexes--labeled A, B, C and E.¹² As of January 1, 1996, most industrialized countries had eliminated all but “essential uses” of the Annex A and B substances.¹³ The essential uses exception allows parties to continue consuming CS for fire-fighting, medical and defense purposes until suitable alternatives become available.¹⁴
8. The control measures themselves are supplemented by a system of provisions designed to encourage states—particularly developing states--to participate in the CS phase-out, to facilitate that participation, and protect the environmental gains made thereby. These provisions fall into three broad classes: trade measures, positive measures, and non-compliance procedures.
9. The Montreal Protocol is one of a number of multilateral environmental agreements that place controls on international trade, whether among parties to the agreement, between parties and non-parties, or both.¹⁵ The trade measures in the Montreal Protocol restrict trade between parties and non-parties and, if necessary, non-complying parties, in order to promote the broadest possible ratification of and compliance with the agreement and to ensure that the environmental gains made by parties are not undermined by activities in non-complying states. To this end, they restrict the movement in international trade of substances controlled by the treaty, products containing controlled substances, and the technology for making or using controlled substances. Parties may neither import from nor export to non-parties any controlled substance. Nor may parties import products containing controlled substances from non-party states. Each party must undertake to discourage the export to non-parties of technologies for making or using controlled

¹¹ Specifically, 12, 113, 114, and 115 and halon-1211, 1301, and 2402. Montreal Protocol, Article 1, ¶ 1, Annex A.

¹² Note that the terms “controlled substance” (CS) and “ozone depleting substance” are not synonymous. See *Terms and Abbreviations*.

¹³ Report of the Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer [hereinafter “Fourth Meeting”] at 14 (Decision IV/2), UNEP/OzL.Pro.4/15 (1992) [hereinafter “Decision IV/2”].

¹⁴ Decision IV/2.

¹⁵ See, e.g., Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 28 I.L.M. 657 (1989), *opened for signature* 22 March 1989, *entered into force* 5 May 1992; Agreement on the Conservation of Polar Bears, 13 I.L.M. 13 (1973), *opened for signature* 15 November 1973, *entered into force* 26 May 1976; Convention on International Trade in Endangered Species of Wild Fauna and Flora, 12 I.L.M. 1085 (1973), *opened for signature* 3 March 1973, *entered into force* 1 July 1975; International Convention for the Protection of Birds, UNTS 638:185 (1950), *opened for signature* 18 October 1950, *entered into force* 17 January 1963.

substances; and parties are prohibited from subsidizing or otherwise facilitating such exports.

10. The Protocol includes a variety of provisions designed to assist developing countries in the transition from ozone-depleting to more ozone-friendly technologies. For instance, the Protocol allows developing country parties whose annual per capita consumption of controlled substances is 0.3 kg or less, called “Article 5 parties”, to defer their phase-out obligations for up to ten years. To ensure that these Article 5 parties have sufficient supplies of CS to meet their “basic domestic needs” during this period, parties not operating under Article 5 may exceed their annual production caps by 10-15%. Further, the Protocol parties have established mechanisms for providing technological and financial assistance to Article 5 parties as they make the transition to more ozone-friendly technologies.
11. The Montreal Protocol is significant among MEAs in providing such “positive” incentives to developing parties. These “positive measures” stem from the recognition that ratification of an international environmental agreement carries with it both benefits and burdens, and that for developing countries the burdens may sometimes seem disproportionate to the corresponding benefit. By establishing the positive measures, the Montreal Protocol seeks to offset some of the economic and social costs associated with ratification and compliance, and to spread the remaining costs more fairly among party states. In so doing, the positive measures remove, or at least lower, political and economic barriers which might otherwise prevent some states from joining the international effort to protect the ozone layer.
12. The Protocol also establishes a procedure for identifying and addressing compliance problems among parties. This procedure focuses less on penalizing non-compliance than on providing parties with the incentives and assistance they require to meet their obligations under the Protocol. To this end, the non-compliance procedure does not dictate a particular response to all cases of non-compliance, but instead allows the Parties to tailor their response to the specific circumstances and needs of the non-complying party. This response may include the provision of assistance, such as assistance with collecting and reporting data, technical or financial assistance, technology transfer, or information transfer and personnel training. Or, if necessary, the Party’s may suspend the treaty rights of the non-complying Party, including its rights to trade controlled substances and technologies with other Parties, and its access to the financial mechanism and other positive measures.¹⁶ Because it operates primarily through the trade and positive measures and provides recourse to either as a means of ensuring Party compliance, the non-compliance procedure will be examined within the context of the trade and positive measures, but will not be evaluated separately.

The Montreal Protocol Study

¹⁶ Report of the Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, 25 Nov. 1992, UNEP/OzL.Pro.4/15 (Annex V).

12. As nations continue to recognize the global scope of environmental issues, that environmental problems often are global in scope and therefore require global action, and as they conclude that in some cases a mixture of trade and positive mechanisms may offer an effective means to achieve environmental objectives, an increasing number of MEAs may incorporate such mechanisms. In light of the potential growth in the use of such measures, it is pertinent to evaluate whether the trade and positive measures in existing MEAs are, in fact, serving the purposes for which they were designed. As part of a larger evaluation of trade and positive measures in MEAs, the present study examines the effectiveness of trade and positive measures within the Montreal Protocol.¹⁷
13. In undertaking that examination, the study applies the analytical framework outlined in Annex I. In brief, the analysis follows seven steps. In an examination of trade measures in the Montreal Protocol, the study first identifies the objectives of the Montreal Protocol. Second, it identifies the relationship of the trade and positive measures as a whole to the achievement of those objectives. That is, how the purposes of the Protocol regime should be advanced by the inclusion of trade and positive measures. Third, it describes each measure then, fourth, describes how each measure was intended to operate. Fifth, it establishes indicators of effectiveness based on this intended function. Sixth, the study evaluates the effectiveness of each measure by comparing available data to these indicators of effectiveness. Seventh, and finally, it considers whether, by functioning as expected, the trade and positive measures actually advanced the overarching objectives of the regime.
14. The analysis and conclusions presented here bear an important caveat. As will be discussed later, the most important function of both the trade and the positive measures is to promote nearly universal ratification of and compliance with the Protocol regime. An assessment of the effectiveness of these measures, therefore, must rely largely on ratification and compliance data. Every state's decision to ratify and/or comply with a treaty, however, will be based on a variety of factors. For example, a state may ratify the Montreal Protocol out of concern for the health and welfare of its citizens; because of the international political capital that comes from participation in a common cause; to secure access to new, ozone friendly technologies; to protect domestic industries that produce or utilize controlled substances; or from any combination of these motives. Because more than one benefit will accrue to a state that ratifies the Protocol, it cannot be assumed that every state ratifying the Protocol did so because of a specific trade or positive measure or combination of measures. Thus, an assessment of the role of such measures in increasing ratification and compliance must be based on a combination of statistical evidence, anecdotal evidence, and inference.
15. On the basis of the available evidence and reasonable inferences therefrom, the report concludes that the trade measures and positive measures have been effective in increasing ratification of and compliance with the Protocol. Nor do the environmental gains made by the parties appear to have been undermined or offset by "leakage" of CS production or usage to non-party states. Because no evidence of such leakage exists, however, it is not possible to determine whether the leakage was prevented by the trade measures, or simply

¹⁷ This study is sponsored by the United Nations Environment Programme.

failed to occur. Finally, it concludes that, by increasing ratification and compliance, and facilitating the conversion to ozone-friendly technologies in many developing countries, the trade and positive measures have contributed to the primary objective of the Montreal Protocol: reduced global emissions of ozone depleting substances.

TRADE MEASURES IN THE MONTREAL PROTOCOL

The paper analyzes seven trade measures in the Montreal Protocol. These measures work in coordination to eliminate imports and exports of all CS and PCCS between party and non-party states. The first, a *ban on imports of controlled substances from non-complying non-parties*, seeks to prohibit parties outside the Protocol from selling CS in the markets of complying parties. The second, a *ban on exports of controlled substances to non-complying non-parties*, limits the availability of CS for non-complying, non-party states attempting to maintain or increase their levels of CS use. The third measure, a *ban on imports of products containing controlled substances from non-parties*, aims at limiting the PCCS market for non-party states. Fourth, the possibility of implementing *the ban on imports of products made with controlled substances from non-parties*, would reduce for non-parties the market for production using CS, although this measure has yet to take effect. The fifth measure, *exclusion of exports to non-parties from the consumption equation*, determines the CS allowances for party members. The sixth measure, *restrictions on transfer to non-parties of ODS production and consumption technology* seeks to discourage dissemination CS technology. Finally, the seventh measure, really a set of *trade measures under the non-compliance mechanism*, addresses the issue of party non-compliance.

Relation of the Trade Measures to Achievement of Objective

18. The negotiators of the Protocol chose to achieve their objective by first requiring countries to eliminate their production and consumption of ODS, and second either mandating developed country parties to provide assistance to, or otherwise enabling, developing country parties, to meet the first requirement.

Promotion of Widespread Compliance with the Protocol

18. At the time of the Protocol's negotiation, scientists estimated that the ozone layer would never completely recover if as little as five percent consumption of the controlled substances remained.¹⁸ Thus, the negotiators of the Protocol recognized that near-universal compliance¹⁹ with the Protocol's provisions to eliminate over time consumption and production of ODS would be essential to achievement of the Protocol's primary objective to reduce and eventually eliminate global emissions of controlled substances.

¹⁸ Testimony of A. Dwight Bedsole to the House Comm. On Energy and Commerce, Subcomm. on Health and the Environment, 101st Cong. 2d Sess., Jan. 25, 1990 at 274, 283.

¹⁹ Regarding the Trade Measures Part of this study, and unless otherwise specified, the term "compliance" will be used to connote implementation of the control measures in the Protocol, regardless of whether this implementation is by a non-Party pursuant to Article 4(8), or by Parties.

19. However, there were significant incentives for nations *not* to comply with the Protocol's production and consumption reduction requirements. The predicted costs of reducing consumption of CFCs and other controlled substances were significant, and the environmental and health benefits of reduction, though also significant, would not be realized for decades. Moreover, the benefits of any state's reduced emissions would be shared by the world as a whole; states that might otherwise have been willing to make such sacrifices might be discouraged from doing so by the threat of bearing an unfair share of the reduction burden.²⁰
20. In addition, net CS exporting states choosing to comply with the Protocol's production phase-out schedules by shifting production to CS substitutes would face economic competition from non-complying states. Producers in non-complying states would enjoy a cost advantage if CS substitutes were more expensive than CS and the price of complying states' products were to increase as a result of the Protocol's requirement to use CS substitutes. The potential for gaining a cost advantage for its industries—and the corresponding risk of disadvantage for any country that ratified—provided another incentive for states to remain non-parties.
21. When the Protocol was being negotiated in 1986, these risks were more than theoretical. When the threat of ozone loss first became apparent in the mid-1970s, the United States, Canada, Sweden and Norway undertook unilateral and drastic reductions in their CFC emissions. Between 1974 and 1985, the United States alone reduced its production of CFCs for use as aerosol propellants by 95%. Other nations, however, were slow to follow this lead. Indeed, many nations increased their CFC output. As a result, United States CFC producers, which had lead world production, abandoned their markets to the European Community, which failed to undertake even modest reductions until 1981. In the interim, the EC had captured once lucrative U.S. export markets. **IF THE PROTOCOL HAD BEEN IN EFFECT, WOULD THIS OUTCOME HAVE BEEN DIFFERENT BECAUSE OF THE BAN OR BECAUSE OF THE CONSUMPTION/PRODUCTION REDUCTION REQUIREMENTS? US WOULD HAVE SHIFTED PRODUCTION TO SUBSTITUTES AND OTHER COUNTRIES WOULD HAVE ACQUIRED THEIR SUBSTITUTES FROM THE US -- AND THEIR CS FROM WHATEVER PARTY WAS STILL MAKING CS, AS THE CS WOULD BE LESS EXPENSIVE.**
22. There existed a further disincentive to comply with the Protocol. As a result of the competitiveness impact, CS reductions by some states could actually encourage increased use of those substances by other states. If parties to the Protocol were to reduce their production of controlled substances and products containing controlled substances while allowing world demand for such products to remain stable or increase, non-parties would have had a significant incentive to increase their production to meet that demand. Such "leakage" would offset some or all of the environmental gains made by the parties, and would further discourage states from complying with the reduction schedules.

²⁰ See Scott Barrett, Trade Restrictions in International Environmental Agreements: The Case of the Montreal Protocol, OECD COM/ENV/TD(95)15 (1995).

23. The risk of leakage would have been heightened if CS producers in party states had chosen to avoid compliance by moving production facilities to non-party states. Evidence existed that at least some firms intended to do this. For example, a study by French researchers reported that Atochem, the largest manufacturer of CFCs in Europe, had begun negotiations with other European and African firms for the transfer of Atochem's CFC production to non-party states.²¹
24. Trade measures were included in the Montreal Protocol to promote the universal cooperation necessary to the Protocol's success. Once complying countries reached a critical mass of the global market share of production or consumption of CS, the trade measures would operate to pull others on board. By erecting barriers to the flow of CS industries, technologies, substances and goods between complying and non-complying states, the trade measures in the Montreal Protocol made it more difficult for states to continue their own use of controlled substances unabated. If the state were a net CS importer, its supply of CS would diminish. If the state were a net exporter, its markets would decrease. By closing potential CS export markets to non-parties, these barriers neutralized an economic incentive to remain outside the Protocol. Indeed, by restricting CS markets and supplies to parties during much of the phase-out period, the trade measures made ratification of, or compliance with, the Protocol economically more attractive for most states than non-compliance.
25. The trade measures were designed to prevent leakage in two ways. First, the import bans on controlled substances and products containing controlled substances prevented non-party producers from exporting these goods into party markets. DURING THE PHASE OUT PERIOD - BUT WHAT DIFFERENCE WOULD THAT MAKE, AS CONSUMPTION WAS CONTROLLED -- WHO CARES IF A PARTY GOT ITS QUOTA OF CS FROM ANOTHER PARTY STATE OR A NON-PARTY STATE? With fewer markets available, there is less incentive for a non-party state to expand its production of CS or PCCS, or for industry to move production facilities from party to non-party states. AGAIN, WHAT DIFFERENCE DOES IT MAKE IF PRODUCTION IS IN A PARTY OR NON-PARTY STATE? IF CONSUMPTION REMAINS EQUAL, THEN IT SEEMS IRRELEVANT. Second, the Protocol required parties to discourage the export to non-parties of the supplies and technology necessary for producing or using controlled substances. Thus, if a non-party wished to expand its CS production, either for domestic use or for export to other non-parties, it would receive no assistance in doing so from the Protocol parties.
26. Together, the trade measures not only discourage non-participation, but also assure states interested in ratifying that their sacrifices won't be in vain and won't be compounded by unfair economic disadvantages. Ideally, this combination of measures should promote the near universal ratification essential to the success of the Protocol.

²¹ Sylvie Faucheux and J.-F. Noël, *Did the Ozone War End in Montreal?*, Univ. de Paris, Centre Economie-Espace-Environnement, English digest (Paris: Cahiers du C.3.E., 1988) at 11, *quoted in* Benedick, *supra* note 17, at 102.

widespread compliance with the Protocol would create a significant market for CS substitutes and reward net exporting states for shifting their production to substitutes. In the absence of the Protocol, [Controls on access to export markets] Widespread compliance with the Protocol's phase-out of consumption of CS would prevent non-complying state producers of products normally containing or made with CS to gain market share by selling or using relatively inexpensive CS rather than the more expensive substitutes. [By removing this potential advantage, the Protocol encouraged compliance.] **BY CREATING A MARKET FOR SUBSTITUTES IN SPITE OF THEIR HIGHER COST, THE PROTOCOL ENCOURAGED NET EXPORTERS TO PARTICIPATE IN THE SHIFT TO THE PRODUCTION OF SUBSTITUTES. DON HERE THE PROTOCOL DIMINISHED THE IMPACT OF THE COST ADVANTAGE BY CREATING A MONOPOLY MARKET FOR CS SUBSTITUTES AND PRODUCTS CONTAINING AND MADE WITH THEM. BUT IT IS REALLY THE CS CONSUMPTION REDUCTION REQUIREMENTS THAT CREATE THE MARKET FOR SUBSTITUTES; THE NON-PARTY IMPORT/EXPORT BANS DON'T MAKE THE SUBSTITUTES MORE COMPETITIVE. THE CS CONSUMPTION REDUCTION REQUIREMENTS ENSURE THE MARKET FOR THE SUBSTITUTES.**

**Table 1
Trade Measures in the Montreal Protocol**

Art .	Measure (relative to non-parties)	Effective : Annex A	Effective : Annex B	As Modified
3(c)	Exclude exports from consumption equation	1/1/93	8/10/93	Parties who have ratified London Amendments may only export to complying non-parties.
4(1)	Ban imports of bulk CS	1/1/90	8/10/93	
4(2)	Ban exports of bulk CS from article 5 parties	1/1/93	8/10/93	Amended in 1990 to apply to all parties (who have also ratified the London Amendments).
4(3)	Ban imports of PCCS	5/27/93	NA	Deadline extended for some parties.
4(4)	Ban imports of PMCS	NA	NA	Found not feasible 11/93
4(5)	Discourage exports of CS technology	1/1/89	8/10/92	Language softened by London Amendments
4(6)	Refrain from assisting technology transfers	1/1/89	8/10/92	

Analysis of the Specific Trade Measures

I. The Ban on Imports of Controlled Substances from Non-Complying Non-Parties

25. As of 1 January 1990, Article 4(1) of the Protocol requires each party to ban the import of Annex A substances²² from any state not party to the Protocol. Article 4(8) provides that an exception to the ban can be granted to non-parties that submit data demonstrating compliance with the CS phase-out provisions of Article 2, the trade provisions of Article 4, and the reporting requirements of Article 7 [hereinafter "complying non-parties"].

Intended Operation

26. The ban on imports of CS restricts the markets available to producers in non-complying, non-party states. Further, Article 4(1) reduces the incentive for migration of CS production from party states to non-complying, non-party states since such migrant producers would be unable to export their products back to the markets of party states from their new locations.
27. This measure also helps reassure producing party states that their efforts will not be undermined by leakage. This measure cuts off the markets of complying and party states for non-complying states. As more than 91% of global consumption came from complying/party markets, leakage was prevented. The evidence shows that almost all potential exporters of CS ratified or complied with the Protocol prior to or within a couple of months of the import bans' going into effect. While these facts do not prove the existence of a causal relationship between the import ban and compliance by net CS exporting countries, it is evidence of a connection. By restricting access to the market in party states for CS to complying states, the ban on imports of CS promotes compliance and prevents leakage.

Effectiveness Indicators

28. By its text, the Protocol could not enter into force until it had been ratified by at least 11 states, representing at least two-thirds of global CS consumption in 1986, the baseline year.²³ The Protocol did not pass this milestone until the nations of the European Community ratified simultaneously, in December 1988. When the Protocol entered into force on January 1, 1989, its 26 original parties represented roughly 92% of global CS consumption. (See Tables 2 & 2A). By precluding non-complying, non-party CS producers from these markets, the import ban on Annex A substances could be expected to provide a powerful incentive for states which were net exporters of those substances

²² The most important CFCs as well as halons are listed in Annex A. Analysis of the effectiveness of trade measures becomes considerably more complex if one considers ODS controlled by the London and Copenhagen Amendments (other fully halogenated CFCs, carbon tetrachloride, methyl chloroform, hydrochlorofluorocarbons, hydrobromofluorocarbons and methyl bromide). To avoid confusion, therefore, the evaluation of trade measures in this discussion is generally restricted to Annex A substances. Where evidence with respect to Annex B substances is particularly probative, it has been included.

²³ Montreal Protocol, art. 16(1).

(i.e., produce more CS than they require for domestic consumption) to comply with the Protocol in order to maintain market access in all other party states.

29. However, the vast majority of states are CS consumers, rather than CS producers. Only 20 states reported more than *de minimus* production of Annex A substances in 1989.²⁴ Of these 20 states, 12 states—representing at least 90% of global production—ratified the Protocol prior to its entry into force. (See Table 2A). Because the import ban did not become imminent until after the Protocol entered into force, and each of these parties actively contributed to that entry into force, it is unlikely—though not impossible—that their ratifications were precipitated by the threat of the import ban. Of the remaining eight states, only two were net exporters of Annex A substances in 1989: Australia (1571 tons) and Venezuela (121 tons). Both countries ratified the Montreal Protocol before the import ban became effective on January 1, 1990.

Table 2				
Global Consumption and Production of Annex A Substances, 1989^a				
	Consumption (tons)	Percent of Total	Production (tons)	Percent of Total
Article 5 parties:	125,555	9.87%	59,582	5%
Non-Article 5 parties:	1,146,887	90.13%	1,133,776	95%
Total	1,272,442	100%	1,193,358	100%

^a The figures presented in this and the following table are based upon data provided by parties to the Protocol Secretariat pursuant to article 7 of the Protocol. Ozone Secretariat, Reports of the Secretariat on Data, <<http://www.unep.org/unep/secretar/ozone>> (visited 15 September 1997). Because not all parties have reported data, these figures understate the actual amount of CS produced and consumed in 1989, with a corresponding overstatement in the percentages of global production and consumption.

²⁴ Argentina, Australia, Brazil, C.I.S., Canada, China, Czech Republic, France, Germany, Greece, India, Italy, Japan, Mexico, Netherlands, S. Africa, Spain, United Kingdom, United States., and Venezuela.

Table 2A
Consumption and Production of Annex A Substances
by States Ratifying the Protocol Prior to its Entry into Force (January 1, 1989)

	Consumption (tons)	Percent of Global Consumption	Production (tons)	Percent of Global Production
E.C. ^a	369,925	30.0 %	426,363	35.7%
U.S.A.	363,237	28.5 %	381,665	32.0%
Japan	250,299	19.7 %	174,980	14.6%
C.I.S	139,406	11.0 %	143,350	12.0%
Other	44,344 ^b	3.5 %	25,579 ^c	2.1%
Total	1,167,211	91.7 %	1,151,937	96.4% ^d

^a Belgium, Denmark, France, West Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, United Kingdom.

^b Canada, Egypt, Finland, Kenya, Malta, Mexico, New Zealand, Nigeria, Norway, Sweden, Switzerland, Uganda

^c Only Canada and Mexico reported production.

^d This figure, which is based on the incomplete data provided by the Protocol parties, and which includes production of *both* CFCs and halons, is significantly higher than the 90% reported elsewhere.

Data Analysis

29. Considered by itself, the data on the Annex A import ban is too sparse to assess its effect on ratification with any degree of certainty. However, the ratification pattern that emerged in that data was echoed and amplified when the parties implemented a second import ban on a different group of CS. In June 1990, the Second Meeting of the Parties adopted a set of significant amendments to the Montreal Protocol, known collectively as the London Amendments.²⁵ Among other changes, the London Amendments added two new lists of substances to the Protocol regime. Annex B covers ten fully halogenated CFCs not covered in Annex A, plus carbon tetrachloride and methyl chloroform. Annex C covers seventy-four “transitional substances,” substitute chemicals which, while still destructive, are less harmful to ozone than Annex A and B chemicals. The Amendments also revised Article 4, and extended the Article 4(1) import ban to Annex B substances.²⁶ More importantly, they redefined the term “state not party to this Protocol” to be

²⁵ Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (London), June 29, 1990, C.N.246.1990.Treaties-9, entered into force August 10, 1992.

²⁶ Montreal Protocol art. 4(1 bis) (as modified by London Amendments).

substance specific. Thus, for purposes of the trade controls, any state which has not agreed to be bound by the control measures in effect for a particular substance must be considered a non-party with respect to that substance.²⁷ Consequently, the Annex B import ban extends not only to states not party to the original Protocol, but also to any Protocol party that is not also a party to the London Amendments.

30. The ban became effective on August 10, 1993, one year after the London Amendments entered into force. At the time, sixteen states were producing, or had the capacity to produce, Annex B substances.²⁸ Twelve of these states ratified the London Amendments before they entered into force. Of the four remaining states, three were net exporters of Annex B substances: Belgium (19669 tons); Poland (4657 tons); and Romania (6911 tons). The fourth, Brazil, had a net export capacity of approximately 16000 tons.²⁹ Both Brazil and Romania ratified the London Amendments before the Annex B import ban became effective. Belgium ratified in October 1993, less than two months after the ban went into effect. Although Poland did not formally ratify the Protocol until October 1996, it submitted compliance data pursuant to article 4(8) in March 1993, and secured recognition as a complying non-party, thereby avoiding the import ban.³⁰ Poland maintained its complying non-party status, and its access to party markets, until its formal ratification of the Protocol. Thus, within two months of the import ban's entry into force, all producers of Annex B substances had ratified or were in compliance with the London Amendments.
31. Taken as a whole, the evidence from the original Protocol and the London Amendments suggests that the ban on imports of CS from non-parties probably influenced the ratification and compliance decisions of at least some producing states. By prompting these states to join the Protocol regime, or to comply with its CS control measures, the CS import bans advanced the goal of universal ratification and compliance. In light of the small number of CS producing states, this contribution was a significant one.
32. The article 4(1) ban on CS imports from non-parties may have served its most important function by way of its mere inclusion in the Protocol text to prevent leakage. In the absence of such a ban, and the protection it afforded from leakage through non-party producers, the major CS producers might have been unwilling to commit to significant production cutbacks. This hypothesis does not admit readily of proof, however, and any evidence in support of it would necessarily be anecdotal.

²⁷ Montreal Protocol art. 4(9) (as modified by London Amendments).

²⁸ Belgium, Brazil, Canada, China, France, Germany, India, Japan, the Netherlands, Poland, Romania, the Russian Federation, South Africa, Spain, United Kingdom, and United States. Ozone Secretariat, Reports of the Secretariat on Data, <<http://www.unep.org/unep/secretar/ozone>> (visited 15 September 1997).

²⁹ Brazil reports no Annex B production for 1993. The figure here is based on Brazilian consumption of 20697 tons, and an estimated production capacity based on the average of production levels reported in 1989 (46,871 tons), 1990 (29994 tons), and 1994 (34397 tons). Ozone Secretariat, Article 5 Countries Data on Production of Ozone Depleting Substances <<http://www.unep.org/unep/secretar/ozone/suma5p.htm>> (visited 15 September, 1997).

³⁰ See discussion of decision IV/17C, *supra* at section 2.3.2, para. 33.

II. Ban on Exports of Controlled Substances to Non-Complying Non-Parties

33. Originally, Article 4(2) of the Protocol required Article 5 parties to ban exports of Annex A substances to non-party states beginning January 1, 1993. Non-Article 5 parties were not similarly barred from exporting to non-party states, although Article 3(c) discouraged such exports by not allowing their subtraction from a party's consumption as calculated in the Protocol consumption equation. (See discussion in Section 2.3.4) In 1990, the London Amendments revised these provisions, banning CS exports from *any* party to any non-party. The London Amendments also extended the export ban to Annex B substances beginning August 10, 1993, one year after the London Amendments entered into force.
34. The entry into force of the Annex A export ban was delayed by Decision IV/17C of the Fourth Meeting of the Parties.³¹ As previously noted, Article 4(8) of the Protocol allows parties to trade with non-party states that have demonstrated their compliance with the Protocol's substantive provisions. Decision IV/17C provided that non-parties which submitted compliance data and notified the Secretariat of their compliance by March 31, 1993 would temporarily be deemed complying non-parties--and thus exempted from the trade bans--until the next Meeting of Parties, at which time the decision would be made whether to grant a full exception. Because it would not be possible to determine which non-party states intended to take advantage of Decision IV/17C prior to this March 31st deadline, implementation of the Annex A export ban was delayed until that date. The effective date for the Annex B export ban was not affected by the decision, and it entered into force on August 10, 1993.³²

Intended Operation

35. By denying non-complying, non-party states access to CS produced by the parties, the export ban on CS made non-compliance with the Protocol substantially more burdensome. As noted in the preceding section, CS production is limited to a handful of states.³³ Most states do not possess CS production capacity adequate to meet their domestic needs and must import CS from other states.

Effectiveness Indicators

³¹ Report of the Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, 25 Nov. 1992, UNEP/OzL.Pro.4/15.

³² See Decision IV/17A, UNEP/OzL.Pro.4/15.

³³ See *supra* note 24 and accompanying text.

36. Of the states that have reported producing Annex A substances for 1992, all had ratified the Protocol by the end of 1992.³⁴ (See Table 3) Thus, when the CS export bans went into effect, non-party states were faced with the choice of constructing their own CS production facilities, seeking CS suppliers among other non-complying states, or complying with the Montreal Protocol. Even early on, however, very few non-party states possessed the CS production capacity necessary to produce CS for export, and other trade measures in the Protocol erected significant barriers to creating new production facilities – or maintaining existing facilities – in non-complying countries. (See section 2.3.5) Thus, states with appreciable CS consumption needs had a strong incentive to comply with the Protocol. As the number of non-party states capable of producing CS has declined, the export ban has become an increasingly powerful incentive for countries to comply with or ratify the Protocol.

Table 3 States Reporting Production of Annex A Substances, 1992*							
Producer	Ratified		Producer	Ratified		Producer	Ratified
Argentina	9/90		Cuba	7/92		Mexico.	3/88
Brazil	12/91		Japan	9/88		Russian Fed.	11/88
Australia	5/89		India	6/92		So. Africa	1/90
Canada	6/88		Kenya	11/88		U.S.A.	4/88
E.C.	12/88		Korea, Rep	2/92		Venezuela	2/89
China	6/91						

Sources: Ozone Secretariat, Countries Reporting Data on Production of ODS <<http://www.unep.org/unep/secretar/ozone/suma5p.htm>> ,<.../sumna5p.htm> (visited Sept. 15, 1997); Ozone Secretariat, Status of Ratification of the Agreements on the Protection of the Stratospheric Ozone Layer <<http://www.unep.ch/ozone/rati1.htm>> (visited Sept. 9, 1997).

Data Analysis

37. Some CS importing nations explicitly acknowledged that the export ban affected their decision to ratify. Myanmar (formerly Burma) increased its consumption of CS from 1.4 tonnes in 1986 to 16.4 tonnes in 1992.³⁵ Import supply is therefore important to Myanmar, and Foreign Ministry officials acknowledged this when acceding to the Protocol in November 1993. A Press Release issued by the Ministry highlighted that, as a party, Myanmar would be spared the trade restrictions and would be allowed to import controlled substances during a 10-year grace period for limited domestic uses, including

³⁴ This table does not include those 25 states which remain non-parties to the Protocol, for which production and consumption data are unavailable, or those parties which have not yet complied with the reporting requirements of Article 7. All sources suggest that, by the end of 1992, Protocol parties represented all but a small fraction of global production capacity. See, e.g., Table 2.

³⁵ Article 5 Countries Data on Consumption of Ozone Depleting Substances.

for refrigeration and air conditioning.³⁶ In governmental discussions leading up to Israel's ratification in June 1992, officials highlighted the fact that the impending export ban operated as an incentive. Representatives from the Industry and Trade Ministry warned other government ministers that Israel relied on CS imports from countries already party to the Protocol. The Environment Ministry director-general stated that Israel must immediately sign the Protocol in order to prevent serious damage to local trade and industry.³⁷

38. Both the Montreal Protocol and the London Amendments experienced a sharp increase in ratifications around the time the export bans entered into force. Between December 1992 and March 1993, nineteen states ratified the Montreal Protocol. (See Table 8) The monthly ratification rate during this period averaged 4.75, more than three times the average monthly rate over the life of the Protocol. (The shift is visible as a sharp upturn in the "total ratifications" trend line in Chart 1.) In March alone, ten nations ratified, seven times more than in an average month. This number has been surpassed only once, when the European Community and its member states ratified as a group in December 1988.
39. Ratification of and compliance with the London Amendments also increased dramatically. Although the London Amendments were adopted in June 1990, it took nearly two years for the Amendments to accumulate the twenty ratifications necessary for their entry into force. During this period, the Amendments averaged one ratification per month. Again, the ratifying parties included the leading producers of Annex B substances. (See para. 29 supra.) Once the twentieth ratification was submitted, in May 1992, the entry into force of the Annex B trade bans—in August 1993—became imminent. During the next fourteenth months, the ratification rate more than tripled, and overall participation in the amendment rose from twenty to sixty-four parties. (See Chart 2) As with the Montreal Protocol, the only month in which these peak growth rates were matched was December 1991, when the European Community and five member states ratified simultaneously.
40. In addition to delaying the implementation of the Annex A export ban, Decision IV/17C also provided a means for avoiding one or both of the bans entirely: submission of the appropriate compliance data by March 31, 1993. States' efforts to take advantage of IV//17C serve as additional evidence of the effectiveness of the export bans. A number of countries clearly indicated their interest in taking advantage of Decision IV/17C, and the exemption from the export bans which it allowed. In August 1993, the Implementation Committee reported that twenty-two states had submitted compliance data in an effort to take advantage of Decision IV.³⁸ Twelve Montreal Protocol non-parties had submitted compliance data: four had provided sufficient data, eight needed to provide more information. In addition, nine London Amendment non-parties had provided sufficient

³⁶ The Press Release also cited the technological and financial assistance it would receive and its commitment to protecting the environment. (BBC Summary of World Broadcasts, Jan. 6 1994).

³⁷ Liat Collins, "Measures Threatened This Summer Israel Urged to Sign Ozone Layer Protocol," *The Jerusalem Post*, Wednesday, April 29, 1992.

³⁸ Report of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol on the Work of its Sixth Meeting, at 5, UNEP/OzL.Pro/ImpCom/6/3 (1993).

data (one needed to provide more) to ensure that parties could still trade with them, even though they were non-parties to the London amendments. Of those non-parties that supplied sufficient data pursuant to Decision IV/17C, more than half went on to ratify.

41. As a result of Decision IV/17/C, some non-parties, e.g., Jamaica,³⁹ Uruguay,⁴⁰ and Sierra Leone,⁴¹ wrote directly to the Secretariat, requesting advice or confirmation regarding how to avoid the export ban.⁴² In reply, the Secretariat advised that non-parties could either provide compliance data or ratify, and there is evidence to suggest that action was taken in response to this advice. For example, Uruguay, which was a party to the Montreal Protocol but not the London Amendment, wrote in February 1993, asking how it could take advantage of the exemption as it related to substances covered by the London Amendment. In conformity with the Secretariat's advice,⁴³ Uruguay submitted compliance data to satisfy IV/17C, and ultimately ratified the London Amendment in November 1993. Jamaica wrote to the Secretariat in February 1993, to confirm that if it provided compliance data it could continue to import until the Fifth Meeting. Less than a month later, Jamaica ratified the Protocol and the London Amendment. When Belize wrote to acknowledge the Secretariat's reply, it claimed that all necessary actions were underway for ratification of the Vienna Convention and the Protocol but, to date, it has not ratified.
42. Further evidence of the impact of the export ban is provided by four countries that sought further extensions of the Decision IV/17C exemption. At the Fifth Meeting of the Parties, Decision V/3 confirmed that the export ban was going into effect, even for parties to the Montreal Protocol if they had neither ratified the London Amendments nor submitted compliance data. However, Decision V/3 provided an exception for Malta, Jordan, Poland, and Turkey, which had requested exemptions "pending completion of their procedures for ratification of the London Amendment."⁴⁴ The exemptions were granted

³⁹ Reply from Ozone Secretariat to Minister of Tourism & Environment, Jamaica, dated 22 February 1993, which refers to letter from Minister dated 19 February (held on file with Ozone Secretariat): "You are correct in assuming that if you fulfill the conditions of Decision IV/17C, you can continue to import the substances from the date of your submission to the date of the Fifth Meeting of the Parties."

⁴⁰ Letter to Ozone Secretariat from Subdirector of Environment, Eastern Republic of Uruguay, dated 19 February 1993 (held on file with Ozone Secretariat, hereinafter,): "[Please] clarify whether the Eastern Republic of Uruguay is required to take action to obtain the exemption envisaged in paragraph 8 of Article 4 of the Montreal Protocol ..."

⁴¹ Cable to Ozone Secretariat from Director General, External Relations, dated 18 January 1993 (held on file with Ozone Secretariat, hereinafter,): "Local Sierra Leone companies are denied information of this product [freon] by overseas European suppliers on grounds that Sierra Leone did not sign the Montreal Protocol covering the said product. Please urgently furnish us with details of this Protocol and advise solution to current impasse..."

⁴² The Secretariat also received letters from parties, e.g. France, Ireland, India, clarifying which non-parties they could legally export to in light of Article 4(8) and Decision IV/17C.

⁴³ See reply from Ozone Secretariat to Subdirector of Environment, Ministry of External Relations, Uruguay, dated 4 March 1993: "In order not to undergo any inconvenience, Uruguay can perhaps ratify the London Amendment before the 10 August 1993 or take action according to Decision IV/17C of the Fourth Meeting of the Parties."

⁴⁴ Decision V/3, ¶ 2.

until the Sixth Meeting of Parties, provided that compliance data was submitted by 31 March 1994.

43. This extension provided enough time for Jordan and Malta, which ratified the Amendment in November 1993 and February 1994 respectively. Poland and Turkey submitted data pursuant to Decision V/3, but requested yet another exemption from the export ban. Decision VI/4 provided that if they submitted compliance data by 31 March 1995, they could continue to be treated as parties under Article 4 during the 1995-1996 year. Turkey ratified the London Amendment in April 1995. Poland, however, has submitted a statement regarding possible non-fulfillment of its obligations under the Montreal Protocol, with reference to the availability of substitutes.⁴⁵ Three of these countries, then, ensured that they avoided the effect of the export ban completely; the fourth avoided it as long as possible. That they were acutely aware of the impact of the export ban is emphasized by their insistence that parties be continually informed of their exempt status. When Poland and Turkey submitted data pursuant to V/3 they requested that Decision VI/4 reflect that. Likewise, Jordan and Malta specifically requested that VI/4 indicate their change of status.⁴⁶

III. Ban on Imports of Products Containing Controlled Substances from Non-Parties

44. Article 4(3) requires the parties to elaborate a list of products containing controlled substances (PCCS) listed in Annex A, and requires them to ban the import of such products from non-complying non-parties as of 1 July 1993. Because the list of PCCS is developed in an annex to the Protocol (Annex D), a party may avoid the obligation to ban PCCS imports by notifying the Secretariat that it will not adopt the annex, or will adopt it only with respect to certain products.⁴⁷ The parties adopted a list of PCCS on 21 June 1991,⁴⁸ the list entered into force on 27 May 1992, and the requirement to ban went into effect for non-objecting parties on 27 May 1993.⁴⁹ Although Singapore initially objected to the listing of several products, it withdrew its objection in 1992.⁵⁰ Thus, the ban became effective for all Protocol parties in May 1993. As with the import and export bans on CS, non-parties can avoid the PCCS import ban by complying with the substantive provisions of the Protocol pursuant to Article 4(8).

⁴⁵ Decision VII/15 Compliance with the Montreal Protocol by Poland.

⁴⁶ VI/4 noted the extension granted to Poland and Turkey, but Malta and Jordan were not mentioned. The President of the Implementation Committee determined that their inclusion in the decision was a non-issue since both countries had by then acceded. UNEP/OzL.Pro/ImpCom/9/2, at 4.

⁴⁷ Montreal Protocol, Article 4(3); Vienna Convention, Article 10.

⁴⁸ The List, published as Protocol Annex D, includes: 1) automobile and truck air conditioning units; 2) domestic and commercial refrigeration and air conditioning equipment containing CFCs or halons (e.g. refrigerators, freezers, dehumidifiers, water coolers, ice machines, air conditioning and heat pump units); 3) aerosol products, except medical aerosols; 4) portable fire extinguishers; 5) insulation boards, panels and pipe covers; and 6) pre-polymers.

⁴⁹ UNEP/OzL.Pro.5/5 Add.1 (13 September 1993).

⁵⁰ See Decision IV/16, Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, 25 Nov. 1992, UNEP/OzL.Pro.4/15.

Intended Operation

45. The ban on imports of PCCS promotes compliance by states that wish to export such products to party markets. It eliminates a competitive advantage that would otherwise accrue to PCCS manufacturers in non-complying states. As Protocol participants implement control measures, and the supply of CS becomes restricted, firms that manufacture products containing CS in party states and complying non-party states would probably face higher production costs. Firms that choose to make a rapid transition to CS alternatives would face significant conversion costs. Firms that choose to delay conversion while CS are still available would likely pay higher prices for those CS as they become increasingly scarce.⁵¹ In both cases, producers of products containing CS would probably experience higher production costs than in the past as a result of the control measures.
46. By contrast, firms producing PCCS in non-complying states would not be subject to control measures, would not face the same pressure to convert, and would not face these cost increases. Firms in non-complying states would thus have a competitive advantage relative to firms in complying states, and could offer their products at lower prices. Thus, non-party states would capture a greater share of the market. The potential economic gains would provide an incentive for states not to comply with the Protocol.
47. Indeed, in the absence of trade restrictions, non-complying states would likely expand their CS consumption to meet consumer demand for PCCS in party states. Such "leakage" would undermine the environmental gains made by reductions in complying states. By closing PCCS markets in complying states to producers from non-complying states, the import ban eliminates the competitive advantage associated with, and thus the incentive for, non-compliance. While PCCS producers in non-complying states still may be able to produce CS more cheaply (assuming that they have adequate access to CS production facilities), they can only sell PCCS to consumers in other non-complying states, against whose domestic producers they would enjoy no competitive advantage due to the Protocol.

The import ban, thus, creates a positive incentive to ratify or comply for those states that wish to export PCCS to markets in complying states. PCCS include a large variety of important consumer goods that make up substantial portions of some export economies, e.g., refrigerators, and air conditioners. By mid-1992, when Annex D entered into force, seventy-eight states had ratified the Protocol. (See Table 8). The parties included every developed nation, with the exception of Monaco, most countries with economies in

⁵¹ At the time the Protocol was negotiated, consumer demand for products made with or containing ODS was rising and was expected to continue rising, particularly in developing and newly industrializing countries. If a large number of firms chose to delay transition to ODS alternatives in order to take advantage of this rising demand, the price of ODS would increase as the supply of ODS was reduced. If a significant proportion of manufacturers of products made with or containing controlled substances made a rapid transition to ODS alternatives, demand for ODS could be expected to decrease as rapidly or more rapidly than supply, and ODS prices would not increase.

transition (CEITs),⁵² and several major developing economies, including China. Together, these states represented all or nearly all of the major markets for PCCS, so exclusion from party markets represented a significant detriment to growing economies. States wishing to avoid this economic disadvantage could do so only by ratifying the Protocol or by submitting data demonstrating compliance with its provisions.

Trade measures were also intended to discourage industries in party states from migrating to non-party states to avoid control measures. In the absence of restrictions on PCCS imports, some PCCS producers would have had an incentive to move all or part of their production facilities to non-complying states. As indicated above, the implementation of the Protocol's control measures could impose significant new costs on manufacturers of PCCS in complying states. Relocated firms could produce PCCS more inexpensively, and then export them back into complying states. They would avoid the cost of converting to alternate substances and the limitations on CS supplies, if they could manufacture their products in such non-complying states. Such firms would gain a competitive advantage over those firms that did not relocate, and would capture a larger share of the market in complying states, increase their PCCS production and CS consumption, and undermine the environmental objectives of the Protocol. The import ban, by closing off party markets for PCCS produced in non-complying states, eliminates the incentive to migrate, by making such movements unprofitable.

Effectiveness Indicators

Data Analysis

It is difficult to demonstrate empirically that trade measures reduced or prevented industrial migration, because industrial relocation decisions are based on a wide array of factors. To demonstrate that more migration would have occurred in the absence of the import restrictions, it is useful to compare the level of migration from non-Article 5 parties to non-party states with the level of migration from non-Article 5 parties to Article 5 parties. Because production and consumption are essentially unrestricted in Article 5 states over the short term, they resemble non-party states without the export bans; thus, evidence that firms manufacturing PCCS have migrated to Article 5 states but not to non-party states provides some evidence of the trade ban's effectiveness.

53. There is no documented evidence of relocation of production facilities (plant migration) from non-Article 5 parties to non-party states, or of increased production rates (production migration) in non-party locations. There is some evidence, however, that plant and production migration has occurred between non-Article 5 and Article 5 countries. One such case involved a number of Hong Kong enterprises which used controlled substances in their production. The companies moved from Hong Kong, a non-Article 5 party, to the Guandong Province in China, an Article 5 party.⁵³ In so doing, these companies avoided the limitations on CS use to which they would have been subject in Hong Kong. The

⁵² The exceptions were the Czech Republic (1/93), Slovakia (5/93), Lithuania (1/95), Latvia (4/95) and Georgia (3/96).

⁵³ 1994 UNEP Economic Options Committee Report

firms involved might have migrated to non-party states for the same reasons if the PCCS import ban had not been in place as a deterrent. A second reported case indicates that controlled substances consumption is increasing in Thailand, another Article 5 party, as a result of transnational company subsidiaries or joint ventures operating there.⁵⁴ It is significant that the transnational and joint firms often originate from Singapore, a non-Article 5 party, or Malaysia, an Article 5 party that is close to surpassing its 0.3 kg/per capita consumption limit for controlled substances.⁵⁵ Singapore is operating under the constraints of the Protocol phase-out schedules, and Malaysia must strictly limit growth in its CS consumption. Thailand, like China, offers the advantage of unrestricted CS use during the ten year grace period.

54. These cases suggest both that industries might have migrated to non-parties had the import ban not been in place and that, instead, industries migrated solely to Article 5 parties. However, because there appears to have been little industrial migration in any direction, it is not possible to assess the effectiveness of the PCCS import ban in preventing such migration with any degree of certainty.
45. The high growth in ratifications during the months leading up to the ban has already been noted in relation to the Annex A export ban. (See para. 36, supra.) This growth continued in May 1993, when six states ratified the Protocol. This figure is more than four times the average monthly ratification rate, and the third highest rate recorded for the Protocol. (See Table 8 and Chart 1.)
46. The newly industrializing Asian economies highlight the impact of the import ban on ratification by exporting nations. Such nations, including South Korea, Taiwan, Hong Kong, Singapore, Malaysia, and Thailand, are heavily export dependent, with the overwhelming share of their exports going to developed country parties to the Protocol.⁵⁶ Electronic products—many of which contain CS—comprise a major export sector in these nations, accounting for 15 to 25 percent of total merchandise exports in 1991.⁵⁷ To ensure that their increasing investments in the electronics industry remained profitable, these countries had to ratify or comply with the Protocol to avoid restrictions on their exports. In fact, all of the above-mentioned countries, except Taiwan (which for political reasons is unable to do so), have ratified the Montreal Protocol and the London Amendment.
47. Several key PCCS exporters explicitly acknowledged that the PCCS import ban influenced their decisions to ratify or comply with the Protocol. Malaysia indicated that it had joined the Montreal Protocol to insure that locally made air conditioners, semiconductors and refrigerators using controlled substances would not be barred from

⁵⁴ UNCTAD report.

⁵⁵ (BNA Report)

⁵⁶ David C. O'Connor, "Policy and Entrepreneurial Responses to the Montreal Protocol: Some Evidence from the Dynamic Asia Economies," OECD Technical Paper No. 51 (1991), at 15.

⁵⁷ *Id.*

entering signatory countries:⁵⁸ Specifically, the Minister of Science, Technology and Environment noted that unless substitutes were found for controlled substances, import restriction could have a negative effect on Malaysia's industrialization program.⁵⁹ The Protocol's Economic Options Committee has also theorized that the import ban influenced ratification by Korea because a large number of Korean exports contain CS (e.g. air conditioners, refrigerators) and are exported to parties; therefore, the import ban would have had a major impact on Korea's economy, which relies heavily on international trade.⁶⁰ Although Taiwan is unable to ratify the Protocol,⁶¹ it participates actively at Protocol meetings.⁶² The head of Taiwan's Environmental Protection Agency has said that Taiwan is "complying voluntarily with the Montreal Protocol so that its international trade is not endangered."⁶³

48. Additional, though indirect evidence of the ban's effectiveness emerged in the Protocol negotiations themselves. The United States, a major producer of controlled substances, but primarily for domestic consumption, strongly advocated inclusion of the PCCS import ban as a means of ensuring the competitiveness of its own products once CS reductions began.⁶⁴ As a result, inclusion of the ban was important to the United States as a potential participant in the Protocol regime. The European Community, by contrast, fought against the PCCS ban.⁶⁵ The EC, as the leading exporter of controlled substances, was concerned with the profitability of PCCS production among international purchasers of their CS. The ban might reduce the market for buyers who chose not to be parties to the Protocol, making PCCS production less attractive to these buyers and, therefore, potentially, reducing their purchases of CS from the EC. Both the United States' interest and the EC's concern demonstrate the considerable economic force that parties expected the PCCS import ban to bring to bear on non-complying states.

⁵⁸ See P. Prashanth, "Malaysia: Protecting Ozone Shield," Inter Press Service, 30 November 1989. Additional issues of apparent importance to its decision were: access to ODS, assistance with adjustment from ODS dependence, and "its commitment and responsibility to protect the global environment." See *id*

⁵⁹ *Id.*

⁶⁰ UNEP. Economic Options Paper, at 6-3.

⁶¹ China opposes Taiwan's admission to the Protocol because signatories must be states, and Beijing maintains that Taiwan is part of China. See "Taiwan May Face Trade Measures from Montreal Pact's Signatories," Agence France-Presse, Wednesday, 14 October 1992.

⁶² The ROC now attends the Protocol meets as a "non-government observer" under the name of Taipei's Industrial Technology Research Institute. See Susan Yu, "ROC Delegation Reaches all Goals at CFC Meeting," The Free China Journal, Tuesday, 1 December 1992.

⁶³ See BNA, Int'l Env't Rep. Current Report, "Republic Battles 'Environmental Mess' with Far-Reaching Programs, New Laws," vol. 13(1), 10 Jan. 1990, at 5, 10 (quoting Eugene Chien, Head of EPA, Taiwan). In 1992, the United States Trade Representative agreed in principle to the signing of a ROC-US memorandum that would ensure continued exports of Taiwanese products such as computers and peripheral electronic items to the United States if trade measures are imposed by Parties to the Montreal Protocol. Susan Yu, "No Trade Measures, US Assures ROC," The Free China Journal, Friday, 4 December 1992.

⁶⁴ See Benedick, *supra* note 17 at 26, 79-80, 92.

⁶⁵ *Id.*

IV. Ban on Imports of Products Made with Controlled Substances from Non-Parties

57. Article 4(4) required the parties, by 1 January 1994, to determine the feasibility of banning the import from non-parties of products made with but not containing controlled substances (PMCS) listed in Annex A. In November 1993, the parties accepted the conclusion of the Technology and Economic Assessment Panel that such a ban was not feasible at that time.⁶⁶ The indicators of effectiveness for this measure would be much the same as for the import ban on PCCS.⁶⁷ Because the ban on PMCS has never taken effect, however, its effectiveness cannot and need not be assessed at this time.

V. Exclusion of Exports to Non-Parties from Consumption Equation

Intended Operation

58. Article 3(c) of the Protocol establishes the equation by which parties must calculate their consumption of CS for purposes of complying with the Protocol's control schedules. It defines consumption as the sum of a party's CS production and CS imports minus its CS exports. This equation allows a party to continue exporting controlled substances without having to reduce its own CS consumption by an offsetting amount. When the trade involved is between two parties to the agreement the exports that are subtracted from one state's consumption will be added to the consumption equation of another state as imports. Because the importing party must keep its consumption within the limits set by the Protocol, allowing parties to subtract exports from their own consumption equations has no net affect on the overall reductions of controlled substances. Thus, article 3(c) allows Protocol parties to continue trading CS during the phase-out period without undermining the Protocol's objectives.

59. Article 3(c) also provides that parties may not deduct exports to non-parties from domestic consumption figures after 1 January 1993. By disallowing such deductions, the drafters intended to discourage non-Article 5 parties from exporting controlled substances to non-parties, and thereby encourage ratification by CS importing states.⁶⁸

⁶⁶ Decision V/17, Report of the Fifth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, 19 Nov. 1993, UNEP/OzL.Pro.5/12.

⁶⁷ The causal links between the import ban on PMCS and the advancement of the narrow objectives is substantially similar to that of the PCCS import ban. By closing PMCS markets in complying states to PMCS producers operating in non-complying states, the import restrictions: (i) promote compliance by states seeking to export PMCS to markets in complying states; (ii) promote compliance by states seeking to protect domestic PMCS producers; and (iii) discourage producers of PMCS from migrating from complying to non-complying states. The only notable difference between the two measures is that, owing to the ubiquitous use of CFCs in the manufacture of other products, the PMCS import ban would apply to a much broader array of goods than would the PCCS import ban. Thus, the former measure could be expected to effect a larger number of states, and have a more significant economic effect on those states, than would the latter. Indicators of effectiveness for this measure would be substantially similar to those for the PCCS import ban: (i) participation by states seeking to export PMCS to markets in complying states; (ii) participation by states seeking to protect domestic PMCS producers from unfair competition; (iii) lack of industry migration from complying to non-complying states.

⁶⁸ Benedick, *supra* note 17, at 81, 91.

Effectiveness Indicators

60. Under the consumption equation set out above, whenever a party manufactures CS, whether for domestic consumption or for export, its production figures will increase, bringing the party closer to its consumption limit. Because a party cannot deduct exports to non-parties in calculating its consumption, it can only export to non-parties by reducing its own domestic consumption. As domestic consumption limits are progressively restricted under the Protocol's control schedules, parties can be expected to reduce their exports to non-parties in order to preserve limited CS supplies for domestic consumption. This reduction in CS exports, in turn, should encourage ratification and compliance by countries that need access to CS supplies. Since, as has already been noted, the great bulk of countries are CS importers rather than producers, this measure was expected to significantly increase participation in the Protocol.⁶⁹

Data Analysis

61. Article 3(c) does not mention the article 4(8) exception for complying non-parties that applies with respect to the article 4 trade measures. Nor have the Parties explicitly extended that exception to article 3(c). Presumably, therefore, the article 3(c) restriction applies to all exports to non-parties, regardless of whether those non-parties are in compliance with the Protocol. No such exports may be subtracted from a party's consumption equation for purposes of complying with its consumption limits non-parties, however,
62. Prior to the London Amendments, the article 3(c) exclusion applied only to exports from non-Article 5 parties to non-parties. Originally, the Protocol prohibited Article 5 parties from exporting controlled substances to any non-party, whether or not that non-party was a complying non-party under article 4(8). Thus, only a non-Article 5 parties could export controlled substances to non-party states. Moreover, Non-Article 5 parties were allowed to export to non-parties regardless of whether the importing non-party state was in compliance with the Protocol pursuant to article 4(8).
63. This situation was considered unfair by many developing country parties, who believed that all parties should be subject to the same export rules. In response to these concerns, the 1990 London Amendments extended the article 4(2) export ban to cover non-Article 5, as well as Article 5 parties. At the same time, the London Amendments modified the article 4(8) exception to include exports to complying non-parties. Thus, any Protocol party that has also ratified the London Amendments (111 as of December 31, 1996) may export controlled substances to complying non-parties, but not to non-complying non-parties. (See Table 4)

⁶⁹ *Id.*

Table 4			
Effect of London Amendments on Export Restrictions to Non-Parties			
	Before London Amendments		After London Amendments
	Non-Art. 5 Parties	Art. 5 Parties	All Parties
Complying Non-Parties	Export allowed, but cannot be subtracted from consumption	Export prohibited	Export allowed, but cannot be subtracted from consumption in consumption equation.
Non-Complying Non-Parties	Export allowed, but cannot be subtracted from consumption	Export prohibited	Export prohibited.
* Beginning January 1, 1993, these exports would have been subject to article 3(c) and, thus, not deductible in the consumption equation.			

63. Parties that have not ratified the London Amendments remain subject to the original Protocol regime. (See Table 4) Of the forty-nine states currently party to the Montreal Protocol but not to the London Amendments, forty are either Article 5 parties or parties “temporarily categorized” as Article 5 parties pending receipt of complete data.⁷⁰ Article 4(2) of the unamended Protocol prohibits such parties from exporting controlled substances to non-parties. Of the nine remaining states,⁷¹ none produces controlled substances.⁷² Thus, all CS producing parties are obligated to ban CS exports to non-complying non-parties either under the London Amendments or as Article 5 parties.
64. Because the London Amendments imposed a general ban on exports to non-complying non-parties, the Article 3(c) exclusion now applies only to a party's exports to complying non-parties; any such export reduces the exporting party's domestic consumption. Article 3(c) thus creates a disincentive for parties to export to complying non-parties. For non-parties that are net importers of controlled substances, Article 3(c) creates a corresponding incentive to move beyond compliance under Article 4(8) to formal ratification of the Protocol. This effect may appear counter-intuitive in light of the fact that a complying non-party is already in compliance with the major substantive provisions of the Protocol, including the control measures, the trade measures, and the reporting requirements.⁷³ Ratification, however, creates important additional obligations for parties. Unlike complying non-parties, Protocol parties have duties to: cooperate with other parties to

⁷⁰ States falling in this temporary Article 5 category which have not ratified the London Amendments include: Chad, El Salvador, Federated States of Micronesia, Honduras, Kirabati, Korea (D.P.R.), Madagascar, Nicaragua, Samoa, Macedonia, Tuvalu and Yemen.

⁷¹ Brunei Darussalam, Estonia, Georgia, Latvia, Lithuania, Moldova, Tajikistan, Ukraine, and Uzbekistan.

⁷² See Ozone Secretariat, Non-Article 5 Countries Data on Production of Ozone Depleting Substances, <<http://www.unep.org/unep/secretar/ozone/sumna5p.htm>> (visited Sept. 15, 1997).

⁷³ Montreal Protocol, Article 8.

develop improved technologies and control strategies for ozone depleting substances; provide technical assistance to other parties to the extent possible; and make financial contributions for the operation of the Secretariat and other Protocol projects.⁷⁴ In theory, at least, the act of ratification carries with it a seriousness of commitment that mere compliance cannot because ratifying parties are bound by the international law doctrine of *pacta sunt servanda*—promises are kept.

65. Ratification or acceptance by complying non-parties faced with reduced exports by parties, particularly around the time the measure went into effect (1 January 1993), would suggest that the measure was effective in promoting ratification in the Protocol. Twenty-two states, in fact, joined the Protocol within six months after this provision took effect.⁷⁵ However, only five joined before March, 1993, when the ban on exports to non-complying non-parties took effect, as discussed above in Section 2.3.2. How many of the remaining seventeen (or of the initial five) were complying non-parties is an important question for which relevant data has not yet been obtained. Furthermore, a variety of other factors might influence a non-party's decision to choose ratification over simple compliance, the most notable of which are the group of positive measures available to Article 5 parties. (See Part 3, below). Thus, the effectiveness of this provision cannot be accurately assessed in this study.

VI. Restrictions on Transfer to Non-Parties of ODS Production & Consumption Technology

64. Article 4(5) of the original Protocol affirmatively required parties to "discourage" the export of technology for producing and utilizing controlled substances. At the London meeting, the parties rewrote the provision in less compulsory terms, with each party "undertak[ing] to the fullest practicable extent" to discourage such exports.⁷⁶

Intended Operation

65. While parties may choose not to retard the movement of such technology in certain circumstances, under no circumstances may parties facilitate that movement. Article 4(6), which is written in absolute terms, requires parties to "refrain from providing new subsidies, aid, credits, guarantees, or insurance programmes" for the export to non-parties of "products, equipment, plants or technology that would facilitate the production of controlled substances." Article 4(7) of the Protocol excepts from these provisions any "products, equipment, plants or technology that improve the containment, recovery, recycling or destruction of controlled substances, or otherwise contribute to the reduction of emissions of controlled substances."

⁷⁴ Montreal Protocol, arts. 9, 10, 13; Vienna Convention, arts. 3 and 4

⁷⁵ See Schedule of Membership.

⁷⁶ Article 4(5) (as amended by London Amendments, Art. I.(O)(1), C.N.246.1990.Treaties-9 (June 27, 1990).

66. These provisions are explicitly designed to discourage the growth of CS production or utilization facilities in non-party nations without inhibiting the movement of ozone friendly technology. They further reduce the incentives for non-compliance by making non-compliance significantly more difficult, particularly for states with limited development resources. Even were a state to pursue a policy of aggressive non-compliance, Articles 4(5) and 4(6) would significantly reduce that state's ability to obtain the technology necessary to undermine the environmental gains made by Protocol participants.

Effectiveness Indicators

67. It is difficult to measure the impact of these provisions. They took effect immediately upon the Protocol's entry into force, so there is no "trigger" date around which ratifications might have clustered. In the absence of such a date, these provisions can only be considered among the many other factors that may have prompted such states to become both initial signatories and subsequent participants in the Protocol.

68. The amount of transfer of CS production and usage technology to Article 5 parties may indicate the extent to which transfer to non-parties would have occurred. Unfortunately, this data is not compiled by the parties to the Protocol, as it is not needed for evaluation of their compliance with the Agreement.

Data Analysis

69. Data on industrial migration and private capitalization of development of CS production and usage technology in non-party countries might serve as a surrogate. For similar reasons, however, this data is also not compiled. We are left with trade with, and investment in, Article 5 nations as the only available indicator of the activity that might be expected in non-parties in the absence of the technology export restrictions. As noted above in Section 2.3.3.2, migration to Article 5 countries has been rather limited. In sum, the effectiveness of this measure cannot be assessed on the basis of available evidence.

VII. Trade Measures under the Non-Compliance Mechanism

70. Article 8 of the Montreal Protocol requires the parties to establish procedures for addressing party non-compliance with the provisions of the Protocol. At the Second Meeting of the Parties, the parties established a provisional system to evaluate and remedy non-compliance.⁷⁷ Two years later at the Fourth Meeting of the Parties, they established a permanent mechanism for addressing non-compliance.⁷⁸ This permanent mechanism provides a basis for evaluating potentially non-complying acts or omissions of any party

⁷⁷ See Second Meeting of the Parties at 11 (Decision II/5), Annex III.

⁷⁸ See Fourth Meeting of the Parties at 14 (Decision IV/5).

to the Protocol. It established an Implementation Committee with responsibility for determining whether a party is not in compliance with the Protocol, and for proposing corrective measures. Final authority to designate a party as not in compliance rests with the parties as a whole, as does the choice of responsive measures.

71. The “Indicative List of Measures” that a Meeting of the Parties may take in response to a party’s non-compliance includes, but is not limited to, both the provision of various forms of assistance (See section 3.2.2) and, if necessary, the suspension of the non-complying party’s rights and privileges under the Protocol.⁷⁹ Trade rights are among the rights that may be suspended. Thus, if the Meeting of the Parties considers the measure appropriate and necessary, a party not in compliance with the Protocol may lose any or all of its privileges to trade with other parties in controlled substances, products containing controlled substances, and the technology for producing and using controlled substances. In effect, the non-complying party would be treated as a non-complying non-party with respect to those goods.

Intended Operation and Effectiveness Indicators

72. The threat of a loss of trading rights would presumably encourage parties to comply, just as these bans seem to have encouraged non-parties both to comply with the obligations of the Protocol and to become parties to it. The limited data available suggests that the mechanism has been effective.

Data Analysis

73. To date, only two parties—Russia and Ukraine--have been subjected with trade measures to date.⁸⁰ After Russia reported that it would be unable to comply with its treaty obligations in 1996, a Meeting of the Parties decided to provide additional funding to facilitate Russia’s compliance. In addition, however, the parties restricted Russia’s trading privileges with respect to controlled substances. Specifically, Russia was precluded from exporting controlled substances to any party except members of the Commonwealth of Independent States that were not Article 5 parties.⁸¹ In compliance with the parties’ determination, Russian authorities imposed restrictions on CS exports to Article 5 parties, along with similar re-export restrictions from CIS countries through re-negotiated licensing agreements.
74. The case of Mauritania offers additional evidence of the effectiveness of the non-compliance mechanism. The Implementation Committee presented to the Seventh Meeting of the Parties a draft decision to suspend the status of Mauritania as an Article 5

⁷⁹ Fourth Meeting of the Parties , Annex V.

⁸⁰ SEVENTH MEETING OF THE PARTIES, at Decision VII/18, VII/19.

⁸¹ See Seventh Meeting of the Parties at Decision VII/18, ¶ 3. It also commands Russia to verify that its exports to CIS countries do not end up in Article 5.1 countries. Indeed, the problems of reexported and illegal trade of ODS are of special concern to the overall efficacy of the ozone regime. In 1994 alone, illegal imports into the European Union from Estonia and Russia represented the allowed production of the Community for that year. See International Environment Reporter, BNA, 31 May 1995.

party until it submitted the data necessary to demonstrate its qualification for this status. By the Meeting of the Parties, Mauritania had submitted its data and avoided having its Article 5 status suspended.⁸²

75. One last batch of evidence, however, arguably reflects a limitation of the effectiveness of the mechanism. Compliance with the data reporting requirements has been a problem from the beginning.⁸³ This could reflect a failure of the mechanism to adequately induce compliance. However, most of the countries that have failed to provide data in a timely manner have been Article 5 parties that have complained of difficulties in collecting the data. The problem, then, may largely be an administrative, technical, and or financial one. Such problems are still within the scope of the non-compliance mechanism, but would, presumably, not be viewed as problems which trade measures would be expected to help correct. Therefore, this reporting problem does not seem to provide any insight into the effectiveness of the trade measures.

POSITIVE MEASURES IN THE MONTREAL PROTOCOL

Definition of Positive Measures

76. As noted in the introduction, “positive measures” are those measures that reduce the burdens of ratification for countries, particularly developing countries, that might otherwise be unable or unwilling to bear those burdens. Once developing countries have ratified, the positive measures facilitate their compliance with the Protocol and expedite their transition to ozone-safe substances and technologies. Positive measures promote a more equitable sharing of burdens between developed and developing countries. By assuring access to controlled substances during a transition period, and providing the financial and technical assistance for conversion necessary to the use and production of alternative substances and technologies, the positive measures in the Montreal Protocol make it economically and politically feasible for a wide range of countries to ratify the Protocol and comply with all its provisions over the long-term.

77. As with any international treaty, compliance with the Protocol regime carries both benefits and burdens. (See Section 4.1) For example, every party must bear the direct costs of converting to new substances and new technologies. Developing countries, however, must also bear the additional, indirect burdens associated with the foregone or slowed development of important domestic industries, and reduced access to social goods such as refrigeration and air conditioning. The positive measures helped to reduce these costs, thereby easing the transition to ozone friendly chemicals and technologies, while allowing developing countries to pursue crucial development needs.

⁸² See Seventh Meeting of the Parties at ¶¶ 36, 92.

⁸³ The discussion in this paragraph is based primarily upon review of reports for the first nine meetings of the Implementation Committee.

78. In addition to addressing the economic and technological problems faced by developing countries when deciding to join the Protocol, the positive measures address an important political consideration.⁸⁴ The ozone depletion problem, and the proposal to solve it by way of a multilateral instrument, necessarily implicated broader issues of economic development and past responsibility. Countries in the South argued that the North had created the ozone depletion problem, and had benefited from the use of ozone depleting substances; therefore, it would be plainly inequitable for the South to be both denied the developmental benefits of those substances and required to pay for the conversion to ozone-friendly substitutes.⁸⁵ The positive measures rendered the Protocol a politically acceptable instrument for the South. These measures provided a counterbalance to the trade measures, which could have been construed as sanctions imposed by developed countries for a problem created by developed countries.
79. Finally, the positive measures also encourage treaty compliance. Protocol negotiators were from the outset aware of “longer-term potential for developing countries to undermine the effectiveness of the [Protocol].”⁸⁶ Developing countries were characterized by dramatic economic growth, associated potential to produce and use large amounts of ozone depleting substances. Most developing countries, however, lacked the resources necessary to implement the phase-out schedules and make the transition to ozone-safe substances. If transitional mechanisms were not set in place, these countries would have been unable to comply with the Protocol’s requirements. For these reasons, treaty accession alone would not have ensured compliance. The positive measures were designed to make developing country compliance affordable and therefore likely to occur.
80. More recently, countries with economies in transition (CEITs) have faced similar compliance problems. Although the positive measures directed at CEITs are somewhat different and less generous than those directed at developing countries, they are still intended to promote the overall aim of compliance, both through financial assistance and flexible compliance provisions.
81. The Protocol contains five positive measures: (1) a ten year grace period on CS phase out schedules for Article 5 parties;⁸⁷ (2) an extra production allowance to supply Article 5

⁸⁴ The Protocol’s key provision addressing developing countries is Article 5(1). This Article establishes that only those Parties which (i) are by a Meeting of the Parties classified -- based on the UN Scale of Assessments -- as “developing countries,” and (ii) have less than 0.3 kg annual per capita consumption of controlled substances, may benefit from the positive incentives laid out in the Article. See e.g. REPORT OF THE FIRST MEETING OF THE PARTIES TO THE MONTREAL PROTOCOL [hereinafter “FIRST MEETING OF THE PARTIES”], at 18 (Decision I/12 E), UNEP/OzL.Pro.1/5 (1993) [hereinafter “Decision I/12 E”]. Thus, developing country eligibility for Article 5 positive measures is all but automatic. The History of the Protocol shows the importance of this classification, and the effects of decisions from Meetings of the Parties temporarily excluding certain developing countries from Article 5 status. See, e.g., THIRD MEETING OF THE PARTIES at 16-17 (Decisions III/3 (d), and III/5).

⁸⁵ At the February 1987 Meeting of the Ad Hoc Working Group of Legal and Technical Experts for the Preparation of a Protocol, there was “general recognition that special consideration should be given to the situation of developing countries which did not contribute, due to the minimal level of their emissions, to the potential threat to the ozone layer.” UNEP/WG.167/2, at 25.

⁸⁶ Benedick, *supra* note 17, at 150.

⁸⁷ FIRST MEETING OF THE PARTIES at 18 (Decision I/12 E).

parties' basic domestic needs for controlled substances; (3) a financial mechanism to pay the incremental costs of Article 5 parties' and CEITs' conversion to ozone-safe technology; (4) a provision for technology transfer of CS substitutes under fair and most favorable conditions, and (5) a non-compliance procedure aimed at effectively ensuring parties' compliance.

82. Initially, the only positive measures included in the Protocol were the ten year grace period and its counterpart – the extra production allowance to supply Article 5 parties' basic domestic needs (pre-London measures).⁸⁸ The financial mechanism, the technology transfer provisions and the non-compliance procedure were added at the Second Meeting of the Parties, in London, 1990 (post-London measures).⁸⁹
83. Article 5 parties are the only beneficiaries of the pre-London measures, whereas the post-London measures provide assistance for *all* developing country parties and the CEITs. The financial mechanism benefits different states through different institutional arrangements: the Multilateral Fund (MF) assists only Article 5 parties, while the Global Environment Facility (GEF) provides assistance to the non-Article 5 developing countries and the CEIT.

Analysis of Positive Measures

The Pre-London Measures

The Ten Year Grace Period

84. Article 5 of the Protocol entitles developing country parties whose annual CS consumption is less than 0.3kg per capita to delay compliance with the Article 2 control measures for up to ten years in order to meet its "basic domestic needs" for controlled substances. (See box 1.) The deferment period for each control measure begins on the date that measure becomes effective with respect to non-Article 5 parties. Thus, the specific deferment period will differ from one substance to the next.⁹⁰ To continue operating under Article 5, a party's

⁸⁸ Protocol, original text, art. 2 and 5. The Protocol's initial text asked for parties' "facilitation" of environmentally safe technology" (Article 5(2)) and several financing instruments for Article 5 parties (Article 5(3)). It also contained a timid provision on technical *cooperation*. *Id.* art. 9. No moneys were at this stage allocated nor did the parties define what kind of projects would be funded. In fact, these provisions offered little more than an "open door" for future negotiation.

⁸⁹ The Montreal Protocol can be revised according to two processes -- *Adjustments* to controlled substances schedules, Article. 2(9), and *Amendments* which add new controlled substances and other features to the regime (Vienna Convention, art.. 9). By amending the Protocol's Article 10 and introducing Article 10A and Annex III, the Second Meeting of the Parties introduced the remaining positive measures. *See* REPORT OF THE SEVENTH MEETING at 34-36.

⁹⁰ Early proposals to allow a five year grace period and an annual per capita consumption cap of 0.1 kg were rejected by the developing countries as being too restrictive. Benedick, *supra* note 17 at 93. The 10 year period will span a different ten-year period for each group of substances. After that period, the phase-out schedule, as detailed in Article 2, enters into force.

annual level of consumption must not exceed 0.3 kg per capita for Annex A substances or 0.2 kg per capita for Annex B substances.⁹¹

85. The ten year grace period rendered membership a realistic option for states that could not meet the phase-out schedule immediately, but wanted to be part of the Montreal Protocol process. Initially, developing countries considered the grace period important because it allowed them increased usage of controlled substances for an extended period: it would ensure that they could move gradually toward alternative technologies with minimal economic disruption. It allowed developing countries to join the Protocol without sacrificing economic development in the short-term and provided a modicum of commercial advantage.
86. Moreover, by allowing developing countries to join the Protocol without immediately undertaking CS reductions, the grace period ameliorated the effects of the Article 4 trade measures. Without the grace period, most developing country parties would have been forced to choose between facing the trade restrictions as a non-party, or undertaking international obligations they could not meet. At the time the Protocol was negotiated, however, developing countries accounted for less than ten percent (10%) of global CS consumption. Thus, the burdens imposed on the developing countries by the Protocol would have been disproportionate to their role in ozone depletion. The grace period allowed developing countries to avoid the choice between foregone trade or unattainable commitments by joining the Protocol, keeping their consumption below the 0.3kg per capita ceiling, and promising to undertake reductions at a definite point in the future.⁹²

Box 1: BASIC DOMESTIC NEEDS

The original Protocol failed to define the term “basic domestic needs.” This ambiguity generated considerable debate. Developing countries initially hoped to use the grace period to increase their exports of products containing controlled substances; because exports are vital to economic growth, they argued that “basic domestic needs” included the “need” to increase exports. BENEDICK at 93-94, 126. At the First Meeting of the Parties in May, 1989, the parties concluded that such exports were inconsistent with the intent of the Protocol to limit global use. It was decided that the term “basic domestic needs” should be understood not to allow production of products containing controlled substances to expand for the purpose of supplying other countries. REPORT OF THE FIRST MEETING, Decision II/12C at 18.

At the November 1989 meeting of the Open-Ended Working Group, developing countries in attendance – mostly non-parties – sought to remove the “basic domestic needs” restriction altogether. This proposal remained in the draft until the final hours of the London Meeting, and was dropped in the context of settling issues of technology transfer and financial assistance. BENEDICK at 154-155.

⁹¹ Article 5(2).

⁹² Although CEITs suffer economic problems similar to developing countries, they cannot qualify for the grace period.

The Sixth Meeting of the Parties requested the Open-Ended Working Group to make recommendations to the Seventh Meeting regarding clarification, amendment and/or further definition of provisions regarding “basic domestic needs.” In explicit recognition of the need for a continued supply of Annex A and B SUBSTANCES for Article 5 parties, and of the need to avoid a supply monopoly by developed countries (REPORT OF THE SEVENTH MEETING), Decision VII/9 authorizes Article 5 parties to supply Annex A and B substances to other Article 5 parties to meet their basic domestic needs. After the control measures go into effect, Article 5 parties may continue supplying Annex A and B substances to other Article 5 parties, as long as they remain within the production limits required by the Protocol.

87. As the industrialized countries move toward a total phase-out of controlled substances, the grace period has become less important for the purpose of continued supply of CS to developing countries. The option of continuing to use controlled substances has become less attractive as the market for them has dwindled and obsolete technologies for ozone depleting substances have begun to disappear. Developing countries are becoming more interested in moving quickly toward use of ozone-safe substances and technologies. The grace period assists in the transition to such substitutes by making it possible for developing countries to become parties despite their current inability to meet phase-out schedules; it operates as a gateway to the other positive measures.
88. For example, in accepting a report commissioned in 1987 by the Open-Ended Working Group, the Chinese Government indicated that it did not plan to use the 10 year grace period, but that it strongly preferred to move quickly toward new technologies and avoid contributing further to ozone depletion. At the Second Meeting of the Parties (1992), the representative of India said that the amended text met many of India’s concerns with regard to discrimination against developing countries, and that she would therefore recommend it to the Government for signature.⁹³ However, when more rapid phase-out schedules were discussed at the Fourth Meeting of the parties in Copenhagen (1992), most Article 5 countries favored them in principle but were concerned that exports should be guaranteed, at affordable prices, during their own grace and phase-out periods.⁹⁴ The Fourth Meeting of the parties requested the Executive Committee of the Multilateral Fund to update its report on meeting the needs of Article 5 parties during the grace and phase-out periods. The updated report concluded that there would be adequate sources of supply to meet their needs throughout the grace and phase-out periods specified in the London and Copenhagen Amendments.⁹⁵
89. The grace period is, in effect, a special compliance measure for Article 5 parties. For ten years, Article 5 parties can consume controlled substances up to the fixed per capita levels and still be considered in compliance. It allows Article 5 countries time to make the

⁹³ UNEP/OzL.Pro.2/3, p. 18.

⁹⁴ UNEP/OzL.Pro.4/15 at 10.

⁹⁵ UNEP/OzL.Pro.WG.1/11/5.

transition to become “truly” complying parties. From the outset, developing countries were expected to increase their consumption levels due to inevitable economic development, lack of sufficient available substitutes, and limited financial resources. The grace period was developed in recognition that a transitional period was required by developing countries.

90. In exchange for this deferential treatment of developing countries in the short-term, industrialized countries secured a commitment to regulated growth (through the consumption cap) and the promise of future reductions. This ensures that the environmental gains from CS reductions in industrialized countries would not be completely undermined by the potentially exponential growth of CS consumption in the developing countries, which represent the great bulk of the world’s population. At the same time, by bringing developing countries within the Protocol earlier, rather than later, the grace period may help the developing countries make the transition to ozone-friendly technologies more quickly than they otherwise would.

10-15% Extra Production to Satisfy Article 5 Basic Domestic Needs

91. In order to satisfy the basic domestic needs of the parties operating under Article 5, the Protocol allows non-Article 5 parties to exceed the prescribed limits of CFC production by 10 percent during the initial stages of the phase-out schedule (1994-96), and 15 percent in the later stages.⁹⁶ Similar provisions apply to other substances.⁹⁷ The 10-15 percent extra production operates as an incentive for both developed and developing countries. It allows developed countries to maintain production, and therefore revenue from exports., for a considerable period of time.⁹⁸
92. The extra production allowance was developed in the context of ongoing tension between the US and the EC about whether the Protocol should restrict consumption or production. The EC had nearly full control of the world’s export markets in ozone depleting substances, whereas US companies were operating at full capacity to meet domestic demand. If only consumption were controlled, the US companies would experience excess capacity as US consumption dropped, and would be able to compete with the EC on the world market. As a result, the consumption equation accounts for production and consumption, reflecting the ultimate compromise. Against this background, the 10-15 percent extra production allowance provided further flexibility.
93. The extra production allowance assures developing countries that their domestic needs will be met during the transition to alternative substances (which also removes the necessity for

⁹⁶ Art. 2A(3) and 2A(4). Originally, excess production was also allowed for purposes of “industrial rationalization” between parties. The London Amendments removed “industrial rationalization,” in accordance with other changes to Article 2(5). Specifically, any party -- not only small producers -- had been able to transfer production to other parties provided the total output of the two did not exceed the Protocol limits. See REPORT OF THE SECOND MEETING at 26.

⁹⁷ Montreal Protocol, art. 2.

⁹⁸ Even after 1996, the deadline for complete phase out for developed countries, this protection still applies. Montreal Protocol, arts. 2-2H. If a Party operating under Article 5 were unable to obtain adequate supply of the controlled substances that it needed, the Party could submit a notification to the Secretariat and such notification would be considered by the Parties for appropriate action.

developing country parties to invest in old CS technology).⁹⁹ Because the measure is only available to meet the needs of Article 5 parties, it creates an incentive for developing countries to move beyond mere compliance (which might be sufficient to avoid the trade measures) to ratification of the Protocol. This measure also works in tandem with the grace period: the ongoing demand created by the grace period can be met by the 10-15% extra production.

94. The number of developing countries that joined the Protocol before the London revisions is relevant, although the rather limited pre-London measures – the ten year grace period and the extra production allowance – probably did not create a very strong incentive to join. The trade measures undoubtedly provided a strong push to change developing countries behavior, but they might have been avoided by mere compliance with the Protocol’s control provisions – unlike the positive measures, which required states to actually join the Protocol. Of the 117 developing country parties to the Protocol, twenty nine became members before the adoption of the London Amendments (see Table). The chief negotiator for the United States has observed that the grace period that was in effect during this Pre-London period was one of the main concerns of developing countries: “their preoccupation. . . was primarily to maintain maximum usage of CFCs for the longest possible grace period.”¹⁰⁰
95. Even if the trade measures were a significant impetus to some developing countries to join, these trade measures, as discussed above in Part II, probably would have had little influence on the decisions of states to join the Protocol before coming into effect (since before this these measures pose no immediate threat to trading privileges with parties to the Protocol. Therefore, it might be assumed that, if any measures influenced developing countries to join the Protocol before the first trade measure possibly relevant to them (the ban on import of PCCS from non-parties) took effect on 1 January 1993, they would have been the positive measures that had been adopted or were already in effect. A total of fifty-four developing countries joined the Protocol during this period, or nearly half of all of the developing countries that joined the Protocol. Of course, the positive measures could be expected to continue to induce developing countries to join after this period as well.
96. It is also relevant to consider whether developing countries’ consumption levels indicate a concern about the 0.3kg per capita consumption level – i.e., an intent to remain or get below it in order to maintain Article 5 status. Only a few developing country parties are classified as non-Article 5 because their consumption is greater than 0.3kg. (See Table 5)

Table 5

⁹⁹ In its 1995 updated report, the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol reported under the London and Copenhagen Amendments, that Article 5 country producers would be able to meet the needs for CFCs in Article 5 countries. However, they would have to operate at maximum allowable levels of production, and current levels of production would have to be expanded. Regarding halons, neither Article 5 nor non-Article 5 production alone would be sufficient to meet demand in Article 5 countries without additional recycling and halon banking. (UNEP/OzL.Pro/WG.1/11/5, at 7).

¹⁰⁰ BENEDICK, *supra* note 17, at 148.

Per Capita Consumption of Annex A Substances in Selected Developing Country Parties							
PARTY	PER CAPITA CONSUMPTION						
	1989	1990	1991	1992	1993	1994	1995
<i>Countries that have reduced per capita consumption to operate under Article 5(1)</i>							
Singapore	.56 (NA5)	1.44 (NA5)	1.12 (NA5)	.80 (NA5)	.87 (NA5)	.27 (A5)	(A5)
Cyprus	NR	NR	.41 (NA5)	.47 (NA5)	.64 (NA5)	.29 (NA5)	(A5)
S.Arabia	NR	NR	.34 (A5)	.20 (A5)	(NA5)	(A5)	
R.Korea	NR	NR	.26 (A5)	.61 (NA5)	.26 (A5)		(A5)
Kuwait	.65 (NA5)	NR	.73 (NA5)	.77 (NA5)	.43 (NA5)	.35 (A5)	
<i>Countries that have maintained level close to, but under 0.3 limit</i>							
Malaysia	.28 (A5)	.24 (A5)	.22 (A5)	.22 (A5)	.20 (A5)	.24 (A5)	
Jordan	.25 (A5)	.20 (A5)	.18 (A5)	.18 (A5)	.19 (A5)	.16 (A5)	
<p>(A5) - Designates parties operating under Article 5(1) (NA5) - Designates parties not operating under Article 5(1) NR - Indicates no reporting</p>							

97. Most of the developing countries that at one time had exceeded the 0.3 kg cap made successful efforts to bring their per capita consumption down to qualify – or re-qualify – under Article 5(1).¹⁰¹ Table 5 shows that fossil fuel producers Saudi Arabia and Kuwait reduced their per capita CS consumption to below the 0.3 kg cap, enabling them to benefit from Article 5 status, as did several rapidly developing countries like Singapore, Republic of Korea¹⁰² and Malaysia.¹⁰³

98. Statements by countries expressing a desire to remain Article 5 parties are especially persuasive. Such indicators suggest that countries have ratified the Protocol in order to

¹⁰¹ At the Second Conference of the Parties (1993), Decision V/4 “Note[d] that Cyprus, Kuwait, the Republic of Korea, Saudi Arabia, Singapore and the UAE [were] not classified as Article 5 Parties because their per capita consumption [was] over 0.3 kg.” The Parties Decide[d] to reclassify Malta and Bahrain as Article 5 Parties based on data showing per capita consumption less than .3 kg.

¹⁰² At the time still considered as a developing country. Subsequently, The Republic of Korea has joined the OECD and is no longer considered a developing country.

¹⁰³ O’CONNOR, at 13.

enjoy the benefit of the grace period and Multilateral Fund, and also indicate how the threshold requirement is working to ensure some kind of compliance. At the Fifth Meeting of Parties (1993), one representative, whose country was looking forward to reclassification as an Article 5 party, stated that his country would not seek to use the grace period but would seek resources from the Multilateral Fund in order to ensure the phase-out of controlled substances as soon as possible.¹⁰⁴ Malaysian officials said Malaysia was likely to exceed the 0.66 pounds (i.e. .3 kg) per capita ceiling by the following year.¹⁰⁵ It was thought that, as a result, operations based in Malaysia were more likely to migrate to Thailand.¹⁰⁶ A representative of Malta said that the reclassification of his country under Article 5(1) confirmed its rightful access to the Multilateral Fund.¹⁰⁷

Post-London Measures

The Financial Mechanism and Technology Transfer

99. Initially the Montreal Protocol contained only a general provision for financial and technical assistance to developing country parties. Non-Article 5 parties were to “facilitate” provision of environmentally-safe technology and financing to Article 5 parties. No specific allocation was determined at this stage.¹⁰⁸ Not surprisingly, only eight developing countries were original signatories of the Protocol.¹⁰⁹

100. At their Second Meeting, in London (1990),¹¹⁰ the parties established a Financial Mechanism to finance Article 5 parties “incremental costs” for complying with their obligations under the Protocol.¹¹¹ This mechanism included a Multilateral Fund and other unspecified multilateral, regional or bilateral co-operation mechanisms.¹¹² Non-Article 5 countries, i.e., developing countries with a per capita consumption level above 0.3kg and CEIT, can obtain financial assistance through the Global Environment Facility (GEF). Thus, all developing country parties are eligible for some sort of financial assistance. This assistance is more generous for Article 5 countries than for other developing countries and CEIT however.

101. The technology transfer provisions remain somewhat vague. Article 10A requires parties to take “every practicable step, consistent with the programmes supported by the Financial

¹⁰⁴ FIFTH MEETING OF THE PARTIES at 9.

¹⁰⁵ P. Prashanth, “Malaysia: Protecting Ozone Shield,” InterPress Service, November 30, 1989.

¹⁰⁶ “Thai Government Taking No Steps to Curb Rapid Growth in CFC Use,” BNA International Environment Daily, September 12, 1991.

¹⁰⁷ UNEP/OzL.Pro.6/7.

¹⁰⁸ Under the denomination “Financial Provisions,” the original Article 13 solely requested that the parties should at their first meeting consensually adopt “financial rules for the operation [of the Protocol].”

¹⁰⁹ See SCHEDULE OF MEMBERSHIP.

¹¹⁰ SECOND MEETING OF THE PARTIES at 12-14 (Decision II/8).

¹¹¹ Montreal Protocol, art. 10.

¹¹² *Id.*

Mechanism,” to ensure that the best available, environmentally safe substitutes and related technologies are expeditiously transferred to Article 5 parties, and that the transfers occur under fair and most favorable conditions. Only developing countries operating under Article 5 are eligible for technology transfer under Article 10A, although CEIT and developing countries not operating under Article 5(1) may receive transfer of technology through GEF projects.

Table 6 Ratification of Montreal Protocol by Developing Countries,* 1987-1997		
Before Adoption of London Amendments 29 (22%)	After Adoption of London Amendments 91 (78%)	Total 120

* UNCTAD, *Handbook of International Trade and Development Statistics*, 1995

102. The Financial Mechanism and technology transfer provisions provide strong incentives for developing countries and CEITs to join the treaty. As non-Article 5 countries moved toward phase out of controlled substances,¹¹³ developing countries became increasingly concerned about the economic implications of fully using the 10 year grace period.¹¹⁴ The financial mechanism has enabled these countries to accelerate their phase out.

103. There is little doubt that the Financial Mechanism and technology transfer provisions were instrumental in getting developing countries to join the Protocol. Two well known cases involved India and China, which made their ratification contingent on US\$40 million being added to the fund for each country.¹¹⁵ Currently, well over 100 developing country parties – including China and India -- have joined the Protocol.

104. Perhaps the best indicator of the effectiveness of the Financial Mechanism (and technology transfer) is the rate at which the Fund is being accessed. The fund has thus far only resulted in the reduction of a yearly average of 3,000 tons of controlled substances (approximately 15,000 tons) in Article 5 countries.¹¹⁶ The projects approved and to be implemented as of 1994 were expected to contribute to an overall reduction of 51,500 tons of controlled substances, or 15-20% total phase out expected in these countries by 2010.¹¹⁷

¹¹³ Montreal Protocol, arts. 2-2E (London Amendments, 1992), and 2F-2H (Copenhagen Amendments, 1994).

¹¹⁴ UNCTAD SECRETARIAT REPORT, ENVIRONMENT, INTERNATIONAL COMPETITIVENESS AND DEVELOPMENT: LESSONS FROM EMPIRICAL STUDIES at 18, TD/B/WG.6/10 (September 12, 1995) [hereinafter “UNCTAD-International Competitiveness”].

¹¹⁵ See UNEP, STUDY ON THE FINANCIAL MECHANISM at 163 (1995).

¹¹⁶ *Id.* at iii.

¹¹⁷ *Id.*

105. An Indian official declared that his country's phase-out schedule would depend on "the easy availability of funds and know how. . . ." ¹¹⁸ In fact, India and China are already engaged in large scale CS substitution projects, all of which depend on resource transfer. In India, for instance, six of the major refrigerator makers are redesigning their production lines to fully use CFC substitutes and increase energy efficiency. ¹¹⁹ In China, a non-CFC refrigerator is being developed as part of a joint project between China and the United States. ¹²⁰

Table 7					
Developing Country Parties Operating under Article 5(1), 1992-1996					
	Aug. 1992	Aug. 1993	July 1994	Sept. 1995	June 1996
DVC.	48 of 83	79 of 123	91 of 138	101 of 150	111 of 156
NA5	4 Bahrain, Malta, Singapore, UAE	6 Brunei Dar., Rep. Korea, Kuwait, Singapore, UAE	5 Cyprus, Kuwait, Singapore, Slovenia, UAE	5 Cyprus, Kuwait, Lebanon, Slovenia, UAE	2 Brunei Dar., Slovenia
A5	24	39	60	72	82
Temp.A5	20	40	31	29	29
Total A5 & DVC	44 of 48	79 of 79	91 of 91	101 of 101	111 of 111
DVC	- Number of parties classified as developing countries (compared with no. of parties in total)				
NA5	- Number of DVC parties classified as non-Article 5 (because consumption >.3kg)				
A5	- Number of DVC parties classified as Article 5 (because consumption < .3kg)				
Temp.A5	- Number of DVC parties temporarily classified as Article 5 (incomplete or no data)				
A5&DVC	- Total Number of parties classified as Article 5 out of total number of DVC parties				

Sources: UNEP/OzL. Pro.5/5, at 10; UNEP/OzL.Pro.6/5, at 8; UNEP/OzL.Pro.7/6, at 12; UNEP/OzL.Pr./ ImpCom/14/3, at 9.

¹¹⁸ Mahesh Uniyal, "India-Environment: India for Early ODS Phase Out," Inter Press Service, Global Information Network, Monday, September 18, 1995.

¹¹⁹ 1994 UNEP Economic Options Committee Report, at 1-8.

¹²⁰ *Id.*

106. In some instances, the Financial Mechanism is essential to compliance. For example, the Technology and Economic Assessment Panel (TEAP) concluded that Russia's compliance could be delayed by up to four years unless additional financial assistance is provided. So too, Article 5 have argued that the financial and technical transfer provisions must be revised to ensure that developing countries have the assistance they need to meet their phase out commitments after the ten year grace period ends.¹²¹
107. Declarations from Article 5 countries of their intention to maintain their status, or from CEITs requesting similar treatment, demonstrate their interest in benefiting from the Financial Mechanism. Similarly, an analysis of developing countries' consumption rates – and efforts to keep them below the 0.3kg per capita consumption threshold – also demonstrate the importance of the Multilateral Fund.
108. The parties have repeatedly been faced with the issue of classifying and reclassifying countries as Article 5 parties. For some countries, the main issue was determining the accuracy of their estimated consumption reports.¹²² At their Seventh Meeting (1995),¹²³ the parties decided to “continue funding projects already under way but not to allow additional projects once a country has been reclassified as non-Article 5(1).”¹²⁴ In addition, several developing countries, plus the Republic of Korea and Singapore, have reduced their annual consumption rates to below 0.3kg per capita in hopes of becoming eligible for Multilateral Fund assistance.¹²⁵ The Sixth Meeting of the Parties,¹²⁶ however, excluded these countries from the Fund's scope; they would neither benefit nor have to contribute to the Fund. In fact, some of these countries belong to the Asian “Tigers” group, and are therefore capable of paying for their own conversion to CS substitutes.
109. In 1995 Cyprus, Kuwait, Lebanon, Slovenia, and the United Arab Emirates, all developing countries, were reclassified as non-Article 5 countries since their per capita consumption levels exceeded the 0.3kg threshold.¹²⁷ After submitting corrected data, Kuwait and Lebanon, avoided the reclassification and therefore continued to be eligible for Multilateral Fund assistance.¹²⁸

Non-Compliance Procedure

¹²¹ See REPORT OF THE SEVENTH MEETING, Decision VI/5, para.(e).

¹²² Montreal Protocol, art. 7(1) and (2).(2).

¹²³ Decision VI/5 (c).

¹²⁴ See David G. Victor, *The Early Operation and Effectiveness of the Montreal Protocol's Non-Compliance Procedure*, IIASA, 1996, at 11. [hereinafter NCP Effectiveness].

¹²⁵ See BRACK at 19-20.

¹²⁶ *Id.*

¹²⁷ UNEP/OzL.Pro/ImpCom/10/4 (Aug. 30, 1995) at 3, 5-6.

¹²⁸ *Id.*

110. In addition to the trade measures discussed in section 2.3.7, the non-compliance procedure under the Protocol allows the parties to take positive steps to assist non-complying parties in coming into compliance. These steps include the provision of financial and technical assistance, technology transfer, assistance with data collection for reporting requirements, and information exchange and personnel training. By making such mechanisms available to non-complying parties, the non-compliance procedure advances the Protocol's ultimate objective of reducing consumption of controlled substances.
111. The availability of these cooperative measures, as an alternative to more confrontational, punitive responses to non-compliance, increases the willingness of party's to admit and address their compliance problems. Indeed, Paragraph 4 of the procedure establishes a "self-reporting" requirement, which encourages parties to notify the Protocol's Implementation Committee if, despite their best efforts, they may be unable to fulfill their Protocol obligations.¹²⁹ This self-reporting allows parties to avoid traditional, accusatory procedures and receive more rapid assistance, including financial assistance, in achieving compliance.
112. This cooperative approach has been well-received. To date, all compliance submissions regarding CS phase-out have been under the self-reporting provision of the procedure.¹³⁰ In 1995 five countries with economies in transition jointly reported their foreseeable failure to comply with the Protocol's London Amendments, i.e., the elimination of production and consumption of certain CS by January 1, 1996.¹³¹ At the Seventh Meeting of the Parties, each of the submitting nations was presented with compliance recommendations and requirements particularized to its circumstances. For example, the parties adopted a "wait and see" policy for Bulgaria, under which Bulgaria could continue its efforts to come into compliance throughout 1996, without fear of suspended rights or privileges. The parties determined that Belarus should receive international assistance in addressing its non-compliance problem, contingent on its proper reporting of data, and on its commitment not to export any controlled substances to non-Article 5 parties that were not members of the Commonwealth of Independent States (CIS). As was noted in section 2.3.7 on trade measures, Russia and Ukraine both received financial assistance packages in return for similar commitments to restrict their CS exports.¹³²

¹²⁹ *Id.* ¶ 4.

¹³⁰ NCP, ¶. 4.

¹³¹ Statement by Countries With Economies in Transition that are Parties to the Montreal Protocol - Belarus, Bulgaria, Poland, Russian Federation, the Ukraine, Circulated at the Eleventh Meeting of the Open-Ended Working Group of the Parties to the Montreal Protocol, May 1995.

These parties had originally intended to submit their request for a five-year grace period directly to the Meeting of the Parties, thereby avoiding the NCP. However, the Implementation Committee considered that such a request should be processed under the procedure's ¶ 4 and thus be considered as a self-reporting non-compliance submission. See REPORT OF THE ELEVENTH MEETING OF THE IMPLEMENTATION COMMITTEE, at Annex II at 13-14, UNEP/OzL.Pro/ImpCom/11/1 (1995).

¹³² Seventh Meeting of the Parties to the Montreal Protocol, Decision VII/17.

113. In addition to providing financial assistance, the non-compliance procedure may also work by suspending a country's access to existing positive mechanisms, such as the multilateral fund. For example, in response to Mauritania's failure to adequately report data on its baseline consumption of controlled substances, the Implementation Committee proposed revoking the country's Article 5 status and, thus, its access to both technology and financial assistance.¹³³ Before the Seventh Meeting of the Parties could consider the recommendation, however, Mauritania submitted the required data, thereby avoiding the recommended sanction.¹³⁴ Similarly, the reclassification in 1995 of 5 countries as non-Article 5, compelled two of them--Kuwait and Lebanon--to correct the reporting of their consumption data and thus remain eligible for Multilateral Fund assistance. (See section 3.2.2.1.)

114. At this stage it is perhaps too early to determine the full effectiveness of the NCP in promoting party compliance. Nonetheless, some preliminary observations may be made. The self-reporting non-compliance formula distinguishes the NCP from traditional, accusatory dispute resolution mechanisms. Indeed, the way the procedure is tailored encourages negotiated solutions instead of confrontational, and strictly enforceable decisions. The NCP aims more at solving problems than at making sure that an abstract treaty provision is applied. As one author has stated, the CEIT submissions "underline the importance of the close interplay between coercion and assistance."¹³⁵ This feature should then enhance the Protocol's effectiveness since it "provides [other parties] with the belief and expectation that if in the future they would find themselves in non-compliance. . . they would be protected rather than incriminated."¹³⁶

Overall Effectiveness of Trade & Positive Measures

Achievement of Narrow Objectives

117. The overall objective of the Montreal Protocol is to protect the ozone layer, and thereby human health and the environment, by establishing "precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge."¹³⁷ The trade and positive measures should serve two related functions within the Protocol system. First, they should advance the goal of controlling "total global emissions" of controlled substances by maximizing ratification of and compliance with the Protocol's control schedules. The inclusion of the ten year grace period for Article 5 countries, the

¹³³ UNEP/OzL.Pro/ImpCom/12/3 (Dec. 1, 1995), at 2.

¹³⁴ See NCP Effectiveness at 10, citing the Seventh Meeting of the Parties at 23.

¹³⁵ Jacob Werksman, *Compliance and Transition: Russia's Non-Compliance Tests the Ozone Regime*, . . . at 25. (on file with CIEL).

¹³⁶ Dr. I. Rummel-Bulska, *Monitoring of the Implementation of the Montreal Protocol and of the Basel Convention*, paper presented UNEP/Georgetown University Law Center International Workshop, May 20-21, 1996 at 4.

¹³⁷ Montreal Protocol, preambular para. 6.

Financial Mechanism, and other positive measures ensures that the burdens of CS reduction are distributed as equitably as possible. Second, they should promote the primary Protocol objective more directly by reducing leakage and by providing assistance to developing countries—and more recently CEITs--in actually meeting, or exceeding, their control obligations, thereby contributing to overall CS reductions.

118. In determining whether these measures are operating as expected, and thereby contributing to the success of the protocol, it is necessary first to determine whether the narrow objectives of the measures have been met. Based on the evidence presented herein, we conclude that they have been met. In the ten years since its entry into force, membership in the Montreal Protocol has grown from twenty-six to one hundred sixty-five parties, more than any other international environmental agreement. New states continue to join at a rate of roughly one per month. Participation in the Protocol is now nearly universal, with the Protocol's parties representing 98% of the world's population, and more than 99% of global CS production.
119. In assessing the role of the several trade and positive measures in promoting this participation, it is important to recognize that every state's ratification decision will be affected by a variety of factors. The benefits of ratification include not only increased protection for the health and environment of its citizens, access to CS to meet its domestic needs, and access to party markets for its export goods, but also less tangible benefits, such as increased international prestige because of cooperation in a global effort, and potential domestic political gains. Yet each party also faces burdens, including the direct costs of conversion to ozone friendly technologies, the indirect costs of foregone development, and the potential hostility of important domestic constituencies. The balance of these burdens and benefits will differ for each state. The trade and positive measures should be considered effective when the evidence demonstrates that the measures have shifted this balance in favor of ratification and compliance.
120. Our analysis shows that the trade and positive measures have functioned in precisely this manner for a significant number of states. There is a high coincidence of new ratifications with the entry into force of particular trade measures and with the entry into force of the post-London positive measures. This coincidence is augmented by extensive anecdotal evidence, including references to the impact of trade or positive measures by relevant officials in ratifying or complying states, requests for clarification on the actions necessary to avoid particular trade measures or to take advantage of the positive measures, and abundant evidence from rational inference. Collectively, this evidence clearly demonstrates that the integrated system of trade and positive measures has contributed substantially to the global expansion of the Protocol. In sum, the trade and positive measures have been effective in achieving the first of their narrow objectives.
121. As noted at the beginning of the section, the second of the narrow objectives of the trade and positive measures is to contribute directly to reductions in ozone depleting substances by preventing leakage and facilitating party compliance. To the extent that these narrow objectives have been satisfied, the Protocol's overall objective of reducing global use of controlled substances will have been advanced. For this reason, the

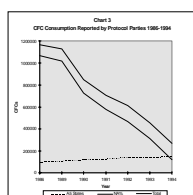
effectiveness of the trade and positive measures will be not be considered separately here, but will be incorporated into section 4.2.

Broad Objectives: Have Trade and Positive Measures Contributed to Control and Reduction of Global ODS Consumption?

122. While participation in the Protocol has risen to near universal levels, global consumption of controlled substances has been drastically reduced. From 1989 to 1995, non-Article 5 parties consistently exceeded CFC reduction goals set by the Protocol;¹³⁸ and by 1995, global use of Annex A and Annex B substances had been reduced by eighty percent (80%) from baseline levels.¹³⁹ On January 1, 1994, non-Article 5 parties phased-out all non-essential uses of halons,¹⁴⁰ three years ahead of schedule. On January 1, 1996, non-Article 5 parties phased out non-essential uses of the remaining Annex A and Annex B substances.¹⁴¹ At the same time, consumption of Annex C and E substances was frozen, and reductions begun.¹⁴² Chart 3 shows CFC consumption reported by Protocol parties between 1986 and 1994. Because the chart is based on the incomplete consumption data provided by the parties, the amounts shown are somewhat smaller than actual consumption. Nonetheless, the Chart clearly demonstrates the dramatic nature of CS reductions during this period.

Non-Article 5 Parties

123. The extent to which these reductions may be traced to the inclusion of trade and positive measures in the Protocol cannot be determined with precision. As was discussed in section 2.3.1 (para. 27), the original parties to the Protocol—those who ratified prior to the Protocol’s entry into force—represented approximately 90% of global CS consumption in 1986, the baseline year. Because the trade measures did not become imminent until after these states had ratified, it is unlikely that they ratified in an effort to avoid trade restrictions. (See Tables 2 & 2A)



¹³⁸ AFEAS, *Production and Sales of Fluorocarbons*, <http://www.afeas.org/prod_sales_fluoro.html> (visited Sept. 8, 1997) (Chart--“ODEP Weighted CFC Production by Year, 1980-1995”).

¹³⁹ Sebastian Oberthur, *Production and Consumption of Ozone-Depleting Substances 1986-1995* (Berlin: Deutsche Gesellschaft für Technische Zusammenarbeit, 1997), at v.

¹⁴⁰ Ozone Secretariat, *Workings of the Montreal Protocol: Control Measures Status 1996*, <<http://www.unep.org/unep/secretar/ozone/issues.htm>> (visited Sept. 20, 1993).

¹⁴¹ Id.

¹⁴² Id.

124. This does not mean that the trade and positive measures did not influence the original parties' decisions to ratify or the reductions they undertook once they became members. The nature of that influence, however, must remain largely speculative. For instance, it is possible, that the major parties would have failed to reach consensus on the Protocol had the trade measures not been included, or that major producer or consumer countries would have chosen not to ratify. As Benedick makes clear, CFC producing and consuming countries that had taken unilateral action beginning in the 1970s, only to have their sacrifices undermined and their export markets captured by expanding CFC use elsewhere, were adamant that the experience not be repeated under the Protocol.¹⁴³ Their concerns were exacerbated by the fact that, when the Protocol negotiations began, only eight countries had demonstrated sufficient commitment to CS reductions to ratify the Vienna Convention.¹⁴⁴ Without the security of the trade measures, these parties may have been reluctant to commit to international action.

125. It is more likely, however, that the inclusion of the trade and positive measures has affected the speed with which reductions have been undertaken. In the absence of the trade measures, CS producing states would have been reluctant to undertake substantial short-term reductions because of the potential for economic loss. As the trade measures have brought ever greater numbers of parties into the Protocol, thereby reducing the risk of economic disadvantage, free riding, and leakage to non-party states, the parties have been able to adopt ever more ambitious reduction programs. As a result, the Protocol's phase-out objectives are being achieved much more rapidly than originally planned.

126. The massive CS reductions by the original non-Article 5 parties have been supplemented by reductions in the twenty-two states that have joined the Protocol as non-

¹⁴³ See, e.g., Benedick, *supra* note 17, at 25-26, 29, 54, 81, 91-92.

¹⁴⁴ United States Participation in International Negotiations on Ozone Protocol, Subcomm. on Human Rights and Int'l Orgs., Comm. on Fgn Aff., 100th Cong. (1st Sess.), March 5, 1987 at 16. The depth of official concern in the United States was demonstrated in the following exchange:

Mr. Solomon: Well, this again brings me back to the most serious issue that I think faces this nation today, and that is trade and exports. And even though some of these countries have reduced aerosol use by 30 percent and 40 percent, those same countries are our competitors, and we do not even have the aerosol's to export anymore....

Mr. Benedick: We agree with [your position] that it is important in any control regime that we have . . . that American industry not be disadvantaged, and that is precisely why we are engaged in these international negotiations, because, unlike eight or nine years ago when we acted unilaterally, we want this time to have the whole world, the major producer and the major user countries together agree on an international mechanism.

And we want within that mechanism to assure a level playing field, that U.S. industry would not be disadvantaged by unfair competition from countries which are not taking the issue as seriously. .

Id. at 18.

Article 5 parties since its entry into force.¹⁴⁵ Together, these states consumed more than 80,000 tons of Annex A substances in 1986,¹⁴⁶ all of which is subject to phase out under the Protocol. Evidence suggests that several of these states ratified the Protocol in order to avoid trade restrictions. For example, five states (Brunei Darussalam, Czech Republic, Monaco, Slovakia, and Uzbekistan) ratified during the peak ratification period surrounding the entry into force of the export ban on controlled substances and the import ban on products containing controlled substances. (See sections 2.3.2 and 2.3.3)

Article 5 Parties

127. Parties operating under Article 5(1) of the Protocol are scheduled to freeze their consumption of Annex A substances on July 1, 1999, and to undertake reductions over the ensuing decade, with a complete phase out of Annex A and B substances by January 1, 2010.¹⁴⁷ Because their reduction obligations have not yet been triggered, it is still too early to assess the effectiveness of the Protocol with respect to the Article 5 nations. Nonetheless, some preliminary observations may be made.

128. Until the first freeze goes into effect, Article 5 parties are free to expand their CS consumption up to the 0.3kg per capita consumption cap. Most Article 5 parties have taken advantage of the grace period, and have expanded CS consumption dramatically during the last ten years. Indeed, CS consumption among Article 5 parties has grown far more rapidly than previously predicted,¹⁴⁸ and they now surpass non-Article 5 parties in overall CS use.¹⁴⁹ (See Chart 3 and Table 8.)

129. Despite this trend, not all Article 5 parties have increased their CS consumption. Of forty-eight Article 5 states reporting consumption data for Annex A substances for both 1986 and 1994, twenty-three states (48%) either reduced their consumption or maintained relatively constant consumption. As discussed in section 3.2.1.2, several developing countries—including rapidly developing countries like Singapore, Malaysia, the Republic of Korea--were required to reduce or control consumption in order to remain below the 0.3kg per capita consumption cap, and thus retain their Article 5 status. (See Table 5) To the extent that these or other Article 5 parties have been required to undertake reductions or restrict their growth in order to remain below the consumption cap, the trade and positive measures have contributed to the overall objectives of the Protocol by offsetting growth that otherwise would have occurred.

130. Of the twenty-three states that reduced consumption or maintained consumption at constant levels, all but three (Croatia, Saudi Arabia, and Singapore) had undertaken

¹⁴⁵ Australia, Austria, Azerbaijan, Brunei Darussalam, Bulgaria, Czech Republic, Estonia, Georgia, Hungary, Iceland, Latvia, Liechtenstein, Lithuania, Moldova, Monaco, Poland, Slovakia, South Africa, Turkmenistan, Uzbekistan, Yugoslavia.

¹⁴⁶ Ozone Secretariat, Non Article 5 Countries Data on Consumption of Ozone Depleting Substances <<http://www.unep.org/unep/secretar/ozone/sumna5p.htm>> (visited Sept. 15, 1997).

¹⁴⁷ Ozone Secretariat, About the Montreal Protocol: Control Measures Status 1996.

¹⁴⁸ See Scientific Assessment of Ozone Depletion: 1994, Ch. 13.

¹⁴⁹ Sebastian Oberthur, *Production and Consumption of Ozone-Depleting Substances 1986-1995* (Berlin: Deutsche Gesellschaft für Technische Zusammenarbeit, 1997), at vi.

country programs or compliance projects with the assistance of the Multilateral Fund.¹⁵⁰ These states represent only a portion of the 51,500 tons of CS being phased out via Multilateral Fund projects approved and to be implemented as of 1994.¹⁵¹ Again, these figures represent a direct reduction in total global emissions of controlled substances and a corresponding advancement of the objectives of the Protocol.

Summary

As we have repeatedly noted, the trade and positive measures create an integrated network of incentives to ratify and comply with the Protocol. Because of this integration, and the short time frame involved, it is generally not possible to attribute a particular state's ratification decision or ozone reduction program to a single treaty provision. Considered in isolation, the evidence of effectiveness clearly applicable to a particular provision may appear meager. Cumulatively, however, this evidence clearly demonstrates the effectiveness of the trade and positive measures as a whole. On the basis of the data here presented, it is evident that the system of trade and positive measures has increased ratification of the Protocol, facilitated compliance by developing countries and countries with economies in transition, and prevented the emergence of uncontrolled CS production facilities in non-party states. As a result, the level of controlled substance reductions, and thus reductions of ozone depleting substances in general, already undertaken and scheduled to be undertaken in the coming decade has been significantly increased, and the overall objectives of the Protocol advanced accordingly. In short, the trade and positive measures in the Montreal Protocol have functioned as expected, and with the desired effect.

¹⁵⁰ See UNEP, Multilateral Fund for the Implementation of the Montreal Protocol, Inventory of Approved Projects (As at December 1994), 23 January 1995. (On file with CIEL.)

¹⁵¹ *Id.*

ANNEX I

Framework for Analysis

Identify Broad Objectives of the Regime

Trade measures and positive measures must be evaluated within the context of the MEA in which they are found. Their *raison d'être* is to advance the objectives of the overall regime; therefore, their success or failure must ultimately be measured by their tendency to advance or inhibit the purposes for which the regime as a whole has been established. An analysis of the effectiveness of these measures, therefore, should begin by identifying the objectives of the MEA, in this case to protect the ozone layer and the human health and global environment which depend upon the ozone layer. The analysis should end by demonstrating the degree to which the trade and positive measure provisions have advanced or inhibited the achievement of those objectives.

Identify Narrow Objectives of the Trade and Positive Measures

The effectiveness of the trade measures of the Protocol, however, cannot be judged solely by looking for the achievement of the broad objectives of the Protocol. The drafters of the Protocol designed these measures to operate as key links in a causal chain that would eventually result in the achievement of the Protocol's final objectives. Once the broad objectives of the regime have been identified, the analysis should identify the role of the trade and positive measures in the achievement of those broader objectives. What, incremental advances were the trade and positive measures intended to make? Why were they included in the regime? The product of this second analytical step should be a list of the narrow, objectives of the trade and positive measures. The narrow objectives are intermediary: their achievement should advance the broad objectives of the regime as a whole.

Evaluate Individual Trade and Positive Measures

Describe the Trade/Positive Measure

The next step is to describe each trade and positive measure, i.e., the mechanisms by which the narrow objectives will be reached, and the broader objectives thereby advanced. The structure of these mechanisms should be described, as well as their operative features.

Describe Causal Links Between Each Trade and Positive Measure and Achievement of Narrow Objectives

The analysis should then describe the expected causal relationship between each mechanism and the achievement of the narrow objectives. How is trade measure X expected to lead to the occurrence of narrow objective Y? This step provides a focus for subsequent research, and aids in the identification of effectiveness indicators. It is important to recognize that the measures may function in ways not foreseen at the start of the study or at the time of their creation. The examiner should thus avoid simply reiterating popular explanations of how a mechanism should, or does, function, and instead should proceed through a detailed and critical analysis of causes and effects. At minimum, this analysis

should: describe the existing context (e.g. political and economic factors, production and consumption patterns) into which the MEA was introduced; consider the extent to which that situation was altered by non-trade provisions of the MEA; and, determine how specific trade and positive measures could have resulted in further change. The result should be a logical chain between each trade measure and the advancement of one or more of the narrow objectives.

Identify Indicators of Effectiveness for Each Trade and Positive Measure

The causal relationship between trade and positive measures, and their narrow objectives will provide the basis for establishing the indicators of effectiveness. Those indicators will be occurrences (or non-occurrences) that suggest that the logical relationships identified in theory are operating, in fact. These indicators should be sufficiently specific to suggest a correlation between the imposition of the trade measure and fulfillment of a narrow objective. To use an example from the Montreal Protocol: the ban on imports of products containing controlled substances (PCCS) promotes ratification of, or compliance with, the Protocol by denying non-parties access to markets in party states, thereby providing a strong participation incentive for states that wish to export. Ratification or compliance by non-parties that wish to export PCCS to party states will thus be an appropriate indicator of effectiveness for this trade measure.

Evaluate the Effectiveness of Each Trade and Positive Measure

Compare available data to the indicators of effectiveness

Once indicators have been identified, the effectiveness of each trade measure may be evaluated by comparing available data to the relevant indicators. Data that demonstrates the occurrence (or non-occurrence) of the indicator events is *positive* evidence of the effectiveness of the trade measure.

Evaluate effect of other factors on occurrence of indicators

While positive evidence is necessary to prove that a trade measure has been effective, it is not sufficient. The analysis must demonstrate not only that the intended results have been achieved, but also that the trade measure has been the cause of those results. To do this, the examiner must consider the possibility that the desired occurrences (indicator occurrences) would have resulted even in the absence of the trade measure at issue and, to the extent possible, negate this possibility. The indicator occurrences might be precipitated by any number of causes (e.g., political or economic shifts) and it will generally be impossible or impracticable to disprove causation by all of them. For this reason, studies should focus on other provisions in the regime, and should provide evidence that these provisions were not the primary causal agents in the occurrence of the indicator events. In regimes where a variety of provisions address the same narrow objective, isolating the causal impact of a single provision may prove impossible. In such cases, it may not be appropriate to independently evaluate the effectiveness of that provision. Once conclusions have been reached about the effectiveness of the group of

provisions as a whole, however, it may be possible to draw inferences about the relative importance of various measures.

Consider Whether Achievement of Narrow Objectives Has Advanced Broad Objectives of Regime

Provided the trade measures have proven effective in achieving the narrow objectives for which they were included, consideration should follow of whether the achievement of these narrow objectives has served to advance the broader objectives of the regime as a whole. If the advancement of the broad objectives is an inevitable consequence of the narrow objectives, this final step may be a simple reiteration of the connection between the two.

ANNEX II

**ADDITIONAL TABULAR
AND GRAPHIC MATERIAL**

Table 8
Ratifications of Montreal Protocol by Month, 1988-1996

Month	New / Mo	Total Mem	Month	New/ Mo	Total Mem	Month	New/ Mo	Total Mem
Oct-87	0	0	Nov-90	1	65	Dec-93	1	130
Nov-87	0	0	Dec-90	0	65	Jan-94	1	131
Dec-87	0	0	Jan-91	3	68	Feb-94	1	132
Jan-87	0	0	Feb-91	1	69	Mar-94	2	134
Feb-87	0	0	Mar-91	0	69	Apr-94	0	134
Mar-88	1	1	Apr-91	0	69	May-94	1	135
Apr-88	1	2	May-91	0	69	Jun-94	1	136
May-88	0	2	Jun-91	1	70	Jul-94	1	137
Jun-88	3	5	Jul-91	2	72	Aug-94	0	137
Jul-88	1	6	Aug-91	0	72	Sep-94	1	138
Aug-88	1	7	Sep-91	1	73	Oct-94	4	142
Sep-88	3	10	Oct-91	1	74	Nov-94	3	145
Oct-88	4	14	Nov-91	0	74	Dec-94	0	145
Nov-88	2	16	Dec-91	1	75	Jan-95	2	147
Dec-88	14	30	Jan-92	0	75	Feb-95	0	147
Jan-89	1	31	Feb-92	1	76	Mar-95	0	147
Feb-89	2	33	Mar-92	1	77	Apr-95	1	148
Mar-89	1	34	Apr-92	0	77	May-95	0	148
Apr-89	1	35	May-92	1	78	Jun-95	0	148
May-89	4	39	Jun-92	4	82	Jul-95	0	148

Jun-89	0	39	Jul-92	2	84	Aug-95	0	148
Jul-89	3	42	Aug-92	2	86	Sep-95	1	149
Aug-89	4	46	Sep-92	0	86	Oct-95	0	149
Sep-89	1	47	Oct-92	4	90	Nov-95	0	149
Oct-89	1	48	Nov-92	3	93	Dec-95	1	150
Nov-89	1	49	Dec-92	4	97	Jan-96	2	152
Dec-89	3	52	Jan-93	5	102	Feb-96	1	153
Jan-90	2	54	Feb-93	0	102	Mar-96	2	155
Feb-90	0	54	Mar-93	10	112	Apr-96	0	155
Mar-90	2	56	Apr-93	2	114	May-96	0	155
Apr-90	2	58	May-93	6	120	Jun-96	1	156
May-90	0	58	Jun-93	1	121	Jul-96	0	156
Jun-90	0	58	Jul-93	3	124	Aug-96	0	156
Jul-90	3	61	Aug-93	1	125	Sep-96	0	156
Aug-90	1	62	Sep-93	1	126	Oct-96	2	158
Sep-90	1	63	Oct-93	1	127	Nov-96	1	159
Oct-90	1	64	Nov-93	2	129	Dec-96	1	160
Average Ratification Rates			Periods in which ratification rates significantly exceeded normal.					
Total Rat/Mo: 160/111 Avg. Rat/Mo.: 1.44 Avg. Rat/Qtr.: 4.32			Rat. 10/88-12/88: 17* Rat. 12/92-2/93: 9 Rat. 3/93-5/93: 18 Avg. Rat/Mo: 5.67 Avg. Rat/Mo: 3.0 Avg. Rat/Mo: 6.0 * EC states ratif. 12/88					

*Source: Status of ratification of the agreements on the protection of the stratospheric ozone layer, January 1997 <<http://www.unep.ch/ozone/ratif1.htm>> visited Sept. 9, 1997.

Table 9
Consumption of Annex A Substances by Selected Article 5 Parties, 1990-1994^a

	1986	1989	1990	1991	1992	1993	1994	% Chg.^b
Argentina	5210.6	3463.4	2669.2	2943.8	4306	1805.9	3055.95	-65
Bangladesh	176.7	204.9	195.1	92.9	213.1	226.6	226.6	+28
Botswana	2.6	6	9	9	12	14.6	8.4	+223
Brazil	10973.5	9109.7	8538.8	8503.6	8356.6	8209.6	7780.5	-29
Burkina Faso	22.8	26.5	27.8	29.2	30.65	32.1	33.6	+47
Cameroon	118.5	98.1	77.7	66.5	63.7	156.6	156.6	+32
Chile	730.4	938.2	684	714.1	581.6	786.5	684.05	=
China	29237.2	34783	41829	50263.2	57044.6	66282.6	70778.6	+142
Colombia	2611	2318.4	2025.8	1415.4	1720.6	1765	2114.6	-19
Congo	16.9	6.3	29.85	53.4	40.3	40.25	27.1	+60
Costa Rica	242.5	342	292.25	281.75	281.8	221.5	281.75	=
Croatia	515	515	464	137	333.5	228.7	339.8	-34
Cuba	884.4	974	778.4	327.8	122	122	150	-83
Egypt	2362.4	2161.2	2161.2	1960	2015	1746	1870	-21
Fiji	16.8	40.1	35.7	42.1	0.2	7.4	0.1	-99
Gambia	6.5	10.75	15	11.4	12.2	21	16.6	+155
Ghana	89.6	50.4	106.6	96.6	72	55.65	39.3	-56
India	2202	4357.5	4429.25	4429.25	4501	5276.8	6387	+190
Indonesia	1705	2722	2722	2722	3739	5020	2625.6	+53
Jordan	535	590	540	545	531	580	520	=
Kenya	230	230	230	105	47	47	273	+19
Korea, Rep.	8528.6	14066.8	14066.8	14066.8	19605	8727.6	10069.6	+18
Malawi	14.3	18.7	18.7	23.1	45.6	88	30	+110
Malaysia	2190.2	3442.1	3384.2	3829.3	3420.5	3624.2	4729.8	+116
Maldives	0.1	2.2	3.5	5	5.8	6.3	6.05	+595
Malta	286.8	366.3	179.4	85.2	64.8	61.9	61.2	-79
Mauritania	17.3	17.3	17.3	17.3	17.3	17.3	17.3	=
Mauritius	57.2	75.8	69.95	69.95	70	64.1	31	-46
Mexico	8818.2	6266.5	11117.3	9815.25	8513.2	10465.2	9652	=
Morocco	1.8	558.8	604.2	557.8	220.8	629.6	756.8	+4194
Niger	0	15.4	16.55	16.55	17.7	17.4	17.6	
Panama	129.6	225.5	252.1	376.7	168	358.8	254.2	+96
Papua N.G.	48.5	38.4	38.4	28.3	38.7	39.4	39.05	-19
Peru	248.6	746	512.6	512.6	512.6	279.2	248.6	=
Philippines	1860	3261	2957	1887	2677.6	3778.7	3959.4	+113
Romania	829.7	1239.6	1239.6	1239.6	1239.6	1649.5	769.2	=

Saint Lucia	6	7.8	9.2	9.2	9.2	10.6	9.2	+50
Senegal	142.3	91.9	<i>87.05</i>	<i>87.05</i>	<i>87.05</i>	82.2	117.7	-17
Seychelles	0	1.2	2.7	3.6	4.7	10.3	3.7	
Singapore	4052	870	3166.6	825.6	1673	1481.6	791.6	-80
Sri Lanka	215	<i>212.25</i>	209.5	184.8	216.5	294	<i>255.25</i>	+18
Syrian A.R.	1554	1194.9	1272.2	1325.7	1365.4	1406.4	2380	+53
Thailand	4595	4595	6660.2	7904	9057.2	8053.2	6865.2	+49
Tunisia	584	657	730	1055	567.6	581.2	508.1	-13
Turkey	4122	3210.4	2935.6	2660.8	4118.4	4451.2	4284.8	=
Uganda	7.1	13.8	14.3	14.6	15.3	16.1	<i>15.7</i>	+121
Uruguay	322.8	531.4	<i>473.8</i>	416.2	304.6	223	311.8	=
Venezuela	4269.4	4090.2	3036.9	3711.1	4390.4	3924.1	3092.9	-28
Total	100789. 9	108763. 7	120936. 3	125477. 1	142450. 4	142986. 9	146646. 9	+45

^a Note, these figures are based on data provided by parties to the Ozone Secretariat. Not all parties have reported data for all periods. We have included only those states reporting data for at least three of the seven years, including 1986 and either 1993 or 1994. To avoid erratic changes in overall consumption figures based solely on gaps in party reporting, we have estimated party consumption in unreported years by averaging figures reported in the immediately preceding and succeeding years or, if necessary, the two years closest in time to the unreported year. Estimated figures are italicized. Although all of the major Article 5 consumers of CS have reported data-- including most notably Brazil, China, India, Korea, Mexico, and Thailand—the figures in the “Total” row under-represent the actual growth in CS consumption by Article 5 parties.

^b Where an equal (=) symbol is listed in the net change column, the party’s consumption level changed by less than ten percent between 1986 and 1994