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WILMINGTON, DELAWARE 19898

CHEMICALS AND PIGMENTS DEPARTMENT

June 11, 1987

Mr. John S. Hoffman
Stratospheric Protection Task Force
U. S. Environmental Protection
Agency
PM - 221
401 M. Street, S.W.
Washington, DC 20460

Dear John:

A first review of the draft "Preliminary Analysis of Costs and Benefits of Stratospheric Ozone Protection," has been completed. As noted in my April 22, 1987 letter, an adequate review was not possible because the back up data for each of the control methods still is not available. These comments are being supplied now to aid in your preparation of a new draft. Our detailed comments will be supplied after receipt of the back up data requested. Our preliminary review has convinced us that, as we stated previously, at least 60 days will be required to adequately review the back up data. We urge you not to issue this report until this review can be completed.

We are providing the attached copy of the draft report with our comments shown on each page. Since some comments are too lengthy to write in the report margins, we also are providing the attached summary of comments for some of the lines on each page. It should be noted that we do not necessarily agree with the cost or emission reduction achievable for each of the options listed if we have not commented. Due to the time constraints and the lack of back up information, we have not attempted to comment on each line at this time.

One general comment is that we believe the costs for many options are understated and the emission reductions identified are overstated. A review of the details will help confirm this. For instance, methods are identified which reduce FC-113 emissions in excess of 90% for a cost of only 7¢/lb. for each lb. reduced. This decrease resulted mainly from conversion to not in kind alternatives. We totally disagree with this analysis. If these reductions were that easy they would be taking place today.

In general, we had difficulty understanding the information on pages 30 to 36 and 40 to 46. We would suggest you rearrange the items in the Tables by segment to aid the reader in understanding what can be accomplished by segments. For instance, we have placed each line pertaining to the cleaning agent segments in separate tables (See tables I to V). Since this aids greatly in an understanding of the options we suggest you present the information in this format.

We have analyzed the information on the cleaning agents segments further (see Table VI and VII) and have additional comments as shown,

- The EPA has identified a 90% reduction in CFC-113 use at a cost of only 7¢/lb. This is totally unrealistic for the following reasons:

  (1) Examination of the various short term options indicates that EPA is placing heavy reliance upon the substitution of methylene chloride for CFC-113 as a way of effecting a major reduction of CFC-113 usage in solvent applications (see Table VII). We question the utility of methylene chloride as a replacement for CFC-113 because of the following:

  - Its solvency - Methylene chloride is a strong solvent which would be incompatible with many of the materials of construction employed in items now cleaned in CFC-113.

  - Its toxicity - Methylene chloride is classified by the ACGIH as a suspected carcinogen. The ACGIH also is proposing that its TWA be reduced from 100 ppm to 50 ppm.

  Similar comments apply to chlorinated solvents PCE and TCE.

  (2) Heavy reliance also is placed on the use of emulsion cleaning systems as a way of effecting a major reduction in CFC-113 usage. Emulsion cleaning systems have found only limited usage in the past because of problems associated with emulsion stability, chemical stability, rinsing, lack of ability to produce a high degree of surface cleanliness, and reclamation and/or disposal of spent cleaning solution.

  (3) A substantial reduction in CFC-113 usage is due to the employment of refrigerated freeboard chillers on degreasing and defluxing equipment. The true utility of such equipment has yet to be demonstrated. Our work (Society of Manufacturing Engineers Technical Report FC83-916) failed to show any benefits for employment on well-designed and well-operated degreasers.

(4) One of the control options for Conveyorized Degreasers and Electric and Electronic Equipment Cleaning that is expected to effect about an 8% reduction in solvent usage is said to consist of covered openings and thermostats. The nature of these items needs some clarification. An opening of some type must be present to permit work to be continuously introduced and withdrawn from a conveyorized degreaser. When and how would these covers operate? Also the need for additional thermostats over and above those normally provided is something that also requires some further discussion and definition.

(5) In the case of open-top degreasers, a reduction in solvent usage of about 21% is projected for what is listed as covers, drainage and increased freeboard. Offhand, this option would seem to suggest that a major portion of existing equipment does not conform with the guidelines for CFC-113 degreasers that Du Pont has been promoting for 20 years. We think the primary problem with open-top degreasers is a failure by users to employ good work practices and we think that the improvement in this application is more likely to be effected by the use of robotics to eliminate poor work practices than it is with changes to correct equipment design deficiencies. Some clarification of what is included in this option is needed. For example, what percentage of existing equipment does not have proper freeboard, etc.

(6) Questions can be raised regarding the utility of some of the listed equipment related options. In the case of the Electric and Electronic Equipment cleaning application, one of the options calls for the use of a drying tunnel in conjunction with rotating baskets. We think that the major part of the work processed in this application probably consists of printed circuit boards and electronic assemblies which you would not want to tumble in a rotating basket. Also, another purportedly low cost equipment related option in this application category is a drying tunnel with carbon adsorbers. "Freon" TMS is the principal solvent used in this application and it is not particularly amenable to low cost recovery by carbon adsorption. Recovery of "Freon" TMS by carbon adsorption would require either specialized equipment for vacuum or inert gas desorption or (with conventional adsorbers) additional facilities for solvent analysis and reconstitution together with facilities for disposal of water/alcohol mixtures.

(7) The long term candidates listed for this category are alternatives CFC-123 and CFC-132b, at a cost of only 7¢/lb. Bulk quantities of CFC-123 are projected to cost $1.25 to $2.50/lb. and bulk quantities of CFC-132b are projected to cost $1 to $2/lb., considerably greater

than 7¢/lb. It should be noted that recent negative toxicity information may limit the usefulness of CFC-132b as a cleaning agent. Also, we are not aware of any testing that would lead us to believe that FC-123 could displace FC-113 in 50% of the existing applications.

It also is to be noted that hot vapor recycle is listed as a long term option. Hot vapor recycle is in use in a number of applications today. The unavailability of retrofit units may be the reason it is classified as a long term option, but we think retrofit equipment might be made available on a mid-term basis while new equipment incorporating this feature should be considered as a short term option.

Another problem in understanding the information is apparent when each of the options is listed by segment. As shown in Table VIII it is not apparent what actual scenario is proposed for the long term. Does it mean that all the short term options will be followed or only option 1, then options 6 and 7 will be adopted mid term, then option 8 is skipped because it costs more than option 9 and 10, and then options 9 and 10 are implemented? Option 9 and 10 appear to be mutually exclusive, it is doubtful that some manufacturers will switch to hydrocarbons while others switch to FC-134a. It also is doubtful that any manufacturers would convert to FC-22/142b in the mid term and then to FC-134a longer term. The point is, some clarification needs to be made about what options are included in each of the short, mid term, and long term scenarios. The way this information is presented this can not be determined.

It also is appropriate to comment about options 7 and 9 in Table VIII. We believe auto manufacturers will not accept any flammable material or blends, like FC-22/142b, which could become flammable. For this reason these options should be eliminated from consideration. If this option is not excluded the cost category should be changed; it is inconsistent with the category for a conversion to F-22. We believe a conversion to hydrocarbons would cost at least as much as a conversion to F-22.

There are more difficulties understanding the information in pages 30 to 36 and pages 40 to 46. In the table of Short Term Options, we believe that the options listed in Category 1 are those which the EPA feels could be exercised at a cost penalty of less than 15 cents/kg. (7¢/lb.) to bring about, in the aggregate, a reduction of 30% in the overall usage of all CFCs in the United States. However, after adding the reduction contributions shown in the last column in the table, a value closer to 25% results rather than 30%. If the table labeled "Long Term Options", is included for similar class 1 category of options costing less than 15 cents/kg it is indicated that CFC usage is reduced by 35%. There is a footnote that indicates the 35% reduction figure is the sum of the contribution of the listed long term options and of the previously listed short and mid-term

options. However, if the listed contributions for all options (short, mid and long term) costing less than 15 cents/kg are added the sum is now closer to 45% than it is to 35%. We believe that some explanation of the true significance and meaning of the tables is needed. Also, the values listed in the column labeled "% Use Reduction for Application" refers to a purported effect that adoption of the related option would have after adoption of all other previously listed options for the same application. The fact that this value is related to and dependent upon the exercising of prior options needs to be noted either in the table or in an accompanying discussion. The values listed in the column "Contribution to Overall Use Reduction" also are dependent upon the exercising of the previously listed options.

Another difficulty with the information is apparent when the achievable reduction are summed for each of the major subsegments. For illustration purposes some of the higher volume subsegment totals have been summarized in Table IX. If all the short term, mid term and long term items are totalled for these subsegments they exceed the total use by about 25% (100MM lb/yr). Obviously, there must be some double accounting which significantly overstates the reduction achievable. This of course may relate to an actual scenario which does not include all listed options. If so, this scenario should be stated.

We also could not discern what cost is associated with the additional options provided in the category, "All Controls Reduce U.S. Compound by ___%" We suggest you add this.

Please consider these comments in your plans for completion of this report. We look forward to receiving the back up information so we can complete our review.

Sincerely,

Joseph M. Steed
Environmental Manager
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Attachment
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The subcommittee heard testimony from environmental groups and government representatives from St. Paul, Minn., and Montgomery County, Md., who said that while FIFRA does not expressly forbid local governments from making their own pesticide regulations, some court interpretations of the law have invalidated such local laws.

On the other hand, representatives of pest control and lawn care companies told the lawmakers that "patchwork" regulations by the 40,000 different political subdivisions in the country could make their work impossible.

Rep. Pat Roberts (R-Kan) also noted the possibility of "patchwork" rules. He said that the highly visible lawn care industry is a "lightning rod for all kinds of regulatory impulses" on the part of local officials and that they should be allowed to regulate only in special cases.

According to testimony from Jay Feldman, national coordinator of the National Coalition Against the Misuse of Pesticides, at least 10 localities have passed lawn care notification and posting ordinances: Wauconda and Park Forest, Ill.; Lakewood and Parma, Ohio; Prince George's County and Montgomery County, Md.; St. Paul and Duluth, Minn.; and Anchorage.

Feldman added that ordinances in five jurisdictions — Wauconda, Ill.; Lebanon, Maine; Stafford, Vt.; and Montgomery and Prince George's counties, Md. have been challenged in court.

"We believe in the authority of local political subdivisions of states, which traditionally have been vested with the authority to establish standards that protect the welfare of their residents when it is determined that federal and state protection is inadequate," Feldman testified.

According to William Walsh, an attorney for the United States Public Interest Research Group, most states have already preempted their local jurisdictions from establishing most kinds of regulatory activity, such as licensing and fees. However, Walsh said localities are fighting to protect the right of states to delegate their police power to local political subdivisions, so that they can protect the public health and welfare when necessary.

"Today's call for congressional recognition of limited local regulatory authority under FIFRA does not pose the threat of adding a third tier of regulation on industry," Walsh said. "Any suggestion to the contrary is an exaggeration."

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ENVIRONMENT: ADMINISTRATION GROUP TO PROMOTE ALTERNATIVE FUEL VEHICLES TO REDUCE OZONE POLLUTION

The Reagan Administration is moving to become a major promoter of vehicles powered by cleaner-burning alternative fuels, according to Administration officials.

An Administration task force has encouraged the Environmental Protection Agency to draft a major new policy statement should help localities understand how to meet air quality standards by encouraging the use of alternative fuels, sources said. In addition, the task force is looking into the benefits of having the federal government buy vehicles that can use fuels such as ethanol, methanol, and compressed natural gas.

The Administration task force, however, is not likely to suggest either federal financial incentives or new regulatory requirements that would increase the number of alternative fuel vehicles. Instead, free market forces and state action should be relied upon, the task force is expected to conclude. Overall, the Reagan Administration philosophically wants to avoid market intervention to stimulate alternative fuels. Nevertheless, some officials working with the task force question whether this is possible. One person commented, "If it is so economical, why isn't it happening in the market?"

Top Administration officials hope that the task force report itself— including a detailed explanation of the costs and benefits of using alternative fuels—will spark new interest in alternative fuels. They believe that using such vehicles will reduce the levels of ozone

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pollution faster than other available strategies. In addition, the approach promises tangential benefits such as an expanded market for natural gas and corn.

Vice President George Bush, who heads the task force and is a leading proponent of alternative fuels, already is championing their virtues in Iowa as he campaigns for the GOP presidential nomination. In a recent speech, Bush stated, "Instead of storing crops and taking federal payments, farmers could sell them to the energy companies that would spring up (in addition to those already in business) to convert the crops to ethanol fuel."

But the complexities of the subject are many, and they have already slowed the investigations of an interagency group preparing the report at the direction of the recently-revived Vice President's Task Force of Regulatory Relief (Report No. 69, A-10). The report was supposed to be ready by early May, but it will not be completed until late July, officials said. Administration researchers are trying to assemble facts such as the potential cost of such vehicles and how much less pollution their introduction would promise.

A major piece of the project is already nearing completion by EPA—a still non-public, half-inch-thick description of what credit the government will give states and localities for encouraging the use of alternative fuel strategies. In the past, EPA has not been able to provide much guidance on this subject.

In testimony prepared for delivery today before the House Energy and Commerce Subcommittee on Energy and Power, EPA is expected to that greater use of alternative fuel vehicles may be the only way some localities can move toward attaining ozone reduction, according to Administration officials who judged the statement to be a firmer stand for alternative fuels that the EPA has ever taken.

Many major metropolitan areas are far from meeting air quality standards set by the Clean Air Act. Even though most cities have in place state implementation plans outlining reduction efforts, EPA expects that many of them will not have attained compliance with pollution-reduction targets by the Dec. 31 deadline.

Boyden Gray, counsellor to the Vice President, owns a methanol-powered car and co-chairs the task force working on the alternative fuels report. He strongly believes that "the information about the power of these fuels to reduce pollution has been lacking." The other co-chair is Wendy Gramm, administrator of the Office of Management and Budget's Office of Information and Regulatory Affairs.

According to Gray, the major achievement of the task force will be to have encouraged EPA to give guidance to the states about what they can expect if they were utilize one of these approaches. He said, "The most important thing is to specify with clarity what the benefits are and what the costs are." Gray stated: "This has not been done before, the states have not been given any idea that this is an alternative they can pursue. Once they know that, we'll see what happens." EPA staffer Jeff Alford confirmed, "This working group really did stimulate us to sit down and get this working paper together."

California is the only state to have approved a plan to spur use of alternative fuel vehicles and Gray commented that "until recently" the EPA and state bureaucracies "were not getting along very well together in terms of how they would embark on a long-term program for the future in terms of going to neat alcohol strategy." Gray added. "Now that is going very well."

EPA recently has raised its predictions of just how ozone will be eliminated through the use of alternative fuel vehicles, according to Gray and EPA officials. An early April letter from EPA Administrator Lee Thomas estimated that "substitution of optimized pure methanol-fueled vehicles for 10 percent of the urban fleet would result in a 1.6- to 3.2-percent reduction in ozone levels."

"That's changed," Gray said, because that EPA estimate was based on national averages, and converting vehicles in metropolitan areas, where a higher percentage of

hydrocarbon emissions come from cars and trucks, will have a greater effect. EPA officials said Thomas' estimate may rise slightly, but generally will be in "the same ballpark." EPA has been reexamining the effects of various hypothetical strategies on Washington, D.C., New York, and Los Angeles.

Gray said the task force will not support one fuel as opposed to another, saying, "I don't think it is right for us to takes sides." However, in his assessment, compressed natural gas has a better shot at the heavy-duty vehicle market, ethanol will likely have more of a role as a fuel blend because of its expense, and methanol probably will have a major role in running cars.

The use of alternative fuels will help keep the United States from being dependent on foreign energy sources, Gray predicted, pointing to the large U.S. shut-in gas and coal resources that could be used.

Ethanol now benefits from a tax subsidy, but according to Gray, "There is a growing consensus that the taxpayer is the ultimately a beneficiary from the current subsidy." He explained, "The drain to the Treasury is more than offset by the savings to agriculture program." The Department of Agriculture officially disagrees, but has been ordered to redo a recent study of the ethanol subsidy.

Gray noted that there is "a distinct problem" in that the subsidy—which relies on exempting ethanol from six cents of the federal gasoline tax—thus comes out of the Highway Trust Fund and perhaps should be properly charged as a farm program. However, that problem is for the future, he said.

The possibility of an enlarged federal fleet of alternative fuel, or flexible fuel vehicles also is under discussion by the task force. Gray considers such a move partly one of symbolic value, but points out that a federal purchase, combined with state purchases, will encourage car manufactures to lower the cost. The Ford Motor Co., he reported, has said that an order for 100,000 such cars would make the cost per car only about $150 more than for gas-powered cars. Generating such a large demand, however, could prove very difficult, Gray admitted. California may buy about 5,000 flexible fuel vehicles, he noted.

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PRODUCT SAFETY: CPSC STAFF RECOMMENDS LABELING OF METHYLENE CHLORIDE PRODUCTS

Certain products containing methylene chloride are hazardous substances because they can cause cancer and thus are subject to labeling under Section 2(p)(1) of the Federal Hazardous Substances Act, the staff of the Consumer Product Safety Commission recommended in a briefing package released June 16.

The CPSC proposed last August to declare household products containing methylene chloride to be hazardous substances under the FHSA, due to a cancer risk from inhalation of methylene chloride vapor.

The staff said it carefully reviewed comments received on the proposed rule, as well as other relevant information which has become available since the proposal was issued. Because of the new information, the staff has modified its risk assessment to incorporate physiologically-based pharmacokinetic modeling and has expanded its guidance on the use of respirators.

After a full assessment of all available information, the staff concluded that the use of many household products that contain more than contaminant levels of methylene chloride poses a potential cancer risk to consumers when the products are used in a manner that exposes consumers to the vapor. New data received from the Environmental Protection Agency's consumer use and shelf surveys, and analysis of those data conducted by EPA's contractor with CPSC guidance, now allow estimates of an aggregate risk to the population that could be caused by the use of certain products containing methylene chloride, the staff said.

Hudson
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ADDENDUM

STRATOSPHERIC OZONE LEGISLATIVE PROPOSALS

I. Senate Bills

A. S. 570, "The Stratosphere Protection Act of 1987" (Baucus for himself, Chafee, Mitchell, Stafford, Durenberger, Gore, Wirth and Reid). This bill imposes regulatory requirements on EPA to list and regulate substances which are known, or reasonably expected, to cause or contribute to atmospheric or climatic modifications. CFC -11, -12, -114 and halons -1211 and -301 shall be included. As of January 1, 1988, the bill makes unlawful the production of substances which would result in a potential 5% increase in 1986 levels (reduction based on ozone-depleting potential) and subsequently, regulations must be issued to reduce at least by an additional 25% (of 1986 levels) by January 1, 1989; 50% by 1991 and 90% by 1995. The bill also provides that producers must report their production levels; an exemption for medical uses (10 years) and national security use of halon -1211 and -1301; trade restrictions on countries which do not have parallel schemes; and civil and criminal enforcement and citizens' suits.

B. S. 571, "The Stratospheric Ozone and Climate Protection Act of 1987" (Chafee, for himself, Baucus, Stafford, Mitchell, Durenberger, Gore, Wirth and Reid). This bill is very similar to Baucus' bill, but requires a phase-out of the initial priority list substances (using the same schedule as in S. 570, but achieving 90% reduction in 1993 instead of 1995) as well as for substances based on their ozone-depleting potential (using the same schedule as in S. 570).

II. House Bills

A. H. Con. Res. 47: Urging the President to take immediate action to reduce the depletion of the ozone layer attributable to worldwide emissions of chlorofluorocarbons (Richardson, for himself, Bates, Rinaldo, Edwards (CA), Waxman, Rodino, Scheuer, Martinez, Hamilton, Mrazek, Sikorski and Berman). H. Con Res. 47 acknowledges that there is a growing scientific consensus that certain chemicals can deplete the ozone layer and cause harm to human health and environment and that international cooperation is needed. The Resolution encourages the President to "negotiate an immediate reduction in the use of chlorofluorocarbons in the European Community and in other Nations . . . and to negotiate a worldwide program as expeditiously as practicable for the elimination of" other substances that may deplete the ozone layer.

B. H. Con. Res. 50: Concerning the encouragement and support for international negotiations, pursuant to section 156 of the Clean Air Act, by the President to develop a protocol to the Vienna Convention for the Protection of the Ozone Layer setting forth standards and regulations to protect the strato-

sphere from the adverse effects of chlorofluorocarbons (Dingell, for himself and Lent). H. Con. Res. 50 acknowledges that the ozone layer is being and will continue to be adversely affected or depleted by long-lived chlorine molecules from world-wide use of CFCs and that any international agreement must accomplish the goals of protection of human health and environment and protection of American jobs. The Resolution encourages and supports the President in his attempt to forge an international agreement.

C. H.R. 2036, "The Stratospheric Ozone Protection Act of 1987" (Bates, for himself, Sheuer, Waxman, Edwards (CA), Leland, Sikorski and Eckart). H.R. 2036 would amend the Clean Air Act to include the following emission reduction schedule for all fully halogenated alkanes: freeze at 1986 levels within one year of enactment; additional 20% reduction three years after enactment; additional 50% reduction five years after enactment; and 90% reduction seven years after enactment. In addition, the bill would impose trade restrictions as follows: one year after enactment there will be a ban on importation of bulk fully halogenated alkanes and prohibition on the export of technologies used to produce them; and three years after enactment, a ban on importation of all products containing fully halogenated alkanes or products made with same. The bill also provides for administrative orders (presumably enforceable under Section 113 of the Clean Air Act) and citizen enforcement.

D. H.R. 5737, "The Stratospheric Ozone and Climate Protection Act of 1986" (Richardson, for himself and Edwards (CA)). This bill would also amend the Clean Air Act. Like S. 570 and 571, this bill requires the Administrator to list substances, including CFC -11, -12, -22, -113, -114, and other enumerated substances with annual additions, which shall be prohibited from manufacture, introduction into commerce, import or use after five years on the list. Listed substances shall reduce by 20% in the first year. The bill also would require: certification of equivalent programs (without such programs, imports are banned one year after listing); labelling; reporting on production levels; and civil and criminal enforcement.

THE WHITE HOUSE

WASHINGTON

June 1, 1987

MEMORANDUM FOR NANCY J. RISQUE

FROM: BOB SWEET

SUBJECT: Ozone Planning Group Meeting

This morning I met with Richard Benedick (State), Eileen Claussen (EPA), Dave Gibbons (OMB), Jan Mares (OPD), J.R. Spradley (NOAA), and Steve Galebach. The purpose of the meeting was to review the agenda for the ENRE Working Group Meeting on Ozone, tomorrow, from 2:00 to 4:00 PM in Room 22 OEOB. The following presentations will be made:

- o legislative/legal issues -- Tom Hookano, Justice -- 15 minutes;
- o physical/climatic effects of ozone depletion -- Dr. Albritton, NOAA -- 45 minutes;
- o health effects resulting from ozone depletion -- John Hoffmann, EPA -- 1 hour;

The purpose of these presentations is to provide Working Group members a further understanding of the international negotiations to restrict certain chemicals thought to deplete the stratospheric ozone layer.

There will be a second Working Group meeting on Friday, June 5, 1987 at 2:00 PM to discuss the cost/benefit impact of an international agreement. CEA is preparing this paper in conjunction with EPA and OMB. This will complete the Working Group meetings and will allow time to prepare for the June 11 DPC meeting.

At the meeting this morning, Richard Benedick handed out the attached letter from Secretary Shultz to the Attorney General stating that, unless there are "compelling objections from some members of the Domestic Policy Council," the State Department "will continue to negotiate in conformance with the existing Circular 175 authority" and so notify negotiators from other nations this Friday, June 5.

Steve Galebach and I spent some time this afternoon considering the steps to take in light of this new development. Steve will brief the Attorney General at 9:00 AM, tomorrow, June 2, and recommend either a written response or a phone call to Secretary Shultz, in order to clarify the process. He will be in touch with you as soon as he receives guidance from the Attorney General.

In the meantime, I am proceeding on the assumption that the Working Group meetings will be held in preparation for a DPC meeting on June 11.

THE WHITE HOUSE

WASHINGTON

May 29, 1987

MEMORANDUM FOR NANCY J. RISQUE

FROM: BOB SWEET

SUBJECT: Ozone Strategy

Attached is a memorandum prepared by Jan Mares of OPD. It provides a good summary of the negotiations on stratospheric ozone to date.

The DPC met Wednesday, May 20 where Richard Benedick, Chief U.S. Negotiator, provided the Council with an overview of the issues that needed their guidance. At the close of the meeting, several questions were posed that required additional Working Group review. Since that time, there has been one Working Group meeting where Dr. Albritton, of NOAA, made an excellent presentation on the scientific aspects of stratospheric ozone depletion. (One of the questions the Council asked was some clarification about the "squishiness" of the science.) The Working Group then agreed to address several questions in a series of small sub-group meetings and reconvene on Tuesday, June 2, 1987 at 2:00 PM to hear brief presentations from EPA on the health effects of ozone depletion, cost/benefit analysis, whether halons should be included in the negotiation, pending court actions, and possible congressional activity.

This issue is extremely complex and requires the assimilation of a great deal of information by the Working Group members in order to provide an appropriate response to the Council's questions.

I believe a supplemental paper should be drafted following Tuesday's meeting answering the Council's questions and circulated to the members prior to the June 11 meeting.

I will be meeting with the presenters, Eileen Claussen of EPA, J.R. Spradley of NOAA, Steve Galebach of the AG's Office, Dave Gibbons of OMB, Jan Mares of OPD, and Richard Benedick of the State Department, to prepare for the Tuesday Working Group meeting and identify those issues that remain unresolved.

THE WHITE HOUSE

WASHINGTON

May 29,1987

MEMORANDUM FOR NANCY RISQUE AND GARY BAUER

FROM: BOB SWEET AND JAN MARES

SUBJECT: Stratospheric Ozone Protocol Negotiations

The Environmental Protection Agency, under terms of a court order resulting from a lawsuit by the Natural Resource Defense Council against the EPA Administrator, must publish in the Federal Register by December 1, 1987, a proposed decision on whether there is need for further domestic regulation, under the Clean Air Act, of chemicals which deplete the stratospheric ozone layer. These chemicals (certain chlorofluorocarbons (CFCs) and halons) are used for solvents, refigerants, foam blowing, fire extinguishing agents, sterilants, aerosal propellants, and other miscellaneous uses.

Compared to other environmental laws, the Act sets a low threshold for required action by EPA. The U.S. produces over one-third of the world's CFCs and halons. Because of the global nature of the problem of ozone depletion, unilateral U.S. regulatory action would not be as effective in protecting the ozone layer as uniform global action.

The U.S. has been participating in international negotiations since 1983 on this subject, leading to the 1985 Vienna Convention on Protection of the Ozone Layer. Negotiations on a protocol to this Convention resumed in December, 1986, and the protocol is scheduled for signing in September, 1987 in Montreal. An important U.S. objective in attaining an early and effective international agreement on ozone is to avoid disadvantages to U.S. economy resulting from unilateral U.S. action that may be required by the Clean Air Act.

The objectives for the U.S. government in the international negotiations were established in State Department Circular 175 of November 28, 1986, which was cleared on an interagency basis. These objectives include:

(a) a near-term freeze on the combined emissions of the most ozone-depleting CFC and halon substances;

(b) long-term scheduled reductions of emissions of these chemicals down to the point of eliminating emissions from all but limited uses for which no substitutes are commercially available (could be as much as 95%) subject to (c) and;

(c) periodic review of the protocol provisions based upon regular assessment of science, technology, environmental, and economic (STEE) elements, which could remove or add chemicals, or change the schedule or the emission reduction target.

The major unresolved issues concerning the international negotiations which are being discussed within the Domestic Policy Council Working Group process are:

(a) the extent of uncertainties on the science, assumptions, models estimating the effects, and costs and benefits relating to the CFC and halon emissions and their reduction; and

(b) whether the implications of the science, assumptions, and models warrant an international agreement now for a reduction in CFC's and halon emissions beyond a freeze at 1986 levels, subject to reversal if the STEE elements warranted reversal as opposed to providing a mechanism for agreeing in the future on reductions in emissions based on the STEE elements.

EPA, State, and some others appear to believe the analysis of the science, costs, and benefits justifies an international agreement that would provide for a scheduled 20% reduction in the CFC emissions and a further 30% reduction if the STEE elements warrented.

OSTP, Interior, and most others appear to believe an international agreement on a freeze of CFC and halon emissions is justified but believe any reduction steps beyond a freeze should be based on future reviews of STEE elements and subsequent agreements.

Two other major issues on which there is no apparent interagency disagreement but which have not been resolved because of their enormous implications, complexity, and difficulty are:

(a) how the trade and enforcement aspects of the protocol will be established so that the U.S. is not one of few parties complying with the protocol and doing so to its disadvantage, and

(b) how the less developed countries will be encouraged to participate in the protocol and give up the possibility of future significant use of CFCs whose replacements are currently forecast to be more expensive.

There is also no present agreement amongst the protocol countries on these two issues.

MEMORANDUM FOR THE DOMESTIC POLICY COUNCIL

FROM: THE ENERGY, NATURAL RESOURCES & ENVIRONMENT WORKING GROUP

SUBJECT: Stratospheric Ozone

On May 20, 1987, the Council met to discuss the international protocol negotiations currently underway to limit emissions of ozone depleting chemicals.

Several questions were raised and the Working Group was asked to provide answers. The questions were:

* What are the legislative and legal impacts of an international ozone protocol?

* What are the most up-to-date scientific data on climatic and health effects of ozone depletion?

* What is the cost/benefit effect of an international treaty restricting ozone depleting chemicals?

The following information has been summarized by the Working Group after discussion of detailed presentations by experts in each area.

Legislative/legal

A pending lawsuit against the EPA seeks to compel the Administrator to promulgate regulations governing stratospheric ozone and to schedule such regulation. The court is not likely to force action as long as productive international negotiations continue. If the international negotiations result in a scheduled reduction, the EPA would have sound defenses to any attempt by the plaintiff or the court to impose substantive emissions levels through the lawsuit. However, if there is no international agreement, it will be difficult to continue to argue for no domestic regulation, either in the existing lawsuit or in future litigation. EPA will be hard pressed to ask for more time to study the issue, having initiated study of the issue eight years ago.

To date legislative action has been restrained by strong opponents of domestic legislation (such as Congressman Dingell). If the international negotiations for a protocol fail, there will be a strong push for a unilateral domestic reduction on Capitol Hill. Key Senators and Congressmen have been making statements

to this effect for months; recent press attention will only heighten that resolve. If the protocol called for a freeze or a freeze plus an automatic 20 percent reduction with no potential for future reductions, the legislative outcome is less certain; Congress would undoubtedly hold additional hearings to determine the need for further domestic reductions. If, on the other hand, the protcol mandated a freeze plus a 50 percent reduction, it seems likely that any pressure for additional domestic regulation would dissipate. Environmental groups, which were initially backing a 95 percent target, have agreed that a freeze plus 50 percent reduction would be a very positive beginning; some of the active groups would settle for less than 50% but more than 20%. Without a strong push from these groups, additional congressional action, at least in the near term, would be unlikely.

Climatic

Emissions of CFCs and Halons may be depleting the stratospheric ozone layer, reducing the screen against harmful ultraviolet radiation and altering the Earth's climate system. Continued growth of CFC and Halon emissions at 3% per year is predicted to yield a globally averaged column ozone depletion of 6% by the year 2040, and more thereafter, which is much greater than the natural decadal variability and hence significant. In contrast a true global freeze of the sum of all CFCs and Halons at the present rate is predicted to yield a maximum global average ozone depletion of less than 1%. Ozone depletions at high latitudes are predicted to be 2-3 times larger than the global average. Depletions in upper stratospheric ozone greater than 25% are predicted to occur in both cases which would lead to a local cooling greater than natural variability. The consequences of this cooling for the Earth's climate are unclear. While these theories simulate much of the present atmosphere quite well, they are not perfect, which places a factor of 2-3 uncertainty on their predictive abilities.

Observations have shown (1) column ozone increased about 3% from 1960 to 1970, remained constant throughout the 1970's, and has decreased thereafter by about 4%; (2) a decrease of about 7% during the last decade in the upper stratosphere; and (3) a 40% decrease in column ozone over Antarctica in the spring season since the mid-1970's. Whether the recent changes in column and upper stratospheric ozone are due to natural phenomena or in part to CFCs remains an open question.

To limit column and upper stratospheric ozone depletions to less than the decadal natural variability reductions beyond a true global freeze may be required. A protocol that reduces emissions as much as 20-50 percent could fall short of a true global freeze since it will not include all chemicals, compliance in developed countries may be less than 100 percent, and substantial growth in CFC usage may occur in developing countries. If there is environmental damage due to CFCs and Halons their long

atmospheric lifetimes would mean that recovery would take many decades even after complete cessation of emissions.

Health

Depletion of the ozone layer would result in increased penetration of biologically damaging ultraviolet radiation (UV-B) to the earth's surface. Based on the research completed to date, greater exposure to UV-B radiation has been linked to increases in the number of skin cancers and cataracts, suppression of the human immune response system, damage to crops and aquatic organisms, and increased formation of ground-level ozone (smog).

Based on epidemiological and ecological studies, dose-response relationshps were developed and reviewed as part of EPA's risk assessment. The extent of additional cancer deaths will depend on the degree of CFC control. If today's ozone level is maintained, the projected number of skin cancer deaths for White U.S. citizens born before 2075 (a total population of over 600,000,000) would be 3,000,000. If the ozone level is decreased by 26 percent, there would be a projected increase in the number of skin cancer deaths of 1,900,000 over the base of 2,100,000. For an ozone level decrease of 7.7 percent (the likely result of a protocol freeze), there would be an increase in skin cancer deaths of 300,000 over the case in which there was no ozone depletion. For an ozone level decrease of 6.1 percent (the likely result of a 20 percent reduction in emissions), there would be an increase in skin cancer deaths of 200,000 over the base. For an ozone level decrease of 3.2 percent (a 50 percent reduction), there would be an increase in skin cancer deaths of 100,000 over the base. This analysis assumes that exposure to sunlight (e.g., sunbathing) does not increase, that no major improvements in treatment of skin cancer occur, and that ozone depletion does not increase after 2100. The uncertainties in the total estimates of additional cases are due to uncertainties about the action spectra, predicted ozone depletion, and the dose-response co-efficients. There is a 90% probability that the actual cases will be between 20% and 260% of the estimated value, and a fifty percent probability that it will be between 50% and 125% as great.

Recent studies have also shown a strong dose-response relationship between UV-B and the incidence of cataracts. Approximately 12.5 million cases in the U.S. could be averted by a protocol freeze for the 600 million citizens born by 2075. A 50 percent reduction in the major CFCs would result in approximately 16.3 million cases averted. While laboratory studies link UV-B to suppression of the human response system with possible implications for increasing the incidence of herpes simplex and leishmaniasis, research into possible broader implications has not been undertaken and the quantitiative impact is not projected.

Limited studies have examined the effects of increased UV-B radiation on plants and aquatic organisms. Five years of field studies of soy beans provide the most extensive data and suggest potentially large losses in yield for this species. Laboratory studies of UV-B effects on aquatic organisms show changes in community composition and reduced breeding season for phytoplankton and loss of larvae for higher order fish. Potential implications for the aquatic food chain have not been studied.

Cost/Benefit

A cost benefit analysis has been performed for the projected skin cancer deaths, skin cancer non-fatal cases, and cataracts health effects projected from increased UV-B radiation occuring at the projected baseline growth of CFC emissions and at the levels of emissions contemplated by a protocol freeze of emissions, a 20 percent reduction thereof, and a further 30 percent reduction thereof. Such analysis involves substantial economic uncertainties and is not being presented with respect to the benefits derived from reducing the incidence of UV-B on plants, aquatic life, the human immune system, ground level ozone concentrations, polymer degradation, and global temperature because of the lack of sufficient quantitative experimental information. However, the benefits of these non-quantifiably evaluated benefits are acknowledged to exist and to be additive to the other benefits which were estimated.

A range of assumptions was used in the analysis. The key variations in the assumptions were the valuations of lives saved (two million and four million were used) and the discount rates for the costs and the benefits. Four percent and six percent were used for the benefits and the costs were evaluated at the same rate.

Sensitivity analysis was performed with respect to the economic valuation of lives saved and the growth in their value over time.

The uncertainties in the underlying data from which the individual health effects were calculated was not separately estimated. The central values for health effects from the EPA Risk Assessment Analysis were used in the cost benefit analysis. In order to bound the benefit assumptions by the uncertainty in the underlying health effects data, climate models, etc., the calculated benefits should be reduced or multiplied by a significant factor which could be as much as ____ percent.

The conclusions of the analysis are as follows:

--The benefits from a "protocol freeze" of the CFC emissions are substantially more than the costs over all plausible assumptions and ranges of uncertainty.

--The aggregate benefits of a "protocol freeze" plus a 20 percent reduction in CFC emissions are also in almost all plausible cases substantially in excess of the costs.

--However, the marginal benefits of the additional 20 percent reduction beyond the freeze are not in all cases in excess of the marginal costs of the additional 20 percent reduction.

--The marginal costs of a further 30 percent reduction (beyond the freeze plus 20%) appear in some cases to exceed the benefits from a further 30 percent reduction. It is also true that in some cases examined the marginal benefits exceed the marginal costs for this incremental 30% step. Further scientific and economic review will be valuable before making the final decision on this step.

ISSUES AND DISCUSSION

At the May 20, 1987 DPC meeting, the head of the U.S. delegation to the international ozone negotiations provided an overview of the progress and the status of the negotiations. DPC guidance is now sought on the following issues.

A. THE INTERNATIONAL NEGOTIATION PROCESS

Should any changes be made to the Circular 175?

The November 28, 1986 Circular 175 authorized the U.S. delegation to negotiate a protocol providing for:

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

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

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

Pro's:

* Diplomatic considerations favor continuing with the

existing Circular 175. The U.S. position, as reflected in the 175 has been presented in formal negotiating sessions, congressional testimony and public position papers.

* The Circular 175 provides a general framework for a potential protocol and allows for various alternative approaches to the specific provisions of a control protocol.

Con's:

* As the negotiations move toward closure, the Circular 175 could be revised to specify the essential elements of a potential protocol from the U.S. perspective.

* The existing Circular 175 was not reviewed or approved by the highest levels in the inter-agency process.

B. AN EMISSIONS CONTROL PROTOCOL

In accordance with the existing Circular 175, the following questions are under consideration in the ongoing international negotiations. These questions relate to the potential emissions control provisions to be included in a protocol.

The first series of questions relates to the freeze on emissions described in the Circular 175. The questions under consideration with respect to a freeze are:

1. When should a freeze on emissions occur?

The Working Group consensus is that a freeze on emissions should go into effect two years after entry into force of the protocol. The anticipated entry into force is 1988; thus the freeze would go into effect in 1990.

2. What chemicals should the freeze cover?

The Working Group consensus is that the freeze should include CFCs 11, 12, 113, 114, 115, and Halons 1201 and 1311.

The next series of questions pertains to the emissions reductions beyond a freeze. The questions currently under consideration relate to the timing and extent of any such reductions, the chemicals to be included in such reductions, and whether such reductions should occur automatically or be tied to the future

scientific and technological assessments provided for in the Circular 175.

1. How much and when?

The Chairman's text provides for a 20% reduction to take effect 4 years after entry into force (1992) and a 30% reduction to take effect either 6 years (1994) or 8 years (1996) after entry into force.

2. Should the reductions be automatic or tied to future science reviews?

The Chairman's text provides for the initial 20% reduction to take effect automatically. The text provides two alternative implementing mechanisms for the next 30% reduction -- either an automatic reduction 6 years after entry into force, or, a 30% reduction 8 years after entry into force if affirmed by a majority vote of the parties.

3. What chemicals should the reductions cover?

The Working Group consensus is that any additional reductions should cover CFCs 11 and 12. There are questions about the coverage of CFCs 113, 114, 115, and Halons 1201 and 1311. National security concerns favor not including the Halons in any of the reductions beyond a freeze. There is also a national security concern with including CFC 113 in any reductions beyond a freeze, especially given 113's importance to the semi-conductor industry. The questions regarding coverage of CFCs 114 and 115 concern their potential use as substitutes for controlled chemicals.

C. PARTICIPATION AND TRADE PROVISIONS

There remain many complex issues to be addressed in the international negotiations pertaining to fair trade provisions and the participation of developing countries. The following issues are under consideration:

1. Should the U.S. delegation seek maximum participation in the control protocol?

The U.S. and the United Nations Environment Program have expended considerable effort (e.g. through our Embassies and through paying travel costs) to encourage broad participation

by developing countries. However, only relatively few have shown the interest or the expertise to participate. Parties to the protocol would not be able to prevent non-joining countries from producing CFCs for their internal market, but would be able to prevent them from profiting through international trade.

A strong protocol, including the major producing and consuming countries, could lead to earlier development of substitute products. This might discourage non-joiners from investing heavily in capacity in a soon-to-be obsolescent CFC technology. Further, the very existence of a protocol, as an expression of concern by the international community, increases the pressure on non-member countries to join; in essence, if they continue to produce CFCs, they are exposed as behaving irresponsibly on a matter of global import.

The Working Group consensus is that the delegation continue to negotiate for as broad a level of participation as possible.

2. What should be the U.S. objective regarding voting among parties to the protocol?

The Working Group consensus is that the delegation negotiate for a system of voting which would credit the major producing and consuming countries.

3. What should be the U.S. objective regarding the control formula and trade provisions?

It is the consensus of the Working Group that the U.S. delegation seek to include in the protocol an effective formula to control emissions with accountability, the fewest possible restrictions on the flow of trade and capital among parties, the most favorable formula for U.S. industry, and strong monitoring and reporting provisions.

THE WHITE HOUSE

WASHINGTON

May 18, 1987

MEMORANDUM FOR THE DOMESTIC POLICY COUNCIL

FROM: THE ENERGY, NATURAL RESOURCES & ENVIRONMENT WORKING GROUP

SUBJECT: Stratospheric Ozone Protocol Negotiations

Issue - What should the U.S. negotiating position be for elements of the protocol to protect the stratospheric ozone layer by controlling emissions of ozone-depleting substances [chloro-fluorocarbons (CFC) and halons]?

Background - The Environmental Protection Agency, under terms of a court order resulting from a lawsuit by the National Resources Defense Council against the EPA Administrator, must publish in the Federal Register by December 1, 1987, a proposed decision on whether there is a need for further domestic regulations, under the Clean Air Act, of chemicals which deplete the stratospheric ozone layer. These chemicals [certain chlorofluorocarbons (CFCs) and halons] are used for solvents, refrigerants, foam blowing, fire extinguising agents, sterilants, aerosol propellants, and other miscellaneous uses.

Compared to other environmental laws, the Act sets a low thresh-hold for required action by EPA. Because of the global nature of the problem of ozone depletion, however, unilateral U.S. regulatory action would not be effective in protecting the ozone layer. An important U.S. objective in attaining an early and effective international agreement on ozone is also to avoid disadvantages to U.S. industry resulting from unilateral U.S. action required by the Clean Air Act.

The U.S. has been participating in international negotiations since 1983 on this subject, leading to the 1985 Vienna Convention on Protection of the Ozone Layer. Negotiations on a protocol to this Convention resumed in December, 1986, following intensive international scientific and economic assessments. Since December, there have been two further sessions, in February and April, 1987, and the protocol is scheduled for signing in September, 1987 in Montreal.

The objectives for the U.S. Government are in State Department Circular 175 of November 28, 1986. These objectives include:

(a) a near-term freeze on the combined emissions of the most ozone-depleting CFC and halon substances;

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

(c) periodic review of the protocol provisions based upon regular assessment of science, technology, environmental and economic (STEE) elements, which could remove or add chemicals, or change the schedule or the emission reduction target.

The Working Group on Energy, Natural Resources and the Environment has considered the issue of stratospheric ozone depletion over the past several months. Attached is a paper prepared by OMB that summarizes the available scientific, environmental, economic, and international data.

Discussion - Since the negotiations are now reaching a stage where final positions are being proposed, and due to the broad economic impact of these positions, several Cabinet agencies have asked that the Domestic Policy Council review the U.S. position and give guidance to the U.S. negotiating team on several elements of our position prior to the next negotiations.

Representatives of key countries, including the U.S., will meet on June 29 and at subsequent sessions to discuss a suggested text (attached) for a control schedule prepared by the Chairman of the April negotiation sessions (referred to as the Chairman's text). At that time they will address the chemicals to be covered, the timing and stringency of the controls, and the relationship of scientific assessments to this process. Following these meetings, the Council will be informed, and asked for further guidance on the U.S. final position prior to the formal negotiating meeting on September 8, 1987, and a ministerial endorsement meeting September 16-20, 1987.

DPC Guidance - General DPC guidance is sought on the following issues:

1. Chemical Coverage

-- The U.S. objective is to achieve the broadest coverage of major ozone depleters on a weighted basis, including fully halogenated CFCs and halons.

-- The European Community, Japan, and the USSR wanted only CFC 11 and 12 covered; but now may agree that CFC 113, 114, 115 and halons could be included if UNEP, in its June meeting, agrees that the Convention can include them.

-- Options include seeking differential coverage, i.e. reducing some and only freezing others. There is support

for freezing but not reducing halons, given its defense uses.

-- There is general interagency agreement on chemical coverage. The negotiating team will press for the broadest attainable coverage in the freeze, subject to DPC guidance.

2. Stringency and Timing of Controls; Relationship to Periodic Assessments

-- Key issues are:

o Stringency: Should there be an initial freeze and subsequent reductions? What should the reduction levels be, and in what timing and increments? What would be the probable effect on the ozone layer?

o Timing: There are environmental benefits for early action to reduce CFC's; further, it would encourage industry to develop CFC substitutes. Given that a required reduction is likely, there is a need to provide time for industrial product development adjustment. Some in industry prefer a definite decision and advance notice. This conflicts with those who prefer to delay positive action as long as possible.

o Relationship to periodic reassessments of scientific, technological, environmental and economic (STEE) factors scheduled in the protocol: Should we go for (1) planned reductions subject to reversal by vote of parties after reassessment, or (2) target levels to be implemented only by positive vote after reassessment, or (3) no targeted reductions?

-- The Chairman's text, released after the last negotiating session in April 1987, represents a possible emerging international consensus and is a convenient vehicle for review. It includes:

o Freeze at 1986 levels of production/consumption of CFC 11, 12, 113, [114, 115] within two years after entry into force (EIF) of the protocol. This could happen in 1988, but the most likely EIF date is 1990.

o An automatic 20% reduction 4 years after EIF. Likely date 1994.

o Additional 30% reduction, to be implemented after scheduled STEE reassessment, with two options:

(1) 6 years after EIF (likely date 1996), if positively confirmed by majority vote of parties, or

(2) 8 years after EIF (likely date 1998), unless reversed by two-thirds vote of parties.

o Additional steps down to possible eventual elimination of these chemicals for all but limited uses would be decided subsequently by parties based on periodic reassessments.

Questions for Decision: Should U.S. delegation seek agreement along lines of chairman's text, work for greater stringency/earlier impact, or propose some relaxation in terms?

(a) Freeze. Interagency accord, within 1-2 years of EIF. Some prefer an earlier freeze.

(b) 20% reduction. Some agencies feel implementation should require positive vote of parties following a STEE reassessment in 1990.

(c) Additional 30% reduction. There is interagency disagreement here on several elements.

-- Should a set level of reduction beyond the first 20% be scheduled; if so, at what level?

-- Should a second reduction be 6 years after EIF and be subject to a positive vote, or be 8 years after EIF and be subject to a reversal vote, or some other variant?

(d) Additional reduction steps. Should the delegation press for further reductions as contained in the Chairman's text and Circular 175? If so, at what levels and time frame? Should they require a positive vote or be implemented unless there is a vote for reversal? Alternatively, should the process for setting reductions and timing be specified? Anything beyond the Chairman's text may not be achievable.

3. Control Formula and Trade Provisions:

(A) Trade Among Parties.

Significant differences remain among governments over a formula for regulating controlled chemicals.

o Options include national ceilings on: (a) production; (b) production plus imports, combined or separately; (c) consumption; or, (d) production plus imports, less exports to parties, less amounts destroyed.

- o There is general interagency agreement favoring a ceiling on consumption, or "adjusted production," but compromise may be needed.

- o U.S. objectives include effective control of emissions with accountability, fewest restriction on the flow of trade and captial among parties, and most favorable formula for U.S. industry. Verification remains an issue.

- o Subject to DPC guidance, the delegation will pursue these objectives and seek DPC approval of specific recommendations at a later time.

(B) Trade With Non-Parties.

-- Key elements:

- o General international consensus on:

  -- Ban on imports of controlled chemicals in bulk from non-parties.

- o No international consensus on:

  -- Restrictions on exports of bulk chemicals.

  -- Restrictions on imports of products containing controlled chemicals.

  -- Consideration of restrictions on products made with controlled chemicals.

  -- Consideration of restrictions on export of technology and equipment.

-- U.S. objectives: to regulate trade in order to encourage adherence to protocol and avoid benefits to non-parties at expense of parties. Proposals consistent with GATT.

-- Interagency consensus in favor of strong trade article, including trade in bulk chemicals and products that could be uniformly enforced. Transfer of technology and equipment remains an issue.

-- Subject to DPC guidance, delegation will pursue these objectives and seek DPC approval of specific recommendations at a later time.

4. Participation.

-- U.S. objective: To encourage effective global control through widest possible participation by other countries.

-- **Problem:** The less developed countries (LDCs) need concessions for essential domestic uses to encourage adherence; but exemptions must remain limited to avoid undercutting global control levels. Concessions being considered in the Chairman's text could double global production ceiling if fully used within the period allowed.

-- One option entails exemption from controls for a limited period for LDCs followed by adherence to the protocol. Controls will be needed to restrict production in the LDCs by existing producers.

-- Related problem: Majority LDC membership could control protocol voting to U.S. disadvantage. Should U.S. press for weighted voting based on historic use and production levels? Should elements be put into the protocol?

-- This issue needs more work. Subject to DPC guidance, we will refine our objectives for subsequent negotiations and later seek DPC approval of specific recommendations.

THE WHITE HOUSE

WASHINGTON

May 18, 1987

MEMORANDUM FOR EDWIN MEESE III

FROM: RALPH C. BLEDSOE

SUBJECT: Ninety-First Meeting of Domestic Policy Council

The Domestic Policy Council will hold its ninety-first meeting on Wednesday, May 20, 1987 at 2:00 p.m. in the Roosevelt Room. The subject for discussion is Stratospheric Ozone.

Stratospheric Ozone

- There are two purposes for this meeting: to bring the Council up to date on the final stages of international negotiations on actions to reduce the depletion of stratospheric ozone, and to seek the Council's "guidance" on several negotiating problems.

- OMB, Justice, Interior, and Commerce have asked that the Council take up this issue, since they had not been heavily involved in the earlier formulation of U.S. policies at the heart of these negotiations.

- State and EPA, which have been predominant in framing the U.S. positions to now, have been generally cooperative in assisting the other agencies in learning about the problems and options available to us.

- There will be three parts to the presentation to the Council:

  - Ambassador Richard Benedick, head of the U.S. negotiating team, will take about 10-minutes to provide background on the international negotiations, and where we now stand.

  - Bob Watson, a NASA scientist, will take about 5-8 minutes to outline the stratospheric ozone problem, and the scientific knowledge we have about it. He will point out the weaknesses and disagreements in current scientific models being used.

  - Benedick will take another 5-10 minutes to outline the four major issues for which the negotiating team wishes guidance.

- Following the presentation, you should guide the discussion of each of the four issues.

- In his background remarks, Benedick will comment on:

  - scientific concerns that began in the 1970s
  - the U.S. aerosol ban in 1978
  - the UN negotiations leading to the 1985 Vienna Convention
  - the U.S. position in the Circular 175
  - progress made in the negotiating sessions
  - relationships between international and domestic policies.

- There are three aspects to the U.S. position:

  1. A freeze on emissions.
  2. Planned reductions and timing.
  3. Continuing reassessment of science as a basis for action.

- The four issues you might wish to guide the discussion through include:

  - Chemical coverage. What chemicals should be covered by the agreements that are reached?

  - Stringency and Timing. What reductions should be agreed to beyond a freeze, and over what time periods?

  - Control Formula and Trade Provisions. How might parties and non-parties to the agreements link their trade policies to controls and results?

  - Participation. What participation by various nations should be sought in the protocol?

- Chemical coverage will not generate too much discussion, except that DOD will express concerns about including Halon chemicals in the reduction targets. The biggest concern will be over which countries will want to take credit for previous reductions, and the ease with which some countries can achieve reductions.

- Stringency and Timing will be the most controversial area. The "Chairman's Text" calls for a freeze at 1986 levels, effective two years after entry-into-force (EIF); a 20% reduction 4 years after EIF; an additional 30% after a scheduled reassessment (6 or 8 years); and additional steps to possible elimination based on periodic reassessments. EPA will support the 50% and perhaps push for more. Interior and Commerce and others will only accept the 50%, provided it is supported by the "science." You should try to focus the discussion of these points so that the negotiating team knows the general directions it should go from the "Chairman's Text" i.e. stronger or weaker, and sooner or later.

- o The Control Formula and Trade Provisions issue is not fully developed, since there are numerous treaties, international laws, and other trade aspects that could lead us well beyond the immediate problem. There should be some discussion of this issue, since it will give the Council members a feel for the "total package" concept that will be a part of the final negotiations.

- o The same applies to the Participation issue, in that how lesser developed countries (LDCs) should be handled has not been fully developed. Again, there should be discussion of this, since it also will be a part of the total package.

- o Lee Thomas will be prepared to describe how the international negotiations have permitted him to have a lawsuit deadline for promulgation of domestic standards put off to December. He will also point out how the final agreements reached in September will influence the domestic rules he will ultimately have to develop.

- o If we run out of time at this meeting, we have time scheduled for next Wednesday, May 27 to continue the discussion.

- o Since the Council will receive a July briefing prior to the final negotiations in September, there will be an opportunity for the Council to make its recommendations, if needed, to the President. The President could then make his decision just before the negotiating team departs for the final sessions in Montreal.

- o Bob Sweet will be filling in for me and is up on the issue.

cc: Nancy Risque
Steve Galebach

SUMMARY OF NEGOTIATION ISSUES

SUBJECT: Stratospheric Ozone Protocol Negotiations

The U.S. negotiating team is seeking DPC guidance on the following issues:

Chemical Coverage

- Should the team press for a freeze with the broadest attainable chemical coverage?
- Given their defense uses, should Halon chemicals be excluded from reduction targets?

Stringency and Timing

- Should the freeze at 1986 levels proposed in the "Chairman's text" be accepted?
- Should the freeze take effect two years after entry into force (EIF) of the protocol or earlier?
- Should an automatic 20% reduction take place four years after EIF or should a positive vote be required after science, technology, environmental, and economic (STEE) elements are reviewed?
- Should an additional 30% reduction be scheduled?
- Should reductions beyond 20% be subject to positive confirmation following STEE reassessment, or should additional reductions automatically take effect unless reversed?
- Should confirmation/reversal of additional reductions be based on a majority or a two-thirds vote?
- Should the team press for further scheduled reductions beyond 50%?

Control Formula and Trade Provisions

- Should the team pursue a formula regulating trade among parties based on the following objectives: effective control of emissions with accountability; fewest restrictions on the flow of trade and capital among parties; and most favorable treatment for U.S. industry?

- Should the team pursue regulation of trade with non-parties consistent with GATT to encourage adherence to the protocol and to avoid benefits to non-parties at the expense of parties?

Participation

- Should concessions being considered in the "Chairman's text" for less developed countries (LDCs) be accepted, or should LDCs be exempted from controls only for a limited period followed by adherence to the protocol?

- Should participating parties have an equal vote or should the U.S. team press for weighted voting based on historic use and production levels?

Next Step

Once the DPC has addressed the issues listed above, the Working Group could be tasked with developing a U.S. alternative to the "Chairman's text" for review by the DPC. If approved, this alternative text could serve as guidance to the U.S. negotiating team for the next session.

THE WHITE HOUSE

WASHINGTON

May 18, 1987

MEMORANDUM FOR THE DOMESTIC POLICY COUNCIL

FROM: ROBERT W. SWEET, JR.
Deputy Executive Secretary

SUBJECT: Domestic Policy Council Meeting of May 20

Attached are an agenda and materials for the Domestic Policy Council meeting scheduled for Wednesday, May 20, 1987 at 2:00 p.m. in the Roosevelt Room. The agenda item for discussion is stratospheric ozone.

The Council will be briefed on international negotiations now underway, and problems associated with reducing depletion of stratospheric ozone. Guidance will be sought from the Council on U.S. positions for various aspects of the problem. A paper containing background information and a summary of the issue areas is attached.

Attachment

THE WHITE HOUSE

WASHINGTON

DOMESTIC POLICY COUNCIL

Wednesday, May 20, 1987

2:00 p.m.

Roosevelt Room

AGENDA

1. Stratospheric Ozone -- Ambassador Richard E. Benedick
Deputy Assistant Secretary,
Environment, Health & Natural
Resources
Department of State

THE WHITE HOUSE

WASHINGTON

May 18, 1987

MEMORANDUM FOR THE DOMESTIC POLICY COUNCIL

FROM: THE ENERGY, NATURAL RESOURCES & ENVIRONMENT WORKING GROUP

SUBJECT: Stratospheric Ozone Protocol Negotiations

Issue - What should the U.S. negotiating position be for elements of the protocol to protect the stratospheric ozone layer by controlling emissions of ozone-depleting substances [chloro-fluorocarbons (CFC) and halons]?

Background - The Environmental Protection Agency, under terms of a court order resulting from a lawsuit by the National Resources Defense Council against the EPA Administrator, must publish in the Federal Register by December 1, 1987, a proposed decision on whether there is a need need for further domestic regulations, under the Clean Air Act, of chemicals which deplete the stratospheric ozone layer. These chemicals [certain chlorofluorocarbons (CFCs) and halons] are used for solvents, refrigerants, foam blowing, fire extinguising agents, sterilants, aerosol propellants, and other miscellaneous uses.

Compared to other environmental laws, the Act sets a low thresh-hold for required action by EPA. Because of the global nature of the problem of ozone depletion, however, unilateral U.S. regulatory action would not be effective in protecting the ozone layer. An important U.S. objective in attaining an early and effective international agreement on ozone is also to avoid disadvantages to U.S. industry resulting from unilateral U.S. action required by the Clean Air Act.

The U.S. has been participating in international negotiations since 1983 on this subject, leading to the 1985 Vienna Convention on Protection of the Ozone Layer. Negotiations on a protocol to this Convention resumed in December, 1986, following intensive international scientific and economic assessments. Since December, there have been two further sessions, in February and April, 1987, and the protocol is scheduled for signing in September, 1987 in Montreal.

The objectives for the U.S. Government are in State Department Circular 175 of November 28, 1986. These objectives include:

(a) a near-term freeze on the combined emissions of the most ozone-depleting CFC and halon substances;

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

(c) periodic review of the protocol provisions based upon regular assessment of science, technology, environmental and economic (STEE) elements, which could remove or add chemicals, or change the schedule or the emission reduction target.

The Working Group on Energy, Natural Resources and the Environment has considered the issue of stratospheric ozone depletion over the past several months. Attached is a paper prepared by OMB that summarizes the available scientific, environmental, economic, and international data.

Discussion - Since the negotiations are now reaching a stage where final positions are being proposed, and due to the broad economic impact of these positions, several Cabinet agencies have asked that the Domestic Policy Council review the U.S. position and give guidance to the U.S. negotiating team on several elements of our position prior to the next negotiations.

Representatives of key countries, including the U.S., will meet on June 29 and at subsequent sessions to discuss a suggested text (attached) for a control schedule prepared by the Chairman of the April negotiation sessions (referred to as the Chairman's text). At that time they will address the chemicals to be covered, the timing and stringency of the controls, and the relationship of scientific assessments to this process. Following these meetings, the Council will be informed, and asked for further guidance on the U.S. final position prior to the formal negotiating meeting on September 8, 1987, and a ministerial endorsement meeting September 16-20, 1987.

DPC Guidance - General DPC guidance is sought on the following issues:

1. Chemical Coverage

-- The U.S. objective is to achieve the broadest coverage of major ozone depleters on a weighted basis, including fully halogenated CFCs and halons.

-- The European Community, Japan, and the USSR wanted only CFC 11 and 12 covered; but now may agree that CFC 113, 114, 115 and halons could be included if UNEP, in its June meeting, agrees that the Convention can include them.

-- Options include seeking differential coverage, i.e. reducing some and only freezing others. There is support

for freezing but not reducing halons, given its defense uses.

-- There is general interagency agreement on chemical coverage. The negotiating team will press for the broadest attainable coverage in the freeze, subject to DPC guidance.

2. Stringency and Timing of Controls; Relationship to Periodic Assessments

-- Key issues are:

o Stringency: Should there be an initial freeze and subsequent reductions? What should the reduction levels be, and in what timing and increments? What would be the probable effect on the ozone layer?

o Timing: There are environmental benefits for early action to reduce CFC's; further, it would encourage industry to develop CFC substitutes. Given that a required reduction is likely, there is a need to provide time for industrial product development adjustment. Some in industry prefer a definite decision and advance notice. This conflicts with those who prefer to delay positive action as long as possible.

o Relationship to periodic reassessments of scientific, technological, environmental and economic (STEE) factors scheduled in the protocol: Should we go for (1) planned reductions subject to reversal by vote of parties after reassessment, or (2) target levels to be implemented only by positive vote after reassessment, or (3) no targeted reductions?

-- The Chairman's text, released after the last negotiating session in April 1987, represents a possible emerging international consensus and is a convenient vehicle for review. It includes:

o Freeze at 1986 levels of production/consumption of CFC 11, 12, 113, [114, 115] within two years after entry into force (EIF) of the protocol. This could happen in 1988, but the most likely EIF date is 1990.

o An automatic 20% reduction 4 years after EIF. Likely date 1994.

o Additional 30% reduction, to be implemented after scheduled STEE reassessment, with two options:

(1) 6 years after EIF (likely date 1996), if positively confirmed by majority vote of parties, or

(2) 8 years after EIF (likely date 1998), unless reversed by two-thirds vote of parties.

o Additional steps down to possible eventual elimination of these chemicals for all but limited uses would be decided subsequently by parties based on periodic reassessments.

Questions for Decision: Should U.S. delegation seek agreement along lines of chairman's text, work for greater stringency/earlier impact, or propose some relaxation in terms?

(a) Freeze. Interagency accord, within 1-2 years of EIF. Some prefer an earlier freeze.

(b) 20% reduction. Some agencies feel implementation should require positive vote of parties following a STEE reassessment in 1990.

(c) Additional 30% reduction. There is interagency disagreement here on several elements.

-- Should a set level of reduction beyond the first 20% be scheduled; if so, at what level?

-- Should a second reduction be 6 years after EIF and be subject to a positive vote, or be 8 years after EIF and be subject to a reversal vote, or some other variant?

(d) Additional reduction steps. Should the delegation press for further reductions as contained in the Chairman's text and Circular 175? If so, at what levels and time frame? Should they require a positive vote or be implemented unless there is a vote for reversal? Alternatively, should the process for setting reductions and timing be specified? Anything beyond the Chairman's text may not be achievable.

3. Control Formula and Trade Provisions:

(A) Trade Among Parties.

Significant differences remain among governments over a formula for regulating controlled chemicals.

o Options include national ceilings on: (a) production; (b) production plus imports, combined or separately; (c) consumption; or, (d) production plus imports, less exports to parties, less amounts destroyed.

- o There is general interagency agreement favoring a ceiling on consumption, or "adjusted production," but compromise may be needed.

- o U.S. objectives include effective control of emissions with accountability, fewest restriction on the flow of trade and captial among parties, and most favorable formula for U.S. industry. Verification remains an issue.

- o Subject to DPC guidance, the delegation will pursue these objectives and seek DPC approval of specific recommendations at a later time.

(B) Trade With Non-Parties.

-- Key elements:

- o General international consensus on:

  -- Ban on imports of controlled chemicals in bulk from non-parties.

- o No international consensus on:

  -- Restrictions on exports of bulk chemicals.

  -- Restrictions on imports of products containing controlled chemicals.

  -- Consideration of restrictions on products made with controlled chemicals.

  -- Consideration of restrictions on export of technology and equipment.

-- U.S. objectives: to regulate trade in order to encourage adherence to protocol and avoid benefits to non-parties at expense of parties. Proposals consistent with GATT.

-- Interagency consensus in favor of strong trade article, including trade in bulk chemicals and products that could be uniformly enforced. Transfer of technology and equipment remains an issue.

-- Subject to DPC guidance, delegation will pursue these objectives and seek DPC approval of specific recommendations at a later time.

4. Participation.

-- U.S. objective: To encourage effective global control through widest possible participation by other countries.

-- **Problem:** The less developed countries (LDCs) need concessions for essential domestic uses to encourage adherence; but exemptions must remain limited to avoid undercutting global control levels. Concessions being considered in the Chairman's text could double global production ceiling if fully used within the period allowed.

-- One option entails exemption from controls for a limited period for LDCs followed by adherence to the protocol. Controls will be needed to restrict production in the LDCs by existing producers.

-- Related problem: Majority LDC membership could control protocol voting to U.S. disadvantage. Should U.S. press for weighted voting based on historic use and production levels? Should elements be put into the protocol?

-- This issue needs more work. Subject to DPC guidance, we will refine our objectives for subsequent negotiations and later seek DPC approval of specific recommendations.

CHAIRMAN'S TEXT

Distr.
RESTRICTED

UNEP/WG.172/CRP.8/Rev.1
30 April 1987

Original: ENGLISH

Ad Hoc Working Group of Legal and Technical
Experts for the Preparation of a
Protocol on Chlorofluorocarbons to
the Vienna Convention for the
Protection of the Ozone Layer (Vienna Group)

Third Session
Geneva, 27-30 April 1987

TEXT PREPARED BY A SMALL SUB-WORKING GROUP OF
HEAD OF DELEGATIONS

ARTICLE II: CONTROL MEASURES

1. Each party, under the jurisdiction of which CFC 11, CFC 12, CFC 113, (CFC 114, CFC 115) are produced shall ensure that within (2) years after the entry into force of this Protocol the (combined annual production and imports) (combined adjusted annual production) of these substances do not exceed their 1986 level.

2. Each party, under the jurisdiction of which substances referred to in paragraph 1 are not produced at the time of the entry into force of this Protocol, shall ensure that within (2) years from the entry into force of this Protocol (its combined annual production and imports) (its combined adjusted annual production) do not exceed the levels of imports in 1986.

3. Each party shall ensure, that within (4) years after the entry into force of this Protocol levels of substances referred to in paragraph 1 attained in accordance with paragraphs 1 and 2 will be reduced by 20 per cent.

4. Each party shall ensure that within (6) (a), (8) (b) years after the entry into force of this Protocol, the 1986 levels of substances referred to in paragraphs 1 and 2 will be further reduced (by 30 per cent), (a) (if the majority of the parties so decide, (b) (unless parties by a two-third majority otherwise decide), in the light of assessments referred to in Article III, such decision should be taken not later than (2) (4) years after entry into force.

5. Parties shall decide by (two-third majority) (a majority vote)
   - whether substances should be added to or removed from the reduction schedule
   - whether further reductions of 1986 levels should be undertaken (with the objective of eventual elimination of these substances).

These decisions shall be based on the assessments referred to in Article III.

Note: A second paragraph reading as follows has to be added to Article III. Beginning 1990, and every four years thereafter, the parties shall review the control measures provided for in Article II. At least one year before each of these reviews, the parties shall convene a panel of scientific experts, with composition and terms of reference determined by the parties, to review advances in scientific understanding of modification of the ozone layer, and the potential health, environmental and climatic effects of such modification.

BACKGROUND FACTS OZONE ISSUE

THE DEPLETION MECHANISM

Man-made chlorofluorocarbons (CFC's) and halons are compounds widely used in industrial economies. Their lifetimes in the atmosphere are expected to be 75 - 100 years. Eventually, they are transported into the stratosphere and broken apart, by ultraviolet light (UV), into oxides of chlorine and bromine. These act as catalysts, each molecule breaking apart thousands of ozone molecules. The reduction of ozone transmits more UV to the surface.

NUMERICAL PREDICTIONS OF DEPLETION

Chart 1 shows projected depletions for a range of CFC emissions.

Even when predicted changes in total ozone in the column are small and little change occurs in UV reaching the surface, major changes in the vertical distribution of the ozone are still predicted with a potential net warming effect on the climate.

HOW GOOD ARE THE NUMERICAL MODELS

The models are in some conflict with empirical measurements. Measured ozone abundances above 35 km. exceed modeled abundances by as much as 30-50 percent. There are also errors in predicted temperatures, in distributions of odd nitrogen species and other atmospheric chemicals and in model sensitivity to chlorine.

On the other hand, all of the models predicted, within acceptable limits, similar ozone depletions for given CFC scenarios.

ACTUAL TRENDS IN OZONE

Monitoring efforts to measure actual trends in global ozone have produced inconsistent and inconclusive results. Ground-based "Dobson" instruments, in use since 1960 at dozens of stations, show no trend in ozone abundance. A much smaller number of "Umkehr" stations, in use since 1970, and satellite data taken since 1978 show significant decreasing trends in the total ozone column, largely since 1981. Whether the apparent trends are due to satellite sensor-drift, the El Chichon eruption, the 1982 El Nino, changes in solar radiation, or manmade CFC's is not certain. A detailed re-evaluation of these sources of data will be available in late fall, 1987.

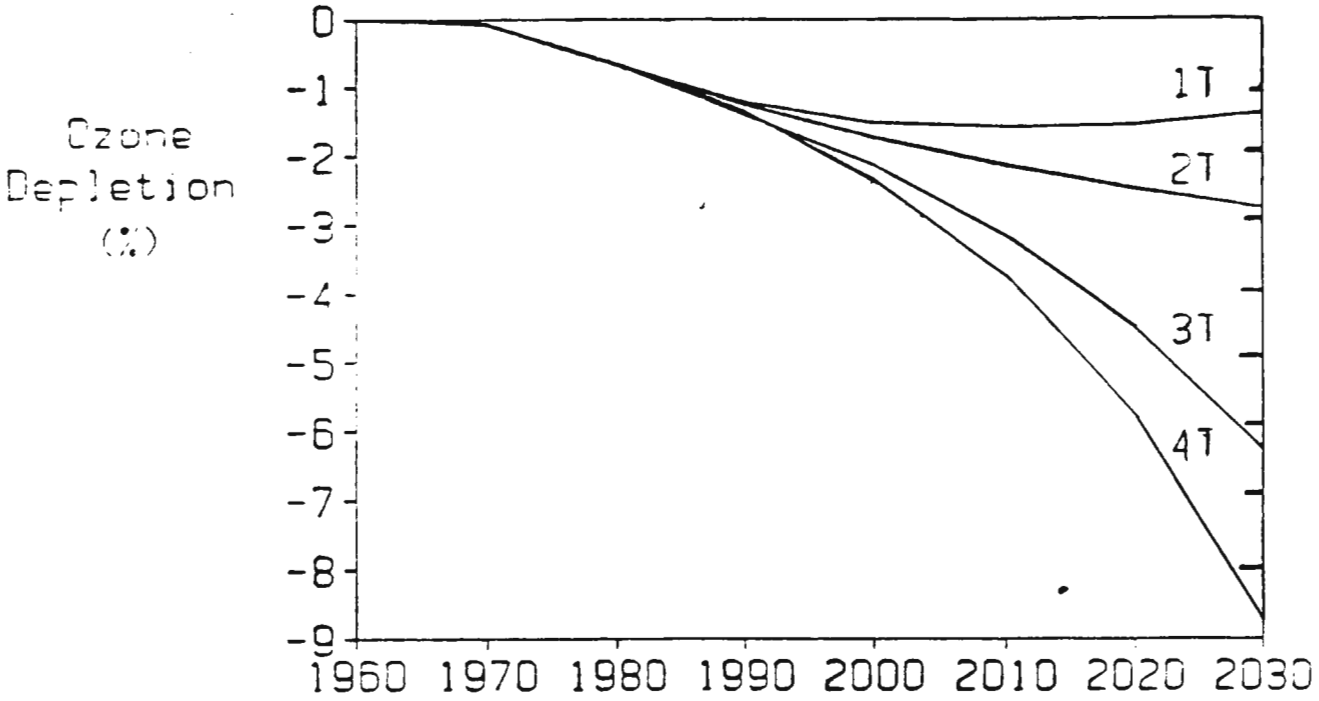
In short, interpretations of the existing satellite and ground-based data on ozone trends range from:

-- No obvious human-caused trends, to

-- Marked downward trends, 2-3X larger than predicted by theory.

Chart 1

Time Dependent Globablly and Seasonally Averaged Changes in Ozone for Coupled Perturbations (IS 2-D Model)



Results show for four scenarios of trace gas growth:

Scenario	CFC-11 and CFC-12
1T	1980 levels
2T	1.2% growth
3T	3.0% growth
4T	3.8% growth

Assumptions for other trace gases are the same in each scenario: constant emissions of CFC-113, CCl4, and CH3CCl3, zero emissions of halons, one percent growth per year in CH4, and 0.25 percent growth per year in N2O. CO2 concentrations grow at 0.5 percent.

Source: Stordel and Isaksen, (1986).

THE ANTARCTIC OZONE "HOLE"

It was discovered in 1985 that, since about 1965, in the Antarctic spring, and only in the spring, overhead ozone has increased in a ring around, and decreased directly above Antarctica. This seasonally temporary depletion has been more and more each year and now amounts to 40-50 percent of the ozone, approximately offset by the build-up in the ring. It was totally unanticipated by the existing science and models.

The global implications, if any, of the "hole" are currently unknown since the cause is not established. The existing observations could be consistent with but are not proof of the man-made chlorine hypothesis.

EFFECTS OF OZONE DEPLETION

Ozone depletion has a number of potential adverse impacts as follows. Except possibly for skin cancer, the level of depletion needed to cause significant adverse effects is unknown.

Skin Cancer Effects. Prolonged sun exposure is considered to be the dominant risk factor for non-melanoma skin tumors. However, uncertainty exists in the actual doses received by populations and in the changes in response which would result from changes in dose. Changes in behavior have tended to increase skin cancer incidence and mortality, which, therefore, could be reduced by changes in behavior.

In the U.S. there are more than 400,000 non-melanoma skin cancer cases each year with about 4000 deaths. Table 1 shows the range of estimates of increase from a 2 percent depletion for San Francisco. Worldwide growth of CFC emission of 1 percent annually is estimated to cause a 2 percent depletion by about the year 2010.

Table 1.

Type	Current Cases, %	Current Deaths, %	Increase in Incidence, % Male	Female
Basal Cell	71	20-25	2.1 - 7.2	0.7 - 5.0
Squamous Cell	29	75-80	3.2 - 11.7	3.1 - 13.3

The non-melanoma skin cancer effects of ozone depletion are not likely to be given great weight in developing countries wishing to use CFC's -- skin pigmentation is a protective barrier that reduces the incidence of such tumors.

Much circumstantial evidence implicates solar radiation as one of the causes of cutaneous malignant melanoma (CMM), with 25,000 cases and 5,000 deaths in the U. S. in 1985. On the other hand, some studies find no correlation between incidence and latitude, and outdoor workers have lower CMM rates than indoor workers.

EPA's estimate is that each 1 percent ozone depletion would increase incidence by 1-2 percent and deaths by 0.8-1.5 percent.

Immune System Effects. Solar radiation has been found to have a detrimental effect on the immune system of both humans and animals. Although the mechanisms are not fully understood, it is clear that the UV part of the spectrum, which is screened out by ozone, is responsible.

Plant Life Effects. Existing knowledge of the risks to crops and terrestrial ecosystems from ozone depletion is extremely limited.

Data for crop species, although incomplete and often not from field studies, suggest that large variations exist within species for response to UV. For example, in 3/4 of soybean cultivars tested, levels of UV simulating 16-25 percent ozone depletion reduced yields by up to 25 percent with quality reductions.

Little or no data exists for trees, woody shrubs, vines, or lower vascular plants. Increased UV could alter competition in natural ecosystems unpredictably.

Aquatic Life Effects. Experiments show that UV causes damage to fish larvae and juveniles, shrimp and crab larvae, and to plants essential to the aquatic food web. Enhanced UV would probably change the composition of marine plant communities and could cause unpredictable changes to aquatic ecosystems.

Current data is very incomplete and limited. Understanding of aquatic organism lifecycles and of aquatic ecosystems is very limited. Great uncertainty exists about effects because UV attenuation in the water column is variable and organism behavior can affect dosage.

Climate Changing Effects. CFC's, like CO2, are greenhouse gases, but more powerful by a factor of 10,000. Increasing concentrations contribute to global warming.

CFC's IN U. S. INDUSTRY

Use of CFC's in the U. S. is spread among seven use categories and a large number of applications.

Table 2

Use Category	1985 Use (Metric Tons)	Percentage of Ozone Depleting Potential
Solvents	41,369	14
Refrigeration	78,987	28
Foam Blowing	70,430	28
Fire Extinguishing	6,250	20
Sterilization	12,133	4
Aerosol Propellants	8,000	3
Other Miscellaneous	7,083	3

COSTS OF EMISSION REDUCTION

EPA has done a preliminary analysis of possible actions to reduce CFC compound use in the short (shown below), medium, and long term:

Table 3

Cost/Kilogram Reduced	Percent Reduction in Use (Weighted by Ozone Depleting Potential)
Short-term:	
<$0.15	30
$0.15 to <$2.30	5
$2.30 and more	16
Short-term total	61

CHEMICAL SUBSTITUTES FOR CURRENTLY USED CFC's

The industry is looking at several possible compounds which could be sustituted for current CFC's. The minimum time frame to introduce such susbstitute products into commercial use would be 5-10 years. For the following reasons, it is likely to be closer to 10:

- -- Publicly known production processes are low in yield with large waste streams that are partly toxic and partly recyclable. Long-term (3-4 years) toxicology tests will probably not be done until the process that will be used is defined and optimized.
- -- Potential producers may not commit to a process until they are reasonably sure that better ones don't exist.
- -- Commercial users may insist upon completion of toxicology testing before adopting new compounds.
- -- Users would also need a period for product compatibility/performance testing and for any product and process redesign.
- -- Producers would need time to design and build full scale plants.

Dupont has published estimates that substitutes are likely to have a cost that is 2-5 times that of current CFC's. However, for most uses, the cost of CFC's is a very small part of the total cost of the final product. Dupont estimates that 5-6 years would be needed to bring substitute compounds to the commercial market place, not including time for customers to shift to the new products.

One industry estimate of future U. S. CFC consumption estimates that a freeze would cause a real price increase of 2-3 times within the first 3 years and 4 times beyond 7 years. EPA and others argue that a freeze would not bring in substitute compounds in the short-term, because alternatives would prevent a sufficient price increase unless a 50 percent or greater reduction in use were imposed.

CFR CONTROL MUST BE GLOBAL

U. S. use of CFC's is 27 percent or world use and is not large enough that U. S. action alone can significantly affect long term emissions. Under the Clean Air Act, EPA must consider unilateral action even though it would not be as effective as global action.

CONTROL IN U.S. IS MORE DIFFICULT - AEROSOLS ALREADY BANNED

Patterns of use in the U.S. and in other non-communist reporting countries are significantly different. Other country use is 2 times U.S., Canada, and Sweden banned non-essential aerosol use in 1975, using available substitutes.

Some observers have argued that the U. S. position should be for equal percentage reductions in use after the elimination of non-essential aerosol use. Others argue that approach is very unlikely to be acceptable to countries with unrestricted aerosol use.

COSTS AND BENEFITS

CEA believes that given the projections of ozone depletion and estimates of the health consequences assuming no behavorial changes, it is possible to asess the economic benefits of the CFC control protocol presently under discussion. EPA's risk assessment indicates that the freeze + 20 percent cutback will avoid approximately 992,900 deaths in the U.S. from skin cancer among people alive today and those born through 2075. An additional 30 percent cutback will save an additional 78,700 lives. The economic benefit of saving these lives, under standard assumptions for valuation of statistical lives saved and discounting of future values, is very large, on the order of hundreds of billions.

These benefits, which do not include non-health benefits or benefits from avoidance of non-fatal skin cancers and cataracts, are much larger than the costs of control estimated by industry or EPA. Industry has estimated that the cost of a freeze to the U.S. would be about $1 billion cumulatively between now and the year 2000. EPA has estimated that the cost of a 30 percent reduction in the controlled substances would be about $3-$4 billion cumulatively between now and the year 2000.