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NATIONAL SECURITY COUNCIL
WASHINGTON, D.C. 20506

2470

ozone protocol

powell-pres - ozone

March 31, 1988

Dan
This package is urgent. Pres must sign today. He leaves by mid-afternoon for Easter break. Can we hear from you by 11:15.
Jerry
x5650

ACTION

MEMORANDUM FOR COLIN L. POWELL

FROM: JERRY W. LEACH

SUBJECT: Ratification of Montreal Protocol on Ozone Depletion

The President needs to sign the Protocol. EPA Administrator Lee Thomas has requested that this be done as soon as possible. White House Cabinet Affairs has asked that we move the copies forward immediately so that they can be signed as a routine matter today. There were earlier plans for a signing ceremony but these have now been scrapped.

The Senate gave its advice and consent to the Protocol on March 14, 1988 by a vote of 83-0.

The Protocol is a supplement to the Vienna Convention for the Protection of the Ozone Layer which was finalized in March 1985 and ratified by the United States in August 1986. The Convention has research cooperation, information exchange, and consultation provisions but no control measures.

The Protocol contains internationally coordinated controls on ozone-depleting substances. It establishes an obligation by each signatory to limit consumption and production of such substances. It also restricts trade in the controlled substances between signatory and non-signatory countries.

The key control measures are:

a) a freeze at 1986 levels on annual consumption of certain chlorofluorocarbons (CFCs) beginning in the seventh month after entry into force and of certain halons beginning three years after entry into force;

b) reduction of national consumption of CFCs by 20% in 1994 and by 50% in 1999; and

c) periodic reassessment of the controls, adding or deleting chemicals or changing the reduction schedules.

After ratification, each country must deposit the Articles of Ratification with the UN. Assuming that this happens in the next two weeks, the United States is likely to be the first country to do so.

The target date for entry into force is January 1, 1989. Eleven countries covering two-thirds of world CFC consumption must have ratified by that date for the Protocol to come into effect.

Thirty one countries (U.S., Canada, most of Western Europe, USSR, Japan, New Zealand, and ~~nine~~ developing countries) have signed and will ratify the Protocol. For the agreement to be fully effective, the signatory group must active in getting other countries to join. The U.S. is spearheading this effort in conjunction with the UN Environmental Program. A U.S. team will be discussing the matter with the Chinese next week.

Over the last two weeks, new evidence has come to light to indicate that ozone depletion is occurring more rapidly than the signatories realized at the time of negotiation. There is likely to be pressure to speed up implementation and to increase the reduction schedules.

Dan Levin concurs.

RECOMMENDATION

That you sign the memo at Tab I.

_____ Approve

_____ Disapprove

Attachments
Tab I Memo to the President
Tab A Ozone Protocols for Ratification by the President (in duplicate)
Tab II Memo from State conveying the Protocol to the White House

Prepared by:
Jerry W. Leach

THE WHITE HOUSE

WASHINGTON

2470

ACTION

MEMORANDUM FOR THE PRESIDENT

THROUGH: WHITE HOUSE CLERK'S OFFICE

FROM: COLIN L. POWELL

SUBJECT: Ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer

Issue

Whether or not to ratify the Protocol at Tab A.

Fact

The Protocol contains internationally coordinated controls on ozone-depleting substances. It establishes an obligation by each signatory to limit consumption and production of such substances. It also restricts trade in controlled substances between signatory and non-signatory countries. The Senate gave its advice and consent on March 14, 1988 by a vote of 83-0.

Discussion

Thirty one countries (U.S., Canada, Mexico, most of Western Europe, the USSR, Japan, New Zealand, and eight developing countries) signed the Protocol and are expected to ratify it. The U.S. is spearheading the effort to get more signatories. The target date for entry into force is January 1, 1989. Eleven countries covering two-thirds of world CFC consumption must have ratified by that date for the Protocol to come into effect.

Over the last two weeks, new evidence indicates that ozone depletion is occurring more rapidly than previously believed. There is likely to be pressure to speed up implementation of the Protocol.

Recommendation

OK	No	
___	___	That you ratify the Protocol by signing the Instrument of Ratification at Tab A (in duplicate)

Attachment

Tab A Instrument of Ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer (in duplicate)

RONALD REAGAN

President of the United States of America

TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETING:

CONSIDERING THAT:

The Montreal Protocol on Substances That Deplete the Ozone Layer was done at Montreal on September 16, 1987; and

The Senate of the United States of America by its resolution of March 14, 1988, two-thirds of the Senators present concurring therein, gave its advice and consent to ratification of the Protocol;

NOW, THEREFORE, I, Ronald Reagan, President of the United States of America, ratify and confirm the Protocol.

IN TESTIMONY WHEREOF, I have signed this instrument of ratification and caused the Seal of the United States of America to be affixed.

DONE at the city of Washington

our Lord one thousand nine hundred eighty-eight and of the Independence of the United States of America the two hundred twelfth.

By the President:

Secretary of State

100TH CONGRESS
1st Session

SENATE

TREATY DOC.
100–10

MONTREAL PROTOCOL ON SUBSTANCES THAT DEPLETE THE OZONE LAYER

MESSAGE

FROM

THE PRESIDENT OF THE UNITED STATES

TRANSMITTING

THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEPLETE THE OZONE LAYER, DONE AT MONTREAL ON SEPTEMBER 16, 1987, TO THE VIENNA CONVENTION FOR THE PROTECTION OF THE OZONE LAYER

DECEMBER 21, 1987.—Protocol was read the first time, and together with the accompanying papers, referred to the Committee on Foreign Relations and ordered to be printed for the use of the Senate.

U.S. GOVERNMENT PRINTING OFFICE

19–118 WASHINGTON : 1987

LETTER OF TRANSMITTAL

THE WHITE HOUSE, *December 21, 1987.*

To the Senate of the United States:

I transmit herewith, for the advice and consent of the Senate to ratification, the Montreal Protocol on Substances that Deplete the Ozone Layer, done at Montreal on September 16, 1987. The report of the Department of State is also enclosed for the information of the Senate.

The Montreal Protocol provides for internationally coordinated control of ozone-depleting substances in order to protect public health and the environment from potential adverse effects of depletion of stratospheric ozone. The Protocol was negotiated under the auspices of the United Nations Environment Program, pursuant to the Vienna Convention for the Protection of the Ozone Layer, which was ratified by the United States in August 1986.

In this historic agreement, the international community undertakes cooperative measures to protect a vital global resource. The United States played a leading role in the negotiation of the Protocol. United States ratification is necessary for entry into force and effective implementation of the Protocol. Early ratification by the United States will encourage similar action by other nations whose participation is also essential.

I recommend that the Senate give early and favorable consideration to the Protocol and give its advice and consent to ratification.

RONALD REAGAN.

LETTER OF SUBMITTAL

DEPARTMENT OF STATE,
Washington, DC, November 21, 1987.

The PRESIDENT,
The White House.

THE PRESIDENT: I have the honor to submit to you, with a view to transmittal to the Senate for its advice and consent to ratification, the Montreal Protocol on Substances that Deplete the Ozone Layer.

The Protocol is an important instrument for the protection of a critical global environmental resource. The stratospheric ozone layer prevents harmful amounts of ultraviolet radiation from reaching the earth. Depletion of stratospheric ozone by atmospheric pollutants could result in significant adverse impacts on human health, including an increase in skin cancer rates and suppression of human immune responses. Environmental effects of stratospheric ozone depletion could include reduced crop yields, adverse effects on aquatic ecosystems, including fisheries, and potentially significant climatic changes.

A multilateral regulatory regime, which is established by this protocol, is necessary to control emissions of ozone-depleting substances, since such emissions anywhere affect the ozone layer globally. United States ratification is necessary for entry into force and effective implementation of the Protocol. Early ratification by the United States will encourage ratification by other nations whose participation is also essential. Ratification of the Protocol is consistent with our foreign policy and economic and environmental interests.

The Protocol, negotiated under the auspices of the United Nations Environment Program, is a supplemental agreement to the Vienna Convention for the Protection of the Ozone Layer, adopted in March 1985 and ratified by the United States in August 1986. The Convention provides for research, monitoring, and information exchange, and a framework for the adoption of one or more protocols. While control measures were considered during the Convention negotiations, agreement on a coordinated control regime could not be achieved at that time. The current Protocol is the result of negotiations beginning in December 1986 and concluding in September 1987.

In negotiating the Protocol, the Department of State coordinated with all relevant federal agencies and consulted closely with the Congress, industry and environmental organizations. Signature of the Protocol by the United States are endorsed by all interested agencies and the Domestic Policy Council staff. Congressional support is also broad. While some would have preferred that the Proto-

cols' provisions be more stringent or less stringent, there is widespread agreement among these groups that multilateral rather than unilateral measures are necessary for effective control of ozone-depleting substances, that adoption of the Protocol is a significant achievement, and that the United States should ratify the Protocol.

Two principal features of the Protocol are an obligation to limit consumption and production of ozone-depleting substances (Article 2) and the restriction of trade in controlled substances with States not party to the Protocol (Article 4).

On control measures, Article 2 requires:

A freeze at 1986 levels on annual consumption of chlorofluorocarbons 11, 12, 113, 114 and 115 beginning in the seventh month after entry into force, and of halons 1211, 1301 and 2402 beginning three years after entry into force.

Long-term scheduled reductions (of twenty percent by 1994, and of fifty percent by 1999) of chlorofluorocarbon annual consumption.

Periodic assessments of the control provisions, based upon scientific, environmental, technical and economic information, which could result in addition or removal of chemicals from the list of controlled substances or a change in the reduction schedule or reduction target.

Production of the controlled substances by Parties to the Protocol in individual countries is also controlled, but allowed to remain somewhat above consumption in individual countries, in order to maintain sufficient supply for developing countries and to achieve economic efficiencies or to respond to supply shortages. The Parties' total production can be no greater than their total allowed consumption.

Article 2 also contains specific provisions for Parties whose production in 1986 was less than twenty-five kilotons (paragraph 5); Parties which had production facilities under construction before adoption of the Protocol (paragraph 6); and Parties that are members of a regional economic integration organization (REIO) (paragraph 7).

In particular, paragraph 5 of Article 2 permits a Party whose 1986 production of the controlled substances was less than twenty-five kilotons to transfer to or receive from another Party production as long as the combined production of the Parties concerned does not exceed their combined production limits as set by the Protocol. It would allow, for example, U.S. producers to maintain production beyond our allowed consumption level in order to supply Canadian users if small Canadian plants are closed because they have become inefficient as a result of controls.

Under paragraph 6, a Party is permitted to add to its 1986 base the amount produced by facilities under construction or contracted for and provided for in national legislation before adoption of the Protocol, provided its annual consumption of the controlled substances does not exceed .5 kilograms per capita. This paragraph would allow the Soviet Union to include in its 1986 base year level expanded production foreseen in its five year plan; with this adjusted base level, it would freeze and begin reducing along with other Protocol Parties.

Paragraph 7 permits Parties that are member States of a REIO to fulfill jointly their obligations regarding consumption, as long as their total combined level of consumption does not exceed the limits specified in Article 2 and provided all member States of the REIO and the organization itself are Parties to the Protocol. This provision would allow the European Economic Community (EEC) to fulfill jointly its obligation respecting consumption, provided all twelve EEC members join the Protocol. Each EEC-member State that is a party to the Protocol would still be required to comply individually with the Protocol's production limits.

The procedure for calculating "production" and "consumption" is outlined in Article 3. The calculation takes into account the relative ozone-depleting potentials of the various chemicals.

With respect to trade with non-parties, Article 4 provides for:

A ban on imports from non-parties of the controlled substances within one year of the Protocol's entry into force.

A ban on imports from non-parties of products containing the controlled substances starting in the fourth year following the Protocol's entry into force. Within three years of entry into force, the Parties are to elaborate a list of products subject to this provision.

Consideration within five years of entry into force of restrictions on imports from non-parties of products produced with (but not containing) the controlled substances.

A prohibition against concluding new agreements which provide non-parties with financial assistance for producing the controlled substances.

Article 5 provides a ten-year grace period from compliance with the control measures for low-consuming developing countries that adhere to the Protocol, in order to encourage the broadest possible participation in the Protocol.

Article 6 specifies that beginning in 1990 and at least every four years thereafter, the Parties shall assess the control measures on the basis of available scientific, environmental, technical and economic information. It provides for expert panels, which are to report to the Parties, to be convened at least one year before each assessment.

Article 7 requires an annual report by each Party of its production, imports and exports of controlled substances. Article 8 requires the adoption of procedures and institutional mechanisms for determining non-compliance and for treatment of Parties found to be in non-compliance. Articles 9 and 10 provide for cooperation in research and exchange of information on alternative substances, products and technologies to reduce emissions of the controlled substances; cooperation in promoting public awareness; and technical assistance to facilitate participation in and implementation of the Protocol. Article 11 provides for meetings of the Parties, which will normally be held in conjunction with meetings of the Parties to the Convention. Article 12 defines the functions of the Secretariat, which will be carried out by the Secretariat established by the Convention.

Article 13 provides that funds required for the operation of the Protocol will be charged against contributions from its Parties, and that financial rules are to be adopted by consensus. Thus, the Pro-

tocol itself contains no mandatory financial obligations, but would commit the United States in principle to payment of its fair share of the future expenses of the secretariat, meetings of the parties, and panels of experts. Costs associated with these activities are likely to be relatively small and are capable of being covered with presently projected agency budgets.

Article 14 states that provisions of the Convention relating to its protocols shall apply to this Protocol. Article 15 sets out the dates and places where the Protocol is open for signature.

To ensure that the Protocol is effective and the economic burden of the controls is equitably shared, Article 16 provides that the Protocol will enter into force only when eleven countries representing at least two-thirds of global consumption have ratified the agreement. The Protocol is to enter into force on January 1, 1989, provided these conditions have been fulfilled and the Convention has entered into force. In the event these stipulations have not been fulfilled by that date, the Protocol will enter into force ninety days after the conditions have been met. The effective date of the freeze would in that case be delayed, but the specified dates for the reduction steps would remain effective.

The obligations the United States would assume under the Protocol will require implementing regulations. EPA is to issue proposed regulations on December 1, 1987 and intends to issue a final set of regulations by August 1, 1988. The effective date of the regulations would be tied to the entry into force of the Protocol. Section 157 of the Clean Air Act grants the Administrator of the Environmental Protection Agency authority to regulate substances, practices, processes, or activities which he finds may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere, if such effect may reasonably be anticipated to endanger public health or welfare. This broad authority provides the statutory basis for implementing the Protocol, including its trade provisions.

An environmental impact statement will be separately forwarded to the Senate for its information.

I recommend that the Montreal Protocol for Protection of the Ozone Layer be transmitted to the Senate as soon as possible for its advice and consent to ratification.

Respectfully submitted.

GEORGE P. SHULTZ.

MONTREAL PROTOCOL ON SUBSTANCES THAT DEPLETE THE OZONE LAYER, 1987

The Parties to this Protocol,

Being Parties to the Vienna Convention for the Protection of the Ozone Layer,

Mindful of their obligation under that Convention to take appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer,

Recognizing that world-wide emissions of certain substances can significantly deplete and otherwise modify the ozone layer in a manner that is likely to result in adverse effects on human health and the environment,

Conscious of the potential climatic effects of emissions of these substances,

Aware that measures taken to protect the ozone layer from depletion should be based on relevant scientific knowledge, taking into account technical and economic considerations,

Determined to protect the ozone layer by taking 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, taking into account technical and economic considerations,

Acknowledging that special provision is required to meet the needs of developing countries for these substances,

Noting the precautionary measures for controlling emissions of certain chlorofluorocarbons that have already been taken at national and regional levels,

Considering the importance of promoting international co-operation in the research and development of science and technology relating to the control and reduction of emissions of substances that deplete the ozone layer, bearing in mind in particular the needs of developing countries,

Have agreed as follows:

ARTICLE 1: DEFINITIONS

For the purposes of this Protocol:

1. "Convention" means the Vienna Convention for the Protection of the Ozone Layer, adopted on 22 March 1985.

2. "Parties" means, unless the text otherwise indicates, Parties to this Protocol.

3. "Secretariat" means the secretariat of the Convention.

4. "Controlled substance" means a substance listed in Annex A to this Protocol, whether existing alone or in a mixture. It excludes, however, any such substance or mixture which is in a man-

ufactured product other than a container used for the transportation or storage of the substance listed.

5. "Production" means the amount of controlled substances produced minus the amount destroyed by technologies to be approved by the Parties.

6. "Consumption" means production plus imports minus exports of controlled substances.

7. "Calculated levels" of production, imports, exports and consumption means levels determined in accordance with Article 3.

8. "Industrial rationalization" means the transfer of all or a portion of the calculated level of production of one Party to another, for the purpose of achieving economic efficiencies or responding to anticipated shortfalls in supply as a result of plant closures.

ARTICLE 2: CONTROL MEASURES

1. Each Party shall ensure that for the twelve-month period commencing on the first day of the seventh month following the date of the entry into force of this Protocol, and in each twelve-month period thereafter, its calculated level of consumption of the controlled substances in Group I of Annex A does not exceed its calculated level of consumption in 1986. By the end of the same period, each Party producing one or more of these substances shall ensure that its calculated level of production of the substances does not exceed its calculated level of production in 1986, except that such level may have increased by no more than ten per cent based on the 1986 level. Such increase shall be permitted only so as to satisfy the basic domestic needs of the Parties operating under Article 5 and for the purposes of industrial rationalization between Parties.

2. Each Party shall ensure that for the twelve-month period commencing on the first day of the thirty-seventh month following the date of the entry into force of this Protocol, and in each twelve month period thereafter, its calculated level of consumption of the controlled substances listed in Group II of Annex A does not exceed its calculated level of consumption in 1986. Each Party producing one or more of these substances shall ensure that its calculated level of production of the substances does not exceed its calculated level of production in 1986, except that such level may have increased by no more than ten per cent based on the 1986 level. Such increase shall be permitted only so as to satisfy the basic domestic needs of the Parties operating under Article 5 and for the purposes of industrial rationalization between Parties. The mechanisms for implementing these measures shall be decided by the Parties at their first meeting following the first scientific review.

3. Each Party shall ensure that for the period 1 July 1993 to 30 June 1994 and in each twelve-month period thereafter, its calculated level of consumption of the controlled substances in Group I of Annex A does not exceed, annually, eighty per cent of its calculated level of consumption in 1986. Each Party producing one or more of these substances shall, for the same periods, ensure that its calculated level of production of the substances does not exceed, annually, eighty per cent of its calculated level of production in 1986. However, in order to satisfy the basic domestic needs of the Parties

operating under Article 5 and for the purposes of industrial rationalization between Parties, its calculated level of production may exceed that limit by up to ten per cent of its calculated level of production in 1986.

4. Each Party shall ensure that for the period 1 July 1998 to 30 June 1999, and in each twelve-month period thereafter, its calculated level of consumption of the controlled substances in Group I of Annex A does not exceed, annually, fifty per cent of its calculated level of consumption in 1986. Each Party producing one or more of these substances shall, for the same periods, ensure that its calculated level of production of the substances does not exceed, annually, fifty per cent of its calculated level of production in 1986. However, in order to satisfy the basic domestic needs of the Parties operating under Article 5 and for the purposes of industrial rationalization between Parties, its calculated level of production may exceed that limit by up to fifteen per cent of its calculated level of production in 1986. This paragraph will apply unless the Parties decide otherwise at a meeting by a two-thirds majority of Parties present and voting, representing at least two-thirds of the total calculated level of consumption of these substances of the Parties. This decision shall be considered and made in the light of the assessments referred to in Article 6.

5. Any Party whose calculated level of production in 1986 of the controlled substances in Group I of Annex A was less than twenty-five kilotonnes may, for the purposes of industrial rationalization, transfer to or receive from any other Party, production in excess of the limits set out in paragraphs 1, 3 and 4 provided that the total combined calculated levels of production of the Parties concerned does not exceed the production limits set out in this Article. Any transfer of such production shall be notified to the secretariat, no later than the time of the transfer.

6. Any Party not operating under Article 5, that has facilities for the production of controlled substances under construction, or contracted for, prior to 16 September 1987, and provided for in national legislation prior to 1 January 1987, may add the production from such facilities to its 1986 production of such substances for the purposes of determining its calculated level of production for 1986, provided that such facilities are completed by 31 December 1990 and that such production does not raise that Party's annual calculated level of consumption of the controlled substances above 0.5 kilogram per capita.

7. Any transfer of production pursuant to paragraph 5 or any addition of production pursuant to paragraph 6 shall be notified to the secretariat, no later than the time of the transfer or addition.

8. (a) Any Parties which are Member States of a regional economic integration organization as defined in Article 1(6) of the Convention may agree that they shall jointly fulfill their obligations respecting consumption under this Article provided that their total combined calculated level of consumption does not exceed the levels required by this Article.

(b) The Parties to any such agreement shall inform the secretariat of the terms of the agreement before the date of the reduction in consumption with which the agreement is concerned.

(c) Such agreement will become operative only if all Member States of the regional economic integration organization and the organization concerned are Parties to the Protocol and have notified the secretariat of their manner of implementation.

9. (a) Based on the assessments made pursuant to Article 6, the Parties may decide whether:

(i) adjustments to the ozone depleting potentials specified in Annex A should be made and, if so, what the adjustments should be; and

(ii) further adjustments and reductions of production or consumption of the controlled substances from 1986 levels should be undertaken and, if so, what the scope, amount and timing of any such adjustments and reductions should be.

(b) Proposals for such adjustments shall be communicated to the Parties by the secretariat at least six months before the meeting of the Parties at which they are proposed for adoption.

(c) In taking such decisions, the Parties shall make every effort to reach agreement by consensus. If all efforts at consensus have been exhausted, and no agreement reached, such decisions shall, as a last resort, be adopted by a two-thirds majority vote of the Parties present and voting representing at least fifty per cent of the total consumption of the controlled substances of the Parties.

(d) The decisions, which shall be binding on all Parties, shall forthwith be communicated to the Parties by the Depositary. Unless otherwise provided in the decisions, they shall enter into force on the expiry of six months from the date of the circulation of the communication by the Depositary.

10. (a) Based on the assessments made pursuant to Article 6 of this Protocol and in accordance with the procedure set out in Article 9 of the Convention, the Parties may decide:

(i) whether any substances, and if so which, should be added to or removed from any annex to this Protocol; and

(ii) the mechanism, scope and timing of the control measures that should apply to those substances;

(b) Any such decision shall become effective, provided that it has been accepted by a two-thirds majority vote of the Parties present and voting.

11. Notwithstanding the provisions contained in the Article, Parties may take more stringent measures than those required by this Article.

ARTICLE 3: CALCULATION OF CONTROL LEVELS

For the purposes of Articles 2 and 5, each Party shall, for each Group of substances in Annex A, determine its calculated levels of:

(a) production by:

(i) multiplying its annual production of each controlled substance by the ozone depleting potential specified in respect of it in Annex A; and

(ii) adding together, for each such Group, the resulting figures;

(b) imports and exports, respectively, by following, *mutatis mutandis,* the procedure set out in subparagraph (a); and

(c) consumption by adding together its calculated levels of production and imports and subtracting its calculated level of exports as determined in accordance with subparagraphs (a) and (b). However, beginning on 1 January 1993, any export of controlled substances to non-Parties shall not be subtracted in calculating the consumption level of the exporting Party.

ARTICLE 4: CONTROL OF TRADE WITH NON-PARTIES

1. Within one year of the entry into force of this Protocol, each Party shall ban the import of controlled substances from any State not party to this Protocol.

2. Beginning on 1 January 1993, no Party operating under paragraph 1 of Article 5 may export any controlled substance to any State not party to this Protocol.

3. Within three years of the date of the entry into force of this Protocol, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a list of products containing controlled substances. Parties that have not objected to the annex in accordance with those procedures shall ban, within one year of the annex having become effective, the import of those products from any State not party to this Protocol.

4. Within five years of the entry into force of this Protocol, the Parties shall determine the feasibility of banning or restricting, from States not party to this Protocol, the import of products produced with, but not containing, controlled substances. If determined feasible, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a list of such products. Parties that have not objected to it in accordance with those procedures shall ban or restrict, within one year of the annex having become effective, the import of those products from any State not party to this Protocol.

5. Each Party shall discourage the export, to any State not party to this Protocol, of technology for producing and for utilizing controlled substances.

6. Each Party shall refrain from providing new subsidies, aid, credits, guarantees or insurance programmes for the export to States not party to this Protocol of products, equipment, plants or technology that would facilitate the production of controlled substances.

7. Paragraphs 5 and 6 shall not apply to products, equipment, plants or technology that improve the containment, recovery, recycling or destruction of controlled substances, promote the development of alternative substances, or otherwise contribute to the reduction of emissions of controlled substances.

8. Notwithstanding the provisions of this Article, imports referred to in paragraphs 1, 3 and 4 may be permitted from any State not party to this Protocol if that State is determined, by a meeting of the Parties, to be in full compliance with Article 2 and this Article, and has submitted data to that effect as specified in Article 7.

ARTICLE 5: SPECIAL SITUATION OF DEVELOPING COUNTRIES

1. Any Party that is a developing country and whose annual calculated level of consumption of the controlled substances is less than 0.3 kilogram per capita on the date of the entry into force of the Protocol for it, or any time thereafter within ten years of the date of entry into force of the Protocol shall, in order to meet its basic domestic needs, be entitled to delay its compliance with the control measures set out in paragraphs 1 to 4 of Article 2 by ten years after that specified in those paragraphs. However, such Party shall not exceed an annual calculated level of consumption of 0.3 kilogram per capita. Any such Party shall be entitled to use either the average of its annual calculated level of consumption for the period 1995 to 1997 inclusive or a calculated level of consumption of 0.3 kilogram per capita, whichever is the lower, as the basis for its compliance with the control measures.

2. The Parties undertake to facilitate access to environmentally safe alternative substances and technology for Parties that are developing countries and assist them to make expeditious use of such alternatives.

3. The Parties undertake to facilitate bilaterally or multilaterally the provision of subsidies, aid, credits, guarantees or insurance programmes to Parties that are developing countries for the use of alternative technology and for substitute products.

ARTICLE 6: ASSESSMENT AND REVIEW OF CONTROL MEASURES

Beginning in 1990, and at least every four years thereafter, the Parties shall assess the control measures provided for in Article 2 on the basis of available scientific, environmental, technical and economic information. At least one year before each assessment, the Parties shall convene appropriate panels of experts qualified in the fields mentioned and determine the composition and terms of reference of any such panels. Within one year of being convened, the panels will report their conclusions, through the secretariat, to the Parties.

ARTICLE 7: REPORTING OF DATA

1. Each Party shall provide to the secretariat, within three months of becoming a Party, statistical data on its production, imports and exports of each of the controlled substances for the year 1986, or the best possible estimates of such data where actual data are not available.

2. Each Party shall provide statistical data to the secretariat on its annual production (with separate data on amounts destroyed by technologies to be approved by the Parties), imports, and exports to Parties and non-Parties, respectively, of such substances for the year during which it becomes a Party and for each year thereafter. It shall forward the data no later than nine months after the end of the year to which the data relate.

ARTICLE 8: NON-COMPLIANCE

The Parties, at their first meeting, shall consider and approve procedures and institutional mechanisms for determining non-com-

pliance with the provisions of this Protocol and for treatment of Parties found to be in non-compliance.

ARTICLE 9: RESEARCH, DEVELOPMENT, PUBLIC AWARENESS AND EXCHANGE OF INFORMATION

1. The Parties shall co-operate, consistent with their national laws, regulations and practices and taking into account in particular the needs of developing countries, in promoting, directly through competent international bodies, research, development and exchange of information on:

(a) best technologies for improving the containment, recovery, recycling or destruction of controlled substances or otherwise reducing their emissions;

(b) possible alternatives to controlled substances, to products containing such substances, and to products manufactured with them; and

(c) costs and benefits of relevant control strategies.

2. The Parties, individually, jointly or through competent international bodies, shall co-operate in promoting public awareness of the environmental effects of the emissions of controlled substances and other substances that deplete the ozone layer.

3. Within two years of the entry into force of this Protocol and every two years thereafter, each Party shall submit to the secretariat a summary of the activities it has conducted pursuant to this Article.

ARTICLE 10: TECHNICAL ASSISTANCE

1. The Parties shall, in the context of the provisions of Article 4 of the Convention, and taking into account in particular the needs of developing countries, co-operate in promoting technical assistance to facilitate participation in and implementation of this Protocol.

2. Any Party or Signatory to this Protocol may submit a request to the secretariat for technical assistance for the purposes of implementing or participating in the Protocol.

3. The Parties, at their first meeting, shall begin deliberations on the means of fulfilling the obligations set out in Article 9, and paragraphs 1 and 2 of this Article, including the preparation of workplans. Such workplans shall pay special attention to the needs and circumstances of the developing countries. States and regional economic integration organizations not party to the Protocol should be encouraged to participate in activities specified in such workplans.

ARTICLE 11: MEETINGS OF THE PARTIES

1. The Parties shall hold meetings at regular intervals. The secretariat shall convene the first meeting of the Parties not later than one year after the date of the entry into force of this Protocol and in conjunction with a meeting of the Conference of the Parties to the Convention, if a meeting of the latter is scheduled within that period.

2. Subsequent ordinary meetings of the Parties shall be held, unless the Parties otherwise decide, in conjunction with meetings

of the Conference of the Parties to the Convention. Extraordinary meetings of the Parties shall be held at such other times as may be deemed necessary by a meeting of the Parties, or at the written request of any Party, provided that, within six months of such a request being communicated to them by the secretariat, it is supported by at least one third of the Parties.

3. The Parties, at their first meeting, shall:

(a) adopt by consensus rules of procedure for their meetings;

(b) adopt by consensus the financial rules referred to in paragraph 2 of Article 13;

(c) establish the panels and determine the terms of reference referred to in Article 6;

(d) consider and approve the procedures and institutional mechanisms specified in Article 8; and

(e) begin preparation of workplans pursuant to paragraph 3 of Article 10.

4. The functions of the meetings of the Parties shall be to:

(a) review the implementation of this Protocol;

(b) decide on any adjustments or reductions referred to in paragraph 9 of Article 2;

(c) decide on any addition to, insertion in or removal from any annex of substances and on related control measures in accordance with paragraph 10 of Article 2;

(d) establish, where necessary, guidelines or procedures for reporting of information as provided for in Article 7 and paragraph 3 of Article 9;

(e) review requests for technical assistance submitted pursuant to paragraph 2 of Article 10;

(f) review reports prepared by the secretariat pursuant to subparagraph (c) of Article 12;

(g) assess, in accordance with Article 6, the control measures provided for in Article 2;

(h) consider and adopt, as required, proposals for amendment of this Protocol or any annex and for any new annex;

(i) consider and adopt the budget for implementing this Protocol; and

(j) consider and undertake any additional action that may be required for the achievement of the purposes of this Protocol.

5. The United Nations, its specialized agencies and the International Atomic Energy Agency, as well as any State not party to this Protocol, may be represented at meetings of the Parties as observers. Any body or agency, whether national or international, governmental or non-governmental, qualified in fields relating to the protection of the ozone layer which has informed the secretariat of its wish to be represented at a meeting of the Parties as an observer may be admitted unless at least one third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure adopted by the Parties.

ARTICLE 12: SECRETARIAT

For the purposes of this Protocol, the secretariat shall:

(a) arrange for and service meetings of the Parties as provided for in Article 11;

(b) receive and make available, upon request by a Party, data provided pursuant to Article 7;

(c) prepare and distribute regularly to the Parties reports based on information received pursuant to Articles 7 and 9;

(d) notify the Parties of any request for technical assistance received pursuant to Article 10 so as to facilitate the provision of such assistance;

(e) encourage non-Parties to attend the meetings of the Parties as observers and to act in accordance with the provisions of this Protocol;

(f) provide, as appropriate, the information and requests referred to in subparagraphs (c) and (d) to such non-party observers; and

(g) perform such other functions for the achievement of the purposes of this Protocol as may be assigned to it by the Parties.

ARTICLE 13: FINANCIAL PROVISIONS

1. The funds required for the operation of this Protocol, including those for the functioning of the secretariat related to this Protocol, shall be charged exclusively against contributions from the Parties.

2. The Parties, at their first meeting, shall adopt by consensus financial rules for the operation of this Protocol.

ARTICLE 14: RELATIONSHIP OF THIS PROTOCOL TO THE CONVENTION

Except as otherwise provided in this Protocol, the provisions of the Convention relating to its protocols shall apply to this Protocol.

ARTICLE 15: SIGNATURE

This Protocol shall be open for signature by States and by regional economic integration organizations in Montreal on 16 September 1987, in Ottawa from 17 September 1987 to 16 January 1988, and at United Nations Headquarters in New York from 17 January 1988 to 15 September 1988.

ARTICLE 16: ENTRY INTO FORCE

1. This Protocol shall enter into force on 1 January 1989, provided that at least eleven instruments of ratification, acceptance, approval of the Protocol or accession thereto have been deposited by States or regional economic integration organizations representing at least two-thirds of 1986 estimated global consumption of the controlled substances, and the provisions of paragraph 1 of Article 17 of the Convention have been fulfilled. In the event that these conditions have not been fulfilled by that date, the Protocol shall enter into force on the ninetieth day following the date on which the conditions have been fulfilled.

2. For the purposes of paragraph 1, any such instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by member States of such organization.

3. After the entry into force of this Protocol, any State or regional economic integration organization shall become a Party to it on

the ninetieth day following the date of deposit of its instrument of ratification, acceptance, approval or accession.

ARTICLE 17: PARTIES JOINING AFTER ENTRY INTO FORCE

Subject to Article 5, any State or regional economic integration organization which becomes a Party to this Protocol after the date of its entry into force, shall fulfill forthwith the sum of the obligations under Article 2, as well as under Article 4, that apply at that date to the States and regional economic organizations that became Parties on the date the Protocol entered into force.

ARTICLE 18: RESERVATIONS

No reservations may be made to this Protocol.

ARTICLE 19: WITHDRAWAL

For the purposes of this Protocol, the provisions of Article 19 of the Convention relating to withdrawal shall apply, except with respect to Parties referred to in paragraph 1 of Article 5. Any such Party may withdraw from this Protocol by giving written notification to the Depositary at any time after four years of assuming the obligations specified in paragraphs 1 to 4 of Article 2. Any such withdrawal shall take effect upon expiry of one year after the date of its receipt by the Depositary, or on such later date as may be specified in the notification of the withdrawal.

ARTICLE 20: AUTHENTIC TEXTS

The original of this Protocol, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

In witness whereof the undersigned, being duly authorized to that effect, have signed this Protocol.

Done at Montreal this sixteenth day of September, One Thousand Nine Hundred and Eighty-Seven.

ANNEX A—CONTROLLED SUBSTANCES

	Substance	Ozone depleting potential [1]
Group I	$CFCl_3$ (CFC–11)	1.0
	CF_2Cl_2 (CFC–12)	1.0
	$C_2F_3Cl_3$ (CFC–113)	0.8
	$C_2F_4Cl_2$ (CFC–114)	1.0
	C_2F_5Cl (CFC–115)	0.6
Group II	CF_2BrCl (halon-1211)	3.0
	CF_3Br (halon-1301)	10.0
	$C_2F_4Br_2$ (halon-2402)	(to be determined)

[1] These ozone depleting potentials are estimates based on existing knowledge and will be reviewed and revised periodically.

I hereby certify that the foregoing text is a true copy of the Montreal Protocol on Substances that Deplete the Ozone Layer, concluded at Montreal on 16 September 1987, the original of which is deposited with the Secretary-General of the United Nations, as the said Protocol was opened for signature.

For the Secretary-General,
The Legal Counsel:

CARL-AUGUST FLEISCHHAUER.

UNITED NATIONS, NEW YORK, *15 October 1987.*

Je certifie que le texte qui précède est une copie conforme du Protocole de Montréal relatif à des substances qui appauvrissent la couche d'ozone, conclu à Montréal le 16 septembre 1987, dont l'original se trouve déposé auprès du Secrétaire général de l'Organisation des Nations Unies, tel que ledit Protocole a été ouvert à la signature.

Pour le Secrétaire général,
Le Conseiller juridique:

CARL-AUGUST FLEISCHHAUER.

ORGANISATION DES NATIONS UNIES, NEW YORK, *le 15 octobre 1987.*

○

United States Department of State

Washington, D.C. 20520

2178

March 21, 1988

MEMORANDUM FOR COLIN L. POWELL
THE WHITE HOUSE

Subject: Ratification of the Montreal Protocol on Substances That Deplete the Ozone Layer

Attached for signature by the President is the instrument of ratification, in duplicate, of the Montreal Protocol on Substances That Deplete the Ozone Layer, done at Montreal on September 16, 1987.

The Senate gave its advice and consent to ratification on March 14, 1988.

The Montreal Protocol, negotiated under the auspices of the United Nations Environment Program, is a supplemental agreement to the Vienna Convention for the Protection of the Ozone Layer, adopted in March 1985 and ratified by the United States in August 1986. The Protocol provides for internationally coordinated control of ozone-depleting substances in order to protect public health and the environment from potential adverse effects of depletion of stratospheric ozone. The Protocol establishes an obligation to limit consumption and production of ozone-depleting substances and restricts trade in controlled substances with States not party to the Protocol. United States ratification is necessary for entry into force and effective implementation of the Protocol.

Melvyn Levitsky

Melvyn Levitsky
Executive Secretary

Attachment:

Instrument of
ratification,
in duplicate

Rays and Fumes in the Air and in the News

To the Editor:

In a careful reanalysis of data from ground observing stations and satellites, a group of scientists has been able to extract the existence of a small but statistically significant decline in global stratospheric ozone (news story, March 16). The trend over the last 15 years is less than .2 percent per year, about 100 times smaller than some naturally occurring periodic and quasi-periodic fluctuations. Apart from complimenting the analysts on their difficult task, I want to make two observations:

(1) It has been estimated that for every 1 percent decline in stratospheric ozone, an additional 2 percent of skin-cancer-inducing ultraviolet radiation reaches the earth's surface. One would therefore expect ultraviolet radiation to have increased at the rate of .4 percent a year.

The evidence is decidedly otherwise. In the Feb. 12 issue of Science, Joseph Scotto of the National Cancer Institute and his collaborators published direct measurements of surface ultraviolet radiation from eight U.S. sites. Every one of the well-calibrated instruments shows a declining trend, rather than an increase, since the monitoring program began in 1974, with declines ranging from .5 percent to as much as 1.1 percent a year.

The reasons for this remarkable discrepancy are unexplained. But less ultraviolet radiation should mean fewer skin cancer cases, rather than more — all other things being the same. That skin cancer rates are increasing is puzzling and indicates factors other than ultraviolet radiation intensity are at work.

(2) Many scientists seem convinced that the reported decline in ozone must be due to chlorofluorocarbon released into the atmosphere; they wish to persuade the public that this hypothesis is established fact. But the decline is much larger than could reasonably be expected from current chlorofluorocarbon theories; therefore other natural or man-made causes must contribute to the ozone change and perhaps even overwhelm any chlorofluorocarbon effects.

Further, to be convincing, the theory must explain the odd variations in decline rate with latitude and season. If the theory cannot explain — never mind, forecast — the seasonal Antarctic "ozone hole," how can we trust it to make the 100-year forecast on which to base decisions to roll back or even close down the manufacture of chlorofluorocarbons?

Public policy about chlorofluorocarbon faces the problem of decision making under uncertainty. What is needed, it seems to me, is a more complete analysis that weighs the risks from a delay in instituting controls on production and use of chlorofluorocarbons against the possibility of getting substantial improvements in the theory so that its predictions can be relied upon.

S. FRED SINGER

Washington, March 17, 1988

The writer, currently with a Federal department, is environmental sciences professor, University of Virginia.

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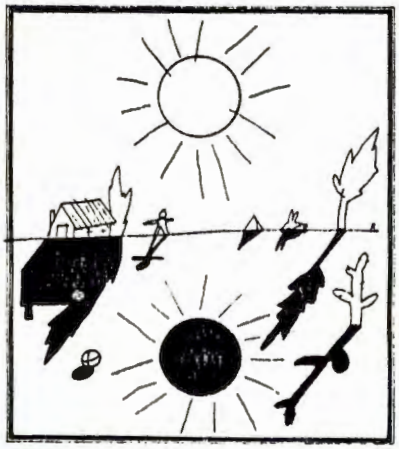
Expand Ethanol Use

To the Editor:

In your report on Colorado's high-oxygen fuel test (news story, March 1) and the state's clean-air program, which mandates the use of oxygenated fuels in winter months, you



Rico Lins

quote an Amoco spokesman, Jerry Levine, as saying, "We were very surprised — we thought there'd be more consumer backlash."

It is no wonder that Mr. Levine was surprised: the company worked hard to undermine the program. In addition to their usual scare stories about the impact of ethanol, oil companies created and financed an organization called the Consumer Environmental Awareness Project, whose goal was to question whether the clean-air program had consumer backing.

With such a concerted effort by the oil companies, Amoco was undoubtedly surprised and disappointed to discover that consumers ignored their negative campaign and supported the program, which proved a success. Consumers apparently realized that antiethanol claims by oil companies are deceptive and self-serving.

Before the Colorado program began, auto dealers and their mechanics who believed the oil company message expected widespread mechanical problems and reduced mileage. However, as you indicate, dealers learned what ethanol proponents have been saying all along: the use of oxygenated fuels such as ethanol does not impair vehicle performance.

Unfortunately, the oil companies blocked ethanol from most of the Denver market by shipping gasoline containing methyl tertiary butyl ether, or MTBE, an alternative oxygenate that cannot be blended with ethanol under Environmental Protection Agency restrictions.

Since ethanol use reduces carbon monoxide emissions by twice as much as MTBE, Colorado residents would breathe easier if the oil companies stopped trying to prevent consumers from using ethanol and allowed it to take its place as the fuel of choice for environmental reasons.

Other cities with carbon monoxide problems may also want to learn the lesson of Colorado. Just as carbon monoxide pollution obscures the view of the Rocky Mountains in Colorado, the campaign of the oil companies against ethanol obscures the truth about ethanol's benefits to America. The expanded use of ethanol can clear up both problems at the same time.

RICHARD J. DURBIN

Member of Congress, 20th Dist., Ill.

Washington, March 4, 1988

WP, 3/15/88

Senate Approves International Ozone Treaty

Pact Would Limit Chemicals Harmful to Earth's Protective Shield

By Michael Weisskopf
Washington Post Staff Writer

The Senate unanimously approved an international treaty yesterday to halve the world's consumption of chemicals that erode the gaseous ozone layer shielding Earth from harmful ultraviolet rays.

By the 83-to-0 vote, the United States became the first major producer and consumer of the chemicals—chlorofluorocarbons (CFC)—to ratify the treaty tentatively approved by 30 other nations. President Reagan is expected to sign the instrument of ratification.

The treaty represents the first international agreement to curb an air pollutant and is considered a model for other multinational environmental problems.

"This is an important assertion of U.S. leadership on a critical environmental issue," said Richard Benedick, chief U.S. negotiator. "This sets a good example for other major producer countries to accelerate their own ratification process."

The treaty, which calls for a staged, 50 percent cut in ozone-depleting chemicals over 10 years, becomes effective Jan. 1, 1989, if ratified by 11 countries representing two-thirds of global use of CFCs. The United States accounts for 30 percent of world consumption, the European Community 30 percent and Japan 10 percent to 15 percent.

Used widely as refrigerants, plastic foaming agents and solvents, CFCs do not break down in the lower atmosphere as most pollutants do. As they waft into the upper atmosphere, they release chlorine that eats away the stratospheric ozone layer.

High above Earth's surface, ozone screens the sun's ultraviolet rays, preventing skin cancer, eye disease and crop damage.

Environmentalists argue that the treaty does not go far enough to stop ozone depletion, citing recent reports of the widening ozone "hole" over Antarctica. They are seeking a global ban on CFCs, a $750 million-a-year U.S. business in 1986.

"The evidence since the protocol was signed demonstrates that ozone depletion has been far more rapid and more widespread than previously anticipated," said Rafe Pomerance of the World Resources Institute.

Sen. John H. Chafee (R-R.I.) tried to accompany ratification with a resolution urging faster and deeper CFC cuts in the treaty or unilateral U.S. actions to reduce consumption. But he failed to obtain the unanimous consent needed to consider the measure along with the treaty, and it was shelved for later consideration.

Benedick lauded the treaty as a "landmark" but expressed concern that some EC members will delay ratification. Since the 12-member EC plans to ratify as a unit, he said, this could delay the Jan. 1 implementation date.

Noting that Great Britain, France and Italy were the "least enthusiastic" during treaty negotiations in Montreal last September, Benedick warned of a "real danger in tying themselves to the slowest members."

All of the world's industrial powers, including the Soviet Union, have signed the Montreal protocol, but only Mexico also has ratified it.

If the required number of countries have not ratified the agreement by Jan. 1, implementation is scheduled three months after the conditions are met.

OES Press Announcement March 15, 1988

OZONE PROTOCOL

We are gratified by yesterday's unanimous Senate vote in support of the Montreal Protocol on Substances that Deplete the Ozone Layer. A statement on this important agreement is available in the Press Office.

Drafted: OES/ENV - SButcher

Cleared: OES/E - ASens, Acting
OES - RJSmith, Acting
OES - AParker
PA - CRedman

March 15, 1988

OZONE PROTOCOL ADOPTED

We are gratified that the Senate voted yesterday to give its advice and consent to ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer.

Unanimous Senate approval of the Protocol stands as a clear statement by the United States that the world community must take decisive action to assure that the stratospheric ozone layer is protected from the damaging effects of chlorofluorocarbons and halons. Yesterday's vote demonstrates our willingness to continue our leadership role in this vital undertaking.

The Montreal Protocol is one of the most important international environmental agreements in history. It provides for internationally coordinated control of ozone-depleting substances in order to protect a vital global resource. The Protocol requires Parties to reduce production and consumption of the major ozone-depleting chlorofluorocarbons by 50% by 1998. This will spur development and use of safer substances. Recognizing the special needs of developing countries, the Protocol allows them a grace period in the control schedule. The Protocol also establishes an ongoing process for review of new scientific data and technical and economic developments, as well as a process to adjust the Protocol's provisions if the review indicates that adjustments are necessary to protect global health and the environment.

Broad participation in the Protocol by countries throughout the world is important to the effective protection of the ozone layer. The Montreal Protocol provides incentives for countries to join the agreement. It restricts imports of the controlled substances from countries that do not join. This will encourage countries to join and prevent those that do not join from competing unfairly with those of us who do shoulder our share of the responsibility for protection of the ozone layer.

The Montreal Protocol is a model of international cooperation. Through the Montreal Protocol, the world community has recognized that the problem of ozone depletion is global both in terms of its causes and its effects. Therefore, solving it must also involve all nations of the world. The Protocol is the product of an extraordinary process of scientific study, negotiations among representatives of the business and environmental communities, and international diplomacy. It is a monumental achievement.

For further information contact:
Suzanne Butcher
Office of Environmental Protection
647-9312

WH Press Briefing, 15 Mar 88, pp. 5-6.

MR. FITZWATER: Okay, the President commends the Senate for its prompt advice and consent to ratification of the Montreal Protocol on substances that deplete the ozone layer. This action marks an important milestone for the future quality of the global environment and for the health and well-being of all people of the world. The unanimous and 83-to-0 Senate approval of the protocol stands as a clear statement by the United States that the world community must take decisive action to assure that the stratospheric ozone layer is protected from the damaging effects of chlorofluorocarbons and halons. Yesterday's vote demonstrates our willingness to continue a world leadership role in this vital undertaking.

WP, 3/16/88

Evidence of Ozone Depletion Found Over Big Urban Areas

Pattern Widens; Severity Surprises Experts

By Cass Peterson
Washington Post Staff Writer

Atmospheric ozone has decreased by as much as 3 percent over densely populated areas of North America and Europe since 1969, according to a new international study that provides the first evidence of worldwide ozone depletion.

The study found even more dramatic ozone losses during the winter months and at higher northern latitudes, including wintertime drops of more than 6 percent in Alaska and the Scandinavian countries.

The severity of the ozone decrease came as a surprise to researchers, and once again confounded scientific theories that had projected a much smaller rate of ozone depletion.

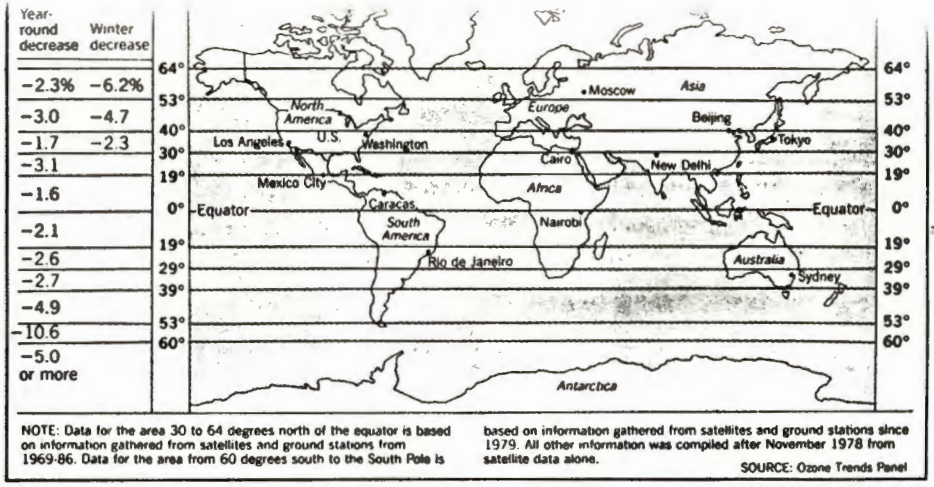
It also raises immediate questions about potential health effects. Stratospheric ozone filters out the most damaging ultraviolet solar rays, and federal experts have estimated that each percentage point of decrease in ozone could lead to a 5 to 7 percent increase in numbers of skin cancers.

"Things are worse than we thought," said Robert Watson of the National Aeronautics and Space Administration. "There has been a long-term change since 1969 that had not been recognized before."

More than 100 scientists from U.S. and U.N. agencies collaborated on the study, which reanalyzed nearly two decades of ozone data gathered by satellite and by ground-based instruments.

Watson and other scientists said there is little doubt that the ozone decrease is attributable to chlorofluorocarbons (CFCs) and other

See OZONE, A8, Col. 1



NOTE: Data for the area 30 to 64 degrees north of the equator is based on information gathered from satellites and ground stations from 1969-86. Data for the area from 60 degrees south to the South Pole is based on information gathered from satellites and ground stations since 1979. All other information was compiled after November 1978 from satellite data alone.

SOURCE: Ozone Trends Panel

BY CLARICE BORIO—THE WASHINGTON POST

Worldwide Ozone Depletion Reported; Severity of Trend Surprises Experts

OZONE, From A1

man-made chemicals that destroy ozone in the stratosphere. The figures reported in the study were adjusted to account for natural ozone changes, which can come from sun spots, volcanic activity and unusual weather patterns.

"We have strong evidence that change in the ozone is wholly or in large part due to man-made chlorine," Watson said.

The report comes a day after the Senate ratified a 31-nation treaty to cut global CFC emissions by 50 percent over the next decade. Scientists yesterday questioned whether the treaty, signed last year in Montreal, is stringent enough. "The Montreal protocol can do absolutely nothing," Watson said.

F. Sherwood Rowland of the University of California at Irvine, who headed one of the study groups, said the current changes are occurring at chlorine levels of about 3 parts per billion in the atmosphere, and the treaty will allow chlorine levels to reach 6 to 7 parts per billion before they are reduced.

"We're seeing severe damage now and we know it's going to get worse because we have more chlorine on the way," he said.

According to the study, ozone has declined by about 2 percent at latitudes between 40 and 52 degrees north, which includes the contiguous United States above a line running roughly from New York City to Eureka, Calif. Between the latitudes of 30 and 39 degrees north, which includes most of the rest of the contiguous United States, ozone levels decreased about 1.7 percent.

Because most ground-based stations are in the United States or European nations, ozone depletion levels for the Southern Hemisphere had to be estimated from satellite data alone, which is considered less accurate and has been gathered for only 10 years.

The exception is the Southern Hemisphere area closest to Antarctica, where researchers have monitored ozone from ground stations. According to the study, ozone in that area has been reduced about 5 percent since 1979, probably because of a deep "hole" that develops in the ozone over Antarctica each year.

The Antarctic phenomenon came as a surprise when it was first reported in 1984 because none of the computerized "models" that scientists use to predict ozone depletion projected decreases of that size. Last year, ozone levels over Antarctica dropped by more than 50 percent, the deepest depletion since the "hole" was first reported.

The worldwide figures reported yesterday were similarly startling, because the overall ozone decreases are three times greater than expected. Had the models been accurate, scientists would have expected to see ozone decreases of perhaps .5 to 1 percent—small enough that they would have been hard to distinguish from natural fluctuations.

"All the previous reports have said there is no statistically significant trend since the 1960s," Watson said. "What we are reporting is clearly a statistically meaningful decrease in ozone. Our models are not doing a good job."

One problem, scientists said, is that current models have not taken into account the added effect of ice crystals, which form over Antarctica in the coldest months and provide a base for chlorine reactions with ozone.

Rowland said similar reactions may be taking place over the Arctic, which would explain why ozone has decreased more at latitudes closer to the North Pole than it has at more southerly latitudes.

Next winter, scientists hope to conduct the kind of intensive research in the Arctic that they have conducted the last two years in Antarctica.

NYT 3/16/88

Study Shows Significant Decline in Ozone Layer

By PHILIP SHABECOFF
Special to The New York Times

WASHINGTON, March 15 — Federal scientists reported today that atmospheric ozone over the Northern Hemisphere had declined significantly over the last two decades. The study, the most authoritative so far, reaches a conclusion similar to another reported earlier this year but adds important new details on the extent of worldwide depletion of the protective ozone shield.

Today's study, released by the National Aeronautics and Space Administration, also found that loss of ozone in the Southern Hemisphere, which is most acute in springtime over Antarctica, was spreading into wider areas and that ozone levels were reduced throughout the year.

Ozone in the upper atmosphere absorbs ultraviolet rays from the sun that can cause skin cancer and eye problems and damage other human health and natural systems. Scientists estimate that for every 1 percent decline in atmospheric ozone, 2 percent more ultraviolet radiation reaches the earth's surface.

Consensus on Blame

Government and academic scientists who helped prepare the new study said that there is now, for the first time, a broad scientific consensus that man-made chemicals are responsible for much of the ozone loss.

They also said that the new findings showed that the health threat from ultraviolet radiation piercing the thinning ozone shield is serious one. They said it required quick international ratification of a treaty reached by 31 nations last Septemeber to restrain the use of chlorofluorcarbons and other chemicals that are destroying ozone in the upper atmosphere.

Dr. Robert T. Watson, a NASA scientist who was chairman of the panel of scientists that prepared the new report, said at a news conference today its findings suggested that more "draconian" measures than the treaty may be needed to stabilize the protective ozone shield.

The study was prepared by more than 100 scientists who analyzed atmospheric measurements from both satellites and ground stations. They found that, after discounting for natural causes of depletion, such as decreased solar activity, ozone in the range of 30 degrees to 60 degrees north latitude decreased 1.7 to 3 percent from 1969 to 1986.

This area includes most of the heavily populated regions of the United States and Canada, Western Europe, the Soviet Union, China and Japan.

Improvements on Earlier Study

The ozone loss was found to be as much as 6.2 percent in the wintertime at some latitudes, more severe than had been predicted by scientific models.

An analysis published earlier this year by scientists at the University of Illinois found that global ozone levels dropped by 5 percent from 1979 to 1986. But scientists at today's news conference said that they had made new, more accurate corrections of raw data from satellite instruments, accounting for much of the difference.

Dr. Kenneth Bowman, an author of the Illinois study, said that the results reported in the NASA study are based on a recalibration of data from the satellite measurements and that there was "no real disagreement" in the two studies, except that his estimates of ozone depletion were a little higher. He said that, based on the refinement of the measurements, he would agree that the decline in ozone was not quite as large as his report had suggested.

Theory on Chemicals

Today's study also found that the dramatic loss of ozone that has been occurring over Antarctica in springtime is now having an effect on much of the Southern Hemisphere. The ozone layer over the Antarctic declined by as much as 50 percent last September. But today's study notes that ozone appears to have decreased since 1979 by 5 percent or more throughout the year at all latitudes south of 60 degrees south.

The report said that an expected cyclical increase in solar radiation, which stimulates the production of ozone in the atmosphere, is expected to offset ozone losses to man-made chemicals from 1985 to 1991. But the loss of ozone is expected to resume after 1991 as solar radiation declines.

In the early 1970's, F. Sherwood Rowland and Mario Molina, scientists at the University of California, Irvine, speculated that chlorofluorocarbons, industrial chemicals widely used in refrigeration, insulating foam, solvents and aerosol propellents were remaining in the atmosphere for long periods and combining with and destroying ozone molecules. Later, halons, chemicals used in fire extinguishers, were added to the list of suspects.

That theory has now gained wide acceptance as correct.

Dr. John Gille, a scientist with the National Center for Atmospheric Research and one of the leaders of the panel of scientists that prepared today's study, said that for a long time it was strongly suspected that the man-made chemicals were destroying the ozone layer. But he said this study had produced "the corpse."

"For the first time," he said in an interview, "we have a really definitive answer that ozone has decreased. We understand what is going on and we can predict it will be much more severe in the future."

Elements of Treaty

The protocol adopted last September in Montreal would freeze the production and use of chlorofluorocarbons at 1986 levels starting in 1989 and roll back production by as much as 50 percent by 1999.

The United States Senate voted on Monday, 83 to 0, to approve ratification of the international agreement and President Reagan today praised the vote. But the only other nation to ratify the protocol so far is Mexico.

Dr. Rowland noted, however, that because chlorofluorocarbons remain in the atmosphere for many decades, the destruction of ozone will continue after the freeze as more of the chemicals are used and released into the atmosphere.

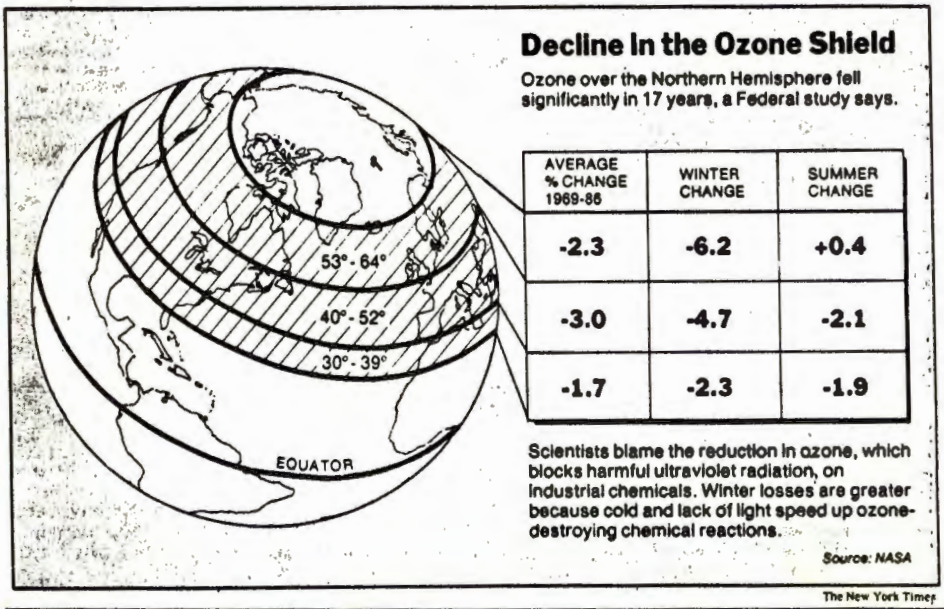
"My own view is that we are seeing severe damage now and we know it is going to get worse because more chlorine is on its way" into the atmosphere, Dr. Rowland said.

Dr. Watson of NASA said that study shows that "ratification of the Montreal protocol is an essential first step."

But he added that it suggests Lee M. Thomas, Administrator of the Environmental Protection Agency, and Mustafa K. Tolba, the director of the United Nations Environmental Program, "should look long and hard" at whether to invoke a provision of the protocol that calls for member nations to reconvene if scientific evidence shows that the the agreement is insufficient to protect the ozone layer.

Mr. Thomas said after today's news conference that the findings of the new study would be considered during a reassessment of the global ozone situation scheduled under the protocol for 1990. "The crucial first step, however, is international ratification of the Montreal protocol," he added.

Scientists say the new findings show a serious health threat.



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

March 18, 1988

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

On behalf of the hundreds of members of the Alliance for Responsible CFC Policy, an industry coalition of U.S. users and producers of chlorofluorocarbon(CFC) chemicals, I am writing to urge you to sign as soon as possible the Montreal Protocol on Substances that Deplete the Ozone Layer. The agreement has the widespread support of governments, industry and environmental organization representatives worldwide.

The Protocol, which was approved unanimously by the U.S. Senate on Monday, March 14th, is an unprecedented agreement that establishes an effective risk assessment/risk management process on the issue of global stratospheric ozone depletion. It provides the proper framework for incorporating new scientific information into the assessment of what future actions may be necessary to further protect the ozone layer.

By signing the Montreal Protocol, you will maintain the United States' key leadership role in the world community in seeking the appropriate global response to this important environmental issue. The U.S. will be the first significant producer and consumer of chlorofluorocarbons to complete the ratification process.

We further encourage that you personally contact the heads of government in those nations that have signed the agreement and ask that they move expeditiously to ratify the Protocol. Also, we ask that you instruct the State Department and other U.S. departments and agencies to include the Montreal Protocol as a priority agenda item for any discussions with nations that have not yet signed the agreement.

The Alliance remains committed to the goal of having a responsible and effective global environmental policy with regard to this issue that minimizes international economic disruption. U.S. leadership in making the Protocol process work is essential.

Sincerely yours,

Richard Barnett

Richard Barnett
Chairman

systems that miss the deadline, the agency has broad discretion in assessing penalties. He added that the penalties would be used primarily to finance abatement actions.

Moore said EPA "has no official position" on extending the deadlines but said a proposal for EPA to grant individual waivers could burden the agency with thousands of applications. He presented EPA's views at a joint hearing of the Senate Environment and Public Works Subcommittees on Hazardous Wastes and Toxic Substances and on Superfund and Environmental Oversight.

Florio Opposes Extension

Appearing as a witness, Rep. James Florio (D-NJ) said he was not convinced of the need for deadline extensions. Florio, a principal author of the law, said he might support waivers of the deadline for individual school systems "only if EPA is required to certify on a site-specific, school-by-school basis" the conditions that would justify an extension.

Rep. Michael Oxley (R-Ohio) disagreed with Florio and blamed the deadlines for driving up schools' costs for asbestos contractors and consultants. If the deadlines are not extended, he said, "a lot of members of Congress are going to be uncomfortable when thousands of school districts are being fined $5,000 a day."

Moore said AHERA-accredited inspectors and management planners are being trained in EPA-approved training courses at the rate of 2,000 per month. By the end of March, he said, about 9,000 inspectors and management planners will be trained.

These numbers indicate that there will be enough inspectors to meet the deadline, Moore said. He acknowledged, however, that the geographic distribution of the inspectors may prevent school systems from meeting the deadlines.

Robert L. Anderson, executive director of the school boards association in Montana, said a three-month, across-the-board extension of the deadlines is needed.

Witnesses representing the National Parent Teacher Association, the National Education Association, the American Federation of State, County and Municipal Employees, and the Service Employees International Union said at the hearing that they oppose any extensions. They said the law gives EPA sufficient discretion to resolve compliance problems.

Air Pollution

STRATOSPHERIC OZONE DECREASES MEASURABLY IN NORTHERN HEMISPHERE, OZONE REPORT SAYS

Stratospheric ozone over the Northern Hemisphere decreased 2.5 percent between October 1978 and October 1985, Robert T. Watson of the National Aeronautics and Space Administration said March 15.

Watson presented the NASA findings at a press briefing to release the *Executive Summary of the Ozone Trends Panel*. It summarizes 17 months of research by more than 100 scientists who are members of the international panel, which Watson chairs.

The panel reached the following conclusions:

▸ There is undisputed evidence that the atmospheric concentrations of gases that deplete stratospheric ozone levels—chlorofluorocarbons, halons, methane, nitrous oxide, and carbon dioxide—continue to increase on a global scale because of human activities.

▸ Calculations using two-dimensional photochemical models predict that increasing atmospheric concentrations of trace gases would have caused a small decrease in ozone globally between 1969 and 1986. Predicted decreases between 30 degrees and 60 degrees latitude in the Northern Hemisphere for this period ranged from 0.5 percent to 1 percent in summer and 0.8 percent to 2 percent in winter.

▸ Previous reports of large global decreases in ozone since 1979 of 1 percent per year, or 3 percent per year at 50 kilometers altitude, were wrong. "The trends obtained were erroneously large" because of unjustified and incorrect assumptions.

▸ There has been a "large, sudden, and unexpected" decrease in the abundance of springtime Antarctic ozone over the last decade. Ozone decreases of more than 50 percent in the total column and 95 percent locally between 15 kilometers and 20 kilometers altitude have been observed.

▸ The total column of ozone in the Southern Hemisphere's spring of 1987 at all latitudes of 60 degrees south was the lowest since measurements began 30 years ago.

▸ In 1987, a region of low-column ozone over Antarctica lasted until late November into early December, "the longest since the region of low ozone was first detected."

▸ Although the column ozone depletion is largest in the Antarctic springtime, ozone appears to have decreased since 1979 by 5 percent or more at all latitudes south of 60 degrees south throughout the year.

▸ The weight of evidence "strongly indicates that man-made chlorine species are primarily responsible for the observed decrease in ozone" within the polar vortex.

For copies of the report, contact Charles Redman, Office of Public Affairs, Space Science, NASA, Room 320-B, 600 Independence Ave. S.W., Washington, D.C. 20546; telephone (202) 453-1547.

Air Pollution

SENATE VOTES 83-0 TO RATIFY PROTOCOL TO PROTECT STRATOSPHERIC OZONE LAYER

The Senate March 14 voted unanimously to ratify an international agreement to protect the Earth's stratospheric ozone layer.

President Reagan is expected to sign the instrument of ratification, which the State Department will prepare.

The Montreal Protocol, as it is known, would limit consumption and production of five chlorofluorocarbons and three halons considered as threats to the ozone layer. The goal of the agreement is to reduce consumption and production of the compounds.

This would require, by June 30, 1999, a reduction in consumption and production of the five CFCs to 50 percent of 1986 levels. A freeze on the consumption and production of the halon compounds at 1986 levels would occur in the 12-month period beginning on the first day of the 37th month after entry into force of the protocol.

A broad international consensus on the protocol was reached in Montreal in September 1987, but for it to enter into force on its target date of Jan. 1, 1989, the protocol must be ratified by that date by the governments of 11 countries accounting for at least two-thirds of world consumption of the five CFCs in 1986. In addition, the 1985 Vienna Convention to Protect the Ozone Layer, under which the protocol was fashioned, must be ratified by 20 nations by Oct. 1 (18 ER 1744).

By March 14, 16 nations had ratified the convention, but no ratifications of the protocol have yet been deposited at the treaty office of the United Nations.

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New Studies Raise Concerns:

Ozone Pact OK'd, but Some Say It's Not Enough

The Senate March 14 gave unanimous approval to a treaty limiting the use of chemicals that deplete the Earth's protective ozone layer. But some senators who favor stricter limits said the treaty has already been made outdated by new scientific studies.

Less than 24 hours after Senate approval of the pact, known as the Montreal Protocol on Substances That Deplete the Ozone Layer, a new international report provided the first hard evidence of a worldwide depletion of the ozone layer.

The treaty would require a 50 percent cut in the production and consumption of chlorofluorocarbons (CFCs) and halons by 1999. *(Weekly Report p. 370)*

The chemical compounds, widely used in refrigeration, insulation and aerosol sprays, emit long-lasting gases that scientists believe deplete the ozone layer high above the Earth. The layer filters out about 90 percent of the sun's harmful ultraviolet rays. Scientific studies suggest that as the ozone layer thins, there will be a significant increase in health and environmental problems, including skin cancer.

The latest study, which involved 100 scientists from the United States and several U.N. agencies, concluded that the ozone layer has decreased by as much as 3 percent over densely populated areas since 1969. "Things are worse than we thought," said Robert Watson of the National Aeronautics and Space Administration.

President Reagan is expected to sign the instrument of ratification, making the United States the first major producer of CFCs to ratify the Montreal Protocol. The pact was signed by 31 countries, including the members of the European Community and Japan. The United States produces about 30 percent of the world's CFCs; the European Community accounts for another 30 percent, and Japan for about 10 percent. At least 11 countries that account for two-thirds of all CFC consumption and production worldwide must ratify the treaty for it to go into effect as scheduled on Jan. 1, 1989.

Supporters said they hoped the 83-0 vote in favor of the pact (Treaty Doc 100-10) would send a clear signal to other leading CFC-producing nations that they should act quickly. *(Vote 47, p. 755)*

But the unanimous vote obscured some Senate complaints that the treaty does not go far enough.

"The evidence ... convinced me that we must move quickly and forcefully to eliminate, not just reduce, chemicals that are destroying the Earth's protective ozone shield," said John H. Chafee, R-R.I.

Chafee had hoped to attach a resolution to the treaty urging faster and deeper cuts in CFCs, but failed to line up enough support. Chafee said the resolution was being reviewed and would be presented at a later date.

"The evidence ... convinced me that we must move quickly and forcefully to eliminate, not just reduce, chemicals that are destroying the Earth's protective ozone shield."

—Sen. John H. Chafee, R-R.I.

Chafee said his resolution will call for the United States to lead worldwide ozone-protection efforts; to convince the rest of the world to ratify the Montreal Protocol; and to speed up the agreement's reduction schedule either internationally or within the United States.

Several senators, including Foreign Relations Committee Chairman Claiborne Pell, D-R.I., urged the United States to move unilaterally to impose more stringent controls.

"The United States should continue to lead by example by requiring larger and faster reductions," Pell said.

Chafee and Max Baucus, D-Mont., have introduced bills (S 570, S 571) that would require the United States to reduce levels of CFCs by 95 percent by 1995.

The United States had sought a 95 percent reduction in CFCs worldwide, but accepted a 50 percent cut when other nations refused to go along.

Major Provisions

The protocol imposes a graduated-reduction schedule that would bring a 50 percent decline in CFC usage by 1999.

Seven months after the treaty goes into effect, developed nations must freeze consumption and production of CFC compounds at 1986 levels. Thirty months later, levels for halon compounds must be frozen.

Industrialized nations will have until July 1, 1994, to reduce production and consumption of CFC compounds by 20 percent and until July 1, 1999, to bring them down to the 50 percent level.

Developing nations, which make and use fewer CFC compounds, will have to reduce production and consumption by a smaller percentage. And low-consuming developing nations will be allowed small increases in per capita consumption for 10 years. After that, their consumption schedules must match other nations'.

Nations not observing the treaty would have a tough time producing and consuming the controlled compounds. One year after the treaty takes effect, imports from non-treaty countries of bulk chemicals used in CFC production would be banned. Three years after that, treaty members would be prohibited from importing any products containing CFCs from non-treaty countries.

The treaty also contains mechanisms for sharing research on the problem and on possible CFC substitutes. ■

—By Mike Mills

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NYT 3/20/88

Even With Action Today, Ozone Loss Will Increase

By JAMES GLEICK

The destruction of the earth's protective ozone layer, set in motion by the release of industrial gases into the atmosphere, will continue for decades despite the best efforts of governments and industries to control it, scientists now agree.

Society appears to have ignited a sequence of atmospheric processes that cannot be quickly reversed. The surprisingly rapid depletion of ozone now seen by satellites — confirmed last week by a Government panel of 100 atmospheric scientists — has prompted widespread rethinking of forecasts that the changes would be gradual.

First of two articles on global ozone loss.

Ultraviolet radiation reaching populated areas could rise as much as 5 to 20 percent early in the 21st century, according to projections from a variety of still-unreliable computer models. Those levels would cause vast increases in skin cancer, and biologists say they could devastate some crops and ocean populations.

Even if emissions are halved in the next decade, as called for under an international treaty awaiting ratifications, levels of chlorine gases in the atmosphere will continue to rise. A single chlorine molecule remains in the stratosphere, breaking down tens of thousands of ozone molecules, for as long as a century.

'A Real Hole Here'

"We're going to have to live with our past mistakes, and the situation will get worse," said Irving M. Mintzer, head of the climate program of the World Resources Institute, a research group in Washington. "We've dug ourselves a real hole here."

Furthermore, the latest ozone measurements reflect only gases released in the 1970's and earlier; gases now rising through the lower atmosphere will take seven to 10 years to reach the stratosphere, six to 15 miles above Earth's surface. More gases in refrigerators and insulating foams will be gradually released over the decades.

Government scientists estimate that levels of these gases will not

Continued on Page 30, Column 1

Scientists Say Ozone Loss Will Increase for Years

Continued From Page 1

stop rising until they reach 6 to 8 parts per billion, more than double their present levels. "What we do in the next few years is very important, but the effects won't be felt until down the line," said Richard Stolarski of the National Aeronautics and Space Administration.

The 31-nation treaty negotiated last year in Montreal would first stabilize the rate of emissions of chlorofluorocarbon gases and then gradually reduce them to half of their 1986 levels. Environmental experts argue, however, that the recent ozone findings make the assumptions underlying the Montreal protocol seem too optimistic, and they see a need for much tighter controls.

Government environmental officials, on the other hand, say they are unwilling to reopen the delicate treaty process and that the issue of further cuts in emissions can be taken up beginning in 1990 under a timetable in the current accord.

A new study by the Environmental Defense Fund, an advocacy group in New York, estimates that an 85 percent cut in emissions will be necessary to stabilize the levels of destructive chlorofluorocarbons and other gases. Other environmental groups are also citing the 85 percent figure and asserting that, even with that sharp a reduction, the levels in the atmosphere would not stabilize for years.

"Current ozone depletion is effectively irreversible," the fund's report states. "CFC's in the atmosphere will continue to grow throughout the 21st century even under the protocol's 50 percent emissions cut."

Flaws in the Models

The head of NASA's official effort to predict future ozone depletion, Michael Prather, is preparing a report to Congress at the end of this month that will assemble calculations from an international assortment of computer models. Dr. Prather said the forecast ozone loss over the next 30 years could range from 1 to 4 percent.

The same models, however, had previously predicted half or less of the depletion that has now been observed. They do not take into account the surprising seasonal "hole" in ozone over the Arctica, or the unusual polar processes that seem to be so powerful in taking down ozone molecules.

These are the best models we have, we know they're missing things," Prather said. "We are missing the Arctic phenomenon. We know we're getting the right ozone depletion in there."

As a rough guideline, Dr. Prather and other model users believe that emissions of chlorine gases will stay more or less constant even under the terms of the treaty. The cutbacks in the United States and other industrial nations may be offset by exemptions for poor countries and increases by countries that will not join the accord.

Fifteen years have passed since scientists first predicted that chlorine gases, then used in spray cans and still used in refrigerators, insulating foams and industrial solvents, would act as powerful catalysts in the chemistry of the upper atmosphere, breaking down the trace amounts of ozone that absorb ultraviolet radiation.

Higher Rates of Ozone Loss

The forecasts that motivated the Montreal treaty assumed about a 1 percent loss of ozone, already enough to cause tens of thousands of extra skin cancers each year. The extra ultraviolet light, at the short wavelengths most damaging to the genetic material of cells, would mean a 3 to 6 percent increase in the rate of most skin cancers, according to estimates published by the Environmental Protection Agency.

The actual loss of ozone now seems much greater. The new Government panel, sponsored by NASA, reached a consensus estimate of a 1.7 percent loss in the latitudes from Florida to Pennsylvania and 3 percent from Pennsylvania north to mid-Canada.

Even without human intervention, ozone waxes and wanes with a natural variability that is poorly understood. Ozone is the three-atom form of oxygen, which ordinarily forms molecules of two atoms. Near the ground, it is a noxious pollutant; in the stratosphere, its absorptive ability makes Earth's life possible.

Ozone molecules are continually broken down in reactions hastened by chlorofluorocarbons and re-formed by reactions spurred by sunlight. Scientists believe that the outcome of this interaction is closely tied to the 11-year cycle of solar radiation and that the next few years are likely to bring a short-term renewal of ozone, as solar activity reaches its maximum. Then as solar activity wanes again, the scientists expect ozone to resume its decline.

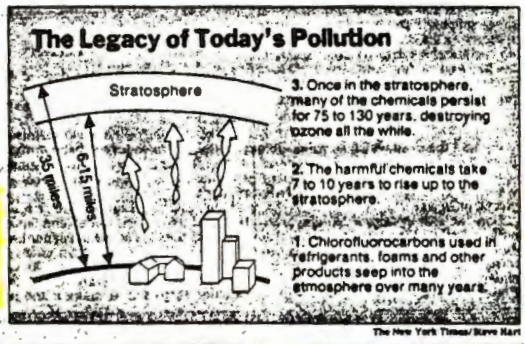
Data have been hard to come by. The report last week was the most authoritative attempt to reconcile incomplete, and sometimes inconsistent, readings from ground stations and satellites. The satellite data go back less than a decade, not enough to give a reliable sense of ozone's long-term behavior.

'Hole' Above Antarctica

Nothing in the direst predictions of environmentalists a decade ago prepared scientists for the discovery in 1985 of a "hole" in the ozone over the South Pole. Depletion over the entire Antarctic continent in springtime has been as high as 50 percent, and the hole has widened each year, now reaching populated areas of South America.

Urgent scientific expeditions have sought the cause, with some success. Though agreement is far from complete, atmospheric chemists believe they have worked out the complex chain of reactions that destroy ozone at such rapid rates. This chemistry, tied to extreme cold and the formation of cloud droplets, suggests that ozone can be unexpectedly sensitive to chlorine compounds.

Natural causes, at first considered to be possible explanations for the hole, now seem to have been ruled out. Some scientists pointed to the influence of particles sent into the atmosphere by the El Chichon volcanic eruption in 1982, for example, but the satellite readings show no special effect from the Mexican eruption.



Gases used today will take decades to reach the stratosphere.

Most scientists are now also persuaded that the seasonal ozone hole, along with a less dramatic loss of ozone at the North Pole, must be connected to the less extreme worldwide depletion. But no one knows just how. Some scientists view the holes as chemical "factories," churning out ozone-depleted air that spreads through the hemispheres.

Every 1 percent loss of ozone allows roughly 2 percent more ultraviolet light to reach Earth's surface. Many scientists guess that a 1 percent depletion takes about a decade at the present rate, and the rate may accelerate.

"Under the treaty, we can expect depletion to grow by at least a factor of three by sometime in the middle of the next century," said Michael Oppenheimer, author of the Environmental Defense Fund report. "We're on an upward ramp that will level off at about 10 percent depletion. We're headed rapidly into the realm of dangerous ultraviolet radiation."

Among biologists specializing in the effects of light on organisms, concern is growing. The American Society of Photobiology, meeting last week in Colorado Springs, presented new research highlighting the urgency of the problem.

"On a global scale, the most significant thing is the destruction of plants," said Thomas Coohill, the group's president-elect. "If you start tampering with the layer of ozone that quickly, you don't have enough time to evolve protective mechanisms."

Sunlight with extra radiation at the short, ultraviolet wavelengths appears no brighter to people or most other creatures, including the tiny ocean organisms that will be among the most vulnerable. Neither sunbathers nor plankton will sense the extra danger.

Some biologists believe that damage to plankton , floating near the ocean surface, could have severe consequences.

"Our data say that these organisms are already under very drastic ultraviolet stress right now," said Donat Haber of the University of Marburg, West Germany. "Most of them are incredibly sensitive. When you expose a population of these organisms, they will die within a few hours."

New research by Dr. Haber's group suggests that a 5 percent increase in ultraviolet light can cut the lifetime of some microorganisms in half. If this occurred on a large scale, the effects could reverberate upward through ecological systems and even influence Earth's climate.

Some sensitive bacteria create nitrogen, which is indispensible for such crops as rice. Phytoplankton, such as algae, play a central role in Earth's carbon dioxide cycle, taking in vast amounts. A significant destruction of phytoplankton could raise carbon dioxide levels, speeding the warming of the atmosphere.

They also provide food for larger creatures. "When you go through the food chain, the effects multiply, and eventually we will be losing millions of tons of fish protein," Dr. Haber said.

The effects of increased ultraviolent light on human health are also poorly understood, though the connection between ultraviolet radiation and skin cancer has been established.

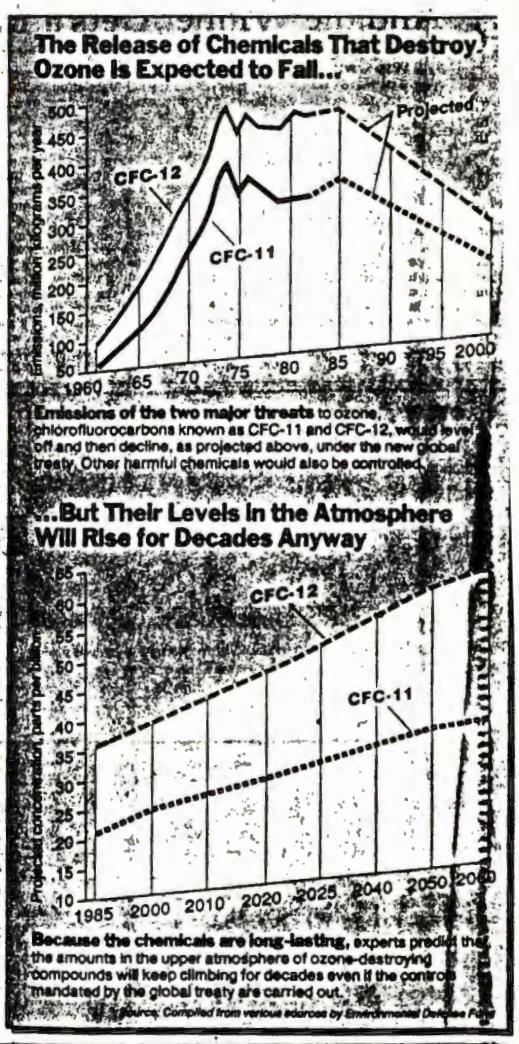
"What's not known — and I think it's really critical — is what are the effects for certain infectious diseases," said Margaret Kripke, a University of Texas immunologist who recently headed an E.P.A. panel on the consequences of ozone depletion.

Ultraviolet light appears to damage the immune system, making people more vulnerable to some virus infections and parasitic diseases. It alters immune cells in the skin and causes other changes that scientists do not understand, turning off some of the immune response to foreign substances.

Research into the biology and chemistry of the ozone problem is intensifying. For those concerned with public policy, however, the psychology of the issue — pervaded by scientific uncertainty — remains troublesome.

"It's not a Chicken Little problem — we don't all die at the end of the week," Dr. Mintzer said. "We're asking people to reduce the risk of an invisible, odorless, colorless gas because we perceive that there will be a risk of destruction of an invisible shield, allowing the penetration of invisible rays."

Next: The response by industry.



NYT 3/21/88

Industry Acts To Curb Peril In Ozone Loss

By PHILIP SHABECOFF

Industry in the United States and abroad is moving aggressively to curb uses of chemicals believed to be destroying the earth's ozone shield.

Somewhat to their surprise, those who make and use these widespread chemicals are finding that complying with a recent international treaty may be relatively painless. The treaty, ne-

Second of two articles on global ozone loss.

gotiated last year in Montreal by 31 nations, calls for a leveling off and then a rolling back in production of the harmful chlorofluorocarbons and halons.

An exception was made for developing countries to enable them to achieve industrial growth. For these countries, per capita consumption of the chemicals would be allowed to rise until it approximated the industrial countries' usage in 1986. Scientists do not expect such increased usage to have much impact on the ozone layer because the amounts involved would remain relatively low.

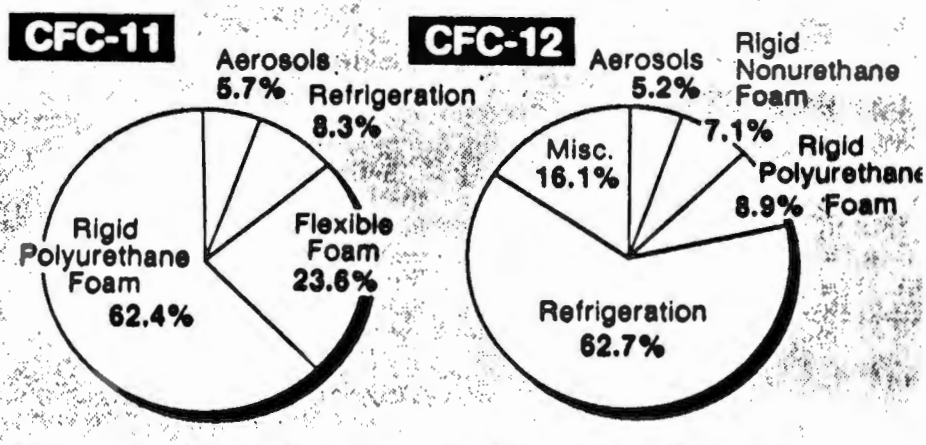
Although the treaty does not mandate a freeze in production levels for industrial countries until next year, and the reductions will not start until 1994, many companies are already working furiously on substitutes in anticipation of huge demand. Some users have also started to employ products made with other substances.

The treaty has not yet taken legal force, but its adoption by the required number of countries — at least 11, in-

Continued on Page A15, Column 1

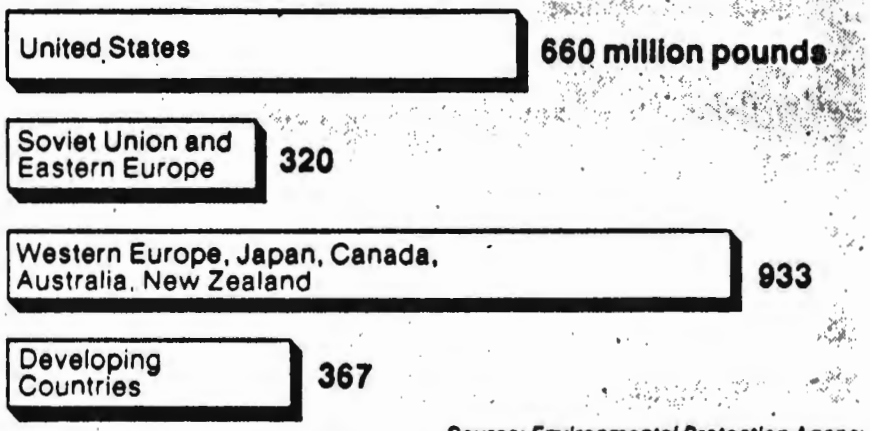
How Ozone-Destroying Chemicals Are Used

Uses in the United States in 1985 of the two major chemical threats to the ozone layer, two forms of chlorofluorocarbons. In other countries, aerosols account for larger shares; in the United States, CFC's are permitted in aerosols only when essential, as in certain safety devices. Another important chemical, CFC-13, is used entirely in solvents.



Where the Chemicals Are Used Worldwide

Industrial use by region in 1985 of chemicals that destroy ozone, including chlorofluorocarbons and halons.



Source: Environmental Protection Agency

Industries Succeeding in Challenge to Curb Gases That Harm Ozone Layer

Continued From Page A1

cluding countries that account for at least two-thirds of global production of the harmful compounds — is widely expected. So far, only the United States and Mexico have ratified the pact.

Faster Action Is Sought

Now, alarmed by increasing scientific evidence that the destruction of atmospheric ozone is more severe than previously thought, some experts are calling for even quicker removal of harmful chemicals from commerce. They note that ozone-destroying chemicals produced today can linger in the stratosphere, destroying ozone all the while, for a century or more.

Industry and Government officials interviewed last week warned that speeding up the removal process could lead to serious economic and social disruption in the United States and elsewhere.

Still, some scientists, environmentalists and members of Congress insisted that the risks of a slow response to the destruction of the ozone layer, including more skin cancers and losses to crops and ecosystems, far outweigh the potential costs of quicker action.

The Montreal treaty to limit the use of chlorofluorocarbons, or CFC's, was viewed by participants as an act of probable environmental necessity but high economic risk.

The chemicals are used in a wide range of products considered essential by modern society, including refrigerants, foams and solvents. Industry representatives in the United States and elsewhere accepted the need to curb use of these chemicals but said the process could lead to substantially higher prices, unemployment and other undesirable consequences.

A half-year later, industry and governments are finding that heroic effort may not be needed to comply with the treaty, which calls for a freeze on production and use of chlorofluorcarbons at 1986 levels by 1989 and a 50 percent reduction in production by the end of the century. The use of halons, chemicals in fire extinguishers, was to be frozen at 1986 levels with no rollback.

Pessimistic reports on ozone prompt calls for faster action.

If substitutes are found and put into use rapidly, there may not even be much of a leap in prices, industry officials now say.

In fact, many producers and users of CFC's are already developing substitute chemicals or processes that will reduce or eliminate the need for CFC's In some cases, such as in packaging for fast foods, alternatives are already being adopted.

Industry in Japan is reportedly moving at least as fast as here. According to some reports, European companies are also developing substitutes for CFC's to supply what is expected to be a wide-open new market.

'Will Be Some Anguish'

"We think we can do it without undue disruption. There will be some anguish but nothing that will devastate society," said Richard C. Barnett, chairman of the Alliance for A Responsible CFC Policy, an association of American companies that make or use chlorofluorocarbons.

But industry and Reagan Administration officials said it was too early to talk about faster and deeper cuts in CFC use and that an accelerated phaseout would cause serious economic disruptions.

"The rapid, complete shutdown of CFC's that some people are calling for would have horrendous consequences," said Mr. Barnett. "Some industries would have to shut down because they cannot get alternative products — the cure could kill the patient."

CFC's were first developed by the Du Pont Company and the General Motors Corporation in the 1930's. Because of their many excellent chemical properties — they are very stable and not flammable, corrosive or toxic — they were quickly adopted for many uses, including insulation foam blowing, aerosol propellents, packaging and cleaning solvents for electronic and medical equipment.

It is that stability, scientists now realize, that makes CFC's dangerous. Because these compounds do not break down chemically for many decades, they move intact up into the stratosphere, which begins six to 15 miles above the earth's surface depending on local conditions. And there, most scientists now agree, the CFC's continually combine with and destroy molecules of ozone, an unstable variant of oxygen.

Because ozone in the upper atmosphere shields the earth's surface from harmful ultraviolet radiation, scientists warn that its thinning will allow more of this radiation to reach the earth, causing millions more cases of skin cancer as well as severe damage to aquatic life, crops and forests.

CFC's are also believed to contribute to the projected warming of the earth's surface as man-made gases accumulate in the atmosphere and prevent warm infrared radiation from the sun from escaping back into space.

New Scientific Reports

Until fairly recently, there was substantial skepticism about the theory that man-made chemicals were depleting the ozone layer, but a growing body of empirical data led to a gradual acceptance of the theory as fact.

Last week a report by about 100 scientists, prepared under the supervision of the National Aeronautics and Space Administration, confirmed earlier reports that ozone was being destroyed over the Northern Hemisphere more rapidly than scientific models had projected.

Industry says haste may cause economic and health problems.

The new report stimulated warnings from environmentalists and some scientists that the pace of reducing CFC's in the environment must accelerate, if necessary with unilateral action by the United States. This country accounts for more than one-fourth of the world's production and use of the chemicals.

Rafe Pomerance, senior associate of the World Resources Institute, a Washingto-based research and police group, said the new findings demonstrate that "the situation is far worse that was predicted during the past year. If the Montreal negotiators had had these findings in front of them they would have agreed to a total phaseout of CFC's."

The Montreal treaty calls for a reconvening of signatory nations in 1990 to consider scientific evidence accumulated since 1987 and to decide if additional steps are necessary. Another clause authorizes the director of the United Nations Environment Program to call an emergency meeting if new evidence shows that urgent action is needed.

Some environmentalists and scientists say the new report gives ample reason for calling an emergency meeting. But industry and government officials believe that precipitate action would accomplish nothing to preserve the ozone layer and could cause substantial harm to economies worldwide.

Joseph M. Steed, environmental manager of the freon products division of Du Pont, one of the biggest manufacturers of CFC's, said if that a mandatory phaseout of CFC's was required by as early as 1993, the substitute chemicals or alternative industrial processes simply would not have been developed and tested. For example, a major use of one form of CFC is for highly efficient insulation in the walls of home refrigerators. "Nobody wants to go with a product that will be in everyone's kitchen and then find it is toxic," Mr. Steed said.

He also said that speeding up the withdrawal of CFC's would require many trade-offs that could affect the economy, public health and even national security. Mr. Steed noted, for example, that 75 percent of the nation's food supply is refrigerated at some point between the farm and the consumers' table. If the supply of CFC's used in refrigeration were cut off before substitutes were developed and tested, he warned, it could affect the food marketing chain and perhaps pose health dangers.

Benefits of Removal

Another trade-off, Mr. Steed said, would be caused by removing the form of CFC used to clean electronic equipment. "What CFC's have offered to industry is a clean product," he said. "The cleanliness determines the reliability of the product. We are not talking here about stereos and television sets. How about computer systems running our national defense, our airline traffic, our entire communications network."

He added, however, that Du Pont is working on a substitute solvent that would substantially reduce CFC emissions.

Eileen B. Claussen, director of program development for the Federal Environmental Protection Agency, said that any decision to move faster against CFC's should be deferred until the scheduled 1990 meeting. Meanwhile, she said, the United States should push hard to have the Montreal treaty ratified by more countries.

Ms. Claussen said it probably would be possible to reduce CFC use by 90 percent without severe disruptions, but not as early as 1993.

A "regulatory impact analysis" by the E.P.A. estimated that by the year 2075 it would cost this country alone at least $27 billion to make the investments required by CFC provisions of the Montreal treaty.

But the cost of removing CFC's from the environment pales next to the environmental agency's estimates of the benefits of doing so. According to the E.P.A. projection, the country would save nearly $6.5 trillion by 2075 by avoiding the costs of cancer deaths and medical treatment, and of lost crops, dwindling fish harvests, damage to materials and rising sea levels that would be incurred if no controls were placed on emissions of CFC's.

Meanwhile, industry, in this country at least, is moving ahead in developing and using substitutes. For example, companies that make disposable plastic packaging, such as containers for fast-food hamburgers, expect to phase out one kind of CFC by the end of this year and substitute another that depletes 20 times less ozone.

To Stephen O. Anderson, an E.P.A. economist who is working with and encouraging industry in finding substitutes for CFC's, "One of the most exciting things that has happened since the protocol is that more and more companies are considering this a business opportunity, not just as a problem."

NYT 3/25/88

Du Pont to Halt Chemicals That Peril Ozone

By PHILIP SHABECOFF
Special to The New York Times

WASHINGTON, March 24 — E.I. du Pont de Nemours & Company, the world's largest producer of chlorofluorocarbons, announced plans today to phase out all production of the chemicals that scientists say are contributing to the destruction of the earth's ozone shield.

While the company refused to set a target date for ending production of the chemicals, Joseph M. Steed, environmental manager of Du Pont's Freon products division, said that reducing output by at least 95 percent by the beginning of the next century was a "reasonable goal."

The company said it was taking the action, which would go well beyond its previous commitment only to reduce output of the chemicals, because of new scientific evidence that the threat to the atmospheric ozone layer was worse than had been thought.

An International Agreement

Du Pont's action indicated a readiness to surpass the goals of an international agreement reached in Montreal last fall calling for an initial freeze on production levels and then a 50 percent reduction in their use by the end of the century.

The company's decision is bound to have wide influence because Du Pont accounts for about 25 percent of the world's production of chlorofluorcarbons, or CFC's. The chemicals, which are widely used in refrigerants, foam insulation and cleaning solvents, among other products, are believed to combine with and destroy ozone molecules in the upper atmosphere.

The ozone shield blocks harmful ultraviolet rays from the sun that can cause skin cancer in humans, damage plants and harm animals.

Du Pont urged today that more countries quickly ratify the Montreal protocol. It also called for immediate reassessment of the problem and consider-

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ation of "additional global limitations on the emission of CFC's."

So far, only the United States and Mexico have approved the treaty. The treaty will take effect when it is ratified by 11 countries, including countries that account for at least two-thirds of the world's production of CFC's.

Du Pont also called on other producers and users of CFC's in the United States and abroad to follow its example. Because it accounts for so large a proportion of global production, its own actions are likely to have a major impact on world CFC markets.

Previously, Du Pont supported limitations on the growth in the use of CFC's but said it was premature to consider eliminating their use entirely.

New Evidence Cited

The company said today that new evidence presented last week by a panel of scientists coordinated by the National Aeronautics and Space Administration showed that much deeper cuts are needed to reduce chlorine in the atmosphere and protect the earth's environment. Data presented by the report indicated that global ozone was already depleted by more than 2 percent.

Du Pont officials said immediate cuts would not help matters much because the quantity of CFC's that would be emitted over the next few years was small compared to the amount of chlorine already accumulated in the atmosphere. Many of the chemicals linger in the upper atmosphere for a century or more, destroying ozone all the while.

Du Pont is already developing substitutes for CFC's, but company officials said it might take some time to develop and test them for safety and other factors. But the company has been a leader in the search for substitutes, which experts say could become a major new source of company sales.

Several environmentalists also said today that as scientific evidence mounted that CFC's were thinning the ozone layer and presenting a threat to public health, Du Pont and other producers of the chemicals were in growing danger of being sued for damages.

But the environmentalists, as well as members of Congress and Lee M. Thomas, the Administrator of the Environmental Protection Agency, had chiefly words of praise for the company's decision.

David D. Doniger, a lawyer for the Natural Resources Defense Council, said he welcomed Du Pont's support for a total end of CFC production, adding that his organization was the first to propose such a plan two years ago.

But Mr. Doniger said the Du Pont statement left some "major questions" open, including the timing of the production phase-out. He said his group supported a complete end to production of CFC's and halons, chemicals used in fire extinguishers that also deplete ozone, within the next six to eight years.

Mr. Thomas said Du Pont's decision to phase out CFC production was "very encouraging," and added: "It strengthens worldwide efforts to protect stratospheric ozone by sending an unmistakable signal that alternatives and substitutes to CFC's can be made readily available in the near future."

3 Senators Back Move

Three Senators who recently sent a letter to Du Pont asking that it keep a commitment made a decade ago to end production of CFC if scientific evidence proved their dangers said they were delighted with the company's decision. The Senators are Dave Durenberger of Minnesota and Robert T. Stafford of Vermont, Republicans, and Max Baucus, a Montana Democrat.

Senator Baucus has introduced legislation that would require an immediate reassessment of the Montreal protocol and a 95 percent cut in CFC production over the next eight years.

R. E. Heckert, chairman of the Du Pont board, answered the Senators' letter two weeks ago by saying that based on current evidence it would be premature for the company to gradually end CFC production.

But in a letter today to Mr. Baucus and Mr. Durenberger, Mr. Heckert said last week's report by the NASA panel contained "important new information" that led the company to conclude that "additional actions should be taken for long-term protection of the ozone layer."

WP 3/25/88

Du Pont Taking Big Risk With CFC Phase-Out

By Michael Weisskopf
and Malcolm Gladwell
Washington Post Staff Writers

The decision by E.I. du Pont de Nemours & Co. to push for the end of chlorofluorocarbons puts the giant chemical company in a high-risk race against time that could affect hundreds of other manufacturers and, ultimately, the consumer who enjoys the benefits of CFCs in everything from refrigerators and advanced electronics to foam food trays.

According to company officials, alternatives for key uses of CFCs—primarily refrigeration—are at least five years away. Du Pont is considered the leader in developing substitutes, but the company faces intense competition from chemical companies in other nations, including Japan, that also are working feverishly to concoct compounds that will match CFCs' usefulness without endangering the ozone layer.

At stake is a $2.7 billion-a-year market, now dominated by du Pont, for the nonflammable, nontoxic compounds that have cooled the world for more than four decades.

Du Pont, which called for a total phase-out of CFCs in order to prevent destruction of the earth's protective ozone layer, is relying heavily on a product that it says could replace CFC 11 and CFC 12, the compounds that are used most heavily in refrigeration and in mobile air-conditioning units.

The new compound, called 134a, contains no chlorine, the element that reacts with and destroys ozone, and can be substituted directly for other CFCs in many products.

Allied-Signal Inc., the second-largest domestic producer, also is testing alternatives to CFCs 11 and 12.

But before either product goes on the market, it must pass health and environmental safety tests that both companies expect to take at least five years and possibly longer.

"It [134a] looks good and we're optimistic," said environmental manager Joseph Steed. "But there aren't any guarantees. You can make a slight change in these compounds and get a greatly different degree of toxicity."

The risks are real. According to Steed, the company recently put a promising substitute for CFC-based electronics solvent into safety tests, only to find that the new chemical was highly toxic to laboratory animals.

"We didn't even get all the way through the two-year test," he said. "The biologists said, 'We'll finish the test, but you better not count on this compound.' "

If its compound fails the tests, du Pont may well have to go back to the drawing board—and possibly lose its edge in the market to compounds developed by other companies.

Meanwhile, manufacturers who use CFC compounds in their products are standing by a trifle nervously.

"It wouldn't be such a problem as long as we can be assured something will be available in commercial quantities," said Marian Stamos, spokesman for the Association of Home Appliance Manufacturers, which represents makers of refrigerators and freezers.

CFCs were used in all of the 8.2 million refrigerators and freezers produced in the United States last year, and appliance manufacturers were already concerned about the 50 percent cutback required in an international ozone agreement signed by 31 nations last year.

The problem, she said, is that Congress also enacted legislation last year to increase energy efficiency of home appliances—a requirement that the industry had expected to

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IMPACT, From B1

meet by using better CFC-based insulation in its products.

Manufacturers are considering design changes to promote efficiency, possibly replacing CFCs with other insulating materials. For the refrigerant, however, the industry is pinning its hopes on du Pont.

Home air conditioners use CFC 22, a compound that contains little chlorine and is considered less of a threat to the ozone. But mobile air conditioning, from the family station wagon to the trucks that carry produce from coast to coast, depends heavily on CFCs 11 and 12.

Bob McFadden, senior policy analyst for the Motor Vehicle Manufac-

[illegible] can tolerate an "orderly" phase-out of CFCs that allows time for alternatives to be developed. But a quick phase-out could create problems for owners of older cars, he said.

Car shops have already begun looking at the possibility of recycling CFCs, which are now so inexpensive that mechanics routinely vent residual gas into the air when recharging air-conditioning systems.

Recycling could prepare mechanics for new products, which are expected to be considerably more expensive when they come on line. Allied-Signal spokesman Charlie Coe said that his company's possible alternatives are expected to be two to five times more costly than current compounds.

"The process for both of these compounds requires extra steps, so it will be more expensive," he said.

The increased cost won't necessarily be bad for the manufacturers. "This is not an altruistic move," Fred H. Seimer of Chemical Research in New York said of du Pont's call for a total phase-out of existing compounds. "In the chemical business you can come up with substitutes, and substitutes are invariably more expensive and potentially more profitable."

According to industry officials, the segment of the economy with the biggest stake in the race to develop CFC alternatives is the segment that has already invested heavily in refrigeration equipment.

Du Pont estimates that only 20 [illegible] percent of current CFC production goes into new products. The rest is used to maintain existing refrigeration units, from refrigerated trucks to grocery-store freezers.

Retooling those cooling systems to adapt to different refrigeration compounds, or replacing the systems altogether, could cost tens of billions of dollars.

But waiting for the equipment to be replaced normally could take 30 years or more—time that scientists contend the world doesn't have if it wants to keep its ozone layer intact.

For that reason, Steed said, du Pont is concentrating on developing direct substitutes, which could be used in existing equipment without expensive retooling.

"We're already designing the factory," he said. "Our hope is that we'll be ready at the same time the toxicity tests are done."

Washington Post Staff writer Cass Peterson contributed to this report.

WP 3/25/88

Ban on CFCs Urged to Save Ozone Shield

Du Pont, Top Maker, Asks Total Phaseout

By Cass Peterson
Washington Post Staff Writer

E.I. du Pont de Nemours & Co., the world's leading producer of chlorofluorocarbons (CFCs), called yesterday for a total phaseout of the chemicals to prevent destruction of the Earth's protective ozone layer.

In a dramatic reversal of its position, du Pont said that recent scientific findings about the extent of global ozone depletion had convinced the company that an international treaty calling for 50 percent cuts in CFC production over the next decade is not stringent enough to prevent serious damage to the ozone layer.

"Du Pont sets as its goal an orderly transition to the total phaseout" of the most damaging CFC products, the company said in a statement delivered yesterday to the Environmental Protection Agency and several members of Congress.

Du Pont invented CFCs and sells $600 million worth of them annually, about one-fourth of the world's supply. The chemicals, marketed as Freon and under other trade names, are used in refrigerators, air conditioners, as foam-blowing agents and, outside the United States and a few other nations, as propellants in aerosol products.

Three weeks ago, du Pont Chairman Richard E. Heckert said the company did not intend to halt production of CFC products because "at the moment, scientific evidence does not point to the need for dramatic CFC emission reductions."

Officials said yesterday that the company's position changed abruptly last week, when an international scientific team reported that stratospheric ozone levels had dropped by as much as 3 percent since 1969 in some densely populated areas of the United States and Europe and

See DU PONT, A14, Col. 1

Du Pont Urges CFC Phaseout To Prevent Ozone Destruction

DU PONT, From A1

by 5 percent or more in some areas of the Southern Hemisphere.

The decrease was more severe than scientists had expected, leading some to question the adequacy of the 31-nation pact signed last year in Montreal and recently approved by the Senate.

Stratospheric ozone shields the Earth from the sun's most damaging ultraviolet rays, which can cause skin cancer, cataracts and immune system damage. Experts estimate that each percentage point of decrease in ozone could lead to a 5 to 7 percent increase in skin cancer.

According to a du Pont analysis, the Montreal agreement will allow the rate of ozone destruction to more than double over the next century, even if the pact were accelerated to take full effect in five years instead of 10.

The company's statement did not say when it intends to cease production of CFCs, but du Pont officials said the company hoped to have alternatives for refrigeration available within five years. Environmental manager Joseph M. Steed said it would take that long to test potential alternatives for toxicity problems and to construct new production facilities.

Du Pont already has introduced substitutes for some applications, including new blowing agents for foam food packaging and new cleaning solvents for electronic circuitry.

If alternatives aren't ready at the time CFCs are phased out, the company said, there could be "changes in everyday living"—including the need to redesign airtight buildings to admit breezes until alternate air-conditioning equipment is available.

Du Pont's announcement was applauded by environmental groups, who had urged deeper CFC reductions during negotiations on the Montreal agreement. "A late conversion is better than no conversion at all," said Natural Resources Defense Council attorney David D. Doniger.

EPA Administrator Lee M. Thomas called the announcement "encouraging" and "an unmistakable signal that alternatives and substitutes to CFCs can be made readily available in the near future."

The statement was also welcomed on Capitol Hill, where pending legislation would require the United States to go beyond the Montreal agreement in reducing CFC emissions. "This is the last nail in the coffin for CFCs," said one Senate aide. "CFCs are finished."

Sen. Max Baucus (D-Mont.), who has scheduled hearings on the issue before his Environment and Public Works subcommittee next week, called the statement "a very responsible move. Du Pont must now press their industry colleagues."

Baucus was one of three senators who recently wrote to du Pont to remind the company that it had pledged in 1974 to cease production of CFCs if the compounds were ever found to be harmful. The letter was generally regarded as an embarrassment for du Pont, which prides itself on its reputation as an environmentally conscious company.

Du Pont officials said that the letter did not affect their decision, but when company officials paid visits to several senators yesterday to describe the new policy, they omitted Sen. Robert T. Stafford (R-Vt.), who instigated the letter.

Stafford said later that he was "delighted" at du Pont's statement, but added: "It is tragic that it took terrible damage to our protective ozone layer to generate this action. And I hope it isn't too late."

More Bad News for the Planet

A grim report on ozone

Indulging in we-told-you-sos is of little comfort to scientists—especially when their dire predictions weren't even dire enough. Last week, nearly 15 years after the first warnings that man-made chemicals could deplete the ozone that shields earth from the sun's ultraviolet rays, an international team led by NASA reported more reason for concern. Newly analyzed data revealed that since 1969 the ozone layer has thinned by as much as 3 percent in the latitudes spanning much of the United States, Canada, Western Europe, the Soviet Union, China and Japan; the loss was more than 6 percent over parts of Alaska and Scandinavia in winter months. The findings were three times worse than expected—and they were hardly academic. According to the EPA, each 1 percent decline could bring as many as 5 percent more squamous skin cancers and 2 percent more cases of melanoma, which now claims 5,000 American lives a year. Ozone depletion may also be linked to a parade of other horrors, including higher incidence of cataracts, supression of the immune system, decreased crop yields and disruption of the aquatic food chain.

The report came just one day after the U.S. Senate voted 83 to 0 to ratify an international accord to cut world use of chlorofluorocarbons (CFC's) in half by 1999. So far Mexico is the only other nation to approve the pact, signed in Montreal last fall, though the other 29 signatories—including most leading industrial powers—are expected to follow. But environmentalists say more drastic action is needed, particularly in light of last week's report. "If this set of facts had been on the table . . . we could have had a complete phase-out" of CFC production, not just a reduction, said Safe Pomerance of the World Resources Institute. "Now we have to catch up with the damage that has already been done."

The United States, Canada and some Scandinavian countries banned use of CFC's in aerosal sprays in 1978. But they are still widely used as cooling agents in air conditioners and refrigerators and in hundreds of consumer products—from fast-food containers to solvents for cleaning microchips. Manufacturers, led by Du Pont, have long questioned whether there is a clear cause-and-effect link between CFC's and ozone depletion. Indeed, no thinning of stratospheric ozone had even been established until 1985, when British scientists first documented a massive seasonal hole in the layer over Antarctica. Scientists say the peculiar atmospheric conditions over the South Pole make it especially vulnerable. But last week's report concluded that the global shrinkage was due "wholly or in part" to trace gases, primarily CFC's.

KEN HEYMAN—ARCHIVE

More skin cancer: *Ultraviolet rays*

More chlorine: Scientists say the damage will continue even after the Montreal protocol goes into effect. One provision will allow some developing countries to actually increase their use of CFC's during the next 10 years. Even if production were halted, CFC levels would continue to accumulate. "It takes time for gases to go up and mix in the upper stratosphere," says University of California at Irvine chemist Sherwood Rowland, one of the first to sound alarms. Atmospheric levels of chlorine from CFC's reached 1.8 parts per billion in 1974; they are now at 3.5 ppb and will rise to 5 ppb by the end of the century under the accord.

Despite their continuing skepticism, CFC manufacturers support the Montreal pact—in part because it gives them time to develop substitutes. The accord also calls for re-evaluating the timetable if new scientific information warrants. EPA administrator Lee Thomas last week called speedy ratification of the treaty by other countries "a crucial first step" in combating the ozone problem. Chemist Rowland countered that "it ought to be the first step in a sprint, not leisurely steps 10 years at a time." Indeed, the very survival of the planet could depend on hastening that pace.

MELINDA BECK *with* MARY HAGER *in Washington*

Faster Than a Speeding Chip

A novel supercomputer

The chunky little blue computer, three feet on a side, doesn't look as though it had been built for speed. But last week scientists at the Sandia National Laboratories used the machine to break supercomputing's version of the four-minute mile, tearing through complex engineering problems at rates far greater than previously thought possible. The breakthrough in New Mexico suggests that supercomputers soon will be able to tackle tasks that come laden with thousands of variables. Up and running, those systems will help resolve the leading puzzles of our time: how did the universe evolve and which weekend next summer is it least likely to rain?

The Sandia computer relies on a controversial technology called "massively parallel processing." The theory behind the system is elegantly simple. Conventional computers contain only one number-crunching processor; for most jobs, such as spreadsheets or word processing, that's enough. But the problems tackled by supercomputers require billions of computations, and scientists have tried to improve performance by hooking tens or hundreds of processors together. The Ncube computer used at Sandia is "massively" parallel, with more than 1,000 processors, each as powerful as a traditional minicomputer. With such a system, researchers break large problems into parts, assigning each piece to a separate processor. With all the processors working simultaneously, the parallel computer solves the problem faster than its single predecessors.

Beam up: But parallel computers aren't yet widely accepted because it's difficult to write the software needed to divide big problems into pieces. And until last week, many scientists believed that even after going to that trouble, there was still a limit on how much speed a parallel computer would yield. As a test, the Sandia team took three sample problems and smashed the speed limit each time. One example: calculating the stresses inside a building beam supported only at one end. The problem would have taken a powerful minicomputer 20 years to solve; the new machine finished in a week.

The success at Sandia should create fresh enthusiasm for parallel technology. And if all goes well, the powerful supercomputers of the '90s will have to face a crucial new task: designing machines capable of replacing themselves.

Faster Action on Ozone Sought

EPA Chief to Propose Strengthened Treaty

WP 3/29/88

By Michael Weisskopf
Washington Post Staff Writer

Environmental Protection Agency Administrator Lee M. Thomas will propose strengthening the main provisions of the international ozone treaty recently ratified by the Senate with the goal of "faster and further" reductions in the chlorofluorocarbons (CFCs) that destroy the Earth's protective shield.

An international treaty signed last September by 31 nations calls for a staged 50 percent cut in CFCs by 1998. The treaty provides for a reassessment of CFC controls in 1990 and every four years thereafter based on the latest scientific evidence of ozone damage. A decision to strengthen or accelerate controls requires a two-thirds majority of the participating governments.

Thomas, moved by new evidence of CFC dangers and a decision by the world's largest CFC producer to phase out the chemical, will seek to speed up preparations for the 1990 reassessment, Eileen Claussen, the EPA's director of program development, said yesterday.

In a letter to be sent this week to U.N. Undersecretary Mostafa K. Tolba, who oversaw the treaty negotiations, Thomas is to suggest that technical teams start preparations next fall, instead of plans for the summer of 1989. This would move up political deliberations by at least six months to early 1990.

Thomas has previously called for elimination of CFCs, and Clausson said the goal could be attained as early as 1998. But, she said, the EPA continues to oppose unilateral efforts to end the use of CFCs, as proposed by some members of Congress and environmentalists.

"We're much better off doing it as a world community than as a nation," said Claussen. "If we act unilaterally, you make some difference, but it doesn't compare to what you get if all those producing and consuming nations go for a phase-out."

Only Mexico and the United States have ratified the treaty, which has assumed a new importance since a study two weeks ago demonstrated for the first time that worldwide erosion of stratospheric ozone, the gaseous layer that screens out harmful ultraviolet rays and prevents skin cancers, eye disease and crop damage, had occurred. The study showed that ozone levels had fallen by 3 percent in North America and Europe.

Eight days later, E.I. du Pont de Nemours & Co. called for the phase-out of CFCs by early next century. The company produces one-quarter of the world's supply CFCs, used widely as refrigerants, foam blowing agents and solvents for computer chips.

Claussen said the EPA will proceed with plans to implement the 50 percent cut, requiring the five U.S. producers of CFCs to cut back output in proportion to their share of the market in 1986. They will not be asked to go beyond the treaty, however, so as not to give an advantage to foreign competitors and not to take pressure off other governments to do their share for a global problem, she said.

David Doniger, of the Natural Resources Defense Council, said that while the EPA should press for global agreements, it also should independently curb CFCs both as a protector of U.S. public health and as a model for the rest of the world.

"We've gotten other countries to go as far as they have gone by leading, not by being contingent," he said.

Rafe Pomerance, of the World Resources Institute, said the EPA plan simply to scale back output by CFC manufacturers would result in a multibillion-dollar windfall for them because they would increase prices as supply shrinks and demand rises.

Du Pont Sends a Message on Ozone

NYT 3/29/88

The Du Pont Company has pledged to phase out all production of CFC's, the chemicals that erode the life-protecting ozone layer in the high atmosphere. Du Pont, the world's largest producer of CFC's, with sales of $600 million a year, set no specific timetable. But it said a "reasonable goal" would be to cut output by 95 percent by the year 2000 — nearly double the goal set by an international protocol last year.

The Du Pont action sets a compelling precedent for countries and companies still skeptical of the urgent need to develop alternatives to CFC's.

Du Pont has invested heavily in developing substitutes for CFC's. Still, the decision to phase out production must have been hard. The chemicals have many uses, as refrigerants and solvents, in auto air-conditioners and foam packaging, and account for 2 percent of the company's earnings.

CFC's are largely benign and non-toxic. But their very stability is what makes them a threat. Unlike other chemicals, they resist change as they percolate up through the atmosphere. As they are destroyed by sunlight they release their chlorine atoms, each of which destroys about 100,000 molecules of ozone.

Ozone fluctuates widely in response to solar activity. But beyond such natural gains and losses, the ozone layer is also being destroyed by chlorine. The reduction attributable to chlorine since 1969 is as much as 3 percent. For every 1 percent thinning in the ozone layer, some 2 to 3 percent more ultraviolet light streams through. That causes biologists deep concern. Damage to plants and animals could quickly affect the environment, food chains and human health.

Also at risk is the comfortable assumption that the atmosphere is so large and complex it will respond very gradually to man-made changes. The recently discovered "ozone hole" over the Antarctic each September is air that has lost 50 percent of its ozone. There was no hole in the 1960's when the chlorine in the high atmosphere amounted to one part per billion. The hole appeared after chlorine levels increased to the present level of just 3 parts per billion. This suggests that the atmosphere is in fact vulnerable to small changes.

A pending international treaty, the Montreal protocol, calls for a freeze in global CFC production, followed by a cut of only 50 percent. Du Pont's actions signal the need to take even bolder steps to correct an extraordinary imbalance in the earth's protective canopy.

Some Concerns See No Success Till 90's

NYT
31 Mar 88

By PHILIP SHABECOFF

Special to The New York Times

WASHINGTON, March 30 — The race is on in the chemical industry for what is envisioned as a multibillion-dollar market for substitutes for chlorofluorocarbons, the widely used compounds suspected of destroying the earth's ozone shield.

Major producers of the carbons, which are being phased out under an international agreement, are dedicating substantial investments and research to developing alternatives as quickly as possible.

E. I. du Pont de Nemours & Company, ICI Americas Inc. and Allied-Signal Inc. are hurrying to develop substitutes, but they caution that it may be well into the next decade before substitutes are developed and tested for safety and other attributes.

A High Priority

"In my 15 years with this company I have never seen any effort given so high a priority," said Mike R. Harris, halocarbon development manager for ICI Americas.

Meanwhile, smaller companies are stepping forward with products they say can be used now but require capital for production and marketing.

Some 2.1 billion pounds of chlorofluorocarbons, or CFC's, with a value of $2.2 billion, are produced worldwide annually, according to the Alliance for Responsible CFC Policy, an association of companies that make or use chemicals. The United States accounts for about 29 percent of the production and sales.

Joseph P. Glas, director of Du Pont's Freon products division, said that as CFC's are withdrawn "there is an opportunity for a billion-pound market out there." But he cautioned that the market would not develop until CFC's, which are cheap and well suited to their jobs, were no longer readily available.

The key to winning the race of the substitutes, he said, will be in having the right products available when CFC's become scarce and the demand for substitutes begins to crest.

Chlorofluorocarbons, a family of extremely stable, nontoxic, non-flammable and noncorrosive chemicals developed by Du Pont and General Motors during the 1930's, are used in refrigeration and air-conditioning, for making foam insulation and packaging, as aerosol propellants and as cleaning agents for electronics equipment and medical supplies.

But because evidence is growing that CFC's in the environment are depleting ozone in the upper atmosphere, an international accord was reached in Montreal last September.

The agreement would freeze production and use of CFC's at 1986 levels starting next year and then roll back production by 50 percent by the end of the century.

The ozone blocks harmful ultraviolet rays from the sun that can cause skin cancer, damage plants and harm animals.

Du Pont's Program

Earlier this month a team of Government and private scientists reported that the loss of ozone was greater than predicted and some of them called for more urgent action. Du Pont then announced last week that it had set as a goal the phase-out of all CFC production. The company accounts for about 25 percent of the world's production of CFC's.

Du Pont and the other big chemical makers that produce CFC's are concentrating on the development of

Continued From First Business Page

other fluorocarbons that do not do the same damage to the ozone. Such substitutes would require less re-engineering of products by their customers than totally different chemicals.

Basically, the companies seek to replace three CFC compounds: CFC-11, which is used chiefly in foams; CFC-12, widely used as a refrigerant and also in foams, and CFC-13, used as a solvent for cleaning electronic equipment and sterilizing surgical instruments.

Mr. Harris of ICI Americas said his company had embarked on a multimillion-dollar project to build the first commercial plant in North America for the production of CFC-134A, which is regarded as one of the more promising compounds to succeed CFC-12 as a refrigerant, particularly in automobile air-conditioning.

'Family of Substitutes' Sought

Allied-Signal "is actively engaged in the development of a full family of substitutes to replace CFC-11 and 12," said Bernard Sukornick, director of fluorocarbon research at Allied.

He also said he expected the volume of CFC substitutes sold to be lower than that for CFC's because users will find ways to recycle and conserve CFC's as the supply grows scarcer and prices rise. But dollar sales of substitutes would be higher, he said, because the substitutes are expected to be more expensive than CFC's.

Dr. Glas of Du Pont said that his company had started small-lot production of CFC-134A but that Du Pont had not yet formally allocated capital for a commercial facility.

The company is proceeding with "parallel activities" to develop substitutes, he said, including the testing of potential toxicity and other characteristics of the chemicals, as part of an international consortium of 14 companies. At the same time, Du Pont is proceeding with commercial development of the products and working with customers so that the substitutes can be used successfully when they become available.

Big market is seen for compounds that don't harm the ozone.

'Biggest Challenge'

The Du Pont executive said that development of a suitable alternative to CFC-13 as a cleaning agent for electronics products was the "biggest challenge" his division faced. Other company spokesmen agreed that work on a substitute in this area of rapidly growing demand lagged behind development of substitutes for other uses.

Earlier this year, however, a small company, Petroferm Inc., announced that it had developed, with the American Telephone and Telegraph Company, a product called Bioact EC-7, which could replace CFC-113 as a cleaning agent in many cases. The product is made largely from terpene hydrocarbons that can be extracted from citrus fruit, pine trees and other natural compounds.

Other small companies report the development of chemicals or processes that they say would eliminate the need for any fluorocarbons. Stephen F. Malaker, president of Cryodynamics Inc. of Mountainside, N.J., said his company had developed a line of refrigerators using helium as a coolant. He said the refrigerators were already "commercially viable."

The refrigerators have been used in military and space applications for some years and now the company has adapted the concept for commercial and industrial temperature ranges, Dr. Malaker said.

Another small company, the Rovac Corporation of Rockledge, Fla., has developed a refrigerator that uses hydrocarbon propellants of the kind adopted for aerosols after CFC's as aerosol propellants were banned in this country. Tom Edwards, director of Rovac's product design, said the technology was commercially available immediately but that "we need the backing of a major company."

CFC-22, one CFC compound that does not affect atmospheric ozone and is made by most of the major producers, is already beginning to be adopted as a substitute for CFC-11 for foam food containers. The Food and Drug Administration approved such use earlier this year.

Industry officials said that by the end of this year no more of the ozone-damaging CFC's will be used in food containers.

Air Pollution

OZONE DEPLETION MUST BE DEALT WITH ON CRASH BASIS, SENATOR TELLS HEARING

The Senate should press its parliamentary colleagues in Europe, Japan, and the USSR to move quickly to ratify the Montreal Protocol to protect Earth's ozone shield, Sen. Dale Bumpers (D-Ark) said March 30.

Mostafa K. Tolba, executive director of the United Nations Environment Program, should then be pressed to reconvene the parties to the agreement within six months to reconsider a more rapid phase-out of chlorofluorocarbons, Bumpers said.

"A letter signed by 100 senators would help move other nations forward, and I hope the chairman will join me in circulating such a letter" before the Easter recess, Bumpers told two panels of the Senate Environment and Public Works Committee at an oversight hearing on the depletion of stratospheric ozone.

Bumpers said despite the work of many senators, careful negotiations at Montreal, favorable action by the Senate in support of ratification of the protocol, and despite Du Pont's "dramatic and laudable announcement to phase out the production of CFCs, we are now where we should have been a decade ago. Had we acted then, rather than reacting now, we would be completing the transition to new technology today rather than just beginning it." (See related article in this issue.)

Back then, he said, "only 28 senators voted in favor of our 1976 amendment to halt the use of CFCs in aerosols by the end of 1977," Bumpers said. "The hallway outside the Senate was so full of lobbyists from the chemical industry, it was hard to get in. While I am proud of what Du Pont has done now, they had their lobbyists there as well." As a consequence, he said, "we had to wait for the bureaucratic process" and achieve the ban administratively.

Bumpers criticized the Environmental Protection Agency's proposal to implement the Montreal Protocol by establishing a system of free rights to CFC production on a percentage basis of historical levels. "This policy will slow the introduction of alternatives," he said. "A high fee of five to 10 times the current price of 50 cents to $1.00 per pound would not only encourage alternatives but would promote conservation and reuse of CFCs during the transition period. A bill that has been introduced in the House and similar bills are before this committee for the Senate. We should hammer out the differences and act on these bills immediately."

Chemicals

LIMITS ON CHROMIUM USE IN COOLING TOWERS PROPOSED UNDER AUTHORITY OF TSCA SECTION 6

Use of hexavalent chromium in comfort cooling towers would be banned, and manufacturers would have to maintain records of its distribution for use in industrial cooling towers under a rule proposed by the Environmental Protection Agency March 29.

The regulation, proposed under Section 6 of the Toxic Substances Control Act, is based on EPA's determination that Cr^{+6} compounds are "potent human carcinogens" and pose "an unreasonable risk" to human health, the agency said (53 FR 10206).

The proposal would require labels on shipments of the chemicals intended for use in cooling towers that remove heat from industrial processes, chemical reactions, or electrical power plants. The labels would warn that use of the chemicals in comfort cooling towers is prohibited and would state that the chemical increases the risk of lung cancer when inhaled.

The proposed rule is included in the Full Text Section of this issue. The text of the final regulation under TSCA will be published in BNA's *Chemical Regulation Reporter*.

The agency proposed to prohibit use of Cr^{+6} water treatment chemicals in cooling towers dedicated to heating, ventilation, and air conditioning or refrigeration systems.

The proposal also would require vendors to maintain for two years records of water treatment chemical shipments to all types of cooling tower users, regardless of whether the chemicals contained Cr^{+6}.

Choice To Regulate Under Section 6

EPA's interest in controlling human exposure to hexavalent chromium first was announced in the *Federal Register* Sept. 15, 1986, with a request for information on effective ways to control chromium releases from cooling towers.

The agency, after reviewing the chemical's use patterns and health risks, announced in September 1987 its intention to regulate hexavalent chromium under Section 6 of TSCA (18 ER 1322).

EPA said it chose to regulate Cr^{+6} under Section 6 because of the "multimedia" nature of the hazards posed by the chemical. No other single statute provides such broad authority, the agency commented.

The notice said that although EPA is continuing to investigate the possibility of adding hexavalent chromium to its list of hazardous air pollutants and is studying possible emission controls for various source categories under the Clean Air Act, only TSCA gives the agency authority to prohibit both use and sale of a chemical.

Chromium compounds, derived from chromite ore, are classed in two groups: the naturally occurring and more abundant trivalent chromium, and hexavalent chromium, which is manufactured and generally considered more toxic, the agency said. Trivalent chromium compounds would not be affected by the rule.

Hexavalent chromium, usually in the form of sodium dichromate (CAS No. 10588-01-9), is added to cooling tower water to inhibit corrosion of metal components, according to EPA. Cr^{+6} can be discharged from the cooling towers into the environment either in waste water or in small water droplets released into the air, the agency said.

EPA termed hexavalent chromium "a very potent lung carcinogen" and said it believes "a level cannot be identified below which there is no increased risk of cancer."

The cost of substituting non-chromate corrosion inhibitors for chromate-based systems would be $9.4 million, the agency estimated.

The agency will hold a public hearing on the proposed rule if a written request is submitted by May 13 to the Office of Toxic Substances, EPA, 401 M St. S.W., Washington, D.C. 20460. The hearing would begin at 10 a.m. on June 13 at EPA's Office of Administration Auditorium, Research Triangle Park, N.C.

Comments on the proposal may be submitted by May 31 to the OTS Document Control Officer at EPA's Washington, D.C., address given above. More information on the policy aspects of the proposal may be obtained from Debbie Stackhouse, Standards Development Branch, EPA, Research Triangle Park, N.C. 27711; telephone (919) 541-5407. For more information on the proposal's technical basis and background information contact Ronald Myers, also at the Research Triangle Park facility; telephone (919) 541-5578.

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the department in exchange for the department's concessions.

The areas dropped from the plan include those in the southern part of the Straits of Florida, the eastern Gulf of Mexico near Florida Bay, the Florida Keys, and the Dry Tortugas. Griles said a total of 11.1 million acres were removed from the leasing plan under the agreement. In 1987, 32 million acres of areas off Florida were removed from the plan, he said. Areas in the northern segment of the Straits of Florida were not included in the final five-year plan that was announced in July 1987 (18 ER 770).

Florida was one of five states to file a lawsuit in August challenging the department's plan under the Outer Continental Shelf Lands Act (*Florida v. Interior Department*, CA DC, No. 87-1435; 18 ER 1291). Some Florida environmentalists are part of a coalition formed March 9 to seek a leasing moratorium on Florida, California, and New England areas by restricting Interior Department appropriations (18 ER 2352).

Floridians had expressed concern to the department that their fishing and tourism industries would be harmed by oil and gas development. Florida Gov. Bob Martinez invited Interior Secretary Donald P. Hodel to visit the state's coral reefs on a snorkeling expedition in January (18 ER 2057).

Griles said it was tough to reach the agreement, but added that it would have been even more difficult if the Florida areas had larger energy reserves. The reserves off Florida are thought by the department to have less potential than any other area in the leasing plan, he noted.

Areas in which leasing will be allowed include the Cape San Blas area, Griles said. The San Blas area could be offered for leasing in 1991, but will be excluded from the November 1988 lease sale, he said. The area will be studied again by the department in consultation with the state to determine if special lease protections are necessary for environmental reasons, he said.

Griles said the department also could develop special lease protections for the Outer Cape San Blas area in consultation with the state. That area also was left in the leasing plan, he said. That area could be leased in November 1988, and the department thinks it may have significant natural gas reserves, he said.

Outer Continental Shelf

ENVIRONMENTALISTS EXPRESS MIXED FEELINGS OVER AGREEMENT ON SOUTH FLORIDA EXCLUSIONS

Environmentalists expressed mixed reactions to an agreement reached by Florida and the Interior Department March 24 to delete some areas off the state's coast from the department's five-year oil and gas leasing plan.

On March 28 and 29 BNA interviewed Ann Whitfield, legislative director of the state's Public Interest Research Group; Lisa Speer, senior scientist with the Natural Resources Defense Council; and Richard Charter, outer continental shelf coordinator for the California Local Governments Coordination Program.

All three told BNA that they were pleased that areas near the Florida Keys were being deleted from the plan. However, they all also said they were suspicious of the timing of the agreement. (See related item in this issue.)

The department offers areas included in the plan for sale under oil and gas exploration leases. The areas in the plan are considered to have high oil and gas development potential. The leasing process is carried out under the Outer Continental Shelf Lands Act by the department's Minerals Management Service.

Florida dropped a lawsuit challenging the validity of the department's plan in exchange for having areas deleted from the plan. The suit was one of five filed by states in the U.S. Court of Appeals for the District of Columbia Circuit challenging the validity of the plan on which the sales are based (*Florida v. Interior Department*, No. 87-1435; 18 ER 1291).

The environmentalists said that an agreement reached outside of a process providing time for review or comment under the Outer Continental Shelf Lands Act was suspect and helped underscore the claims in their suit. Among those claims was the arbitrary way in which the oil and gas development program is carried out by the department, they said.

Whitfield and Speer said they also are concerned that an area just north of Naples, Fla., was not excluded from the plan. The 26 degrees north latitude area can be made available for sale in November 1988, Whitfield told BNA.

Whitfield also said she is concerned that the agreement did not result in a wider buffer zone west of Apalachicola Bay. The buffer zone required around areas where energy development activities will take place shrinks from 30 miles at the bay to six miles in areas west of the bay, she said.

In addition, Whitfield said she is working with environmentalists nationwide to persuade Congress to remedy her specific concerns as well as concerns for areas to be offered in other states. The environmentalists hope to get language added to the appropriations legislation for the department to require it to refrain from offering some areas in the plan for leasing.

The deletion of tracts under the agreement is a first step, but not the solution, Speer told BNA. It does not make sense to lease sensitive areas when there are many other energy-rich areas that are not as environmentally sensitive, she said. The OCS Lands Act sets forth a requirement for the department to balance the need for energy against the environmental consequences, Speer said.

Speer said she also is concerned that the department agreed to defer some sensitive areas in Florida, but left other sensitive areas off Mendocino, Calif., in the plan. The California area is the site of planned lease sale No. 91 to be offered in February 1989. She said public opposition to leasing in the Mendocino area is greater than the opposition to the Florida leasing. The fact that the department did not delete the area from the plan indicates the decision making process is arbitrary, she said.

Charter told BNA that he hopes that California can get the same kind of consideration that Florida did. In referring to Florida's agreement to drop the lawsuit, he said the state was "bought off."

Air Pollution

DU PONT BACKS 'ORDERLY TRANSITION' TO TOTAL PHASE-OUT OF HALOGENATED CFCs

Du Pont is setting its course for an "orderly transition" to the total phase-out of fully halogenated chlorofluorocarbon production, according to a policy statement delivered to U.S. congressional leaders March 24.

Du Pont said its new position is based on scientific findings of global ozone change "and the likely involvement of chlorine" in that change.

In a report released March 15, the Ozone Trends Panel, an international panel of more than 100 scientists, said that stratospheric ozone over the Northern Hemisphere decreased 2.5 percent between October 1978 and October 1985

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and that the evidence "strongly indicates" that artificial chlorine compounds are a major factor in ozone declines within the polar vortex (18 ER 2356).

The Montreal Protocol, an international agreement reached in September 1987, would institute, if ratified by the required number of nations, a freeze of consumption and production at 1986 levels of five chlorofluorocarbons: CFC-11, CFC-12, CFC-113, CFC-114, and CFC-115. Subsequently, reductions would be put into effect that would bring consumption and production in the late 1990s to 50 percent of 1986 levels.

The U.S. Senate voted March 14 to support ratification of the protocol (18 ER 2356). The State Department has drafted a ratification instrument, which is expected to be sent soon to the White House for President Reagan to sign, an official in the department's Bureau of Oceans and International Environmental and Scientific Affairs told BNA March 29. Reagan is expected to sign it, after which it would be sent to the United Nations in New York, he said.

Before the Ozone Trends Panel made its report, Richard E. Heckert, chairman of the board of Du Pont, received a letter from Sens. Max Baucus (D-Mont), Robert T. Stafford (R-Vt), and Dave Durenberger (R-Minn), reminding him of a stand taken by Du Pont in 1975 that, "If creditable scientific data show that certain fluorocarbons cannot be used without a threat to health, Du Pont will stop production of those compounds."

In a response dated March 4, Heckert said, "At the moment, scientific evidence does not point to the need for dramatic CFC emission reductions. There is no available measure of the contribution of CFCs to any observed ozone change. In fact, recent observations show a decrease in the amount of ultraviolet radiation from the sun reaching the United States. Moreover, there is no agreement within the scientific community on the potential health effects of any already observed ozone change."

In that letter, however, Heckert said there is "enough scientific evidence to justify prudent concern over unrestrained CFC emissions. This has led to global initiatives such as the Montreal Protocol, which was strongly supported by Du Pont."

Du Pont Scientist On Panel

However, Du Pont acknowledged the impact of the Ozone Trends Panel in its subsequent reassessment of the danger of some CFCs. In its new policy statement, the company said the scientific findings by the panel, "with a Du Pont scientist among its membership," persuaded the company that global protection of the ozone layer requires a total phase-out of fully halogenated CFCs.

Because society remains still dependent on these compounds for many essential uses, "the introduction of alternative chemicals and technologies will be an essential part of this phase-out," Du Pont said. "We will continue our aggressive effort to develop environmentally safe alternatives and help customers adapt so that a safe but rapid transition is possible. We ask the user industries and other suppliers to join us in pursuit of this goal."

In addition, the company urged other countries to take the panel's scientific evidence seriously, speed up their efforts to ratify the Montreal Protocol, and then immediately start the process of assessing the protocol to consider further global limitations on CFC emissions.

"By building on the growing international scientific consensus, worldwide policymakers are in the position to act cooperatively, not unilaterally," Du Pont said. "We believe this is the only means to ensure adequate and timely ozone protection."

As part of the effort to find substitutes, 14 chemical companies from eight nations are cooperating in efforts to bring to market as soon as possible substitutes for the CFCs targeted by the Montreal Protocol. They are pooling their efforts on toxicity testing of alternatives.

To begin with, two compounds are targeted for testing: HCFC-134a, a potential substitute for CFC-12; and HCFC-123, a substitute for CFC-11. Other compounds could be added to the program once they are identified and it is determined how they should be tested.

Du Pont's Tony McCain told BNA March 24 that three committees have been established. A management panel, which is meeting every two months, gives direction to the programs that will be conducted, McCain said. It is chaired by Joe Glas, head of Du Pont's Freon Division. A panel of toxicologists is headed by Allied Chemicals' George Rusch. A product quality committee, which will make decisions on the quality of the chemicals produced for testing and how to maintain that quality, is headed by Hugo Steven of ICI in England.

A timetable for testing is still being worked on, McCain said. It is possible that a two-year inhalation test might start in 1989. "To get the final report from a two-year study, it takes one year to write the report after you expose the animals," he said. "We hope to be done in about five years."

Allied-Signal, French Firm To Cooperate

In a related development, Allied-Signal Inc. and Atochem, a wholly owned subsidiary of France's ELF Aquitaine Group, March 29 announced an agreement to work together to develop non-ozone depleting substitutes for CFCs.

The agreement encompasses research to develop process technology and pilot plant construction leading to full-scale commercialization and more rapid introduction of new products, they said.

Allied-Signal is the second largest U.S. producer of CFCs. Atochem is the largest CFC producer in Europe. Both companies are charter members of the Program for Alternate Fluorocarbon Testing.

At a March 30 hearing by two panels of the Senate Environment and Public Works Committee, an Allied-Signal official said the company has not yet been provided with the data from the Ozone Trends Panel.

"Even without the data, one message comes through clearly from our reading of the press reports—this problem is a global one," Marilyn I. Montgomery, vice president and general manager of Allied-Signal's Genetron Products, told the panels.

To be effective, she said, "any solution must be international in scope. The new data gives all of us an added sense of urgency in working toward that global solution. Fortunately, the elements of a realistic and effective solution are already in place in the form of the Montreal Protocol."

Unilateral action to phase out CFCs without regard to other nations creates several concerns, Montgomery said. "The U.S. produces only one-third of the CFCs used in the world. There would be little, if any, environmental benefit. Whatever minimal environmental benefits might be achieved would be at the expense of domestic producers, users, and consumers. Because almost 1 million jobs in the United States are CFC-related, this could create severe economic dislocations."

In addition, she said, "unilateral action in the United States might remove the incentive that other nations have to ratify the Montreal Protocol. We need to exert more pressure rather than less to get other countries to join in a truly international solution."

cent the economy managed in 1987—and the general view has shifted back toward the precrash analysis that inflation, and not recession, is the biggest economic threat. Federal Reserve Board chairman Alan Greenspan has cautioned that growth should not get too rapid, lest inflation rise; few observers expected any significant change of course from the March 29 meeting of the Fed's monetary policy makers. Chief economist Lawrence A. Kudlow of Bear, Stearns & Co. in New York observed drily in a recent edition of his newsletter, "The problem this winter has not been the markets—which have been relatively steady—but forecasters and commentators, who have been highly volatile."

ENVIRONMENT

Global ozone... Backed by environmental organizations, Sens. Max Baucus, D-Mont., and John H. Chafee, R-R.I., are pushing legislation that would unilaterally phase out most U.S. production and use of chlorofluorocarbons (CFCs), the widely used refrigerants and insulation chemicals linked with depletion of the essential ozone layer high above the earth. Environmental Protection Agency administrator Lee M. Thomas is also eager to get rid of CFCs but wants to do it globally. The United States recently ratified a treaty, signed by representatives of 31 nations in Montreal last September, to reduce CFC consumption by 50 per cent within 10 years of ratification. So far, Mexico is the only other country to ratify the treaty. But Thomas wants to get the signatories back together in January 1990 to stiffen the treaty to scale back CFC consumption by 95 per cent, the original U.S. bargaining position. He believes new scientific data showing far more severe ozone depletion than previously believed to exist will convince other nations of the need. Unilateral action would simply let the other countries off the hook, Thomas said. Proponents of unilateral action insist that other countries would follow the U.S. lead, especially if trade restrictions were placed on products made with CFCs.

INTERGOVERNMENTAL RELATIONS

Drugs and border lords... With the antidrug effort emerging as a campaign issue, bipartisan legislation was introduced on March 24 in the House and the Senate to attack both the supply and demand sides of the drug equation. The $2.1 billion package would provide an extra $15 million to establish an interagency task force to police the U.S. southwestern border with Mexico. About 150 new antidrug enforcement officers would be assigned to the area. The legislation would provide another $439 million for equipment and personnel to bolster drug interdiction efforts. Another $300 million would allow the Immigration and Naturalization Service, the Bureau of Alcohol, Tobacco and Firearms, the FBI and the various U.S. Attorneys' offices to hire additional personnel for the antismuggling effort. Although drug producing countries have repeatedly been attacked in Congress, the bill would provide $253 million in economic aid for these countries' drug eradication efforts. The bill would resurrect the grants program for state and local government by providing $250 million next year to help officials contend with drug-related crimes. An extra $555 million would go for community drug treatment and education programs. "We're at a crossroads in our effort to rid this country of the destruction of drug abuse," said Rep. Glenn English, D-Okla., who introduced the House bill. *(See NJ, 11/21/87, p. 2954.)*

INTERNATIONAL AFFAIRS

Raising the stakes in Panama... "I don't want to rule anything out because I want Noriega to have some sleepless nights." So said assistant secretary of State Elliott Abrams in seeking to make it clear that the Reagan Administration would use unspecified increased leverage to force Panamanian strongman Manuel A. Noriega to give up power and leave the country, if he has not done so soon after Easter. U.S. officials, who have been conducting an extraordinary public and private campaign to force Noriega to step down, in late March acknowledged that economic pressures had not dislodged him. The Administration could face serious credibility problems in the region if Noriega, who is under indictment for drug and racketeering charges in the United States, continues to defy U.S. pressure.

LABOR AND BUSINESS

OSHA inspections... The Labor Department's Occupational Safety and Health Administration announced plans to step up inspections of hazardous workplaces, ending a policy that allowed some employers to avoid on-site inspections if their records showed low rates of worker injury and illness. The change, announced on March 22, was spurred by labor union complaints that OSHA has been so preoccupied with reviewing records that it had ignored potentially dangerous conditions at many workplaces. Meanwhile, though, labor suffered a setback when an occupational-disease notification bill was withdrawn from the Senate floor on March 29 after supporters failed to halt a filibuster. The bill, similar to legislation already passed by the House, would require the government to notify workers whose health may be at risk because of present or past exposure to hazardous substances at their jobs. Most business groups opposed the bill. *(See NJ, 4/4/87, p. 832.)*

REGULATION

Must-carry to the Supreme Court... Broadcasters wanting to force cable television operators to carry all local over-the-airwaves broadcast channels will have to fight the next stage of their battle without help from the Federal Communications Commission. The commission had hoped to carry to the Supreme Court its defense of its cable "must-carry" rules, which were struck down in December by the U.S. Court of Appeals for the District of Columbia Circuit. But in late March, the Justice Department's solicitor general refused to handle the FCC's appeal on the ground that the case was not "sufficiently important," according to a commission official. That response wasn't surprising—the department's Antitrust Division in early 1987 had filed comments with the FCC charging that all must-carry rules are unconstitutional infringements on cable companies' 1st Amendment rights. The Justice decision not to appeal the case for the commission leaves a handful of broadcasting trade groups alone to seek Supreme Court review. If the appeal is successful, FCC officials say they might take a more active role in defending their rules, despite Justice's opposition. *(See NJ, 3/26/88, p. 807.)*

Editorials

WE NEED THE OZONE LAYER MORE THAN STYROFOAM

High above the earth a protective layer of ozone shields us from the sun's harmful ultraviolet rays. That screen is losing its strength, being depleted by harmful but useful chemicals known as chlorofluorocarbons, or CFCs. Further loss of the ozone layer could increase the incidence of skin cancer, reduce crops, and eventually lead to worldwide climatic imbalances (page 35).

First discovered in the 1930s, CFCs form the basis of coolants for refrigerators and air conditioners and the styrofoam in take-out coffee cups. Many of these uses make products more convenient, but that convenience is proving costly.

Faced with evidence that CFCs were helping to deplete the stratospheric ozone layer, 31 nations meeting in Montreal last September froze usage at 1986 levels and agreed to reduce consumption by 50% by the end of the century. U. S. industry, in particular CFC market leader Du Pont Co., backed the international effort as preferable to unilateral action by the U. S., which it feared would give its foreign competitors unfair advantage.

That is all well and good. But now policymakers are worried by news on Mar. 15 from an international scientific team headed by the National Aeronautics & Space Administration: The ozone layer is thinning at a faster rate than scientists had thought. A Senate hearing on a proposal calling for virtual elimination of CFCs is set for Mar. 30.

Just three years ago scientists verified that once a year, a hole the size of a continent appears in the ozone over Antarctica. The exact cause of this annual phenomenon isn't known, though many scientists blame CFCs in part. But the implications of the recent reports are scary enough that action is preferable to inaction. The Montreal accord, which still requires ratification by nine more countries, is a good first step, and the U. S. should press allies in Europe and Japan to move quickly to implement it. Industry, too, must intensify research efforts to find CFC replacements. And surely we can live without styrofoam coffee cups.

BILATERAL TRADE PACTS: HANDLE WITH CARE

American and Canadian companies are starting to restructure production and marketing operations and revise their investment strategies to take advantage of the U. S.-Canada Free Trade Area, a tariff-free market of 265 million customers (page 44). The result will be the same sort of spur to economic growth in both countries that has accompanied the lowering of trade barriers by major industrial nations since World War II.

Although there are ratification hurdles yet to be cleared, the free-trade pact is scheduled to go into effect on Jan. 1, 1989. That will start a 10-year phaseout of tariffs and, equally important, a lowering of obstacles to investment flows and trade in services across the 4,000-mile border. For Prime Minister Brian Mulroney, the agreement is expected to provide a platform for a reelection bid. For President Reagan, it is likely to be one of his most important achievements—a fitting legacy for a President who has steadfastly resisted pressures in the U. S. for a turn toward protectionism. Reagan has understood that the most effective defense against protectionism is strong political leadership for a push to create bigger, more dynamic markets.

Already, the U. S.-Canada pact is stirring talk of a North American market that includes Mexico as well. But the industrial disparity between Mexico and the other two countries means that free trade is still a distant goal. Even more remote is another proposal: a U. S.-Japan bilateral free-trade agreement. The danger in such pacts is that they may create rival, discriminatory trading and political blocs. The antidote to such a trend is for the U. S. to continue to support multilateral trade liberalization under the 96-nation General Agreement on Tariffs & Trade. The U. S.-Canada pact doesn't point the way to more bilateral pacts, but to broadening of GATT to include trade in services and investment flows as well as of merchandise. If the GATT talks currently under way succeed, the result will be an important step toward freer trade on a truly global scale.

A SIMPLE SOLUTION TO RUNAWAY CARS

Unintended acceleration—where a car suddenly accelerates when shifted into drive or reverse—is easily the most baffling cause of auto accidents these days (page 66). Government agencies and auto makers around the world have studied the problem for years and still can't pin down the cause except to say that the effect occurs only in cars with automatic transmissions.

That's little comfort for the thousands of victims of this terrifying phenomenon. They're frightened about driving cars that seem to develop minds of their own. And they're frustrated by the growing view among many investigators that driver error—simply pressing the wrong pedal—is the real culprit. Audi, whose 5000 models have borne the brunt of publicity about the problem, has addressed that possibility by installing locks that prevent a driver from shifting out of park without depressing the brake. The Japan Automobile Manufacturers Assn. decided in December to phase in similar devices by the end of next year.

No one expects shift locks to eliminate sudden acceleration. But by charging that the devices are ineffective Band-Aids covering up the "real" cause of the problem, independent safety groups are doing everyone a disservice. Audi's experience shows the locks go a long way in reducing the incidence of runaway cars. The National Highway Traffic Safety Administration is sponsoring a comprehensive study of unintended acceleration, to be completed this fall. Unless it can come up with a clear answer to the problem by then, the NHTSA should mandate shift locks for all new cars equipped with automatic transmissions and sold in the U. S.

idea now, what makes them a good idea next year?" says Edward J. Black, a vice-president of the Computer & Communications Industry Assn.

In public, advocates of Toshiba sanctions are not giving any ground. They got new ammunition on Mar. 22, when a Tokyo court let Toshiba Machine Co. off with a $15,750 fine and suspended prison sentences for two executives implicated in the illegal sales. The verdict "was nothing more than a slap on the wrist with a wet noodle," fumes Garn.

Any sanctions must be in a form that President Reagan will approve. One possibility is limited restrictions on imports from Toshiba Machine, whose annual U. S. sales total about $100 million. That wouldn't affect the parent company's sales of computers, chips, and other electronics equipment. Despite its initial anger, Congress seems prepared to accept the view that the cold realities of interdependence rule out tougher action.

By Steven J. Dryden in Washington, with Larry Armstrong in Tokyo

THE ENVIRONMENT

AN OZONE HOLE OVER CAPITOL HILL

The heat is on Congress to safeguard the atmospheric shield

Few atmospheric scientists doubt that something ominous is happening to the sky. Nor do they any longer doubt that they have identified the culprit—a group of ubiquitous, one-time wonder chemicals called chlorofluorocarbons (CFCs). Those inert, nonflammable substances keep refrigerators cold and put the bubbles in the plastic foam containers that keep fast foods warm. But they also rise into the upper atmosphere where they destroy the delicate layer of ozone that shields the earth from deadly ultraviolet radiation.

The most alarming news yet came on Mar. 15, when an international study team reported serious—and rapid—depletion of the ozone layer over the populous Northern Hemisphere. Earlier, British researchers had discovered a hole in the ozone layer over Antarctica. But the new data indicate that the ozone layer is being depleted up to three times faster than experts had thought.

NEW URGENCY. The announcement by the researchers, headed by the National Aeronautics & Space Administration, added new urgency to efforts to ban CFCs entirely. On Mar. 30 the Senate will hold a hearing on a resolution calling for virtual elimination of CFCs, which are used in goods with a value of $27 billion annually. Senator David Durenberger (R-Minn.) and two other senators are calling on Du Pont Co., the world's leading CFC maker, to cease production.

Ironically, the new data were released just a day after the Senate ratified a treaty calling for a preliminary freeze of CFC production at the 1986 rate and a 50% reduction from that level by 1999. The accord was signed by 31 nations in Montreal last September. But many lawmakers now believe that the treaty is too little, too late. "The international accord is a wonderful step," says Durenberger. But, he adds, "we must move faster than we have on this problem."

"Time is one thing we don't have," agrees Environmental Defense Fund senior scientist Michael Oppenheimer. The ozone layer filters out ultraviolet light that can cause skin cancer, damage crops, and harm marine life. Scientists estimate that a 1% decrease in the ozone layer will cause tens of thousands of skin cancer cases each year. The recent findings indicate that level of damage has already been surpassed. Scientists had predicted losses of roughly 0.5% to 1% in the temperate zone of the Northern Hemisphere. What they found was a loss of 3%.

In addition, the damage promises to worsen—even if all CFC use were stopped now. CFCs carry reactive chlorine atoms that can destroy thousands of ozone molecules. And they can linger in the atmosphere for up to 150 years without degrading. Moreover, CFC concentrations in the atmosphere have tripled since 1970. So it would take years before the 50% reduction called for in the Montreal treaty has an effect.

STERILE RATS. But industry officials are worried that an outright ban in the U. S. would do more harm by unraveling the existing treaty. That accord, they point out, took six years to negotiate, and agreement was reached a decade after the U. S. took the lead by banning the use of CFCs as propellents in aerosol containers. "It's very much a success story that we have gotten this far," says Kevin J. Fay, executive director of the Alliance for a Responsible CFC Policy, an industry group.

Industry officials hope they are given time to develop substitutes. But their efforts so far have not been successful. Du Pont says it is spending $10 million a year on the search. One product it tested in the late 1970s looked promising—until it was found to render rats sterile.

Du Pont is leading industry efforts to oppose further curbs on CFCs. Although the company in 1975 said it would voluntarily suspend CFC production if it could be proven that the products were harmful, Du Pont still maintains that "scientific evidence does not point to the need for dramatic CFC emission reductions." In a letter to Durenberger and other senators, Du Pont Chairman Richard E. Heckert called the proposed production halt "unwarranted and counterproductive."

The absence of alternatives leaves Congress faced with the unpopular prospect of banning outright a product for which there are currently no substitutes. And that could leave a $750 million market to overseas competitors who might not follow suit. But that may not matter: "First it was an isolated incident over Antarctica," notes a congressional aide. "Now that we're talking about depletion over Philadelphia, we might get some response." With the evidence continuing to mount that the sky, if not falling, is thinning dangerously, chances are good that CFCs' days are numbered.

By Tim Smart in Washington, with Joseph Weber in Philadelphia

A 1986 COMPUTER MODEL OF OZONE LOSSES IN THE SOUTHERN HEMISPHERE SHOWS A 2.6% ANNUAL RATE OVER ANTARCTICA (BLUE). NEW DATA INDICATE A 3% RATE OVER THE U. S.

NASA