Jan Morer

THE WHITE HOUSE

WASHINGTON

April 7, 1986

NOTE FOR OZONE SUBGROUP MEMBERS

FROM: VICKI MASTERMAN VM

SUBJECT: Draft Ozone Paper

Attached is a partial draft of an ozone issue paper. The options portion is only in summary form as a few of you are providing information to delineate the specific elements of each option and to quantify the pro's and con's of the various options.

We hope this draft will encourage you to provide written or oral comments very quickly. Our plan is to develop a draft that this subgroup will bring to the working group next week. Please call if you have any questions, 456-2749 or 456-6640.

Draft Ozone Paper

ISSUE

What should the Administration's position be regarding the April United Nations negotiations toward an international protocol for control of ozone depleting chemicals?

BACKGROUND

Strong international and domestic concern exists over ozone depletion caused by emissions of chlorofluorocarbons (CFCs) reacting in the upper atmosphere (stratosphere). Ozone is an essential buffer of ultraviolet light; significant depletion could cause skin cancer, suppress the human immune system, retard crop production and damage aquatic and terrestrial ecosystems. Although stratospheric ozone concentrations have decreased over the past seven years, it is unclear whether any significant change in natural ozone levels has occurred. The only area where scientists have observed significant depletion is Antarctica. There, ozone depletion of approximately 50 percent has been found every spring since 1985. Scientists are not sure of the cause of the Antarctic depletion. Potential causes include chemical emissions, the solar cycle and climate change. Global depletion is expected to occur absent global reduction efforts.

Scientists are unable to predict when depletion will occur and what levels of chemical emissions will trigger significant depletion. Yet the sudden unexplained appearance of the Antarctic ozone hole suggests large global changes could occur before scientists observe them. Further complicating the problem is the fact that substantial CFC emissions will continue for years after a decision to curb emissions. This is because the industrial transition to CFC substitutes and emissions controls will take time, and products containing CFCs (e.g. refrigerators and air conditioners) may continue to emit the ozone depleting gases for years during use. There is also a question as to how soon ozone would recover after significant depletion; CFCs have an atmospheric lifetime of 75 to 100 years.

The Vienna Convention for the Protection of the Ozone Layer, ratified by the Senate in July 1986, established an international framework for scientific cooperation and initiated negotiations toward a protocol for controls on ozone depleting chemicals. The United States has had a leading role in the negotiations toward a control protocol. The next negotiating session is scheduled for April 27-30, 1987. The last negotiating session is tentatively scheduled for July 1987, with the diplomatic signing ceremony tentatively scheduled for September in Canada.

There is domestic as well as international movement toward controls on ozone depleting chemicals. Several Senators have proposed a complete phase-out of ozone depleting agents. And in response to a judicial consent decree, EPA must either propose controls or present the basis for taking no action by May 1987.

Industry recognizes the need for some form of control on ozone depleting agents. The industrial Alliance for Responsible CFC Policy favors reducing the growth of CFC production rather than reducing emissions and strongly disfavors unilateral domestic controls that would disadvantage U.S. competitiveness.

DISCUSSION

Causes of Depletion

Emissions of man-made chemicals are changing the chemical composition of the atmosphere. In particular, atmospheric concentrations of chemicals known to deplete ozone are increasing. These chemicals are: chlorofluorocarbons (CFCs) 11, 12, and 113; halons 1211 and 1301; methyl chloroform; and carbon tetrachloride. Global atmospheric concentrations of CFCs 11 and 12 have been growing in recent years at a rate of five percent per year. Concentrations of CFC 113 have been increasing at a rate of 10 percent per year. Concentrations of halon 1211 have been increasing by 23 percent a year. No trend estimates have been published for halon 1301. Concentrations of methyl chloroform have been increasing by 7 percent a year, and of carbon tetrachloride by 1 percent a year.

Measurements also show atmospheric increases in ozone enhancing agents. These chemicals are carbon dioxide and methane. Concentrations of nitrogen oxides are also increasing; these chemicals deplete ozone in the upper atmosphere (stratosphere) and enhance ozone in the lower atmosphere (troposphere). Even though emissions of ozone enhancing agents offset total atmospheric depletion, the offset is not sufficient to prevent ozone depletion at current emission rates. Moreover, the ozone enhancing chemicals increase ozone concentrations in the lower atmosphere while depletion occurs in the upper atmosphere, altering the vertical distribution of ozone. Ozone in the lower atmosphere can be dangerous as it is a toxic gas and it contributes to global warming. At current use volumes, CFCs 11 and 12 have the most ozone depleting potential, followed by CFC 113. Industrialized countries have relied heavily on CFCs 11 and 12 for use in aerosol propellants, refrigeration, foam-blowing, and solvents. The following is a proportional breakdown of uses:

CFC 11

CFC 11

Use	World	United States
Rigid Foam	39%	51%
Aerosol	31%	5%
Flexible Slabstock	15%	15%
Flexible Molded	4%	5%
~~Chillers~~	3%	6%
Unallocated	8%	18%

CFC 12

Use	World	United States
Aerosol	32%	4%
Mobile Air Conditioning	20%	37%
Rigid Foam	12%	11%
Refrigerators	6%	6%
Chillers	1%	1%
Miscellaneous	7%	10%
Unallocated	22%	31%

While use of CFC 113 has not been as great as use of the other CFCs, 113 is increasingly used in solvents for cleaning electronic equipment.

CFC emissions occur in production of the chemicals, in use of the chemicals (operating losses and leakage) and in destruction of products containing CFCs (e.g. foam crushing). Once emitted into the atmosphere, CFCs have unusually long atmospheric lifetimes of 75 to 100 years. Their chemical stability and unusual persistence enables them to reach the stratosphere where they react with ultraviolet radiation to release ozone-depleting chlorine.

Halons 1211 and 1301 are used in fire extinguishers. Current production of these chemicals is relatively low. However, halons contain bromine which has much greater ozone depleting potential than the chlorine in CFCs.

Scientists are not sure of the cause of the Antarctic ozone hole. Potential causes include man-made ozone depleting chemicals, the solar cycle, and climate change.

Depletion Projections

Various scientific models have predicted the future ozone depletion expected to result from varying rates of CFC growth. Projections of future depletion are also dependent upon the relative growth rates of the other ozone depleting and ozone enhancing chemicals.

EPA has estimated global ozone depletion in 2075 for six alternative CFC global use scenarios (assuming constant rates for other ozone altering chemicals). For reference in assessing these EPA projections, it may be useful to note that studies of future CFC demand estimate the median annual growth rate for CFCs 11 and 12 as 2.5 percent. The United Nations Environment Program suggested scenario testers use a range of 0% to 5% annual growth for CFCs 11 and 12 for the 1986-2100 period.

CFC Use	Projected Ozone 2075
Decrease 80% by 2010	3% Increase
Constant (1985-2100)	.3% Increase
1.2% Increase 1985-2050 and no growth 2050-2100	4.5% Depletion
2.5% Increase 1985-2050 and no growth 2050-2100	25% Depletion
3.8% Increase 1985-2050 and no growth 2050-2100	>50% Depletion
5% Increase 1985-2050 and no growth 2050-2100	>50% Depletion

Questions exist regarding the accuracy of the models. Generally, observational data support model predictions of the atmospheric concentrations of chemicals. Yet there is a 20-50 percent discrepancy between observed and predicted ozone in the upper stratosphere even though the accuracy of ozone predicting models is increasing with time. The models also failed to predict the 50 percent seasonal ozone depletion in Antarctic ozone that scientists confirmed in 1985.

Effects of Depletion

Depletion of the total amount of atmospheric ozone would increase the amount of harmful ultraviolet radiation reaching the earth. Although many uncertainties exist as to the precise impacts of the increase in ultraviolet radiation, scientific data and/or case studies indicate it would increase nonmelanoma skin tumors, increase cutaneous malignant melanoma, suppress the human immune system, increase cataracts, reduce crop yield, harm aquatic life, accelerate the degradation of polymers, and contribute to global warming and the attendant sea level rise threatening coastal populations.

Of all of the potential adverse effects of ozone depletion, the best scientific data exists for the likely increases in skin cancer. Several studies suggest that the ultraviolet radiation

naturally absorbed by ozone is the most important solar radiation component in the incidence of common skin cancer (nonmelanoma tumors). The mortality rate from nonmelanoma skin cancer is two percent. Health projections indicate there will be 500,000 new cases of nonmelanoma skin cancer in 1987 with an expected morality of 10,000. Studies show that a one percent increase in the ultraviolet radiation absorbed by ozone results in a 1.8 - 2.5 percent increase in the incidence of nonmelanoma skin tumors. (A one percent depletion in ozone increases the weighted ultraviolet radiation by about two percent.)

Although there is uncertainty about the relationship between solar radiation and the more serious form of skin cancer, cutaneous malignant melanoma, much evidence supports the link between solar radiation and this disease. Health projections indicate there will be 25,000 new cases of cutaneous malignant melanoma in 1987; the mortality rate from this disease is 30 percent.

Numerous variables affect the incidence of either form of skin cancer including duration of exposure, latitudinal location at time of exposure, time of day, time of year, behavior (clothes and sunscreens) and pigmentation of the skin. White people, whose skin contains less protective melanin, have higher incidence of skin cancer than people with more melanin. The higher incidence of skin cancer among white people than among non-white populations suggests the increase in skin cancer incidence from ozone depletion may not be as important globally as in the United States and western Europe. WHAT ABOUT OZONE-THIN JAPAN?

Unfortunately, very little scientific data exists to assess the likely adverse effects of ozone depletion with the greatest potential global impact -- suppression of the immune system and disruption of aquatic and terrestrial ecosystems. These data are not likely to be available for a long time at current research funding levels. Even if the necessary research were undertaken immediately, meaningful results would not be available for years. Case studies suggest the potential effects of immune system suppression and ecosystem disruption would be disastrous and irreversible. In the studies conducted on plants and animals, ultraviolet radiation weakens the immunological system and reduces the ability to resist disease. Several studies also indicate that the immune response of humans is depressed by ultraviolet radiation. There is, however, no evidence as to the magnitude of the risk. Likewise, limited studies of the effect of ultraviolet radiation on crops and aquatics generally show adverse impacts, but are not sufficient to quantify the overall risk.

Status of International and Domestic Actions

(Status of Int'l & Domestic Actions)

International -- The United States, through the State Department and EPA, has played a leading role in the negotiations toward a Protocol to the Vienna Convention on the Control of Chlorofluorocarbons. The State Department received authority to negotiate a protocol pursuant to inter-agency approval of the November 28, 1986 Circular 175 requesting such authority. The Circular 175 authorized the delegation to negotiate a protocol providing for:

I. A near-term freeze on the combined emissions of the most ozone depleting substances;

II. A long-term scheduled reduction of emissions of these chemicals down to the point of eliminating emissions from all but limited uses for which no substitutes are commercially available (such reduction could be as much as 95%), subject to III; and

III. Periodic review of the protocol provisions based upon regular assessment of the science. The review could remove or add chemicals, or change the schedule or the emission reduction target.

The next negotiation toward a protocol is scheduled for April 27-30, 1987. As the Circular 175 authorized, the United States has pressed for a near-term freeze on emissions of CFCs and halons and for long-term emissions reductions of up to 95 percent subject to periodic scientific assessment. A proposed reduction of 95 percent has not been well-received in the negotiations. Short of the 95 percent proposal, countries have various preferences. A significant issue is how to deal with developing countries that have not reaped the economic benefits of CFC use and thus have not caused the ozone depletion problem, yet also threaten to contribute to depletion as they industrialize and use CFCs for aerosols, regrigeration, solvents and foam-blowing.

Domestic -- The United States has substantially reduced CFC use in aerosols and is now considering further controls on ozone depleting chemicals. In 1978, the United States unilaterally reduced CFC use as an aersol propellant pursuant to an EPA ban of CFC use in nonessential aerosol spray cans. Prior to 1978, CFC use in aerosols was 56 percent of United States CFC use and 25 percent of world use. Aerosols now represent less than five percent of United States use of CFCs 11 and 12, yet remain the largest single use of CFCs outside of the United States (31 percent).

As a result of a lawsuit by an environmental group against EPA, the agency plans to issue a notice summarizing its findings regarding an ozone protection program by May 1987. The notice will either propose further regulation of ozone depleting chemicals or present the basis for a proposed decision to take no

further action at this time.

Proposals for domestic ozone protection programs are largely dependent upon the outcome of the international negotiations toward a protocol on the control of ozone depleting chemicals. EPA's public announcement of its intent to announce its ozone protection plan findings by May 1987 placed considerable emphasis on United States participation in the international discussions. Indeed, the legislative parties drafting ozone protection bills and the environmental parties threatening continued litigation have been attending the international negotiations toward a protocol and have been basing their domestic actions on the progress of international negotiations. In 1980, representatives of U.S. industry formed the Alliance for Responsible CFC Policy. The Alliance has emphasized that any control action must be global in scope to protect the ozone layer and to prevent disadvantaging U.S. industrial competitiveness.

By Dec End of

Two important scientific studies should be completed this calendar year. First, a team of scientists from NASA, NOAA, industry and universities is evaluating the existing data on the amount of the decline in total atmospheric ozone concentrations over the past several years. The team is reanalyzing the data with a view toward addressing the inconsistencies and the uncertainties. The team's findings will be ready in late 1987. Second, a team of scientists from government laboratories and universities is analyzing the results of the 1986 National Ozone Expedition in the Antarctic. This team is assessing the most recent measurements of the Antarctic ozone hole and is analyzing the potential causes.

Additional scientific studies are continuing. For example, NASA, NOAA and the Chemical Manufacturers Association are sponsoring the 1987 Airborne Ozone-Hole Campaign to study Antarctic ozone loss in July through September 1987.

OPTIONS

1. Continue Circular 175 Process

The Administration could let the State Department and EPA continue to negotiate toward a protocol on ozone depleting chemicals pursuant to the Circular 175 process. Under this process, the delegation would coordinate the inter-agency review of the U.S. negotiating positions as the international discussions progress.

(Delineation of elements of options and pro's and con's . . still to come.)

2. Advise the U.S. Delegation of Desired Positions

The Administration could select a negotiating position for the delegation to take to the next round of talks. This position would be selected from among a range of negotiating options including:

a. Freeze plus 95% reduction in 10-14 years.

b. Freeze plus 40-70% reduction in 6-10 years.

c. Freeze plus 20-40% reduction in 6-10 years.

d. Freeze only

Within each alternative negotiating position, sub-options exist for the chemicals to be covered by the agreement, for the processes to be covered by the agreement (production, consumption, adjusted production), and for the countries to be covered by the agreement (i.e. equity issues for developing countries, trade issues with non-parties).

Each potential negotiating position would be subject to future scientific assessment.

3. Impose Domestic Controls Unilaterally

EPA could impose controls on U.S. ozone depleting chemicals while the delegation continues to participate in international discussions.

4. Await Scientific Results for International or Domestic Action

The Administration could delay international agreement or domestic action until there is more scientific certainty about the likely levels of ozone depletion and the causes of depletion.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

OFFICE OF THE ADMINISTRATOR

APR 15 1987

MEMORANDUM TO: Vicki Masterman

FROM: J.R. Spradley, Jr.
Special Advisor to the
Under Secretary for Oceans
and Atmosphere, NOAA

SUBJECT: Draft Ozone Paper

Attached are technical comments provided by the NOAA Office of Oceanic and Atmospheric Research on the draft paper you provided on April 7, 1987.

Attachment

(1)

Draft Ozone Paper

ISSUE

What should the Administration's position be regarding the April United Nations negotiations toward an international protocol for control of ozone depleting chemicals?

BACKGROUND

Strong international and domestic concern exists over ozone depletion caused by emissions of chlorofluorocarbons (CFCs) reacting in the upper atmosphere (stratosphere). Ozone is an essential buffer of ultraviolet ~~light~~; significant depletion could cause skin cancer, suppress the human immune system, retard crop production and damage aquatic and terrestrial ecosystems.

Although stratospheric ozone concentrations have decreased over the past seven years, it is unclear whether any significant change in natural ozone levels has occurred. The only area where scientists have observed significant depletion is Antarctica. There, ozone depletion of approximately 50 percent has been found every spring since 1985. Scientists are not sure of the cause of the Antarctic depletion. Potential causes include chemical emissions, the solar cycle and climate change. Global depletion is expected to occur absent global reduction efforts.

Scientists are unable to predict when depletion will occur or what levels of chemical emissions will trigger significant depletion. Yet the sudden unexplained appearance of the Antarctic ozone hole suggests large global changes could occur before scientists observe them. Further complicating the problem is the fact that substantial CFC emissions will continue for years after a decision to curb emissions. This is because the industrial transition to CFC substitutes and emissions controls will take time, and products containing CFCs (e.g. refrigerators and air conditioners) may continue to emit the ozone depleting gases for years during use. There is also a question as to how soon ozone would recover after significant depletion; CFCs have an atmospheric lifetime of 75 to 100 years.

The Vienna Convention for the Protection of the Ozone Layer, ratified by the Senate in July 1986, established an international framework for scientific cooperation and initiated negotiations toward a protocol for controls on ozone depleting chemicals. The United States has had a leading role in the negotiations toward a control protocol. The next negotiating session is scheduled for April 27-30, 1987. The last negotiating session is tentatively scheduled for July 1987, with the diplomatic signing ceremony tentatively scheduled for September in Canada.

There is domestic as well as international movement toward controls on ozone depleting chemicals. Several Senators have proposed a complete phase-out of ozone depleting agents. And in response to a judicial consent decree, EPA must either propose controls or present the basis for taking no action by May 1987.

Industry recognizes the need for some form of control on ozone depleting agents. The industrial Alliance for Responsible CFC Policy favors reducing the growth of CFC production rather than reducing emissions and strongly disfavors unilateral domestic controls that would disadvantage U.S. competitiveness.

DISCUSSION

Causes of Depletion

Emissions of man-made chemicals are changing the chemical composition of the atmosphere. In particular, atmospheric concentrations of chemicals known to deplete ozone are increasing. These chemicals are: chlorofluorocarbons (CFCs) 11, 12, and 113; halons 1211 and 1301; methyl chloroform; and carbon tetrachloride. Global atmospheric concentrations of CFCs 11 and 12 have been growing in recent years at a rate of five percent per year. Concentrations of CFC 113 have been increasing at a rate of 10 percent per year. Concentrations of halon 1211 have been increasing by 23 percent a year. No trend estimates have been published for halon 1301. Concentrations of methyl chloroform have been increasing by 7 percent a year, and of carbon tetrachloride by 1 percent a year.

Measurements also show atmospheric increases in ozone enhancing agents. These chemicals are carbon dioixide and methane. Concentrations of nitrogen oxides are also increasing; these chemicals deplete ozone in the upper atmosphere (stratosphere) and enhance ozone in the lower atmosphere (troposphere). Even though emissions of ozone enhancing agents offset total atmospheric depletion, the offset is not sufficient to prevent eventual ozone depletion at current emission rates. Moreover, the ozone enhancing chemicals increase ozone concentrations in the lower atmosphere while depletion occurs in the upper atmosphere, altering the vertical distribution of ozone. Ozone in the lower atmosphere can be dangerous as it is a toxic gas and it contributes to global warming.

At current use volumes, CFCs 11 and 12 have the most ozone depleting potential, followed by CFC 113. Industrialized countries have relied heavily on CFCs 11 and 12 for use in aerosol propellants, refrigeration, foam-blowing, and solvents. The following is a proportional breakdown of uses:

CFC 11

(3)

CFC 11

Use	World	United States
Rigid Foam	39%	51%
Aerosol	31%	5%
Flexible Slabstock	15%	15%
Flexible Molded	4%	5%
Chillers	3%	6%
Unallocated	8%	18%

CFC 12

Use	World	United States
Aerosol	32%	4%
Mobile Air Conditioning	20%	37%
Rigid Foam	12%	11%
Refrigerators	6%	6%
Chillers	1%	1%
Miscellaneous	7%	10%
Unallocated	22%	31%

While use of CFC 113 has not been as great as use of the other CFCs, 113 is increasingly used in solvents for cleaning electronic equipment.

CFC emissions occur in production of the chemicals, in use of the chemicals (operating losses and leakage) and in destruction of products containing CFCs (e.g. foam crushing). Once emitted into the atmosphere, CFCs have unusually long atmospheric lifetimes of 75 to 100 years. Their chemical stability and unusual persistence enables them to reach the stratosphere where they react with ultraviolet radiation to release ozone-depleting chlorine.

Halons 1211 and 1301 are used in fire extinguishers. Current production of these chemicals is relatively low. However, halons contain bromine which has much greater ozone depleting potential than the chlorine in CFCs.

Scientists are not sure of the cause of the Antarctic ozone hole. Potential causes include man-made ozone depleting chemicals, the solar cycle, and climate change. (8)

Depletion Projections

Various scientific models have predicted the future ozone depletion expected to result from varying rates of CFC growth. Projections of future depletion are also dependent upon the relative growth rates of the other ozone depleting and ozone enhancing chemicals.

(4)

EPA has estimated global ozone depletion in 2075 for six alternative CFC global use scenarios (assuming constant rates for other ozone altering chemicals). For reference in assessing these EPA projections, it may be useful to note that studies of future CFC demand estimate the median annual growth rate for CFCs 11 and 12 as 2.5 percent. The United Nations Environment Program suggested scenario testers use a range of 0% to 5% annual growth for CFCs 11 and 12 for the 1986-2100 period.

CFC Use	Projected Ozone 2075
Decrease 80% by 2010	3% Increase
Constant (1985-2100)	.3% Increase
1.2% Increase 1985-2050 and no growth 2050-2100	4.5% Depletion
2.5% Increase 1985-2050 and no growth 2050-2100	25% Depletion
3.8% Increase 1985-2050 and no growth 2050-2100	>50% Depletion
5% Increase 1985-2050 and no growth 2050-2100	>50% Depletion

Questions exist regarding the accuracy of the models. Generally, observational data support model predictions of the atmospheric concentrations of chemicals. Yet there is a 20-50 percent discrepancy between observed and predicted ozone in the upper stratosphere even though the accuracy of ozone predicting models is increasing with time. The models also failed to predict the 50 percent seasonal ozone depletion in Antarctic ozone that scientists confirmed in 1985.

Effects of Depletion

Depletion of the total amount of atmospheric ozone would increase the amount of harmful ultraviolet radiation reaching the earth. Although many uncertainties exist as to the precise impacts of the increase in ultraviolet radiation, scientific data and/or case studies indicate it would increase nonmelanoma skin tumors, increase cutaneous malignant melanoma, suppress the human immune system, increase cataracts, reduce crop yield, harm aquatic life, accelerate the degradation of polymers, and contribute to global warming and the attendant sea level rise threatening coastal populations.

Of all of the potential adverse effects of ozone depletion, the best scientific data exists for the likely increases in skin cancer. Several studies suggest that the ultraviolet radiation

(5)

naturally absorbed by ozone is the most important solar radiation component in the incidence of common skin cancer (nonmelanoma tumors). The mortality rate from nonmelanoma skin cancer is two percent. Health projections indicate there will be 500,000 new cases of nonmelanoma skin cancer in 1987 with an expected morality of 10,000. Studies show that a one percent increase in the ultraviolet radiation absorbed by ozone results in a 1.8 - 2.5 percent increase in the incidence of nonmelanoma skin tumors. (A one percent depletion in ozone increases the weighted ultraviolet radiation by about two percent.)

Although there is uncertainty about the relationship between solar radiation and the more serious form of skin cancer, cutaneous malignant melanoma, much evidence supports the link between solar radiation and this disease. Health projections indicate there will be 25,000 new cases of cutaneous malignant melanoma in 1987; the mortality rate from this disease is 30 percent.

Numerous variables affect the incidence of either form of skin cancer including duration of exposure, latitudinal location at time of exposure, time of day, time of year, behavior (clothes and sunscreens) and pigmentation of the skin. White people, whose skin contains less protective melanin, have higher incidence of skin cancer than people with more melanin. The higher incidence of skin cancer among white people than among non-white populations suggests the increase in skin cancer incidence from ozone depletion may not be as important globally as in the United States and western Europe.

Unfortunately, very little scientific data exists to assess the likely adverse effects of ozone depletion with the greatest potential global impact -- suppression of the immune system and disruption of aquatic and terrestrial ecosystems. These data are not likely to be available for a long time at current research funding levels. Even if the necessary research were undertaken immediately, meaningful results would not be available for years. Case studies suggest the potential effects of immune system suppression and ecosystem disruption would be disastrous and irreversible. In the studies conducted on plants and animals, ultraviolet radiation weakens the immunological system and reduces the ability to resist disease. Several studies also indicate that the immune response of humans is depressed by ultraviolet radiation. There is, however, no evidence as to the magnitude of the risk. Likewise, limited studies of the effect of ultraviolet radiation on crops and aquatics generally show adverse impacts, but are not sufficient to quantify the overall risk.

Status of International and Domestic Actions

(6)

(Status of Int'l & Domestic Actions)

International -- The United States, through the State Department and EPA, has played a leading role in the negotiations toward a Protocol to the Vienna Convention on the Control of Chlorofluorocarbons. The State Department received authority to negotiate a protocol pursuant to inter-agency approval of the November 28, 1986 Circular 175 requesting such authority. The Circular 175 authorized the delegation to negotiate a protocol providing for:

I. A near-term freeze on the combined emissions of the most ozone depleting substances;

II. A long-term scheduled reduction of emissions of these chemicals down to the point of eliminating emissions from all but limited uses for which no substitutes are commercially available (such reduction could be as much as 95%), subject to III; and

III. Periodic review of the protocol provisions based upon regular assessment of the science. The review could remove or add chemicals, or change the schedule or the emission reduction target.

The next negotiation toward a protocol is scheduled for April 27-30, 1987. As the Circular 175 authorized, the United States has pressed for a near-term freeze on emissions of CFCs and halons and for long-term emissions reductions of up to 95 percent subject to periodic scientific assessment. A proposed reduction of 95 percent has not been well-received in the negotiations. Short of the 95 percent proposal, countries have various preferences. A significant issue is how to deal with developing countries that have not reaped the economic benefits of CFC use and thus have not caused the ozone depletion problem, yet also threaten to contribute to depletion as they industrialize and use CFCs for aerosols, regrigeration, solvents and foam-blowing.

Domestic -- The United States has substantially reduced CFC use in aerosols and is now considering further controls on ozone depleting chemicals. In 1978, the United States unilaterally reduced CFC use as an aersol propellant pursuant to an EPA ban of CFC use in nonessential aerosol spray cans. Prior to 1978, CFC use in aerosols was 56 percent of United States CFC use and 25 percent of world use. Aerosols now represent less than five percent of United States use of CFCs 11 and 12, yet remain the largest single use of CFCs outside of the United States (31 percent).

As a result of a lawsuit by an environmental group against EPA, the agency plans to issue a notice summarizing its findings regarding an ozone protection program by May 1987. The notice will either propose further regulation of ozone depleting chemicals or present the basis for a proposed decision to take no

(7)

further action at this time.

Proposals for domestic ozone protection programs are largely dependent upon the outcome of the international negotiations toward a protocol on the control of ozone depleting chemicals. EPA's public announcement of its intent to announce its ozone protection plan findings by May 1987 placed considerable emphasis on United States participation in the international discussions. Indeed, the legislative parties drafting ozone protection bills and the environmental parties threatening continued litigation have been attending the international negotiations toward a protocol and have been basing their domestic actions on the progress of international negotiations. In 1980, representatives of U.S. industry formed the Alliance for Responsible CFC Policy. The Alliance has emphasized that any control action must be global in scope to protect the ozone layer and to prevent disadvantaging U.S. industrial competitiveness.

Two important scientific studies should be completed this calendar year. First, a team of scientists from NASA, NOAA, industry and universities is evaluating the existing data on the amount of the decline in total atmospheric ozone concentrations over the past several years. The team is reanalyzing the data with a view toward addressing the inconsistencies and the uncertainties. The team's findings will be ready in late 1987. Second, a team of scientists from government laboratories and universities is analyzing the results of the 1986 National Ozone Expedition in the Antarctic. This team is assessing the most recent measurements of the Antarctic ozone hole and is analyzing the potential causes.

Additional scientific studies are continuing. For example, NASA, NOAA and the Chemical Manufacturers Association are sponsoring the 1987 Airborne Ozone-Hole Campaign to study Antarctic ozone loss in July through September 1987.

(9)

OPTIONS

1. Continue Circular 175 Process

The Administration could let the State Department and EPA continue to negotiate toward a protocol on ozone depleting chemicals pursuant to the Circular 175 process. Under this process, the delegation would coordinate the inter-agency review of the U.S. negotiating positions as the international discussions progress.

(Delineation of elements of options and pro's and con's is still to come.)

(8)

2. Advise the U.S. Delegation of Desired Positions

The Administration could select a negotiating position for the delegation to take to the next round of talks. This position would be selected from among a range of negotiating options including:

a. Freeze plus 95% reduction in 10-14 years.

b. Freeze plus 40-70% reduction in 6-10 years.

c. Freeze plus 20-40% reduction in 6-10 years.

d. Freeze only

Within each alternative negotiating position, sub-options exist for the chemicals to be covered by the agreement, for the processes to be covered by the agreement. (production, consumption, adjusted production), and for the countries to be covered by the agreement (i.e. equity issues for developing countries, trade issues with non-parties).

Each potential negotiating position would be subject to future scientific assessment.

3. Impose Domestic Controls Unilaterally

EPA could impose controls on U.S. ozone depleting chemicals while the delegation continues to participate in international discussions.

4. Await Scientific Results for International or Domestic Action

The Administration could delay international agreement or domestic action until there is more scientific certainty about the likely levels of ozone depletion and the causes of depletion.

(1)

NOAA Suggestions to Draft Ozone Paper

(1) Change "ultraviolet light" to "solar ultraviolet radiation". This is more to the point and will be consistent with the usage in the Effects section.

(2) Change "it is unclear whether any significant change in natural ozone levels has occurred." to "it is unclear whether this decline is anything other than natural variation." This seems to make the point more directly.

(3) Change "The only area where scientists have observed significant depletion is Antarctica." to "The largest ozone decreases observed have been in Antarctica."

(4) Change "There, ozone depletion" to "There, ozone decrease and change "the Antarctic depletion." to "the Antarctic decrease". In Suggestions (3) and (4), the word depletion has often been taken to mean man-made depletion. Hence, it should be avoided here since the cause of the Antarctic ozone decrease is not yet known.

(5) This sentence is not very clearly stated. Furthermore, since it follows the comment on

(2)

Antarctic ozone, it seems to imply ~~that~~ the large decrease in Antarctic ozone forebodes such large decreases for the globe eventually. This is not (necessarily) true. We suggest ~~that~~ (9) the sentence be replaced by "Current theory predicts that, if CFC emissions continue at or more than the present rates, significant ozone depletions are very likely to occur eventually, particularly at higher latitudes", and (b) move it earlier in the paragraph, as indicated.

(6) These sentences are not correct. They should be replaced by: "The present understanding of global atmospheric chemistry predicts ~~that the~~ (present) paramount of ozone loss due to past CFC emissions should be small. Hence, if the large ozone decrease over Antarctica is indeed due to CFC's, then it would imply ~~that~~ the current theory may be ~~m~~applicable to this particular region."

(7) The 23 percent per year cited for the increase of halon 1211 has a large uncertainty. The two-digit quotation implies more accuracy than is justified. We suggest using "about 20%".

(3)

(8) These sentences are out of place here and have already been stated earlier. We suggest deleting them.

(9) It would appear ~~that~~ a major omission in ~~this~~ issue paper is ~~that~~ ~~there~~ is no summary of the impact of control scenarios on domestic and international trade.

3/30

Ozone Subgroup Mtg.

Briefings --

① Friday Science 5:30 pm ~~EEF~~

② Models = Wed / Thurs.

③ Econ [costs of substit'n over time
[bene's of ↓'g emissions

→ Talk to Dave about briefings
└ Rooms.

Protocol Negot's --

Dec
Feb
April 27
July → last negot'g sessions

① withdraw
② freeze
③ freeze + 20%
④ 40-70% / 6-10 yrs +7
⑤ 0-95% 20 yrs

Sept 14-18 } Diplomatic Signing Session in Montreal

Europeans will propose ~~20%~~ 4 yrs - freeze
+2 = 20% ↓

~~to~~ ~~it~~

① Shld. We go to Mtg? — set out the Chrgs will be called
② shld. we chg position? └ lawsuit
③ To what?
- SQ
- 40-70

- separate B/L from our negot'g posit.

- coming to 40% 20 yrs
Need >than
- 20% cld be done w/ current tech
  └ also not give incen to substit's
  └ LDC's need >to be leaned on to comply.

matrix

- Agents } indic's
  - we'll have an agreemt
- freeze } 2 yrs aft entry into force (at time 9 countries ratify)
- European accord } 20-~~40~~ 50 } ~~4 yrs~~ (6 yrs) 4 yrs aft freeze
  us { 6-12 yrs
- 40-70 (EPA's) }
- ~~Montreal~~ up to
- no chg in U.S. posit 95% < 20 yrs

we don't want an agreemt in April? olc not ready to do it now

~~has to~~ has to be posed as negot'g

→ Convention went thru Senate very quickly & Pres signed this summer

→ 1st step ↓ shld be automatic to give indus incentive to prepare.

→ Science cld reverse the process at any time.

Agents = what is freeze on? 11, 12 & 113
Halons = shld drop them
↓ b/c ~ int'l ag
answer DOI
↓
shld incl something about conserving halons. -- i.e. not in testing.

for April -- may want to keep halons in.

/OPTIONS/

Extreme
① 95% phase out 10-14 yrs. -- unspec'd steps in btw/

② 40-70 % in 6-10 yrs

~~③ 20-40~~

④ freeze + 20 - 40 6-10 yrs

⑤ freeze alone + 2 yrs

- St. wants to drop 95% now w/
- scientific review w/ emergency review pot'l.

Chairman's Text → Pressure at this meeting will be to fill in the #'s.
└ turn 2d ¶ into sci review ¶, & focus on ¶3

Production + Adjusted Production

Europeans want Produc + Imports.

→ Science is getting worse & that's why 1st step must be mgful to give indus incentives.

→ Need to avoid unilateral action.

Statement of
Richard Elliot Benedick,
Deputy Assistant Secretary of State
for
Health, Environment and Natural Resources
to the
Subcommittee on Natural Resources,
Agriculture Research, and Environment
Committee on Science and Technology
U.S. House of Representatives

March 12, 1987

The United States, along with other nations of the world, is engaged in a historic effort to undertake cooperative measures to prevent potentially serious adverse effects from depletion of stratospheric ozone. The Vienna Convention for the Protection of the Ozone Layer, adopted in March 1985 under the auspices of the United Nations Environment Program (UNEP) and ratified by the United States in August 1986, was an important first step. But additional concrete measures are necessary. We are now engaged in negotiations under UNEP auspices on a protocol to the Convention which would provide for controls on ozone-depleting chemicals.

EPA is the agency with responsibility under the Clean Air Act for domestic regulation of ozone-depleting substances. The Department of State is working closely with EPA and other federal agencies to keep our domestic and international efforts congruent. We have consulted closely with representatives of U.S. industry and environmental groups as the domestic and international processes develop.

Laying the Foundation of Common Understanding of the Issue

Between the adoption of the Convention in Vienna in March 1985 and the resumption of negotiations on control measures in December 1986, the international community participated in a unique cooperative effort to improve common understanding of the nature and impacts of ozone depletion. The United States Government played a leading role in that process.

-- A two-part UNEP workshop, in Rome in May 1986 and in Leesburg, Virginia in September 1986, focused on key economic issues related to the control of ozone-depleting chemicals.

-- In June 1986, the U.S. co-sponsored with UNEP an international conference with over 300 participants on the effects of both ozone depletion and climate change.

-- The Coordinating Committee on the Ozone Layer (CCOL), a UNEP body comprising scientists from many interested nations, assessed current knowledge of the atmospheric science and effects of ozone depletion, and presented their findings to UNEP for consideration in the development of measures to protect the ozone layer. Scientists and policymakers from EPA and NASA played a leading role.

-- 150 scientists, coordinated by Dr. Robert Watson of NASA, prepared a landmark publication on the state of knowledge about atmospheric ozone, under the auspices of NASA, the World Meteorological Organization (WMO), UNEP, the European Communities, NOAA, FAA and the German Federal Ministry for Research and Technology.

At the same time, U.S. government representatives were working bilaterally with various governments to improve understanding of the nature of the problem and the options for reducing risks.

-- EPA, NASA and NOAA worked with scientists in key nations to increase understanding of the risks if depletion should occur and to advance scientific assessment and monitoring capabilities.

-- We discussed the issue with policymakers in key countries. For example, I traveled, with a team from EPA, to Brussels and Bonn last November for consultations in preparation for the December negotiations.

EPA team to prepare for negot's!!

As this extensive bilateral and multilateral effort moved forward, we saw that consensus was emerging, both in the United States and in the international community, in a number of important areas:

-- The ozone layer is an exceedingly valuable resource for the present and future population of the world.

-- The ozone layer is likely to be adversely affected by the long-lived chlorine molecules which stem from chlorofluorocarbons.

-- If ozone depletion occurs, the increase in harmful ultra-violet radiation reaching the earth could pose significant, even if currently difficult to quantify, risks.

-- While many scientific questions remain to be answered, the risks are sufficiently serious to warrant control actions.

-- The very nature of the ozone layer requires global cooperation if protective measures are to be effective.

The U.S. Position

The United States Government believes that the potential risks to the stratospheric ozone layer require early and concerted action by the international community. We seek agreement on the following:

- o A near-term freeze at current emission levels of CFC 11, 12, 113, and 114, and Halons 1211 and 1301;
- o A longer-term scheduled reduction of up to 95% in emissions of these chemicals; linked to
- o Periodic reassessment based on a regular review of the science and of economic and technical considerations.

No specific time frames and no specific percentage reductions have been determined for the scheduled reductions as of the present time; studies of environmental and economic implications of various options are under way, however, to provide the basis for a U.S. position on these elements of a protocol.

We believe a protocol should:

-- provide as much certainty as possible for industrial planning in order to minimize the costs of adjustment;

-- provide adequate time for shifting away from ozone-depleting chemicals to avoid social and economic disruption, while at the same time give a strong incentive for the rapid development and employment of safer substitutes and recycling techniques;

-- address all the principal man-made sources of long-lived atmospheric chlorine and bromine;

-- allow flexibility for national implementation by allowing trade-offs among controlled chemicals based on their relative ozone-depleting effects;

-- take into full consideration scientific uncertainties and promote future improvements in understanding by instituting a requirement for periodic reassessment of the goal and timing of limits;

-- create incentives to participate in the protocol by regulating relevant trade between parties and non-parties.

Geneva, December 1986 and Vienna, February 1987

We have come a long way since March 1985 in Vienna, when many nations questioned the need for control measures. In the first round of resumed negotiations last December, representatives from all regions agreed that new measures must be taken in the near term to control emissions of ozone-depleting chemicals. However, the discussions were general, and substantial differences over the scope, stringency and time-phasing of control measures remained.

Among other participants at Geneva in December, Canada and the Nordic countries advocated strong, early action. The European Communities (EC), Japan and the USSR acknowledged the need for controls, but did not yet support the long-term measures, broad coverage, and trade provisions we believe are necessary to make the protocol effective.

Between the December and February rounds, we consulted actively with a number of nations, through discussions with environmental, foreign ministry, and trade officials in Washington and abroad, through our Embassies, official visits, and scientific exchanges. For example, a team from NASA, NOAA and EPA traveled to Moscow. We met in Washington with Canadian representatives. I traveled to Europe again. Deputy U.S. Trade Representative Smith and Assistant Secretaries of State McMinn and Negroponte raised the issue with senior officials in Tokyo. Through the USIA "Worldnet" interactive satellite hookup, Dr. Robert Watson of NASA and I discussed the issue with experts, policymakers and journalists in ten European capitals.

NASA NOAA & EPA !!

near-term freeze & LT reduc.

The February round of negotiations in Vienna brought widening agreement on many aspects of a protocol, including a near-term freeze and longer-term reductions. Other elements of progress in Vienna include:

(1) formulation of a useful "Chairman's text" for the critical control Article II;

(2) movement toward agreement on ranking substances according to their ozone-depleting potential;

(3) good progress on restrictions on trade with non-parties;

(4) an "enhanced" commitment to international cooperation on (i) research, (ii) systematic observation, and (iii) international scientific assessments;

(5) clear evidence of movement, although not yet unanimous, within the EC;

(6) setting of a date for the Diplomatic Conference (September 14-18 in Montreal).

Trade Measures

How does this posit develop?

We seek a protocol which would protect the stratosphere but avoid giving unfair advantage to industries of countries which do not participate in the protocol. In Vienna, the sub-group on trade accepted with only minor changes U.S.-proposed language which would, inter alia, ban bulk imports from non-parties of controlled chemicals, and ban or restrict imports from non-parties of products containing these chemicals. Progress on this issue was particularly welcome, since in December many key participants in the negotiations were resistant to discussion of trade measures, largely because they had not yet seriously addressed the issue. Now there is recognition that trade measures such as the U.S. proposed are necessary in order to (a) protect industries in countries party to the protocol from being put at a competitive disadvantage vis-a-vis industries of non-parties; (b) create an incentive for broad participation; and (c) discourage the movement of production facilities to non-parties.

Looking Ahead

All the movement is in the right direction. But the hardest negotiations are still to come. For example, the participants must still negotiate the specific stringency and timing of controls, determine precisely which substances are to be restricted, and specify treatment of developing countries, non-parties and late-signers.

The next round of negotiations is scheduled for April 27-30 in Vienna, with an informal meeting in Oslo April 8-9 to consider the chairman's text. The United States will continue to pursue the objectives I have outlined. We will continue to consult actively with other nations and with interested sectors in the United States.

They will!

This is a difficult and complex negotiating process. We have made substantial progress, but we have a long way to go to reach an effective agreement with broad participation. Meanwhile, we must be sure that our actions domestically support and do not undercut that international process, since this is clearly a matter which the U.S. cannot resolve alone. We have entered a new era of truly global environmental management, in which we are all made more conscious of the unity and vulnerability of our planet.

You have.

3/11/87
#3199T

ALLIANCE FOR RESPONSIBLE CFC POLICY
1901 N. FT. MYER DRIVE, SUITE 1204
ROSSLYN, VIRGINIA 22209
(703) 841-9363

SCIENCE TALKING POINTS

OZONE MEASUREMENTS

- Analyses of more than 25 years of data from a globally distributed network of monitoring stations show that there has been no persistent change in the total amount of ozone.

- Analyses of data from the ozone monitoring network show that a trend exceeding 1% per decade would be detected and provide a measure of early warning. However, false warnings could also result if ozone declines naturally.

- There are concerns about the validity of the reports of a declining trend in ozone observed by a satellite-borne instrument. Analyses presented in a recently published, peer-reviewed scientific paper show that ozone values measured by the satellite instrument are declining compared to those measured by a ground-based network of instruments. Thus, a large part of the ozone decreases observed by the satellite instrument could be due to instrument degradation.

- A team of government, academic and industry scientists are reevaluating all ozone measurements that are now available. Their conclusions should be reported late this year.

- The cause or causes of the temporary ozone decreases over Antarctica during successive Octobers is not yet known. Several possible hypotheses to explain the phenomenon have been identified - only some of these involve CFCs. Science campaigns to test the hypotheses are being co-sponsored by government and industry organizations. It is possible that the most likely cause or causes can be identified by early 1988.

OZONE & GREENHOUSE MODELLING

- Computer model simulations of the potential effects of man's activities indicate that there is no imminent hazard to ozone if CFC emissions do not increase significantly.

- Currently, CFCs contribute 15 to 20% to the total calculated greenhouse warming. Future relative contributions will depend on future emissions of the greenhouse gases. If CFC emissions do not grow significantly, their relative contribution will probably remain below about 20%

- If CFC emissions grow significantly, current scientific information indicates that there could be appreciable ozone depletion and CFCs could become major contributors to greenhouse warming by the middle of the next century.

- Discrepancies between model simulation results and atmospheric observations limits the confidence scientists place in quantitative model predictions.

SCIENCE STRATEGIES

- A strategy of limiting the growth rate of global emissions of CFCs coupled with periodic review of these limits in view of better scientific information can provide adequate protection for the environment.

- A science meeting held in 1986 established the feasibility of a "Network for the Detection of Stratospheric Change." By monitoring key stratospheric constituents, this network could improve the current early warning capability.

- If CFC reductions were ever required because of future measured ozone depletion, computer model simulations indicate that ozone concentrations would begin to recover from any decreases within about 10 years after CFC reductions took place.

jms/clb
jms.ltr

ALLIANCE FOR RESPONSIBLE CFC POLICY
1901 N. FT. MYER DRIVE, SUITE 1204
ROSSLYN, VIRGINIA 22209
(703) 841-9363

MAJOR ARGUMENTS FOR SUPPORTING INTERNATIONAL OZONE PROTECTION EFFORTS

- The Vienna Convention for Protection of the Ozone Layer was a positive step toward needed international cooperation in the areas of research and information exchange on the ozone layer.

- Industry was strongly supportive of the Vienna Convention and subsequent ratification by the United States Senate, and industry is now supporting the negotiation of an agreement establishing a reasonable global limit on future growth of fully-halogenated CFC production capacity, based on reasonable scientific assessment.

- Based on theory and reasonable assumptions about future emissions of substances that may modify the ozone layer, no significant modification of the ozone layer is expected during the next few decades.

- U.S. industry is supporting steps to reduce the emissions of CFCs through the development of conservation, recycling, and recapture programs. Because there is no imminent danger to human health and environment, there is ample time to reach consensus on an international agreement and time for the development of the voluntary programs by industry to alleviate environmental concerns for CFC emissions.

- Any action must be global in scope in order for it to be effective. Further unilateral domestic CFC regulation by the United States will provide little, if any, environmental benefit.

- Unilateral regulation by the U.S. may actually be counterproductive to efforts to reach an international agreement on CFCs. Other countries did not follow the United States' 1978 ban on the use of CFCs as aerosol propellants and have already indicated that they will not be forced into an unreasonable regulatory agreement now. (Aerosol uses remain the single largest use of CFCs outside the U.S.)

Unilat.

- CFCs contribute substantially to the health and safety of workers and consumers. If they are a problem, it is because they are emitted not because they are used. Any calls for CFC phaseouts, either in an international agreement or domestic legislative or regulatory initiatives, are not scientifically justifiable at this time.

- Ozone protection efforts will require greater worldwide cooperation on scientific research and monitoring, including the establishment of a global early warning detection system.

- CFC (chlorofluorocarbons) are non-flammable, inert, chemicals of low toxicity. CFCs are used in air conditioning and refrigeration systems; to prepare flexible foams for furniture, bedding and other cushioning such as seats in automobiles; to prepare rigid foams for home and commercial insulation, and packaging; to degrease, clean and dry electrical and electronic components; to sterilize medical supplies and instruments; and to freeze foods.

- CFCs are utilized in numerous essential products. Over $500 million of CFCs are sold annually in the U.S., and more than 715,000 full-time jobs are related to CFC use. The annual value of goods and services which depend to a varying extent upon CFCs exceeds $28 billion.

- For most uses of CFCs, there are no commercially available acceptable alternatives. The few substitutes that exist for CFCs give poorer performance and have levels of toxicity, flammability, and/or corrosiveness which may present significant health risks to industry employees and consumers.

February 20, 1987

TABLE 1

Application	Interaction with society	Economic Scope (Annual)		
		Value of products services	Direct CFC-related industry employment	Number of production service establishments (p-production) (s-service)
Refrigeration	85 million household refrigerators; 160,000 food stores; 28 million household freezers; 39,000 supermarkets; 178,000 refrigerated trucks; 250,000 restaurants; 27,000 rail cars	$6 billion	52,000	(p) 64
Air Conditioning	40 million homes; essentially all offices, commercial and public buildings	$10.9 billion	125,000	(p) 860
Mobile Air-Conditioning	60-70 million automobiles and trucks (total in use)	$2 billion	25,000	(p) 110 (s) 306,000
Air Conditioning and Refrigeration Servicing	All existing CFC refrigerators and air conditioners	$5.5 billion	472,000	(s) 65,000
Plastic Foam	Insulating foams for homes, refrigerators; food service trays and packaging; cushioning foams	$2 billion	40,000	1,300
Solvents	Microelectronic circuitry, high performance air and space craft, and computers	Products valued at billions. Industry complexity precludes more detailed analysis for this report.		
Food Freezants	Frozen shrimp, fruit, fish, vegetables	$0.4 billion	less than 1000	30
Sterilants	Medical items, catheters, syringes, respiratory units, medical supplies, pharmaceuticals	$0.1 billion (sterilizing equipment)	less than 1000	2300
	TOTAL (not including solvents)	$26.9 billion	715,000	375,000

ALLIANCE FOR RESPONSIBLE CFC POLICY
1901 N. FT. MYER DRIVE, SUITE 1204
ROSSLYN, VIRGINIA 22209
(703) 841-9363

Embargoed For Release Until:
9:00 a.m., September 16, 1986

POLICY STATEMENT

Chlorofluorocarbons (CFCs) are widely used by industry and the general public and contribute significantly to the quality of life in the United States and around the world because of their unique and beneficial combination of functional properties and excellent safety characteristics. The Alliance for Responsible CFC Policy was organized in 1980 to ensure that government policies regarding the further regulation of CFCs are responsible and that any such policies are based on sound scientific facts. It was a further objective of the Alliance to encourage that efforts be pursued on an international basis to resolve the scientific uncertainties pertaining to the ozone depletion theory, the role of CFCs, and the need, if any, for global action to protect the ozone layer. Since 1980, significant scientific research has been conducted concerning the ozone depletion theory, the greenhouse effect, and the role of CFCs. Significant scientific uncertainties remain, however, and the research needs have grown much more complex. Based on the theory, current scientific understandi and reasonable assumptions about future emissions of substances that may modify the ozone layer, no significant modification of the ozone layer is expected during the next few decades, therefore, there is no imminent threat to human health and the environment from current CFC use or emission. On this basis, the Alliance believes that the following position statement provides an outline for responsible U.S. policy with regard to CFCs compatible with current scientifi understanding and consistent with the original goals of the Alliance:

* Recognizing the global nature of the ozone depletion theory, the Alliance supports international resolution of the issue. Additional unilateral regulation of CFCs by the United States would provide little, if any, environmental protection, injure U.S. industry to the benefit of international competition, and may undermine efforts to obtain an international resolution.

* Additional scientific research is essential. The Alliance supports the atmospheric research recommendations contained in the January, 1986 NASA/World Meteorological Organization Science Assessment.

* Voluntary conservation in CFC end uses should be continued and expanded where economically and technologically practical.

* Regulation of specific uses of CFCs is ineffective and discriminatory.

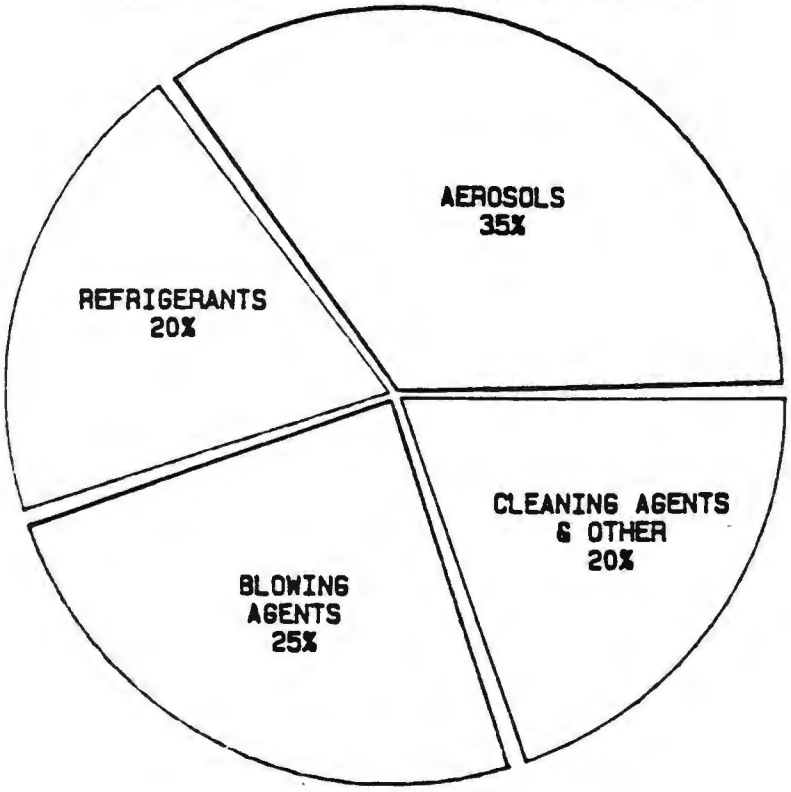
* Responsible policy dictates, given the scientific uncertainties, that the U.S. government work in cooperation with the world community under the auspices of the United Nations Environment Programme to consider establishing a reasonable global limit on the future rate of growth of fully halogenated CFC production capacity.

* Development of alternative products and processes should be encouraged to utilize suitable alternatives to fully halogenated CFCs.

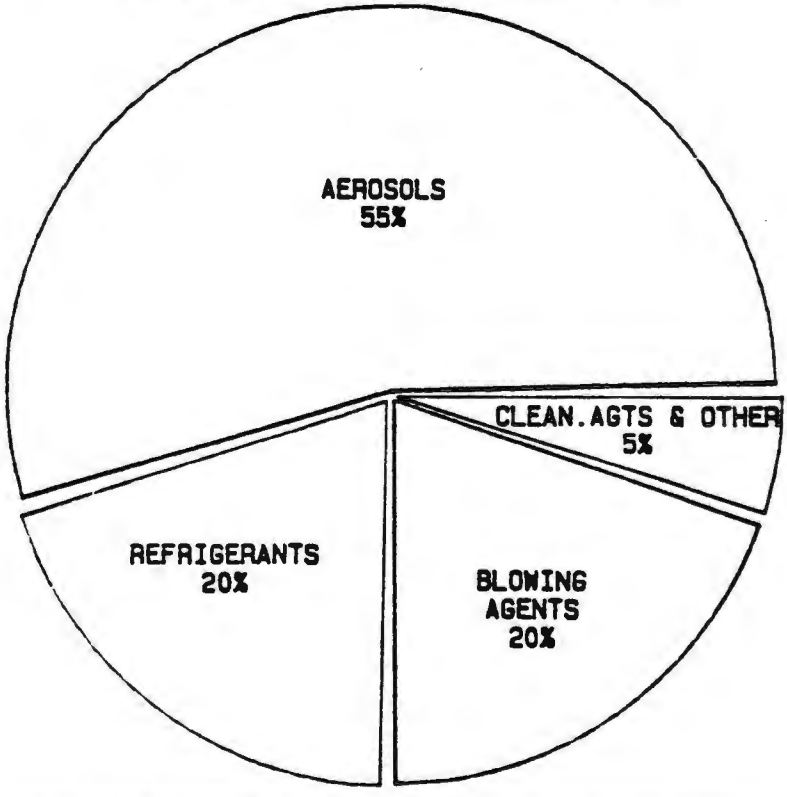
* Research should be continued and expanded to develop substitutes for fully halogenated CFCs.

FC-11/12/113/114/115 VOLUME BY INDUSTRY

1985 WORLDWIDE (EX. U.S.): 1250 MM LBS

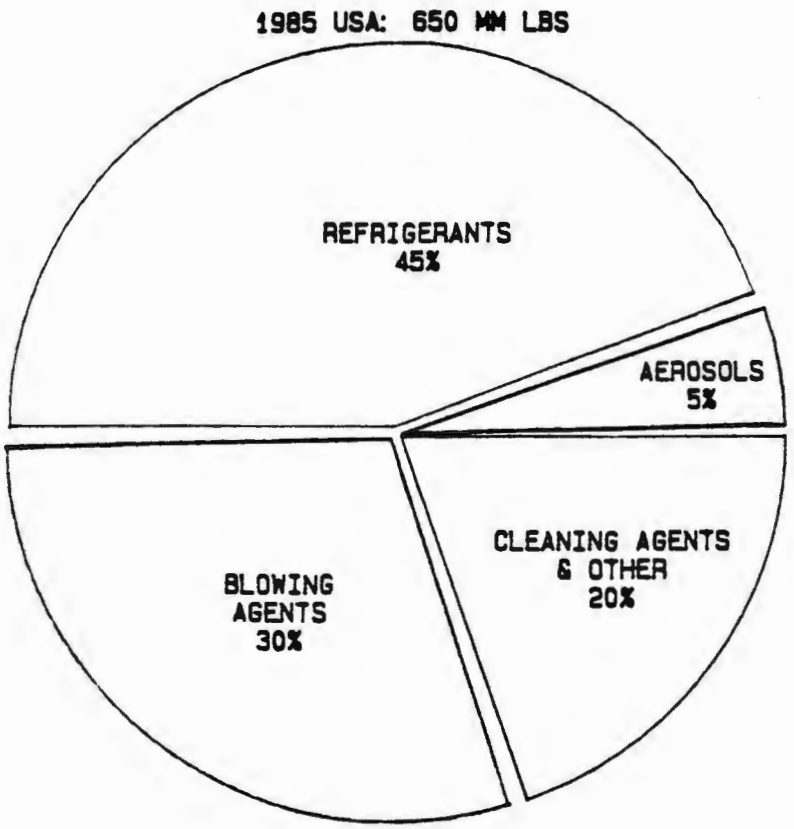


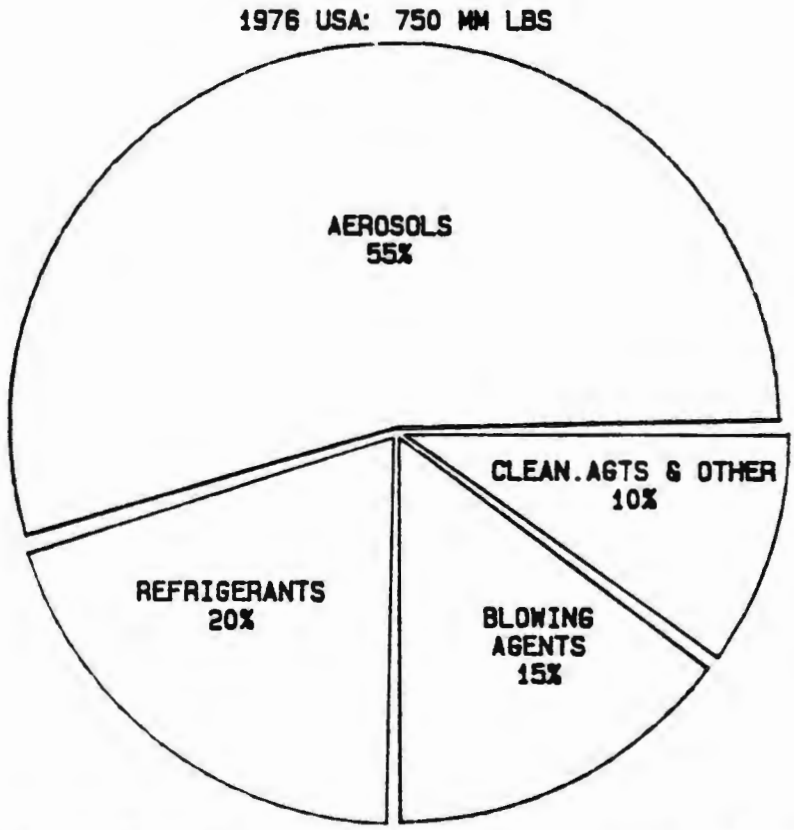
1976 WORLDWIDE (EX. U.S.): 1150 MM LBS



MK85WW 11-18-86

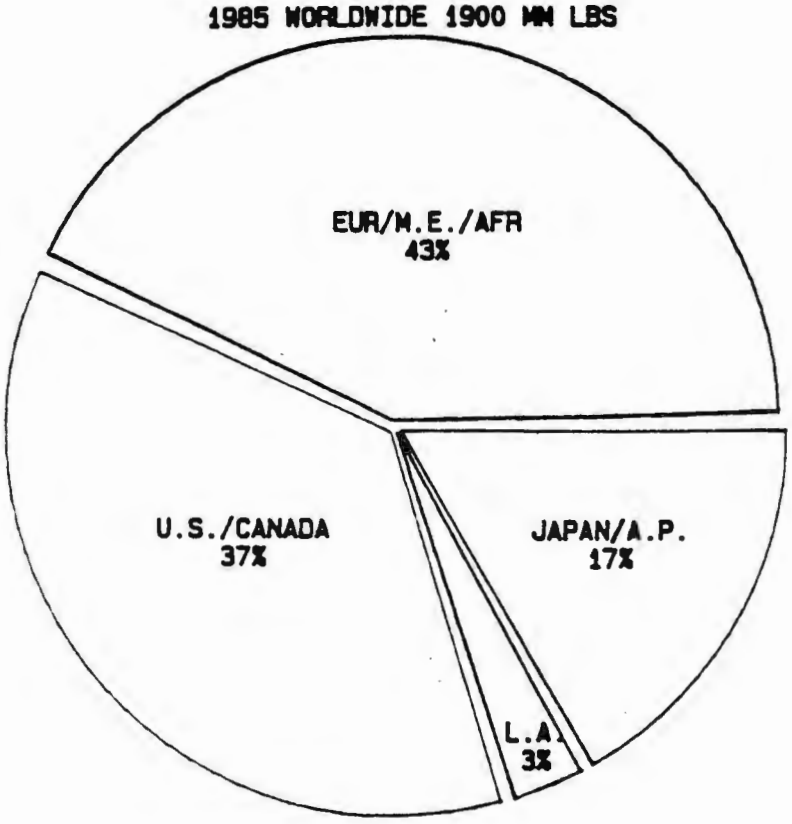
FC-11/12/113/114/115 VOLUME BY INDUSTRY

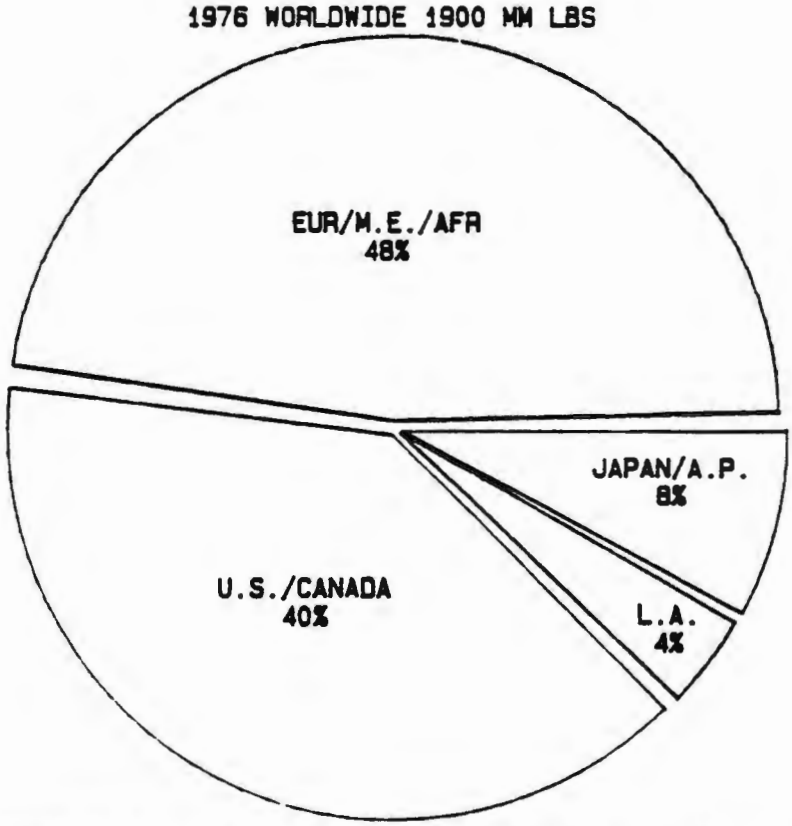




WK85US 11-18-86

WORLDWIDE FC-11/12/113/114/115 VOLUME BY REGION
(EXCL. USSR/PRC/E. EUR.)

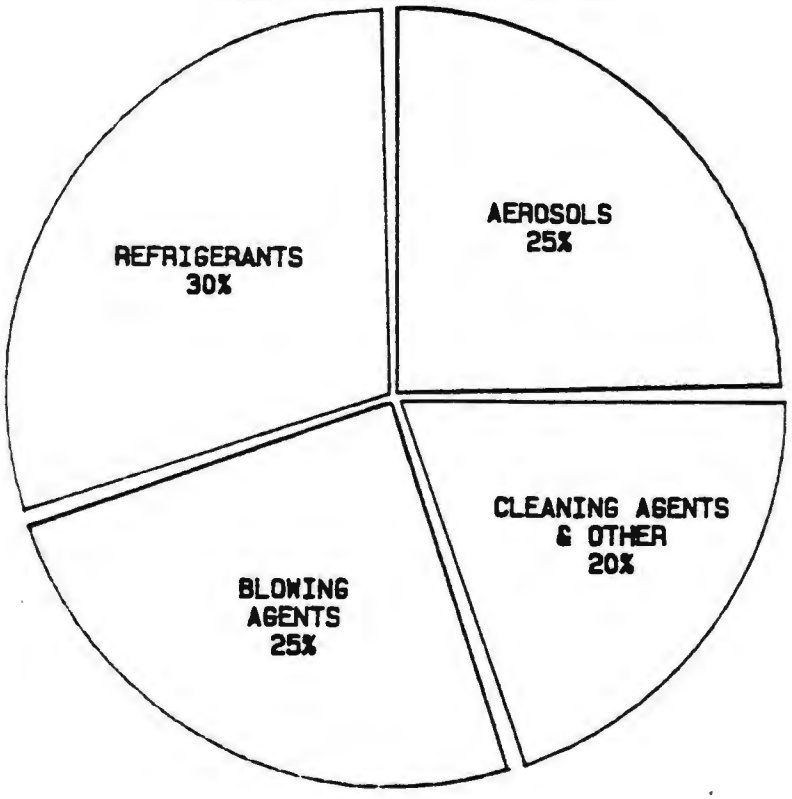




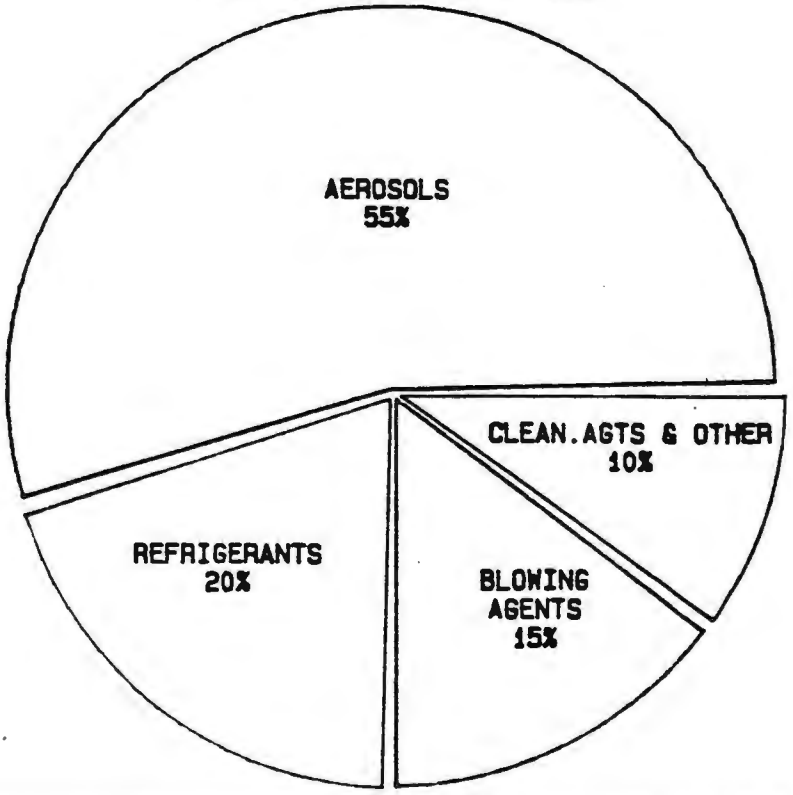
MK85WWB 11-18-86

FC-11/12/113/114/115 VOLUME BY INDUSTRY
(EXCL. USSR/PRC/E. EUR.)

1985 WORLDWIDE 1900 MM LBS



1976 WORLDWIDE 1900 MM LBS



MK85WHA 11-18-86