Collection: Masterman, Vicki: Files
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- timing of State forwarding treaty pckg
- is submission route (via NSC) statutory? Can DPR review? how can we control the process?
- need to propose legislation? what kind? who proposes?
- EPA needs to mesh Court rqmt to publish 1 Dec 87

division re: domestic regs w/ need to promulgate additional regs to adhere to the protocol

- Presidential proclamation prepared by DoS for Pres sign for Fed Reg (thru DPC?)

United States Department of State

Washington, D.C. 20520

September 1, 1987

MEMORANDUM

TO: Ben Cohen
White House: Counsel's Office

FROM: Debbie Kennedy DK
State: Legal Adviser's Office

SUBJECT: Ozone Protocol: Summary of Negotiation and Ratification Process

The attached document briefly describes the remaining steps of the international negotiations on the Ozone protocol and the process of U.S. ratification of the agreement. Feel free to call me if you have any further questions on this subject.

cc: Richard Benedick

Procedural Steps of Ozone Protocol
Negotiations and of U.S. Ratification Process

A. Domestic Process Prior to Signature

1. Request for Authorization to Sign the Agreement. This request takes the form of an action memorandum (typically from the Assistant Secretary of the bureau with substantive responsibility for the subject to which the agreement relates) addressed to the Secretary or, except when a Full Power is to be issued at the same time, any other Principal to whom such authority has been delegated -- i.e., the Deputy Secretary or an Under Secretary. The memorandum is cleared with various State Department bureaus and any other agency which has primary responsibility or a substantial interest in the subject matter.

2. Request for Issuance of Full Power. The full power is is formal evidence of the authority of a particular representative, named in the instrument, to sign the agreement on behalf of his/her government. It is used only for the signing of treaties. The full power is prepared by the State Department's Office of the Assistant Legal Adviser for Treaty Affairs, and must be signed by the Secretary or Acting Secretary of State. It normally is requested at the same time the request for authority to sign the agreement is made.

B. Remaining Steps of International Negotiations

1. September 7: Meeting of legal experts and informal meeting between UNEP Executive Director and selected heads of delegations to the Ad hoc Working Group of Legal and Technical Experts for the Preparation of a Protocol on Ozone-Depleting Substances to the Vienna Convention for the Protection of the Ozone Layer.

2. September 8 - 11: Meeting of Ad hoc Working Group of Legal and Technical Experts for the Preparation of a Protocol on Ozone-Depleting Substances to the Vienna Convention for the Protection of the Ozone Layer. The objective is to have a virtually complete draft of the protocol (the Eighth Revised Draft Protocol) ready by the end of the session on Sept. 11 for review by governments over the weekend.

3. September 14 - 16: Conference of Plenipotentiaries on the Protocol: Consideration by conference of the draft protocol and the report of the Ad hoc Working Group. Discussion of unresolved issues and finalization of the agreement. Adoption of the final text by the conference. (Adoption is the process by which the content of the proposed agreement is settled by the delegates; it is not an expression of a State's agreement to be bound by the agreement, which

occurs only upon specific expression of its consent -- e.g., through ratification, accession, acceptance.) Adoption of the Final Act of the Conference. (The Final Act may contain a summary of the conference proceedings, names of the States that participated, and resolutions adopted by the conference. It does not contain any international commitments.)

C. U.S. Signature of the Agreement

1. Available Time Period: Under Article 14 of the Seventh Revised Draft Protocol, the protocol will be open for signature in Montreal on September 16 -- at the conclusion of the Conference of Plenipotentiaries. Thereafter, it will be open for signature in Ottawa from September 17, 1987 to January 16, 1988 and at the UN Headquarters in New York from January 17, 1988 to September 16, 1988. If the U.S. does not sign the protocol in Montreal, it could sign subsequently in Ottawa or New York.

2. Significance: Signature connotes a State's intent to seek in good faith the necessary domestic authorization for ratification or acceptance and any implementing legislation or regulations. A signatory State is obliged to refrain from acts which would defeat the object and purpose of the treaty until it makes it intention clear not to become a party to the treaty.

D. U.S. Ratification Process

Because of the breadth and importance of the proposed protocol, a preliminary decision has been made to conclude it as a treaty pursuant to Article II, Section 2 of the Constitution. After U.S. signature of the protocol, the following steps would be those taken in connection with U.S. ratification of the agreement. The consent of the U.S. to be bound by the treaty is expressed by its ratification of the agreement.

1. The Department of State would prepare a treaty package consisting of (a) an explanatory report signed by the Secretary or Acting Secretary of State providing background information on the protocol and an analysis of its provisions; (b) a message to be signed by the President transmitting the protocol to the Senate for its advice and consent to ratification; and (c) a certified copy of the protocol itself.

2. After the report is signed by the Secretary of State, the package is submitted to the White House (via the National Security Council) to obtain the President's signature of the message. The package is then transmitted by the White House to the Senate, where it would be referred to the Senate Foreign Relations Committee (SFRC) for appropriate action.

3. Related documents could be sent to the Hill under separate cover. For example, the environmental impact statement (EIS) may be sent directly to the SFRC by the Department of State. Proposed legislation deemed necessary to implement the protocol, if any, would be transmitted to the Congress through normal OMB procedures.

4. The Committee probably would schedule hearings on the protocol.

5. The Committee would then schedule the protocol on its calendar for a vote, and should the Committee report favorably on the protocol, it would be considered for advice and consent by the full Senate. The Senate normally takes action on treaties in the form of a resolution of ratification.

6. Once approved by a two-thirds vote of those present, the Senate's resolution of ratification is then returned with the certified copy of the treaty to the State Department, at which time an instrument of ratification is prepared in duplicate, forwarded to the White House for the President's signature, returned to State where it is also sealed and signed by the Secretary of State.

7. The protocol, as envisaged, does not appear to require additional legislation for U.S. implementation. The promulgation of additional regulations will be required, however, in order for the U.S. to implement the agreement. Pursuant to the terms of a court order in issued in litigation against the EPA Administrator by the Natural Resources Defense Council, EPA must publish by December 1, 1987 a proposed decision on the need for further domestic regulation under the Clean Air Act of certain ozone-depleting chemicals. A final EPA decision is required by August 1, 1988.

8. After the promulgation of implementing regulations, the U.S. instrument of ratification would be deposited with the Secretary General of the United Nations, the depositary for the Ozone Convention and protocol.

9. The protocol would enter into force for the United States according to the provisions on entry into force specified in the protocol.

10. The final step of the U.S. treaty process is the issuance of a proclamation signed by the President, which declares that on and after the protocol's entry into force, it shall be observed and fulfilled by the U.S., its citizens, and persons subject to U.S. jurisdiction. The proclamation is prepared by the Department of State for the President's signature and printed in the <u>Federal Register</u>.

Drafted:L/T:MBrandt;L/OES:DKennedy:647-1370:22830

Clearance:L/T:HCollums

ENVIRONMENTAL FOCUS/ROCHELLE L. STANFIELD

A Can-Do Treaty

An unusual bubble of consensus has been riding the stratosphere in the form of a rare agreement between government officials, industry representatives and environmentalists. They agree that the use of the family of chemicals called chlorofluorocarbons (CFCs) must be reduced in order to save the ozone layer high above the earth and that an international treaty to reduce their consumption—signed last September in Montreal—is an essential first step.

The bubble may be burst by a congressional pin.

To go into effect on the target date of Jan. 1, 1989, the treaty must be ratified by at least 11 of the 24 countries that consume two-thirds of the world's CFCs. The United States, one of the biggest producers and users of CFCs and the prime mover behind the treaty, is looked to by other countries to lead the global ratification effort. There's next to no opposition to the treaty in this country, but the Senate Foreign Relations Committee is likely to hold up its consideration until late spring while it debates the intermediate-range nuclear force treaty and reform of the War Powers Resolution.

Ozone treaty supporters fear that a U.S. delay will give opponents of the treaty, particularly in Great Britain and Japan, ammunition to slow down or halt acceptance by members of the European Community and the Asian countries.

Martin Kozlowski/TNX

And so, supporters were trying to work out a behind-the-scenes maneuver to expedite consideration by taking up the treaty at a routine Foreign Relations business meeting rather than a formal hearing. Apparently, that is not to be.

The supporters are eager to avoid hearings for two reasons. First is timing: With a hearing put off until April, at the earliest, approval could take most of the year. But they also worry that hearings—even if they are structured to be perfunctory—would open up the whole ozone issue and become very divisive.

New scientific reports show ozone being depleted at a much faster rate than previously thought. Many ozone experts, such as Michael B. McElroy of Harvard University, believe that the treaty as it now stands will accomplish too little too late. But neither these scientists nor environmental lobbyists who seek unilateral action by the United States beyond the treaty provisions want to derail the treaty. They unanimously support it, viewing it as the least the world can do to attack the problem. In addition, they recognize that the treaty has provisions for moving up its deadlines for reducing CFC use, if the signatories can agree on new deadlines. Nonetheless, some treaty supporters fear that any show of divisiveness on this issue could also delay ratification of the treaty and could be used by opponents in other countries to defeat it.

The Foreign Relations Committee, however, quietly decided to require a hearing. Several committee members and their staffs weren't aware that a decision had been reached. The reason given was that a treaty—any treaty—requires a hearing, a view put forward most vigorously by ranking Republican Jesse A. Helms of North Carolina. Some treaty supporters see this as a subtle way of delaying the treaty; Helms has never overtly opposed the treaty but has personal ties to Reagan Administration officials in the Interior Department and elsewhere who have fought the treaty within the Cabinet-level Domestic Policy Council.

Last spring, those officials had tried unsuccessfully to persuade President Reagan to reopen the U.S. position on the treaty and thus undercut the international negotiating position of the State Department and the Environmental Protection Agency (EPA).

Any last-ditch effort to defeat the treaty would be ironic, considering the overwhelming support it has in most corners of the United States, including the business community.

True, at EPA's Jan. 7-8 public hearings on its proposed regulations to implement the U.S. role in putting the treaty into effect, the Natural Resources Defense Council Inc. (NRDC), among other environmental organizations, along with some scientists, criticized the proposal as not going far enough. (EPA has an obligation under the Clean Air Act to take unilateral action to protect the ozone layer, insisted David D. Doniger, NRDC senior attorney.)

But nobody attacked the treaty or U.S. implementation of its provisions. "We've never had such a love affair [over a regulation]," said Eileen Claussen, the EPA official in charge of the ozone treaty. "It's a unique thing. At the hearing, a speaker from industry said, 'We support the rule.' "

On most environmental issues, industries hold off implementing forthcoming regulations until they absolutely have to—often taking the agency to court to delay that date as long as possible. That is not the case with CFCs. Long before the treaty deadlines—which give the signatory nations until 1998 to reduce CFC use by 50 per cent or face sanctions—industry is scurrying for alternatives. American Telephone & Telegraph Co. (AT&T) has announced that it is switching from CFC-113 to an environmentally benign product manufactured from orange rinds and papermill by-products to clean computer circuit boards. AT&T currently uses about 3 million pounds of CFC-113 a year to do various cleaning jobs. Company spokesmen said the new product, called Bioact EC-7, will replace about a third of the CFC-113 used by AT&T. Total global use of CFC-113 is 360 million pounds a year, and so EC-7 is not the answer to everyone's prayers. But EPA officials, scientists and environmentalists are encouraged by this potential substitute because the use of CFC-113 had been growing dramatically.

It seems that people are determined to reduce ozone damage one way or another. A week after the public hearings, EPA, Environment Canada and the Conservation Foundation co-sponsored a conference and trade fair on CFC substitutes. To the surprise of the hosts, more than 600 participants showed up, including representatives of 20 countries.

"It's an example of the can-do spirit in action," said Richard E. Benedick, who was the principal U.S. negotiator of the ozone treaty. "It's the spirit of Yankee ingenuity to get on with the job." □

hearing on 10/27 ...

DRAFT

Statement of Dr. Peter E. Wilkniss
Director, Division of Polar Programs
National Science Foundation on October 27, 1987
Before a Joint Hearing of the Subcommittees on Hazardous
Waste and Toxic Substances, and Environmental Protection of
the Committee on Environment and Public Works
United States Senate

Mr. Chairman, I am pleased to have the opportunity to discuss with this Committee the role of the U.S. Antarctic Program with respect to research on stratospheric ozone depletion in the Antarctic. Since the early 1970's the National Science Foundation with vital Congressional support has budgeted for and managed the U.S. Antarctic Program.
The program provides research grants and an infrastructure of permanent stations, temporary field camps, a heavy airlift capability of a Navy squadron operating NSF ski-equipped C-130 aircraft, research and logistic ship support.

The continuing and substantial investment in the Antarctic Program provides U.S. presence in Antarctica and research in the atmospheric, earth, ocean, biological sciences and glaciology. It was this existing Antarctic Program and presence that made possible the deployment in August 1986 of the first National Ozone Expedition (NOZE-I) to McMurdo Station located at 78° South, about 2200 miles directly south of Christchurch, New Zealand.

NOZE-I followed the British announcement of discovery of the ozone hole by a little over a year. The expedition was made up of four teams of researchers from the NOAA Aeronomy Laboratory, Boulder, Colorado; Jet Propulsion Laboratory, Pasadena; University of Wyoming, and SUNY Stony Brook. Funding was provided by NOAA, NASA, NSF and the Chemical

Manufacturers Association. On their return from Antarctica NOZE-I scientists announced preliminary findings. They found that dynamic processes play an essential role in the ozone hole phenomenon by producing the unusual springtime conditions of the antarctic atmosphere and by causing the hole's seasonal disappearance. However, they thought that a chemical mechanism is fundamentally responsible for the formation of the hole. These conclusions resulted from ground-based and balloon sonde observations.

The existing U.S. base at McMurdo and winter aircraft access to it, as well as the support of Navy and contractor personnel involved in the U.S. Antarctic Program were prerequisites of the success of NOZE-I.

This year's NOZE-II built on NOZE-I in several ways. A core of NOZE-I investigators emerged from the NOZE-II competition selection process, and August flights to McMurdo again were used. Instrumentation, however, was significantly improved during the time between the two deployments to allow better and expanded data collection. A totally new approach was the use of LIDARS to probe the Antarctic atmosphere with laser beams.

In addition to continuity, there were major new approaches, particularly observations from NASA aircraft launched from Chile. Also the Antarctic Program's ice strengthened research vessel, Polar Duke, brought a NASA group to Palmer Station located on an island just off the Antarctic Peninsula at 64° South. From Palmer they have been flying a series of ozonesonde balloons. Another new element is the initial study of biological effects of the increased ultraviolet radiation reading the

Earth's surface as a result of the ozone hole. In one of the biological studies, researchers from Texas A&M University will undertake one of the first quantitative assessments of the effects of ultraviolet radiation on antarctic phytoplankton, the microscopic, single-celled plant organisms that float freely in the ocean waters. Phytoplankton constitute the base of the antarctic food web, feeding the small fish, mollusks, and crustaceans, such as the shrimp-like krill, on which penguins and some whales depend for sustenance. Because the phytoplankton are thought to be very sensitive to ultraviolet radiation, effects on marine animal life could be far reaching. In a second study a researcher from the University of California, San Francisco will conduct experiments on the ability of organisms to repair genetic damage caused by exposure to ultraviolet radiation. DNA molecules that carry the genetic code for cells will be examined both with respect to damage of the DNA and effectiveness of repair mechanisms. If repair does not take place there will be mutations affecting future generations of single cell organisms and larger plants and animals. Both biological projects will take place at Palmer Station in November 1987 through January 1988.

The work of the six teams at McMurdo this year indicates a substantially larger than expected ozone decline and also strengthens the chemical theory of ozone depletion that was a central NOZE-I discovery.

The work verifies that the region of the ozone hole is subject to highly unusual atmospheric chemistry. The data collected beginning in late August, show a spectacular depletion of ozone at an attitude of about 9 miles (15km, 50,000 ft.). This was associated with levels of chlorine monoxide more than 100 times greater than normally found in the lower stratosphere. The chlorine monoxide is an ozone killer that is produced mainly from chlorofluorocarbons. The appearance of the ozone hole over Antarctica may be related to chemical reactions that occur on the surface of ice crystals that make up the polar stratospheric clouds. The depletion phenomenon disappears as the polar atmospheric vortex breaks down, the austral summer approaches, the clouds with associated trace gases are dispersed and stratospheric ozone from elsewhere in the southern hemisphere replaces that destroyed.

A NOZE-III expedition has been announced with proposals due to NSF in January of 1988. It is expected to include further atmospheric chemistry and biological effects studies. But beyond this, where should atmospheric ozone research in Antarctica go? We see a series of needs involving logistics as well as science that will enhance capabilities to understand the ozone problem as well as other antarctic phenomena with global significance. These needs include:

Year round access to Antarctica

NOZE-II has demonstrated vividly that despite excellent results the very onset of the ozone hole can only be ascertained by deep winter access (July/early August) to the Continent. Therefore, a major initiative has been started ~~A major investment is required~~ to provide ground based air traffic control, navigation and visual aids, skiway preparation and aircraft internal landing approach system to achieve this arduous, and potentially dangerous task efficiently and safely. ~~This has been initiated, but on the present schedule will require several years.~~ Similar considerations apply to access by ship through winter ice. The present ship Polar Duke was pressed to its limits to transport a NOZE-II group to Palmer Station in late July/early August this year. The ~~requested~~ new ship requested in the FY 1988 budget would be fully capable of meeting this need. In addition to NOZE, biological research, climate and sea-ice research all require year round access to the south polar area provided by the budgeted ship.

Special Antarctic Research Facilities

Sophisticated equipment is being transported to the ice by NOZE, i.e., lidars, lasers, spectrometers. There is great difficulty in carrying out research when dealing with antiquated laboratories, damage to research equipment caused by the pervasive wind blown volcanic dust prevalent at McMurdo. (A) ~~There is a need~~ to construct a special building which will house state-of-art equipment and allow research to be conducted in a safe, clean environment, which does not interfere with other activities. ~~Science Lab construction~~ Funding was included in ~~current~~ the FY 1988 budget ~~with some increase in FY 1988~~. (A)

Long term impact on Biomass

The ozone hole is now evident over the tip of South America. A conjugate program is needed in Antarctica/South America, to monitor impact the ozone hole is having on animals, and ~~plants in short~~ the entire biomass. A joint program with South American and other countries is being planned.

South Pole increasing importance for year round NOZE activities

Facilities at South Pole ~~should be~~ enhanced for year-round monitoring of global change, e.g., ozone depletion.

Balloon borne research

Special facilities to carry out balloon operations at McMurdo, South Pole and on board the new ship, are ~~urgently~~ needed to fully understand structure of ozone depletion process.

Atmospheric dynamics of Antarctica

~~Urgently needed is~~ enhanced direct read-out from weather and communications satellites at U.S. Antarctic stations, to allow expeditions and sophisticated computer manipulation of meteorological data.

Two-fold applications are:

a) to do research an atmospheric dynamics connected to Ozone depletion;

b) to achieve improvements in weather forecasting for operational needs especially year round access to the continent.

Summary, United States Antarctic Program needs in connection with ozone research

The outlined requirements pose new challenges~~, they also reemphasize needs that are included in~~ and are supported by the President's FY1988 budget. ~~with greater urgency and higher priority.~~ These activities require ~~They clearly support~~ the full FY 1988 request, ~~and~~ especially in view of needs which could not be foreseen in the extremely fast moving events in Antarctic research and operations.

Oct 27th

STATEMENT OF

DR. ROBERT T. WATSON

EARTH SCIENCE AND APPLICATIONS DIVISION

OFFICE OF SPACE SCIENCE AND APPLICATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENTAL POLLUTION

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

U. S. SENATE

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss our current understanding of the cause or causes of the observed decrease in ozone over Antarctica during springtime since the late 1970's.

In my testimony today, I will speak on behalf of the scientists and team who participated in the Airborne Antarctic Ozone Experiment, using as a basis the statement of findings prepared by the science team in Punta Arenas, Chile. Before doing so, however, I would like to stress that the tremendous success of this mission is the direct result of the outstanding cooperation and effort of the large and diverse group of participants in this intense and challenging campaign. The success of the mission has exceeded any of our prior expectations, and for this credit must go to not only the scientists, but to the flight, ground and support teams associated with the project.

This scientific summary statement was prepared by the scientists who went to Punta Arenas, Chile to study the Antarctic ozone hole. This summary represents the views of the scientists themselves and not necessarily those of the cosponsoring organizations. The findings that will be presented are preliminary. Under normal circumstances, scientists studying such a complex scientific issue would take many months to years to disclose their initial findings. However, the issue of ozone perturbation is one of justifiable public concern, and hence the public should be kept abreast of the current scientific thinking. It is in this spirit that we would like to share our provisional picture of the Antarctic springtime ozone hole. Furthermore, this will help to stimulate the scientific inquiry and debate that can only lead to an improved and timely understanding of the phenomenon. A much more complete and final interpretation of our findings will be forthcoming after a planned intensive series of scientific meetings and the submittal of a group of scientific papers to the peer review process. This procedure will occur within the next six months.

Description of Goals and Objectives of the Mission

Three basic theories have been proposed to explain the observed decrease in spring-time Antarctic ozone that has been occurring since the late-1970's. One class of theories suggest that the hole is caused by the human activity of loading the atmosphere with chlorinated and brominated chemicals. Chlorofluorocarbons (CFC's) and Halons are contributing increasing levels of chlorine and bromine to the atmosphere. These compounds could then efficiently destroy stratospheric ozone in the Antarctic environment because of the special geophysical conditions that exist in this region of the atmosphere, i.e. a contained polar vortex (an isolated air mass), cold temperatures, and the presence of polar stratospheric clouds. A second class of theories suggests that there have been changes in the circulation of the atmosphere, which now transports ozone-poor air into Antarctica. A third theory postulates solar and cosmic ray induced, periodically enhanced abundances of oxides of nitrogen, which can cyclically destroy ozone.

The NSF-coordinated expedition to the McMurdo station in Antarctica last year was exceptionally successful in increasing our understanding of the Antarctic ozone hole. In conjunction with other experiments, this ground based effort demonstrated the recurrence of the ozone hole, the altitude over which ozone was depleted, that chlorine and nitrogen chemistry was highly perturbed relative to that observed at mid-latitudes, and that the solar cycle theory is an unlikely explanation. However, the McMurdo data were insufficient to distinguish adequately between the relative contributions of the first two classes of theories. Therefore, the goal of the present airborne campaign is to improve our understanding of the relative contributions of these, and possibly other, mechanisms to the formation of the Antarctic ozone hole.

One of the key environmental issues is whether the ozone depletion observed in Antarctica will always be localized in and around Antarctica, or whether it is a precursor of future global changes. A longer term objective of this campaign is to be able to provide information relevant to answering this question.

Participants, Sponsors, and Foreign Government Support

The campaign was coordinated by the National Aeronautics and Space Administration (NASA) and cosponsored by NASA, the National Oceanic and Atmospheric Administration (NOAA), the National Science Foundation (NSF), and the Chemical Manufacturers Association (CMA). In addition, the British Meteorological Office (BMO) provided a significant contribution to the project.

Scientists, engineers, and other personnel from Harvard University, University of Denver, University of Washington, University of Colorado, National Center for Atmospheric Research, Jet Propulsion Laboratory, NASA Ames Research Center, NASA Langley Research Center, NASA Goddard Space Flight Center, NOAA Aeronomy Laboratory, the British Meteorological Office, the European Center for Medium Range Weather Forecasts (ECMWF), Centre Nationale Recherches Meteorologiques, and Atmospheric and Environmental Research, Inc. participated in this campaign. Dr. J. C. Farman of the British Antarctic Survey kindly made available Halley Bay ozonesonde data. Scientists from both Chile and Argentina were also involved.

Key participants in this campaign were also the flight and ground crews of NASA, Lockheed Corporation, and Northrop Corporation, who flew and maintained the ER-2 and DC-8 research aircraft under very challenging conditions. Research and Data Systems, Corp. provided the necessary telecommunication links and support.

The Chilean government hosted the airborne campaign, which was based out of Punta Arenas. The Chilean Air Force supplied the facilities and logistical support. The Chilean Antarctic Institute provided advice regarding the study area. In addition, invaluable assistance was provided by the Direccion General De Aeronautica Civil, and the National Meteorologic Service of Chile.

Other countries also helped: Panama, Costa Rica, Peru, and Ecuador cooperated with the overflights necessary for the transit from the United States to Chile. The government of Argentina offered alternate landing fields for the aircraft as they returned from their Antarctic missions. The National Meteorological Service of Argentina furnished data from Marambio. Lastly, the government of New Zealand assisted with the transcontinental Antarctic flight by the DC-8 that was part of the return to the United States.

Description of Campaign

The Airborne Antarctic Ozone Campaign succeeded in making 12 flights of the high altitude ER-2 aircraft, and 13 flights of the DC-8 medium altitude aircraft over Antarctica. The ER-2 typically operated at geometric altitudes relative to sea level between 12.0 and 18.7 km and flew to 72 degrees South along the Palmer Peninsula. The DC-8 operated at altitudes up to about 10 km and with its long range capability was able to reach the South Pole on several occasions, and is currently returning to the United States via New Zealand after crossing the Antarctic continent. The project had available to it Total Ozone Mapping Spectrometer (TOMS) images of the total ozone column of the southern hemisphere within a day of observation and of the orbits passing over the region of the Antarctic peninsula within 2 to 4 hours of observation. Aerosol and cloud extinction data were also available from the Stratospheric Aerosol Measurement (SAM II) and Stratospheric Aerosol and Gas Experiment (SAGE II), with the latter providing ozone measurements as well. Twice daily analyses and forecasts of winds and temperatures up to 30 mb, 22 km, for three days ahead, were provided by the BMO in chart form, plus forecasts of the trajectories of air parcels on surfaces along which air masses move. Photochemical modelling along these trajectories was done using the aircraft observations. The ECMWF provided once a day analyses and forecasts up to 30 mb for 10 days ahead. A small theory team assisted the experimental scientists with the interpretation on a day to day basis. This approach was possible because of the availability of rapid data reduction facilities and an extensive, dedicated international telecommunications network.

Detailed lists of the participants, a discussion of the theories being addressed, the approach taken in the tests of these theories, and a description of the apparatus involved are given in the Airborne Antarctic Ozone Experiment Plan (NASA and NOAA, July 1987). Copies are available on request from NASA Ames Research Center or NASA Headquarters.

Data obtained from the ER-2 and DC-8 instrumentation

The spatial and temporal distribution of a large number of relatively short-lived chemical constituents that participate in chemical reactions that affect the abundance of ozone were measured from both the ER-2 and DC-8. Instruments aboard the ER-2 resulted in measurements of the distributions of ozone (O_3), chlorine monoxide radical (ClO), bromine monoxide radical (BrO), total odd nitrogen (NO_y), nitric oxide (NO), and water (H_2O) in the vicinity of the aircraft at altitudes ranging from 12 to 18 km above the Earth's surface, well into the altitude region where ozone is undergoing depletion. Instruments aboard the DC-8 measured the abundances of H_2O and O_3 in the vicinity of the aircraft, the vertical distribution of O_3 for approximately 10 km above the aircraft, and the total column amounts of O_3, hydrochloric acid (HCl), chlorine nitrate ($ClONO_2$), chlorine dioxide (OClO), BrO, hydrofluoric acid (HF), NO, nitrogen dioxide (NO_2), nitric acid (HNO_3), as well as a number of other constituents, above the aircraft altitude.

Additionally, the temporal and spatial distributions of long-lived chemical tracers and dynamical variables were measured in order to understand atmospheric motions. These included measurements of nitrous oxide (N_2O), methane (CH_4), chlorofluorocarbons 11 ($CFCl_3$) and 12 (CF_2Cl_2), carbon tetrachloride (CCl_4), and methylchloroform (CH_3CCl_3). In-situ measurements of all of these species were made from both the ER-2 and DC-8, and column measurements of most from the DC-8. The size distribution, abundance, and composition of particles was determined by instrumentation aboard the ER-2, as well as the vertical distribution of aerosols from 12 to 28 km by the DC-8 lidar, in an effort to understand the role of heterogeneous processes. Additionally, atmospheric pressure, temperature, lapse rate, and winds were measured aboard the ER-2 to determine the state variables and dynamical structure of the atmosphere.

The project had regular ozone sonde data available from the Palmer station, the Halley Bay station, the South Pole station, and McMurdo. These define the vertical distribution of ozone at points not routinely covered by the flight tracks. Ozonesondes were launched at special times from Palmer and the South Pole to coincide with aircraft overflights of those locations.

The analyses of some of these data sets have not yet been completed, either because of the lengthy data reduction procedures required or because of the sheer volume of raw data acquired. An example of the latter is the meteorological data set, whose initial analyses had the primary goal of forecasting the flight conditions. Furthermore, many of the analyses of the chemical data sets are clearly only preliminary, to be refined by recalibration checks and more sophisticated re-analyses available at the home laboratories. As a consequence, the initial picture summarized below cannot be a balanced, complete, and final one.

Results and their relationship to theories

The processes controlling the abundance and distribution of ozone in Antarctica are complex and intertwined. However, given the successful nature of this campaign, we are now in a position to start to more fully appreciate the exquisite balance between the meteorological motions and the photochemistry. We will present our preliminary scientific findings as answers to a series of posed scientific questions that are relevant to public policy.

1) Did the springtime ozone hole occur over Antarctica in 1987?

Yes. TOMS satellite, balloon ozonesonde, and both ER-2 and DC-8 aircraft measurements of ozone showed that the springtime ozone decrease occurred again this year. TOMS showed the spatial extent of the phenomenon is continental or greater in scale and revealed the temporal change in the total column of ozone. The abundance of ozone in August and September of 1987 was lower than any previous year at all latitudes south of 60 degrees. In mid-September of this year column ozone was approximately 15% lower at both 70 and 80 degrees south than the values observed in the lowest previous year of 1985. The balloon-sonde data demonstrated that ozone was depleted in the altitude region between approximately 13 and 24 km at Halley Bay, and 15 and 24 km at Palmer. Ozone trends observed at Halley Bay and at Palmer are quite similar, with an approximate 50% decrease observed from mid-August to mid-September near 18 km. The upward looking lidar aboard the DC-8 observed more than a 50% decrease in O_3 at 77 to 90 degrees south between 14 and 19 km, during September, but no discernible trend between 12 and 14 km. There was also evidence from the lidar data of a decrease in O_3 up to 23 km. The in-situ ER-2 instruments observed changes consistent with this picture.

The TOMS data showed that ozone did not simply change monotonically with time, but in some instances changed dramatically over large spatial scales in the matter of only a day or so. One example of such a rapid change in ozone is demonstrated by the TOMS data for September 4-6 over the Palmer Peninsula and Weddell Sea. Changes of greater than 25 Dobson units (DU) in one day were observed over large regions (3 million square km). The ozone sonde data from Halley Bay and the DC-8 lidar data showed that, during this event, the ozone was depleted over a wide altitude range, from about 14 to 23 km.

2) Does the evidence indicate that both chemical and meteorological processes are responsible for the ozone hole?

The weight of observational evidence strongly suggests that both chemical and meteorological mechanisms perturbed the ozone. Additionally, it is clear that meteorology sets up the special conditions required for the perturbed chemistry.

3) Was the chemical composition of the Antarctic stratosphere observed to be perturbed?

Yes. It is quite evident that the chemical composition of the Antarctic stratosphere is highly perturbed compared to predictions based on currently accepted chemical and dynamical theories. The present findings are consistent with the observations made last year from McMurdo. The distribution of chlorine species is significantly different from that observed at mid-latitudes, as is the abundance and distribution of nitrogen species. The amount of total water within some regions of the vortex is significantly lower than anticipated.

Since late August the abundance of the chlorine monoxide radical within the polar chemically perturbed region has been elevated by a factor of more than 100 relative to that measured at mid-latitudes at the highest altitude at which the ER-2 was flown, about 18.5 km. However, the abundance of ClO was observed to decrease rapidly towards lower altitudes. At the highest flight levels, the abundance of ClO at local solar noon ranged between 0.5 and 1 ppbv for the last month of the campaign. While we have no data at higher altitudes, the observed increase in the abundance of ClO from lower altitudes, coupled with the observed low column abundances of HCl, suggests that the ClO abundance may increase somewhat at altitudes above 18 km. In addition to the steep decrease in ClO abundance at lower altitude, the abundance of ClO was also observed to decrease dramatically outside of the chemically perturbed region.

Chlorine dioxide, OClO, which is most likely formed in a reaction sequence involving the ClO radical, was observed both day and night at highly elevated concentrations compared to those at mid-latitude. The preliminary analyses of these observations are consistent with measurements made from McMurdo last year. The column content of hydrochloric acid, HCl, which is one of the major chlorine reservoirs at mid-latitudes, is very low within the chemically perturbed region reaching column contents below 1×10^{15} molecules per cm^2. In addition, the column amount ratio of HCl/HF within the chemically perturbed region decreased significantly from a normal mid-latitude value of 4 to a value less than unity. While chlorine nitrate was observed, the data have yet to be fully analyzed thus precluding a statement at this time about its abundance.

The bromine monoxide radical has been observed at concentrations of a few pptv within the chemically perturbed region of the vortex at the flight levels of the ER-2. The abundance of BrO decreases at lower altitudes. However, because the observed concentrations are close to the detection limit of the instrument, little more can be said about the altitude dependence. The low measured abundances of BrO, coupled with our current lack of understanding of the ClO +

BrO reaction means that we cannot currently assess the significance of this mechanism for ozone reductions at the ER-2 flight levels.

The ER-2 observations of the abundance of odd nitrogen, which is the sum of all nitrogen-containing reservoir and radical species, show, like total water, very low values within the chemically perturbed region of the vortex , indicating that the atmosphere has been denitrified, as well as dehydrated. Abundances of NO_y of 8-12 ppbv were observed outside the chemically perturbed region, while abundances of 0.5 to 4 ppbv were observed inside the chemically perturbed region. A similar large change was observed for one of the nitrogen components, i.e. nitric oxide, NO. In addition, some of the NO_y observations suggest that NO_y component species are incorporated into polar stratospheric cloud (PSC) particles and nitrate was observed in the particle phase on some of the filter samples and on some of the wire impactor samples taken in the chemically perturbed region of the vortex. The column measurements of nitric oxide, nitrogen dioxide, and nitric acid made from the DC-8 exhibit a strong decrease in the abundance of these species towards the center of the vortex. These low values of nitrogen species are contrary to all theories requiring elevated levels of nitrogen oxides, such as the the proposed solar cycle theory.

4) How do the observed elevated ClO abundances support a chemical role in the formation of the ozone hole?

There is no longer debate as to whether ClO exists within the chemically perturbed region near 18 km at abundances sufficient to destroy ozone if our current understanding of the chlorine-ozone catalytic cycle is correct. The rate of decrease in ozone during the month of September at the highest altitudes at which the ER-2 was operated during this campaign is consistent with simultaneously observed concentrations of ClO. However, our present understanding of key chemical reaction rates and photodissociation products within the catalytic process is incomplete. Thus, laboratory studies are urgently needed. It is essential to define the rate of ClO dimer (Cl_2O_2) formation and the photolysis products of dimer decomposition because only one of several possible routes leads to ozone destruction. Once the results of ongoing laboratory studies become available, these in-situ ClO data will allow the chemical mechanism to be quantitatively defined and its consequences better understood.

There is another line of observational evidence consistent with ozone destruction by chlorine catalysis. In the month of August, a consistent positive correlation between ClO and O_3 was observed. By the middle of September, as the ozone concentration was dropping at ER-2 altitudes, a strong anti-correlation developed between ClO and O_3. The anti-correlation was usually present on both large and small scales within the chemically perturbed region.

There are observations that are not entirely consistent with these chemical arguments. For example, based on preliminary data from this year and data from last year from McMurdo, the observed diurnal behavior of OClO, is difficult to rationalize with the present chemical mechanisms, particularly in light of the new observations that the abundances of BrO are low at ER-2 flight altitudes.

5) Can the elevated abundances of ClO inside the chemically perturbed region of the vortex be explained?

Significant progress was made. Observational data that air within the chemically perturbed region of the vortex is dehydrated and that the NO_y abundances are very low are consistent with theories that have been invoked whereby the chlorine reservoir species, $ClONO_2$ and HCl, can react on the surfaces of polar stratospheric clouds to enhance the abundance of active chlorine species, i.e. ClO. The observations also support the picture that the abundance of

NO_y is low because odd nitrogen can be removed from the atmosphere by being tied up in ice crystals, which can then gravitationally settle to much lower altitudes. Low abundances of NO_y are needed to prevent the rapid reconversion of ClO to $ClONO_2$. This picture is further supported by the observations of low column abundances of HCl, by occasional observations of high levels of nitrate found in the ice particles, and by the visual and lidar observations of high cirrus and polar stratospheric clouds.

One observation which is currently difficult to understand is the sharp decrease in the abundance of ClO at lower altitudes. This could be due to a lack of understanding of either the abundance or partitioning of ClO_y, or to dynamical effects. Lack of observations of reactive hydrogen containing radicals, hydroxyl (OH) and hydroperoxy (HO_2) currently prevents an assessment of their role in the conversion of chlorine reservoir species to ClO.

6) How do the observations support a meteorological role in the formation of the ozone hole?

There were instances of rapid large scale changes in total ozone where meteorology appears to have been the controlling factor. One such event occurred over the Palmer Peninsula on September 5. Over a period of 24 hours total ozone as observed by TOMS decreased by 25 DU to below 200 DU over an area of about 3 million square km. Such a rapid decrease is difficult to explain chemically. The origin of that air is not known. It could be either air naturally low in ozone, tropospheric/lower stratospheric, or air in which ozone had been chemically depleted. The feature moved over the Weddell Sea and persisted until September 16, when it merged with two other regions of low total ozone. Lidar measurements from the DC-8 showed low ozone values and extensive aerosol layers between 14 and 19 km in the region of the TOMS minimum of ozone. This and other similar events evident in the TOMS ozone data and the SAM II PSC data between September 5 and 14 were spatially correlated with deepening surface pressure lows with marked meridional flow from middle to high latitudes at lower stratospheric levels. The detailed meteorological mechanism by which the surface lows produce the low column ozone remains unclear and further analysis is required.

The data offer no support for sustained large scale upwelling. In the restricted region covered by the ER-2, 54 to 72 degrees south latitude and from altitudes of 12.5 to 18.5 km, measurements of CFC-11 and N_2O which act as tracers of air motions show no evidence of a general increase in abundances above about 14 km during the mission, although there were instances of structure and elevated values.

The meteorology must play a role in the dehydration and denitrification processes. It is crucial to understand whether the necessary low temperatures are maintained radiatively or by ascent, or some combination of both.

7) Does the complexity of the situation suggest that we need to understand the interplay between meteorology and chemistry?

Yes. It is clear from our ER-2 flights that the region of dehydrated and denitrified air maintained a sharply defined latitude gradient throughout most of the campaign. On a purely meteorological definition, the vortex edge would be well outside the dehydrated, denitrified region. The meteorological flow must therefore have been such as to maintain a kind of "containment vessel", in which the perturbed chemistry could proceed without being influenced by mixing in more normal stratospheric air from outside or below.

Very low values of CFC-11, CFC-12, CH_3CCl_3, and N_2O were observed at the upper levels of the ER-2 flight track within the "containment vessel". A key question is how these low values are produced and maintained in the chemically perturbed region.

The concept of mixing at the region of sharp latitudinal gradient is important, since it has the potential to supply nitrogen oxides which would tend to decelerate the chlorine chemistry. The meteorology is thus important in the termination phase as well as in the initiation phase.

8) Can we quantitatively separate the contributions of chemistry and meteorology to the formation of the ozone hole?

No. The September 5 event illustrates the complexity of the ozone hole, and the difficulty of deriving unambiguous dynamical or chemical signatures. The magnitude and rapidity of the decrease are difficult to ascribe to a chemical cause. Air of low ozone content appears to have been transported into the region. The origin of that air is not known. It could be either air naturally low in ozone, tropospheric/lower stratospheric, or air in which ozone had been chemically depleted.

Another illustration of the difficulty of clearly establishing chemical or dynamical mechanisms is the decreasing trends in ozone in regions of low ClO outside of the vortex whose magnitudes are comparable to those within the vortex. This is evident from an examination of the ozonesonde data from the Palmer station at 64 °S and comparing it to the Halley Bay data at 78 °S, and the DC-8 lidar data. In addition, downward trends of ozone were observed in the lower altitude region where ClO concentrations were substantially lower than at 18 km.

9) What are the global implications of the Antarctic ozone hole?

Until we understand the cause or causes of the spring-time Antarctic hole, we will not be able to address this key question in a responsible manner. Thus, at this time, it is premature for us to speculate on this important topic. However, as we continue to analyze the data that we have acquired and further test and expand the pictures that we have developed, we will be in a better position to address this important question.

10) When will the data be in a form suitable for use in formulating national and international regulatory policies?

As noted in the opening paragraph, the schedule for the assimilation and publication of the results is brisk. Peer reviewed publications will appear in 1988. The results from the 1987 ground-based McMurdo campaign will likely appear on about the same schedule. Both sets of these completed conclusions would be the best basis for any possible policy re-evaluations. The major international scientific review scheduled for 1989, which will serve as input to the 1990 policy review of the Montreal Protocol, will have these conclusions available.

WP 10/28

Ozone Depletion Worsens; Hazard to Researchers Seen

By Cass Peterson
Washington Post Staff Writer

Ozone levels dropped as much as 97 percent at some altitudes over Antarctica last month, raising concerns about the safety of researchers stationed there, a congressional panel was told yesterday.

National Science Foundation official Peter E. Wilkniss told the Senate Environment and Public Works Committee that scientists working from McMurdo Station on Antarctica during this year's expedition found some of the lowest atmospheric ozone levels ever measured. By September, a strip of the stratosphere about nine miles high contained only 3 percent of the ozone considered normal.

The depletion was so dramatic, Wilkniss said, that expedition leaders have become worried about eye damage caused by increased ultraviolet radiation in Antarctica. Ozone screens the Earth from the most damaging ultraviolet rays, which can cause skin cancer, cataracts and suppression of the immune system.

"We got concerned about the health and safety of our workers in Antarctica, who may be exposed to as much as four times the amount of ultraviolet radiation as you would get in summer at the beach in Miami," he said.

The report was the first from ground crews who this year monitored the seasonal "hole" in the ozone layer over Antarctica. Late last month, scientists there reported an overall 50 percent decrease in ozone, a sharper decline than has been recorded in previous years.

The Antarctic ozone hole has riveted the attention of atmospheric scientists since it was first disclosed by British researchers two years ago. Experts who testified yesterday said the latest expedition provided the strongest evidence yet that chlorofluorocarbons (CFCs) are to blame for the seasonal depletion, which begins in the depth of the Antarctic winter and gradually disappears in the spring.

CFCs are Freon-type gases that are used as refrigerants, foam-blowing agents and, in some nations, as aerosol propellants.

"The results from this year indicate that it is time to take a stand," said Michael B. McElroy of Harvard University, who identified himself as a former advocate of a "cautious approach" toward regulating CFCs. "There is no longer reason to doubt that industrial gases containing chlorine are responsible for a dramatic large-scale change in the stratosphere."

"I'm getting worried," said Sen. John H. Chafee (R-R.I.).

"I think you should be worried," responded Robert T. Watson of the National Aeronautics and Space Administration. "If the goal were to return the Antarctic atmosphere to its pristine state, the only hope would be to stop production of CFCs immediately. And then it would take several hundred years."

But Watson said some of the ozone depletion in Antarctica is the result of unusual weather conditions in the area, where winter winds create a kind of whirlpool of frigid air that traps chlorine atoms and creates a fertile atmosphere for chemical reactions.

"I'm not yet convinced whether there will or will not be global ramifications," he said.

University of California scientist F. Sherwood Rowland said monitoring stations in Switzerland, Maine and North Dakota have recorded wintertime ozone drops of as high as 9 percent.

"It would be very risky and foolhardy to assume that similar chemistry won't occur over temperate zones and the tropics," he said.

Rowland also criticized a recent international agreement to reduce CFC use. The agreement, signed by 45 nations, including the United States, last month, would freeze CFC production at current levels by 1990 and reduce the chemicals' use 50 percent by 2000.

In the meantime, Rowland said, chlorine concentrations in the stratosphere will increase about 35 percent. "I don't think the global community can afford to wait for another dozen years before applying stringent controls on CFC emissions," he said.

NYT 10/28

Ozone Hole Raising Concern for Scientists' Safety

By WALTER SULLIVAN
Special to The New York Times

WASHINGTON, Oct. 27 — The atmosphere's protective ozone layer is so depleted over Antarctica in the springtime that there is cause for concern about the safety of scientists and support personnel there, researchers said at a Senate hearing today.

If the seasonal "hole" in the ozone layer continues to expand, they said, it could threaten inhabitants of southernmost South America.

Dr. Peter E. Wilkniss, director of polar programs at the National Science Foundation, told the panel he was concerned "for the health and safety of our people." He said the foundation was discussing the threat with officials from Chile and Argentina.

In the stratosphere, ozone, a form of oxygen, absorbs most of the ultraviolet radiation from the sun, which can cause sunburn and skin cancer and which can be lethal to many life forms. There is wide agreement that declines in atmospheric ozone are linked to the release of chlorofluorocarbons, chemicals used in aerosols, refrigeration and a variety of other applications.

Normally, ultraviolet radiation that gets through the ozone is partly absorbed in the lower atmosphere, but this is less true in Antarctica, where the air is exceptionally clear. Explorers there have had to cope with sunburn since long before the period of ozone depletion.

High Levels of Chemical

The ozone hole forms over Antarctica in September and October, which is springtime in the Southern Hemisphere. On Sept. 30 scientists reported observations from space and long-range aircraft indicating that the hole was even larger this year than last. Today experts from the science foundation described more recent observations from the ground at McMurdo Sound, in Antarctica, showing levels of chlorine monoxide in the lower stratosphere there to be 100 times greater than those elsewhere.

The chlorine monoxide is believed to have come from the breakdown of chlorofluorocarbons. The chlorine is assumed to be responsible for much of the ozone breakdown.

Although an international agreement to reduce the production of chlorofluorocarbons was reached Sept. 16 in Montreal, some specialists testifying today before panels of the Senate Committee on Environment and Public Works described the constraints as inadequate.

Because of uncertainty about the Antarctic ozone hole, delegates at the Montreal meeting "were instructed not to consider the Antarctic phenomenon in their deliberations," Dr. Michael B. McElroy of Harvard University said today. "The situation has now changed," he said. "The chemistry responsible for the enormous drop in ozone over Antarctica is distinct." He said it differed from the process believed to deplete the ozone elsewhere. The situation, he added, "requires an appropriately radical response." Some scientists have proposed a total halt in the production of chlorofluorocarbons.

Dr. McElroy is chairman of Harvard's department of earth and planetary sciences. His explanation for the ozone hole, based on laboratory tests, involves "chemistry of a most unusual character" in which, in the extreme cold of the Antarctic stratosphere, nitric acid and water form crystals that drop out of the atmosphere as nitric acid ice, he said.

This sets the stage for reactions in which chlorine, released from the chlorofluorocarbons, acts as a catalyst to break down the ozone, he said.

Dr. F. Sherwood Rowland of the University of California at Irvine, who warned of the ozone danger in the early 1970's, pointed out that atmospheric measurements from the ground in Switzerland, South Dakota and Maine all show moderate ozone depletion in spring or late winter. Its cause, he said, may be similar to that for the precipitous South Pole depletion, even though those sites are not polar.

It would be "very risky, foolhardy," he added, to assume that the process at work in Antarctica could not spread into temperate latitudes.

Dr. Mack McFarland of E.I. du Pont de Nemours & Company, a chlorofluorocarbon producer, said it was unlikely that the process at work over Antarctica could occur elsewhere.

NSC coming @ Navy
over this one

CFC PROTOCOL SIGNING

Sequence

Any event must include a signing and remarks by the President.

Issue: Who should stand behind the President when he signs?

Option: The President signs with no one behind him.

Option: The President signs with persons behind him representing the breadth of support for the protocol - representatives of industry, the environmental community, and government standing behind him.

Site/Invitation list

Site and size are closely linked. Both NSC and EPA believe bigger is better.

Two smaller sites have interesting symbolism; if unacceptable the larger site, Room 450, could be used.

Rose Garden - Ozone is outside, way up in the sky. Outdoors would be the optimal location. The event could be scheduled for the Rose Garden with Room 450 as a back up in case of inclement weather.

Secretary of the Navy's office - The President could sign with Theodore Roosevelt's old office as Assistant Secretary of the Navy behind him, providing a good historical tie in for the balancing the Administration strives for in environmental matters. A smaller room with similar associations would be the Roosevelt Room in the West Wing.

Reception

A reception afterward, possibly funded by EPA, could further the cooperation and harmony that seemingly opposite interests have found in this agreement.

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

November 13, 1987

Ms. Nancy Risque
Assistant to the President
and Cabinet Secretary
The White House
Washington, D.C. 20500

Dear Ms. Risque:

I am writing to advise you that the Alliance for Responsible CFC Policy will support ratification by the U.S. Senate of the "Montreal Protocol on Substances that Deplete the Ozone Layer."

The Alliance for Responsible CFC Policy, a coalition of U.S. industries that use and produce chlorofluorocarbon chemicals, has been an active participant in efforts to identify appropriate policies regarding protection of the earth's stratospheric ozone layer, including the potential further control of CFCs. On September 16, 1986, the Alliance issued a call for the negotiation of an international agreement under the auspices of the United Nations Environment Programme (UNEP) to cap the rate of growth of fully-halogenated CFC production capacity.

The Montreal Protocol, which was signed by the U.S. and 23 other nations on September 16, 1987, is a significant accomplishment that attempts to balance the needs for environmental protection and economic growth. Although the Alliance believes that the CFC growth limitation is desirable, we do not agree that the further reductions contained in the agreement are necessary to protect the environment or to provide the economic stimulus in the U.S. to develop CFC substitutes and emission control technologies.

To the extent that the agreement attempts to establish a more level playing field among world competitors, and provides a process for ongoing reevaluation and assessment of the science, economic and technological issues, the Alliance continues to believe that this process is far better than the failed policy of unilateral controls by the United States and the serious harm that would be inflicted upon the U.S. economy and U.S. consumers as a result of such a policy.

Recognizing these facts, the Alliance intends to support ratification of the Montreal Protocol by the U.S. Senate. It is our understanding that the agreement may be transmitted to the Senate as early as the first week of December. As has been discussed, if there is to be some type of official ceremony to transmit the Protocol to the Senate, the Alliance is willing to participate in such an event.

Please do not hesitate to contact Kevin Fay, Executive Director of the Alliance, if you have any further questions regarding this matter.

Sincerely,

Richard Barnett

Richard Barnett
Chairman

KFJ:sct

cc: The Honorable Lee Thomas, Administrator
U.S. Environmental Protection Agency

The Honorable John Negroponte, Assistant Secretary
U.S. Department of State

Senator Claiborne Pell, Chairman
Senate Foreign Relations Committee

Senator Jesse Helms, Ranking Minority Member
Senate Foreign Relations Committee

Senator Quentin Burdick, Chairman
Senate Environment & Public Works Committee

Senator Robert Stafford, Ranking Minority Member
Senate Environment and Public Works Committee

Senator Max Baucus, Chairman
Senate Hazardous Wastes and Toxic Substances Subcommittee

Senator John Chafee, Member
Senate Environment and Public Works Commitee

Representative John Dingell, Chairman
House Energy & Commerce Committee

Representative Norman Lent, Ranking Minority Member
House Energy & Commerce Committee

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release 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

THE WHITE HOUSE,
December 21, 1987.

# # #

TO: The Secretary

FROM: L - Abraham D. Sofaer
OES - John D. Negroponte

SUBJECT: Transmittal to the Senate of the Montreal Protocol on Substances that Deplete the Ozone Layer, September 1987

ISSUE FOR DECISION

Whether to sign the attached report to the President, including a proposed message from the President to the Senate seeking its advice and consent to ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer ("Montreal Protocol").

ESSENTIAL FACTORS

The attached report to the President (Tab A) and proposed message from the President to the Senate (Tab B) have been prepared for the purpose of transmitting the Montreal Protocol (Tab C) to the Senate for its advice and consent to ratification.

The Montreal Protocol was signed by the United States on September 16, 1987 in Montreal, Canada. For the United States to become a Party to the Protocol, it must deposit an instrument of ratification with the Secretary-General of the United Nations, the depositary for this agreement.

The Protocol provides for measures to control emissions of substances that deplete the stratospheric ozone layer. Domestically, these measures will be implemented by EPA regulations under the Clean Air Act. During the negotiations, we coordinated with all relevant agencies and consulted closely with the Congress, industry and environmental groups. U.S. signature of the protocol was done with the concurrence of each key agency, as well as the Domestic Policy Council staff. Congressional support for this protocol also has been broad-based. Some members of the public (including a number of user industries) would have preferred that the Protocol be less stringent; others (including some environmental groups and some Senators) would have preferred that it be more stringent. Still, there is general agreement that multilateral measures are preferable to unilateral measures for control of ozone-depleting substances and that the United States should ratify the protocol as adopted.

Entry into force of the Protocol requires ratification, acceptance, approval or accession by eleven nations representing at least two-thirds of global consumption of the controlled substances. Ratification by the United States, which consumes approximately thirty percent of the global total, thus is in effect a prerequisite for entry into force. Early ratification by the United States will demonstrate our commitment to implementation of the Protocol and encourage adherence by other nations whose implementation of the control measures required under the protocol is also essential to achieve effective global protection.

RECOMMENDATION

That you sign the report to the President (Tab A).

Attachments:
- Tab A. Report to the President
- Tab B. Message from the President to the Senate
- Tab C. Protocol Text

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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.

The President,
The White House.

DRAFT

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 was endorsed by all interested agencies and the Domestic Policy Council staff. Congressional support is also broad. While some would have preferred that the Protocol's 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:

o 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.

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

o 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 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.

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Article 2 also contains specific provisions for Parties whose production in 1986 was less twenty-five kilotons (paragraph 5); Parties which had production facilities under construction and provided for in national legislation 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. A Party falling within the provisions of paragraph 6, as described above, is entitled to add to its 1986 production the amount produced by such production facilities, provided its annual consumption of the controlled substances does not exceed .5 kilograms per capita. 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.

Paragraph 5 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. Paragraph 6 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 would allow the European Economic Community to fulfill jointly its obligation respecting consumption, provided all twelve EEC members join the Protocol.

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.

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- 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

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consensus. Thus, the Protocol 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 Protocol 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 a proposed regulation 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,

DRAFT

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 on August 27, 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.

THE WHITE HOUSE,

Ozone transmittal ltr. to President, Secretary of State and Senate

Drafter: OES/ENV:SButcher;L/OES:DKennedy
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M/MO:JLange
M/COMP:JHLinnemann
IO:HGlazer
H:LRosenblatt
EPA/OIA:BLLong
USTR:RReinstein
Energy:MWalker
Commerce:JRSpradley
Justice:THookano
OMB:DGibbons
Interior:BNDunlop

But Some Say 'Too Little Too Late':

Ratification of Ozone Pact Recommended

The Senate Foreign Relations Committee Feb. 17 took a breather from its debate over nuclear-arms control to speed to the floor a less controversial treaty: one that would reduce the emissions of hazardous substances that deplete the protective ozone layer high above the earth.

While the pact is expected to move easily to President Reagan's desk as early as next week, some Senate critics think it doesn't go far enough.

The treaty, signed by 31 countries after a meeting in Montreal last September, calls for a 50 percent reduction in chlorofluorocarbon (CFC) and halon production and consumption levels worldwide by 1999.

The compounds are widely used around the world in air conditioning, refrigeration, insulation, aerosol sprays and foam packaging.

The chemically inert compounds emit long-lasting chlorine and bromine gases, which scientists believe are depleting the stratospheric ozone layer. The thin layer blocks out about 90 percent of the sun's ultraviolet rays. Scientists fear that if the layer is depleted by CFCs, the rays will pose a danger to human life and the environment.

At least 11 countries accounting for two-thirds of all CFC consumption worldwide must ratify the treaty for it to go into force as scheduled on Jan. 1, 1989. Mexico earlier this month became the first — and so far only — nation to ratify the accord.

Senate backers hope speedy U.S. ratification of the so-called Montreal Protocol will inspire other developed countries to certify the pact.

"We are viewed by our global neighbors as a world leader in the protection of the environment," said Max Baucus, D-Mont. "And we are a major producer of the offending chemicals. Thus, it is the United States that holds the ultimate key to the success of the Montreal Protocol."

Major Provisions

The protocol would impose a graduated reduction schedule that would achieve 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.

More Stringent Reductions

The Environmental Protection Agency (EPA) originally called for a 95 percent reduction in CFC production, but EPA Administrator Lee M. Thomas said the proposal was too severe to gain world acceptance.

"(European) Common Market countries were talking about a freeze only. And Japan wasn't even talking," he said at a Feb. 17 hearing.

The administration argues that the treaty's value goes beyond the amount of CFCs ultimately kept from depleting the ozone layer. Thomas said the pact succeeded in getting leading nations to agree on how to handle a global environmental threat, which creates a future "mechanism for changes in the reduction schedule" should the problem later be deemed more serious than previously thought. Also, the 50 percent target, he said, is enough to encourage the development of safer alternatives.

But some Senate critics call the 50 percent schedule ineffective, saying the treaty relies too heavily on assumptions about future actions by governments and industry.

"Put me down as a skeptic and one who is not willing to entrust the survival of our planet to an economic theory," said John H. Chafee, R-R.I., referring to Thomas' prediction that the marketplace will respond to the reductions by creating substitutes.

"I, for one, am becoming increasingly concerned that the protocol may be too little, too late," said Baucus.

Baucus and Chafee have introduced bills (S 570 and S 571) that would require the U.S. to reduce levels of CFCs by 95 percent by 1995. They cite new studies that show the problem is more serious than previously thought.

Chafee has also proposed a separate resolution to accompany, but not affect, the treaty. It would encourage the rest of the world to ratify the treaty; state that the United States should continue as a world leader in the ozone-protection effort; and state that it should negotiate another, more stringent reduction treaty and, if that fails, impose more stringent U.S. requirements.

"Unilateral controls are a tough pill to swallow, but when combined with stringent trade restrictions, they can be a powerful tool to bring other countries around," Chafee said.

Industry groups like the National Association of Manufacturers and the Alliance for Responsible CFC Policy support the protocol. But they argue vigorously against tougher domestic reduction schedules.

"Any unilateral action taken by the United States would have an all but insignificant effect upon the global environment and severely hinder U.S. industry while placing the American economy at an unfair disadvantage in the global market, to say nothing of the loss in American jobs," said a statement by the Alliance.

The group predicted the current treaty would cost industry $5.5 billion between 1990 and 2010. If the U.S. restrictions were raised to 70 percent, the group said, the cost to the economy would rise to almost $10 billion, while reducing worldwide emissions by only 7.3 percent. ∎

—By Mike Mills

CFC Makers Raised Output While Seeking Curbs

By Michael Weisskopf
Washington Post Staff Writer

While publicly seeking to curb the rapid growth of chlorofluorocarbons (CFCs), U.S. manufacturers significantly increased output of the ozone-depleting chemicals in 1986 and 1987, according to statistics released yesterday.

The statistics, compiled by the International Trade Commission, show that production of the two most common CFCs increased 10 percent in 1986 and, according to preliminary data, 12.6 percent in 1987.

As the industry was turning out record-high CFC volumes for the 1980s, the two top U.S. companies—E.I. du Pont de Nemours & Co. and Allied-Signal Inc.—were urging restraint in their public statements. In separate position papers issued in the fall of 1986, they declared that international controls on CFC growth would be "prudent."

"We still are calling for action through controlled growth, and when we say controlled growth, we are talking 1 to 3 percent a year," Bob Traflet, president of Allied's fluorine products division, told a Senate subcommittee in May 1987. "We think that is a prudent level of growth."

According to the Environmental Protection Agency, a 3 percent increase in worldwide production of CFCs until 2075 would erode 40 percent of the stratospheric ozone layer that protects life on Earth from harmful ultraviolet rays.

The Du Pont and Allied statements followed the first authoritative reports linking CFCs to the depletion of the ozone layer. By late 1985, government representatives began meeting in workshops to discuss the need for global controls on CFCs, which are widely used as refrigerants, foam-blowing agents and solvents. Their work laid the foundation for the 31-nation treaty signed in September.

Since the treaty calls for a freeze of CFC production at 1986 levels and a 50 percent decline within 10 years, the past two years of high production figures will not significantly speed up ozone depletion, according to an EPA official.

Still, Du Pont and Allied executives are expected to be asked to reconcile their public positions with their production figures at a hearing of two Senate environmental subcommittees today. An Allied official who supplied the subcommittees with the trade statistics confirmed the figures in an interview yesterday.

Sen. John H. Chafee (R-R.I.), ranking minority member of the Senate environmental protection subcommittee, questioned whether the extra output was being stockpiled by producers or users in anticipation of the treaty.

"These production figures," he said, "raise the question of a serious loophole in the treaty."

Joseph Steed, environmental manager of Du Pont's Freon division, denied that industry was stockpiling CFCs. He said the two-year production boom reflected increased demand for the chemicals, something that industry cannot legally limit.

"How does an international producer constrain trade legally?" he asked. "You can't say no to one customer over another. That's restraint of trade. That's why we called for an international approach to limit production."

Rafe Pomerance of the World Resources Institute said the boom shows the need to restrain industry. "The marketplace provides an incentive to keep producing," he said.

Chemical Company Clashes With Hill

Senators Want Du Pont to Fulfill Pledge to Stop CFC Production

By Cass Peterson
Washington Post Staff Writer

In 1974, E.I. du Pont de Nemours & Co. told Congress that it should not restrict use of chlorofluorocarbons (CFCs) on the basis of a "purely speculative" theory that the chemicals were destroying the ozone layer.

If further research demonstrated that the chemicals were harmful, a senior company official said, Du Pont would voluntarily stop making them.

Now, amid evidence that ozone is disappearing at an alarming rate in some areas because of chlorine in the upper atmosphere, the company is being asked to honor its pledge.

In a letter last month to Du Pont Chairman Richard E. Heckert, Sens. Robert T. Stafford (R-Vt.), Max Baucus (D-Mont.) and David F.. Durenberger (R-Minn.) said Congress dropped efforts to regulate CFCs in the early 1970s because of Du Pont's assurances that it would stop producing the compounds if there were "creditable scientific evidence" of a health threat.

"We believe the time has arrived for the Du Pont corporation to fulfill that pledge," the senators said.

In a response yesterday, Heckert called the request "unwarranted and counterproductive" and said no scientific evidence suggests that CFCs should be dramatically reduced.

"A precipitous reduction in CFC supplies would be both unnecessary and highly disruptive," Heckert wrote. He said that the company stands by its commitment, but that "there is no agreement within the scientific community on the potential health effects of any already observed ozone change."

Du Pont invented CFCs in the early 1930s and is the world's leading supplier of the compounds, used as refrigerants, foam-blowing agents, industrial solvents and, outside of the United States and a few other nations, as aerosol propellants. Du Pont's CFC sales were $600 million last year, a company spokesman said.

In recent years, scientists have confirmed that stratospheric ozone is being destroyed, notably over the antarctic, where a "hole" appears in the ozone layer each year. Intensive research into the antarctic hole has identified chlorine as a major contributor to the depletion, and a significant source of chlorine in the atmosphere are man-made CFCs and related chemical compounds.

Ozone filters out damaging ultraviolet rays, and loss of ozone increases the risk of cancer and such eye ailments as cataracts. Government scientists have estimated that losses of even a small percentage of stratospheric ozone could lead to hundreds of thousands of additional cases of skin cancer.

Scientists interviewed yesterday agreed that no immediate health effects had been linked to ozone depletion over Antarctica, populated only by a handful of researchers. Health concerns stem from the fact that CFCs are extraordinarily long-lived in the atmosphere, meaning that today's emissions are likely to be destroying ozone 75 years in the future.

"The question is how much risk do we avoid by cutting emissions now," said Irving Mintzer of the World Resources Institute. He said there is no doubt about chlorine's role in ozone depletion, "at least not in the credible part of the scientific community."

Du Pont made its 1974 promise amid a growing clamor for stronger regulation of CFC compounds. Linkage between CFCs and ozone depletion then was a new scientific theory, largely unproved by physical evidence.

The theory had captured public attention, however, and Du Pont was battling to protect its trademarked Freon and other valuable CFC compounds.

Du Pont's technical director, Raymond L. McCarthy, told Congress in December 1974 that, if additional research showed "that any chlorofluorocarbons cannot be used without a threat to health, Du Pont will stop production of these compounds."

The company repeated the vow the following year in company publications and full-page advertisements in several major newspapers over the signature of Irving S. Shapiro, then board chairman.

The United States later banned CFCs in aerosol products but did not curtail other uses.

Last year, spurred in part by the antarctic findings, the United States joined other nations in signing an international pact to reduce CFC use by 50 percent in the next decade.

The pact opens the way for additional cuts that may be deemed necessary but has been criticized by environmental groups and some scientists as inadequate.