CEA Suggestions

# DRAFT

THE WHITE HOUSE

WASHINGTON

June 11, 1987

Close Hold

MEMORANDUM FOR THE PRESIDENT

FROM: THE DOMESTIC POLICY COUNCIL

SUBJECT: Stratospheric Ozone

Issue: What guidance should the U.S. delegation follow during the next stages of international negotiation of a stratospheric ozone protocol?

Background

During the 1970's, concerns were expressed by the science community about potentially harmful effects of depletion of the stratospheric ozone layer. It was felt that emissions of certain chemicals were causing this depletion. This led to a 1978 unilateral ban on aerosols in the United States.

Concern for protection of the ozone layer increased after discovery of the Antarctic "hole" in 1985. ~~Some~~ Nearly all scientists predict that significant ozone depletion will occur unless international action is taken to control the relevant chemicals. They say that depletion of the ozone layer is likely to cause adverse health and environmental effects including increased skin cancer deaths, cataracts, crop damage and aquatic impacts.

insert on benefits and costs (attachment)

In 1985, the United Nations Environment Program sponsored the Vienna Convention for the Protection of the Ozone Layer. The U.S. has been a leader at the three international meetings held over the past seven months to develop a global agreement on the control of the chemicals thought to cause ozone depletion. The next international meeting is scheduled for June 29, 1987.

There is strong domestic pressure for action to protect the ozone layer. Any such action should be on an international level to best prevent ozone depletion and to prevent disadvantaging American industry in world markets. Yet if an international agreement is not reached, both Congress and the courts are likely to impose unilateral domestic requirements which would fail to protect the ozone layer and would disadvantage U.S. industry.

U.S. industry uses the chemicals thought to deplete the ozone layer in the production of refrigerators, air-conditioners, foam-insulation and electronic products. Industrial groups have publicly recognized the need to control these chemicals through an international agreement.

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Discussion

The Domestic Policy Council is recommending that you provide guidance to the U.S. delegation as they enter the final stages of negotiating a protocol. The delegation will meet with the Chairman and a small group in Brussels in late June and early July to discuss country views on the attached Chairman's text. The diplomatic meetings at which the final protocol will be discussed and signed will be in early September, 1987, in Montreal. The protocol must then be ratified by each country. Thus, there will be opportunities for further Administration review.

ISSUE I. GENERAL U.S. POSITION ON INTERNATIONAL PROTOCOL

Ideally, the United States should seek a protocol agreed to by all nations which provides for a true global freeze on covered chemicals. Such an international agreement is not obtainable at this time.

Your decision on the following options will guide the U.S. delegation.

Option 1: Continue negotiations pursuant to State Department Circular 175, with U.S. delegation authorized to use its discretion on all issues, including: chemical coverage; acceptable level of country participation; when and to what extent freeze and further reductions up to 95% should occur; whether reductions should be automatic (subject to reversal by 2/3 vote) or require affirmative vote of majority; whether voting system should give weight to major producing and consuming nations; whether to seek, in addition to freeze, a ban by other nations of non-essential aerosols as the U.S. did in 1978; and whether to seek verification provisions.

Pro:

- The U.S. position, as reflected in the 175 has been presented in formal negotiating sessions, congressional testimony and public position papers. Thus, diplomatic considerations favor continuing with the existing Circular 175.

- The Circular 175 provides a general framework, and allows for the delegation to propose flexible, alternative approaches to the specific provisions of a control protocol.

Con:

- As the negotiations move toward a very important U.S. commitment, the essential elements of a potential protocol from the U.S. perspective should be made more specific.

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

Those in favor of this option include the Department of State, Environmental Protection Agency, _____ and _____.

> Insert Option 2: (See attachment)

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Option 3: Continue negotiations, but with the U.S. delegation instructed to make every effort to achieve a protocol containing the following provisions:

(a) Freeze the most ozone-depleting chemicals (CFCs 11, 12, 113, 114 and 115 and Halons 1201 and 1311) at 1986 production level within two years after entry into force.

(b) Twenty percent reduction by participants following a major international scientific, technological, health and economic review which takes into account the effects of the freeze; and when approved by a majority vote of participants not in material breach of freeze.

(c) Further reductions more or less than a cumulative 50%, also following a major scientific, technological, health and economic review which takes into account the effects of the freeze and previous reductions; and when approved by a majority vote of participants not in material breach of the protocol.

~~(d) Entry into force when sufficient number of countries, determined by formula, sign and ratify.~~

~~(e) To encourage participation by current non-producers (such as developing nations), permit a grace period up to the year 2000.~~

There is no significant interagency disagreement here.

(f) Seek other participants' agreement that, in addition to freeze, they will ban use of non-essential aerosols, as United States did in 1978.

Pro:

- These conditions will help ensure that the U.S. actions are matched by other countries.
- These conditions have been studied and found to be generally acceptable to the U.S. economic and political communities. ? Disagree

Con:

- These could be seen as changes in the U.S. position, thus stimulating major new conditions by other countries.
- Introduction of these could be seen by environmental groups as an attempt to stall the negotiations.

Interior, CEQ and _____ support this option.

Reopening the ~~aerosol~~ "non-essential aerosol" and "autonic 20%" issues ~~could~~ would weaken U.S. credibility and threaten the continuation of serious negotiations.

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Option 4: Advise the Convention that beyond a freeze the negotiations should be delayed, pending a major study of scientific, technological, economic, health an environmental factors related to depletion of the stratospheric ozone layer.

Pro:

- This will provide more certainty to the subsequent protocol agreements.
- This might benefit some industries in that they could continue production of items that would otherwise be banned.

Con:

- Congress and environmental groups will severely criticize this move, and Congress will likely ~~legislate~~ or the Courts implement their own "protocol."
- We could lose vital credibility with other countries.

The Office of Science and Technology Policy, Department of Commerce and _____ support this option.

ISSUE II. PROTOCOL TRADE SANCTIONS

Option 1: Generally instruct the delegation to negotiate a trade provision which will protect U.S. industry in world markets.

Pro:

- Gives delegation flexibility to negotiate a trade article.
- Does not risk committing the Administration publicly to trade sanctions in advance of a negotiated agreement.

Con:

- Does not provide specific direction to delegation on desirable aspects of a trade article.
- Does not send strong signal to other countries about the economic value of participating in the negotiations and of complying with a future protocol.

Option 2: Specifically instruct the delegation to attempt to negotiate a protocol which includes a trade provision containing:

(a) Sanctions against non-parties and parties in material breach of protocol requirements;

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(b) Such sanctions should include banning or limiting imports by parties of:

(1) controlled chemicals in bulk;

(2) products containing controlled chemicals;

~~(3) products manufactured by using controlled chemicals.~~

Pro:

- o Encourages participation and compliance in the protocol.
- o Prevents the transfer of commercial benefits from parties to non-parties.

Con:

- o Establishes precedent for use of trade sanctions to enforce environmental regulations.
- o General disfavor of restraints of trade.

Edwin Meese III
Chairman Pro Tempore

Attachment

DECISION:

ISSUE I. GENERAL U.S. POSITION ON INTERNATIONAL PROTOCOL

_____ Option 1. Continue negotiations pursuant to State Department Circular 175.

_____ Option 3. Continue negotiation, with U.S. delegation instructed to achieve protocol under terms described above.

_____ Option 4. Advise Convention that beyond a freeze, further reductions should be delayed.

ISSUE II. PROTOCOL TRADE SANCTIONS

_____ Option 1. U.S. delegation has flexibility to negotiate best possible agreement.

_____ Option 2. Instruct delegation to ensure that the protocol contains specific trade provisions consistent with terms cited above.

Option 2: Continue negotiations pursuant to Circular 175 subject to more detailed instructions in specific areas.

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Concern for protection of the ozone layer increased after discovery of the Antarctic "hole" in 1985. Some scientists predict that significant ozone depletion will occur unless international action is taken to control the relevant chemicals. They say that depletion of the ozone layer is likely to cause adverse health and environmental effects including increased skin cancer deaths, cataracts, crop damage and aquatic impacts.

In 1985, the United Nations Environment Program sponsored the Vienna Convention for the Protection of the Ozone Layer. The U.S. has been a leader at the three international meetings held over the past seven months to develop a global agreement on the control of the chemicals thought to cause ozone depletion. The next international meeting is scheduled for June 29, 1987.

There is strong domestic pressure for action to protect the ozone layer. Any such action should be on an international level to best prevent ozone depletion and to prevent disadvantaging American industry in world markets. Yet if an international agreement is not reached, both Congress and the courts are likely to impose unilateral domestic requirements which would fail to protect the ozone layer and would disadvantage U.S. industry.

U.S. industry uses the chemicals thought to deplete the ozone layer in the production of refrigerators, air-conditioners, foam-insulation and electronic products. Industrial groups have publicly recognized the need to control these chemicals through an international agreement.

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CEA INSERTS - STRATOSPHERIC OZONE

Insert the following paragraph on benefits and costs after second paragraph in "Background":

Because of the large number of skin cancer deaths that could be caused by stratospheric ozone depletion (as many as 2,000,000 in the U.S. alone among people born before 2075), the potential health and economic benefits of protecting the ozone layer are very large. At the same time, the costs of controlling the harmful chemicals are relatively low. Cost/benefit analysis suggests that both a freeze and a further 20% reduction of the ozone-depleting chemicals are economically justified. Further reductions may also be indicated, depending on information that will be acquired prior to taking such steps.

Insert the following after Option 1:

Option 2:

Continue negotiations pursuant to Circular 175, but with the U.S. delegation instructed to make every effort to achieve a protocol containing the following provisions:

(a) Freeze the most ozone-depleting chemicals (CFCs 11, 12 113, 114 and 115 and Halons 1201 and 1311) at 1986 emissions levels within two years after entry into force.

(b) A further 20% reduction of these chemicals (excluding the Halons and possibly 113) to take effect 4 years after entry into force, unless overturned by a 2/3 vote of the parties to the protocol.

(c) A further 30% reduction of the same chemicals, to take place either 6 or 8 years after entry into force of the protocol, subject to (i) a major scientific, technological, health, and economic review which takes into account the effects of the freeze and previous reduction, and (ii) either a positive majority vote of the parties or blockage by a negative majority vote of the parties.

(d) It is assumed that the negotiators will continue to work to achieve an outcome as favorable as possible to the United States in those areas on which there is basic interagency agreement: country participation, voting rules, verification and monitoring, control formula, coordination between scientific reviews and protocol implementation, etc.

Pro:

- Provides both for effective protection of the ozone layer and for continuity and consistency of U.S. international negotiating position.

- Avoids risk of unfavorable unilateral controls imposed by Congress or the courts.

Con:

- Might be viewed by some environmentalists as a retreat from earlier U.S. position.

- Would not have as much support from industry as a freeze alone.

The international negotiations have focused on a trade provision to insure that countries are not able to profit from not participating in the international agreement, and to insure that U.S. industry is not disadvantaged in any way through participation. The trade issues involve imports of the controlled chemicals, of products containing the controlled chemicals, and of products manufactured with the controlled chemicals.

TABLE 1: COMPARISON OF BENEFITS AND COSTS OF CFC CONTROL STEPS

| Step | BENEFITS* (billions of dollars) Discount Rate 4% | 6% | COSTS** (billions of dollars) Discount Rate 4% | 6% |
|---|---|---|---|---|
| (No action) to (Freeze) | $739 | $131 | $1.6 - $3.3 | $1.0 - $1.4 |
| (Freeze) to (Freeze + 20%) | 34 | 6.4 | 3.5 - 7.0 | 2.2 - 3.0 |
| (Freeze + 20%) to (Freeze + 50%) | 58 | 11 | 9.2 - 18.7 | 5.8 - 8.0 |

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*Assumptions for Benefits Calculations:

(1) Deaths averted and scenarios for "Freeze" and cuts corresond to deaths averted and scenarios for health effects estimates. E.g., "Freeze" is a "Protocol Freeze," not a true global freeze, etc.

(2) Benefits and costs as shown in Table are incremental benefits and costs of indicated steps. Present values of marginal benefits are averaged over ranges of parameters reported by Working Group Subcommittee on Benefits and Costs:
- Value of life initially: $2,000,000; $4,000,000
- Increase in value of life over time: growth at 2% per year; value of life constant.
- Four different time profiles for deaths averted

(3) Benefits calculated for premature skin cancer deaths averted only. Benefits for preventing non-fatal skin cancers, cataracts, and other economic damages would be additive.

**Assumptions for Cost Calculations:

(1) Low ends of ranges: marginal costs grow at .625% per year forever.

(2) High ends of ranges: marginal costs grow at 2.5% per year forever.

TABLE 2: SENSITIVITY ANALYSIS--COMPARISON OF BENEFITS AND COSTS UNDER DIFFERENT ASSUMPTIONS

| Step | Percent of cases in which benefits exceed costs | Percent of cases in which benefits approximately equal costs | Percent of cases in which benefits are less than costs |
|---|---|---|---|
| (No Action) to (Freeze) | 100% | 0% | 0% |
| (Freeze) to (Freeze 20%) | 78% | 3% | 19% |
| (Freeze + 20%) to (Freeze + 50%) | 56% | 19% | 25% |

Assumptions: Same as Table 1.

# PRESENTATION TO DOMESTIC POLICY COUNCIL WORKING GROUP

Prepared by

COUNCIL OF ECONOMIC ADVISERS

and

DPC WORKING GROUP SUBCOMMITTEE ON BENEFITS AND COSTS

Friday, June 5, 1987

## ADVERSE EFFECTS OF STRATOSPHERIC OZONE DEPLETION EXAMINED (U.S. ONLY)

- Fatal skin cancers
- Non-fatal skin cancers
- Cataracts
- Crops, fish, and shellfish
- Ground level ozone
- Sea level rise

## EFFECTS NOT EXAMINED

- Human immune system
- Climate change

## SOURCES OF ECONOMIC UNCERTAINTY

- Valuation of life and health effects
- Discount rate issues
- Time profiles of effects
- Cost estimates
- Uncertainties in non-health economic benefit estimates

## VALUATION OF LIFE AND HEALTH EFFECTS

- "Value of life" is shorthand for people's willingness to pay (WTP) to avoid risks.
- Estimates are based on:
  - Wage premiums for risky jobs.
  - Direct payments to avoid risks.
  - Variations in property values.
- Estimates are <u>not</u> based on:
  - Court awards in wrongful death cases.
  - Present values of lifetime earnings.
- "Willingness to pay" to avoid risks increases with wealth and income. But:
  - Should "value of life" of future generations be increased to reflect economic growth? If so, at what rate?
- No adjustment made for possible different WTP for people of different ages.
  - Older people have fewer years to live -- lower WTP.
  - Older people are wealthier -- higher WTP.
  - No empirical evidence that older people are more willing to bear risks than younger people.
- WTP estimates in the literature vary; Subcommittee recommendation: Report $2,000,000 and $4,000,000.

SUMMARY OF MARKET STUDIES OF RISK TRADEOFFS

| Investigator | Sample | Implicit Value of Life (millions of 1982 dollars) |
|---|---|---|
| Blomquist (1979) | Seatbelt usage, panel study of income dynamics, 1972 | $.56 |
| Brown (1980) | National longitudinal survey, 1967-1973 | $1-$1.5 |
| Leigh (forthcoming) | Panel study of income dynamics, 1974 | $3.8-$8.9 |
| | Quality of employment survey, 1977 | $4.8-$8.4 |
| Olson (1981) | Current population survey, 1973 | $7.4 |
| Portney (1981) | Air pollution and property values | $.593-$.890 |
| Smith (1985) | Current population survey, 1967 | $7.5 |
| | Current population survey, 1973 | $3.3 |
| Thaler & Rosen (1976) | Survey of economic opportunity | $.500 |
| Viscusi (1979) | Survey of working conditions, 1970-1 | $2.9-$3.9 |
| Viscusi (1981) | Panel study of income dynamics, 1976 | $7-$11 |

Source: W. Kip Viscusi, "The Valuation of Risks to Life and Health: Guidelines for Policy Analysis," in J.D. Bentkover et al (eds.), Benefits Assessment: The State of the Art, D. Reidal Publishing Company, 1986, pg. 201

## DISCOUNT RATE ISSUES

- Costs and benefits should be discounted by real rate of interest.
  - Rate of return on all assets (including housing), pre-tax.
  - Rate at which present consumption can be transformed into future consumption.
  - Rate which future generations would use in making investment decisions if they could.
  - No strong consensus on what the economy-wide real rate of return is.
  - Subcommittee recommendation: Report 4% and 6%.
- What type of investment is a CFC control policy?
  - Some assets earn a higher rate of return than the economy-wide average; some a lower.
  - People will accept lower rate of return on an insurance policy against a very bad outcome: life insurance, strategic petroleum reserve.
  - Scientific uncertainties suggest no action on CFCs may have severe adverse consequences.
- Should a discount rate <u>higher</u> or <u>lower</u> than the real rate of interest be used?
  - Present generation may value future generations more or less than itself.
  - This is an ethical question, not an economic one.

# IMPLICATIONS OF USING A DISCOUNT RATE HIGHER THAN THE REAL RATE OF INTEREST

EXAMPLE:

Real interest rate = 5%

Discount rate = 10%

Compensate for normal per capita income growth so that $1.82 of real income to the next generation yields the same utility as $1.00 for the present generation.

30 years between generations.

RELATIVE WEIGHTS ASSIGNED TO WELFARE

Current generation: 1

Next generation: .41

Second generation: .17

EPA ESTIMATES OF
SHORT-TERM COSTS OF CFC CONTROLS

| Case | Undiscounted Cumulative Costs 1990-2000 (billions) |
|---|---|
| Protocol Freeze | $0.623 |
| Freeze + 20% cut | $1.95 |
| Freeze + 50% cut | $5.50 |

## TOTAL COSTS OF CFC CONTROLS TO THE ECONOMY

2 Cases:

- Marginal costs grow at .625% per year forever.
- Marginal costs grow at 2.5% per year forever.

Total Discounted Present Value of Marginal Costs (billions of dollars)

| Step | Discount Rate 4% | 6% |
|---|---|---|
| (No action) to (Freeze) | $1.6 - $3.3 | $1.0 - $1.4 |
| (Freeze) to (Freeze + 20%) | $3.5 - $7.0 | $2.2 - $3.0 |
| (Freeze + 20%) to (Freeze + 50%) | $9.2 - $18.7 | $5.8 - $8.0 |
| (No action) to (Freeze + 20%) | $5.1 - $10.3 | $3.2 - $4.4 |

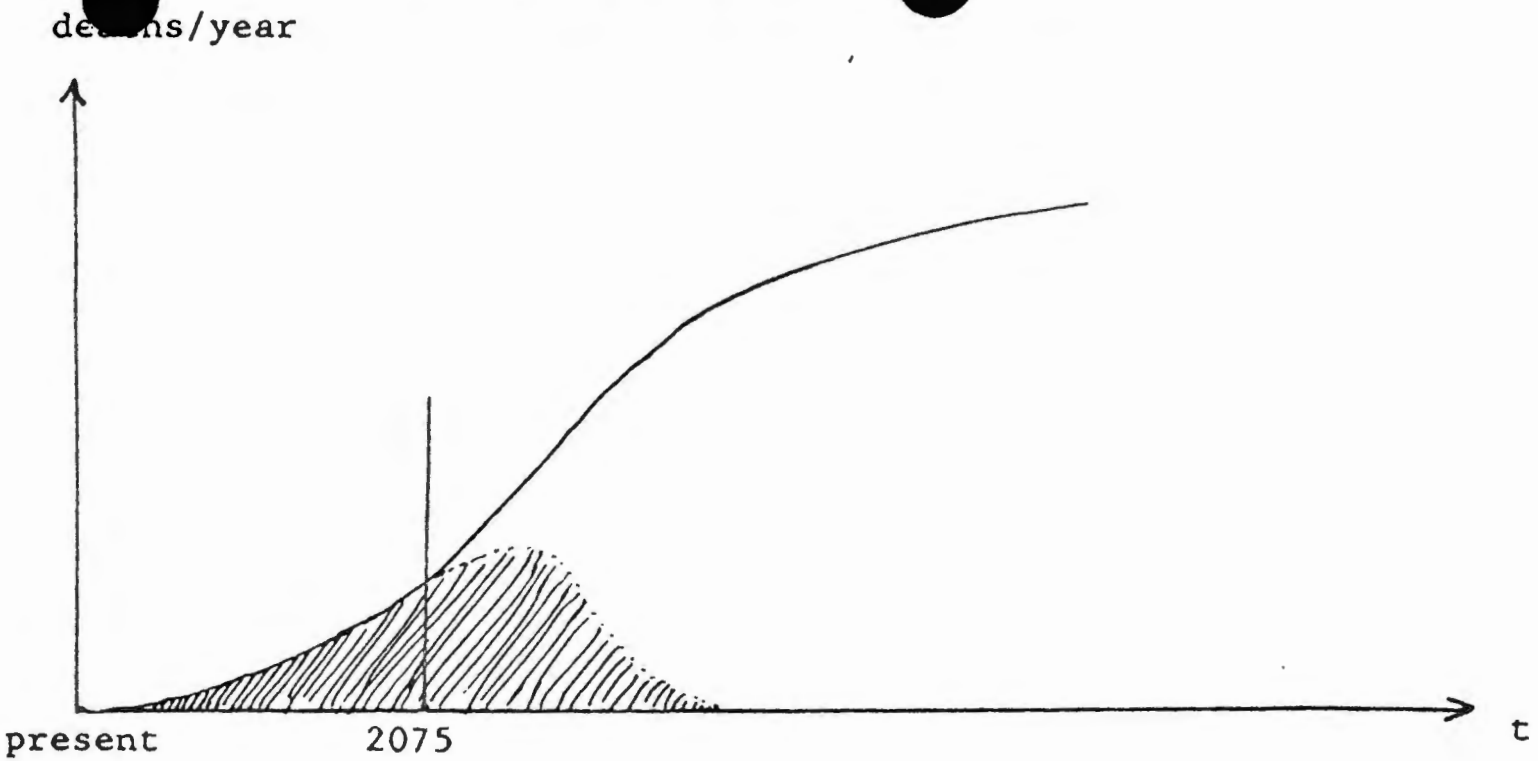
BENEFITS FROM AVERTING SKIN CANCER DEATHS,
COHORTS BORN BEFORE 2075

| Action | Deaths Averted |
|---|---|
| Protocol Freeze | 947,000 |
| Freeze + 20% cut | 993,000 |
| Freeze + 50% cut | 1,072,000 |

| Step | Marginal Deaths Averted |
|---|---|
| (No Action) to (Protocol Freeze) | 947,000 |
| (Freeze) to (Freeze + 20% cut) | 46,000 |
| (Freeze + 20% cut) to (Freeze + 50% cut) | 79,000 |

- Protocol Freeze not a true global freeze; standard scenario assumptions for freeze and cuts.
- EPA central case estimates of deaths averted.

## TIME PROFILE OF DEATHS AVERTED




- Shaded area = deaths averted in cohorts born before 2075.
- Death rate continues to rise after 2075 because the stratosphere is not in equilibrium by 2075 and ozone depletion is continuing.
- Total area under curve equals total deaths averted by control action.
- Exact size, shape, and location of curve is not known.
- Sensitivity analysis attempts to show limits of that uncertainty.

EXAMPLE 1

Assumptions:

- Value of statistical life = $2,000,000.
- Value of life grows over time at historical rate of per capita GNP growth, 2% per year.
- Average of 4 time profiles, with "standard errors" (in parentheses) calculated to give an indication of time profile uncertainty.

MARGINAL BENEFITS (billions of dollars)

| Step | Discount Rate 4% | 6% |
|---|---|---|
| (No Action) to (Freeze) | $ 482 (± 161) | 86 (± 46) |
| (Freeze) to (Freeze + 20%) | 22 (± 4.0) | 4.3 (± 2.2) |
| (Freeze + 20%) to (Freeze + 50%) | 38 (± 7.8) | 7.1 (± 3.6) |
| (No Action) to (Freeze + 20%) | $ 504 (± 164) | 90 (± 49) |

EXAMPLE 2

ASSUMPTIONS:

- Value of statistical life = $2,000,000.
- Value of life constant over time.
- Average of 4 time profiles (standard errors in parentheses).

MARGINAL BENEFITS (billions of dollars)

| Step | Discount Rate 4% | | 6% | |
|---|---|---|---|---|
| (No Action) to (Freeze) | $ 94 | (± 50) | 22 | (± 19) |
| (Freeze) to (Freeze + 20%) | 4.6 | (± 2.2) | 1.2 | (± .9) |
| (Freeze to 20%) to (Freeze + 50%) | 7.6 | (± 3.7) | 2.0 | (± 1.6) |
| (No Action) to (Freeze +20%) | $ 99 | (± 52) | 23 | (± 20) |

EXAMPLE 3

Assumptions:

- Value of statistical life = $4,000,000.
- Value of life grows over time at historical rate of per capita GNP growth, 2% per year.
- Average of 4 time profiles, standard errors in parentheses

MARGINAL BENEFITS (billions of dollars)

| Step | Discount Rate 4% | | 6% | |
|---|---|---|---|---|
| (No Action) to (Freeze) | $964 | (± 322) | 172 | (± 92) |
| (Freeze) to (Freeze + 20%) | 44 | (± 8.0) | 8.6 | (± 4.4) |
| (Freeze + 20%) to (Freeze + 50%) | 76 | (± 16) | 14 | (± 7.2) |
| (No Action) to (Freeze + 20%) | $1008 | (± 328) | 180 | (± 98) |

# NON-FATAL SKIN CANCERS

Information Required:

- Numbers and time profiles, non-melanomas and melanomas
- Distribution of seriousness
  - Non-melanomas
  - Melanoma
- Valuation of non-fatal cases

Illustrative Example:

| Non-melanomas | | | Melanomas | |
|---|---|---|---|---|
| Type | % | Value | Type | Value |
| Very Serious | 10% | $60,000 | Non-fatal | $60,000 |
| Serious | 15% | 5,000 | | |
| Not so serious | 25% | 1,000 | | |
| Least serious | 50% | 100 | | |

- Total benefits in this example are on the order of 13% of benefits from averting deaths.

CATARACTS

Information Required:

- Numbers and time profiles
- Valuation
  - Medical expenses
  - Pain and suffering
  - Restricted activities

Illustrative Example:

- With value of cataract case at $16,000, cataract benefits are at least an order of magnitude less than the benefits from skin cancer deaths averted.

## CROPS, FISH, SHELLFISH

- Effects are difficult to quantify because:
  - Effects on yields of full range of crops not known.
  - Relative growth of these components of GNP not known.
  - Price effects not known.
- For the U.S., effects are probably small relative to health effects.

## GROUND-LEVEL OZONE

- Effects include health and crop impacts.
- Preliminary work in progress suggests these effects are small relative to UVB-related health impacts.

## SEA LEVEL RISE

- EPA quantification includes only cities, not entire shoreline.
- Marginal impacts of CFC controls on projected sea level rise are small relative to potential global warming effects.