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unclas

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PAGES 6

IMMEDIATE

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DTG 113157

PRIORITY

ADMIN FAX # 93

RELEASER _____

ROUTINE

FROM/LOCATION

1. KoHce

TO/LOCATION/TIME OF RECEIPT

1. Jerry Leach / 348 Nsc

2. _____

3. _____

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5. _____

TOC 8 113182 MAY 88

6. _____

7. _____

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1. _____

2. _____

SITUATION ROOM
88 MAY 11 9:33
WHITE HOUSE

SPECIAL INSTRUCTIONS/REMARKS:

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CLASSIFICATION



US ENVIRONMENTAL PROTECTION AGENCY
TELECOMMUNICATIONS CENTER
WASHINGTON, DC 20460

FACSIMILE REQUEST AND COVER SHEET

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TO **JERRY LEACH ROOM 348**

OFFICE/PHONE **DEOB - NSC**

REGION/LAB **Tel # 395-5650 fax # 395-5221**

FROM **JAMISON KOENIG**

PHONE **382-4894**

MAIL CODE **A106**

OFFICE **EPA/DIA**

DATE **5/10**

NUMBER OF PAGES TO INCLUDE THIS COVER SHEET **6**

Please number all pages

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1 of 6

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 10 1988

OFFICE OF
INTERNATIONAL ACTIVITIES

MEMORANDUM

TO: State/OES:BNitze
DOC:JRSpradley
OMB:DGibbons
OPD:JMares
NCPO:AHecht
DOE:EWilliams
EPA/OPPE:LFisher
EPA/OAR:DClay
OSTP:JDorrigan
DOI:IGoklany
NSC:JLeach
NASA:BWatson

FROM: *Sheldon Meyers*
Sheldon Meyers
Acting Associate Administrator

SUBJECT: Draft Response to March 31 Letter from 42 Senators
on Global Climate Change

Attached for your review is a final draft response to the March 31 letter from 42 Senators on global climate change. Please provide your comments to Jamie Koehler (382-4894) of my staff by 4 pm on Wednesday, May 11. Thank you for your prompt attention.

Attachment

cc: Craig DeRemer

20x6

DRAFT
5/10/88

Honorable John F. Kerry
United States Senate
Washington, DC 20510

Dear Senator Kerry:

Thank you for your March 31, 1988 letter to President Reagan, co-signed by forty-one of your colleagues, regarding international initiatives on global climate change. Despite considerable uncertainty regarding the extent of man's influence on the global atmosphere, the possibility of global climate change warrants high-level attention in the international arena. Accordingly, the United States is engaged in a wide range of cooperative research activities -- both bilateral and multilateral -- to improve our scientific understanding of this issue. The U.S.-Soviet Summit in May and the Toronto Economic Summit in June could be good opportunities to discuss and in some cases to strengthen existing programs in this area.

At the December 1987 Summit in Washington, President Reagan and General Secretary Gorbachev agreed to develop cooperative space science programs between our two nations. The United States and the Soviet Union are now negotiating several cooperative programs for the acquisition, coordination and exchange of space-based data related to global climate change.

3 of 6

-2-

Cooperative research with the Soviet Union to help establish the scientific base for documentation and assessment of global climate change has also been conducted for years -- by the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration and other federal agencies -- under the U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection. A "protocol", which lays out joint activities in this area for 1988, includes about 40 individual projects, exchanges and experiments. Also under that Agreement, and as urged by President Reagan and General Secretary Gorbachev in their joint summit statement of last December, the United States and Soviet Union have undertaken to prepare a joint report on future climates.

In February, at our last meeting of the Joint Environmental Committee which I co-chair, Soviet Co-Chairman Yuriy Izrael and I agreed to establish a working group to study the causes of climate change and to explore possible response strategies. The group should hold its first meeting early this summer. I see it as a constructive contribution to the emerging international discussion on this topic.

4 of 6

The United States is also engaged in bilateral programs with other nations with active research programs on this issue. Cooperation with the People's Republic of China, for example, will be carried out under the US-PRC Protocol for Scientific and Technical Cooperation in the Field of Environmental Protection.

Despite considerable bilateral activity, some of which is described above, the United States believes that the global climate issue is most appropriately dealt with on a multilateral basis. Accordingly, the United States supports the establishment by the United Nations Environment Program (UNEP) and World Meteorological Organization (WMO) of an intergovernmental panel to develop methodology for and carry out internationally coordinated assessments of the scientific understanding, magnitude, timing and potential consequences of climate change. The results of these assessments should set the basis for consideration by the international community of a wide range of options to deal with the global climate issue. One such option would be a climate convention setting up an international framework to improve our scientific understanding of this issue. The United States will be an active participant in the work of the WMO/UNEP panel.

5 of 6

In addition to the intergovernmental panel, which should hold its first meeting shortly, seventy nations have joined the United States and Soviet Union in endorsing the International Geosphere-Biosphere Program (IGBP). Established in 1986 by the International Council of Scientific Unions, this transdisciplinary research program will improve our understanding of the interactive physical, chemical and biological processes that regulate the total Earth system.

In short, the United States is engaged in numerous cooperative research programs which will improve our scientific understanding of man's influence on the global atmosphere. The upcoming summits could provide us with an excellent opportunity to further this international cooperation. We will also be working domestically to improve coordination among the many federal agencies with active research programs on this issue.

We appreciate your continued interest in global environmental issues and look forward to working with you in the future.

Sincerely,

Lee M. Thomas

6 of 6

Drafted:EPA/OIA:JKoehler:382-4894:5/10/88

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|-------------|------------------|----------------|
| Clearances: | State/OES:BNitze | DOC:JRSpradley |
| | OMB:DGibbons | OPD:JMares |
| | NCPO:AHecht | DOE:EWilliams |
| | EPA/OPPE:LFisher | EPA/OAR:DClay |
| | OSTP:JDorrigan | DOI:IGoklany |
| | NSC:JLeach | NASA:BWatson |

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CLASSIFICATION 5:05

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PAGES 021

DTG 132038Z

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Ⓟ TOR: 132042Z

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2.

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FAX # 395-5221 TEL # 395-5650

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PHONE

382-4894

MAIL CODE

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EPA/OIA

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE ADMINISTRATOR

Honorable Max Baucus
United States Senate
Washington, DC 20510

Dear Senator Baucus:

Thank you for your March 31, 1988 letter to President Reagan, co-signed by forty-one of your colleagues, regarding international initiatives on global climate change. Despite considerable uncertainty regarding the extent of man's influence on the global atmosphere, the possibility of global climate change warrants high-level attention in the international arena. Accordingly, the United States is engaged in a wide range of cooperative research activities -- both bilateral and multilateral -- to improve our scientific understanding of this issue. The U.S.-Soviet Summit in May and the Toronto Economic Summit in June could provide good opportunities to discuss this issue.

At the December 1987 Summit in Washington, President Reagan and General Secretary Gorbachev agreed to develop cooperative atmospheric science programs between our two nations, including a detailed study on the climate of the future. The United States and the Soviet Union are now negotiating a range of proposed projects for the acquisition, coordination and exchange of space-based data related to global climate change.

Cooperative research with the Soviet Union to help establish the scientific base for documentation and assessment of global climate change has also been conducted for years under the U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection. A "protocol", which lays out joint activities in this area for 1988, includes over 30 possible projects, exchanges and experiments.

2 of 4

-2-

The United States is also engaged in bilateral programs with other nations with active research programs on this issue. Cooperation with the People's Republic of China, for example, will be carried out under the U.S.-PRC Science and Technology Agreement which covers exchanges on atmospheric science and environmental protection and the US-PRC Protocol for Scientific and Technical Cooperation which specifies five major areas of atmospheric research. Studies on the role of the ocean in climate change are conducted under the U.S.-PRC Bilateral Agreement on Cooperation in Marine and Fisheries Science and Technology. Both countries also support related training and educational exchange programs.

In addition to bilateral activity, the United States supports the establishment by the United Nations Environment Program (UNEP) and World Meteorological Organization (WMO) of an intergovernmental panel to develop methodology for and carry out internationally coordinated assessments of the scientific understanding, magnitude, timing and possible effects of climate change. The results of these assessments, along with other pertinent information, will provide a basis for considering a wide range of options to deal with the global climate issue, including the possibility of a climate convention. The United States will be an active participant in the work of the WMO/UNEP intergovernmental panel.

In addition to UNEP and WMO, over seventy nations including the United States and Soviet Union have endorsed the International Geosphere-Biosphere Program (IGBP). Established in 1986 by the International Council of Scientific Unions, this transdisciplinary research program is directed at improving our understanding of the interactive physical, chemical and biological processes that regulate the total Earth system.

In short, the United States is engaged in numerous cooperative research programs which will improve our scientific understanding of man's influence on the global atmosphere. The upcoming summits will provide us with excellent opportunities to discuss this international cooperation. Our interest in international cooperation serves to supplement our domestic research programs related to global climate change which show an increase in the President's budget request for 1989.

3 of 4

-3-

We appreciate your continued interest in global environmental issues and look forward to working with you in the future.

Sincerely,

Lee M. Thomas

4 of 4

TO: POWELL

FROM: GRAHAM, WILLIAM R

DOC DATE: 09 MAY 88
SOURCE REF:

KEYWORDS: ENVIRONMENT

NCO

PERSONS:

SUBJECT: LTR RE RESPONSE TO SENATE LTR ON GLOBAL CLIMATE CHANGE

ACTION: APPROPRIATE ACTION DUE DATE: 13 MAY 88 STATUS: S

STAFF OFFICER: LEACH LOGREF:

FILES: WH NSCIF: CODES:

DOCUMENT DISTRIBUTION

FOR ACTION
LEACH

FOR CONCURRENCE
FORTIER

FOR INFO
DANZANSKY
DEAN

COMMENTS: OSTP cleared on EPA letter of May 16.
No further action required. letter is attached.
DISPATCHED BY _____ DATE _____ W/ATTCH: YES NO attached.
OPENED BY: NSRCB CLOSED BY: DOC 1 OF 1 Jerry Leach

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WASHINGTON, DC 20460

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EPA/OIA

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EPA Form 5040-5 (Rev. 12-83) Replaces EPA Form 5040-5A and the previous edition of EPA Form 5040-5, which are obsolete.

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1 of 4



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE ADMINISTRATOR

Honorable John F. Kerry
United States Senate
Washington, DC 20510

Dear Senator Kerry:

Thank you for your March 31, 1988 letter to President Reagan, co-signed by forty-one of your colleagues, regarding international initiatives on global climate change. Despite considerable uncertainty regarding the extent of man's influence on the global atmosphere, the possibility of global climate change warrants high-level attention in the international arena. Accordingly, the United States is engaged in a wide range of cooperative research activities -- both bilateral and multilateral -- to improve our scientific understanding of this issue. The U.S.-Soviet Summit in May and the Toronto Economic Summit in June will provide good opportunities to discuss and in some cases to strengthen existing programs in this area.

Take out

At the December 1987 Summit in Washington, President Reagan and General Secretary Gorbachev agreed to develop cooperative atmospheric science programs between our two nations, including a detailed study on the climate of the future. The United States and the Soviet Union are now negotiating several cooperative programs for the acquisition, coordination and exchange of space-based data related to global climate change.

Cooperative research with the Soviet Union to help establish the scientific base for documentation and assessment of global climate change has also been conducted for years under the U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection. A "protocol", which lays out joint activities in this area for 1988, includes over 30 possible projects, exchanges and experiments.

*1st Person - see attached
writes that he affects some one else.*

(I expect that it may be raised.)

2 of 4

-2-

The United States is also engaged in bilateral programs with other nations with active research programs on this issue. Cooperation with the People's Republic of China, for example, will be carried out under the U.S.-PRC Science and Technology Agreement which covers exchanges on atmospheric science and environmental protection and the US-PRC Protocol for Scientific and Technical Cooperation which specifies five major areas of atmospheric research. Both countries also support related training and educational exchange programs.

In addition to bilateral activity, the United States supports the establishment by the United Nations Environment Program (UNEP) and World Meteorological Organization (WMO) of an intergovernmental panel to develop methodology for and carry out internationally coordinated assessments of the scientific understanding, magnitude, timing and possible effects of climate change. The results of these assessments should contribute to the base of information for use by the international community in considering a wide range of options to deal with the global climate issue. After reviewing these assessments, one such option that I would consider recommending would be a climate convention setting up an international framework to improve our scientific understanding of this issue. The United States will be an active participant in the work of the WMO/UNEP intergovernmental panel.

In addition to UNEP and WMO, over seventy nations including the United States and Soviet Union have endorsed the International Geosphere-Biosphere Program (IGBP). Established in 1986 by the International Council of Scientific Unions, this transdisciplinary research program is directed at improving our understanding of the interactive physical, chemical and biological processes that regulate the total Earth system.

In short, the United States is engaged in numerous cooperative research programs which will improve our scientific understanding of man's influence on the global atmosphere. The upcoming summits will provide us with excellent opportunities to discuss this international cooperation. Our interest in international cooperation serves to supplement our domestic research programs related to global change which show a 10% increase in the President's budget request for 1989.

3 of 4

-3-

We appreciate your continued interest in global environmental issues and look forward to working with you in the future.

Sincerely,

Lee M. Thomas

4 of 4

THE WHITE HOUSE
WASHINGTON

3194 17

Leach

May 26, 1988

Dear Senator Chafee:

Thank you for your letter of April 25, 1988 on the greenhouse effect and global climate change and for the copy of the letter to the President. I do indeed have a continuing personal interest in the topic and try to be of help whenever I can.

The U.S. Government is very aware of the problem of global climate change and is supporting a wide range of national, bilateral, and multilateral research activities on it. The President's budget request for 1989 reflects a desire to expand domestic and international programs in this area still further.

As you so aptly suggest, the summits over the next month provide good opportunities to discuss the issue. On the basis of discussions held earlier this year, we are likely to be able to announce an expansion of cooperative programs on global climate change with the Soviet Union at the Moscow Summit.

We fully support the work now beginning under the auspices of the United Nations Environment Program and the World Meteorological Organization to develop an international program for dealing with the issue. We are looking to the recommendations that emerge from that process, one of which may be a call for an international convention, before deciding how to proceed on the idea of a convention.

Thank you again for your letter. I look forward to working with you in the future on this and other topics of mutual concern.

Sincerely,



John D. Negroponte
Deputy Assistant to the President
for National Security Affairs

The Honorable John H. Chafee
United States Senate
Washington, D.C. 20510-3901

NATIONAL SECURITY COUNCIL
WASHINGTON, D.C. 20506

May 20, 1988

ACTION

MEMORANDUM FOR JOHN D. NEGROPONTE

FROM: ROBERT W. DEAN *RWD*

SUBJECT: Response to Letter from Senator Chafee concerning
Global Climate Change

At Tab I is a response to Senator Chafee's letter on the greenhouse effect and global climate change. He writes to you because of your personal interest in the issue, deriving from your former position in OES. He is seeking your support for urging the President to use the fora of the Moscow and Toronto Summits to call for an international convention to protect our global climate. He was one of 42 Senators who wrote to the President on this recently. He enclosed a copy of the letter to the President for you (Tab III).

The White House assigned the response to the Senators' letter to the EPA. After many problems with the drafting and clearance process, Lee Thomas finally signed and sent the response on May 16. We held off on answering Chafee's letter to you until we could be sure of the content of Thomas's letter.

An expansion of U.S.-Soviet cooperation in the area of global climate change, primarily under the existing environmental and space agreements, will be a part of the Joint Statement for the Moscow Summit. The wording for the Joint statement has already been agreed to by both governments. The Toronto Summit is more complicated because there is no formal agenda. However, it does seem likely that it will be discussed, though not at U.S. initiative.

In neither case is there likely to be a call for an international treaty. Such a call is regarded as premature. The scientific understanding of the phenomenon is still too rudimentary to know what provisions such a treaty should have. Work is starting under the auspices of the UNEP and the WMO, however, which could have a call for a treaty as a potential outcome.

Ld
Rudy Perina, *Jim for* Roger Dekok, and *Jim for* Mike Andricos concur.

concur
5/26

RECOMMENDATION

That you sign the letter to Senator Chafee at Tab I.

Approve JW / 5/23 Disapprove _____

Attachments

- Tab I Response to Senator Chafee's Letter for Signature
- Tab II Chafee's Letter to You
- Tab III Letter to President by 42 Senators
- Tab IV Lee Thomas's Response to the 42-Senator Letter

Prepared by: JW
Jerry W. Leach

QUENTIN N. BURDICK, NORTH DAKOTA, CHAIRMAN

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GEORGE J. MITCHELL, MAINE
MAX BAUCUS, MONTANA
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HARRY M. REID, NEVADA
BOB GRAHAM, FLORIDA

ROBERT T. STAFFORD, VERMONT
JOHN H. CHAFEE, RHODE ISLAND
ALAN K. SIMPSON, WYOMING
STEVE SYMMS, IDAHO
DAVE DURENBERGER, MINNESOTA
JOHN W. WARNER, VIRGINIA
LARRY PRESSLER, SOUTH DAKOTA

PETER D. PROWITT, STAFF DIRECTOR
BAILEY GUARD, MINORITY STAFF DIRECTOR

11
20
United States Senate

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
WASHINGTON, DC 20510-8175

April 25, 1988

The Honorable John D. Negroponete
Deputy Assistant to the President for
National Security Affairs
The White House
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

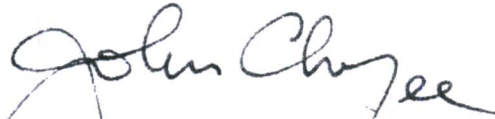
Dear Mr. Negroponete:

Knowing of your interest in international environmental matters, I thought you would like to see a copy of the enclosed letter that was recently sent to President Reagan by forty two Members of the Senate.

The letter addresses a matter that you dealt with during your recent tenure as Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs, namely: the greenhouse effect and global climate change. It urges the President to use the upcoming summit meeting in Moscow as well as the economic summit meeting in Toronto as opportunities to call for an international convention to protect our global climate. With respect to the the Moscow meeting in particular, a joint communique calling for such a convention would be valuable, concrete product that would be recognized widely as an instance of sensible, mutually beneficial cooperation.

Thank you for your continuing interest in this important matter.

Sincerely,



John H. Chafee
United States Senator

Enclosure

QUENTIN N. BURDICK, NORTH DAKOTA, CHAIRMAN

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MAX BAUCUS, MONTANA
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LARRY PRESSLER, SOUTH DAKOTA

PETER D. PROWITT, STAFF DIRECTOR
BAILEY GUARD, MINORITY STAFF DIRECTOR

United States Senate

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

WASHINGTON, DC 20510-6175

March 31, 1988

The Honorable Ronald W. Reagan
The White House
1600 Pennsylvania Avenue
Washington, D.C. 20500

Dear Mr. President:

We are writing to urge that you continue and expand recent initiatives on the international environmental problem of the greenhouse effect and global climate change, such as those announced at the conclusion of the December 1987 summit meeting with Soviet General Secretary Gorbachev. Specifically, we urge that, at the next summit meeting with the General Secretary in Moscow and at the upcoming economic summit meeting this June in Toronto, you call upon all nations of the world to begin the negotiation of a convention to protect our global climate. Such a convention could be modeled after the historic Vienna Convention to Protect the Ozone Layer.

You are to be congratulated for including the problem of global climate change as part of the agenda at the December 1987 summit meeting with General Secretary Gorbachev. It is encouraging to observe the growing commitment that our two nations are making to deal with the environmental threat of global warming. Of particular note was the Joint Summit Communique which stated that the "two sides will continue to promote broad international and bilateral cooperation in the increasingly important area of global climate and environmental change."

Scientists have warned us that increasing concentrations of certain pollutants in the atmosphere will increase the earth's temperature over the coming years to a level which has not existed for tens of millions of years. There is some urgency to this matter since scientists predict that, as a result of past pollution, we are already committed to a significant global warming. These greenhouse gases will lead to substantial changes in the climate of our planet with potentially catastrophic environmental and socio-economic consequences.

The predicted global warming and climate changes are expected to occur at a rate and in a fashion that will preclude natural evolutionary responses. The likely effects of the greenhouse effect include rising sea levels, changes in the location of deserts, extremely high temperatures in cities during

the summer months, increases in the number and severity of hurricanes, the death of large portions of forests, and the loss of adequate moisture in the mid-continent agricultural belt.

The challenge of reducing this threat to the planet's well being is considerable. One of the most significant greenhouse gases is carbon dioxide, a by-product of fossil fuels. The United States and the Soviet Union are the world's two largest contributors of carbon dioxide. Together, we account for almost one-half of the global total.

For these reasons, the United States and the Soviet Union must take positions of global leadership on this matter and call for a convention on global climate change. Such a convention could address our scientific understanding of the problem, the need for and limits of adaptation as a response to future climate change, as well as strategies to stabilize atmospheric concentrations of greenhouse gases at safe levels.

Negotiations to achieve a climate convention would have to take place on a multilateral basis. However, cooperation between the United States and the Soviet Union is an essential precondition of a successful international response to the greenhouse effect. The problems associated with global climate change provide an historic opportunity for our two countries to cooperate on a long term basis to insure the habitability of Earth. These facts were recognized and endorsed in the recently enacted Global Climate Protection Act (P.L. 100-204, sections 1101-1106).


For these reasons, we urge you and General Secretary Gorbachev to use the upcoming summit meeting scheduled to be held in Moscow as a forum to call for the negotiation of a convention on global climate change and to commit the United States and the Soviet Union to a leadership role in that process. At the same time we suggest that you expand and elevate the level of ongoing bilateral U.S.-U.S.S.R. activity which could enhance our understanding of the problem. We endorse the establishment of a high level working group to study potential responses to climate change, including greenhouse gas emissions reductions and adaptation to climate change. This expanded bilateral activity should be recognized and supported as an important priority within the United States' foreign and environmental policy agenda.


Similarly, we urge you to use the seven nation economic summit that is scheduled to be held during the month of June in Toronto as a forum to urge the negotiation of a global climate convention. At last year's economic summit, the leaders of the seven nations stated: "We underline our own responsibility to

encourage efforts to tackle effectively environmental problems of worldwide impact such as ... climate change...." This year's economic summit is the appropriate opportunity to take the next step and call for a global climate convention.

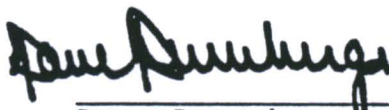
Thank you for your attention and commitment to this important, international environmental issue. We look forward to working with you and assisting you in our mutual efforts to protect our fragile planet.

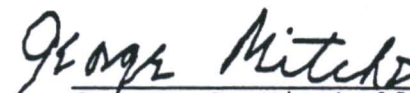
Sincerely,

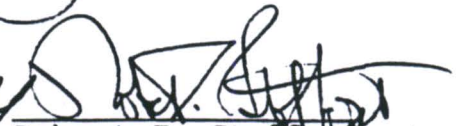

John F. Kerry
U.S. Senator



Max Baucus
U.S. Senator


John H. Chafee
U.S. Senator


Dave Durenberger
U.S. Senator



George J. Mitchell
U.S. Senator



Robert T. Stafford
U.S. Senator


Albert Gore
U.S. Senator



Dale Bumpers
U.S. Senator



Carl Levin
U.S. Senator

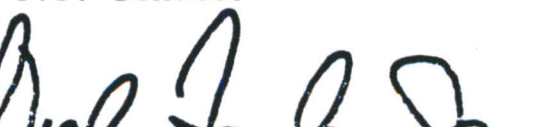

Pete Wilson
U.S. Senator


Frank Murkowski
U.S. Senator


Spark M. Matsunaga
U.S. Senator


Terry Sanford
U.S. Senator


David Pryor
U.S. Senator


Wycle Fowler, Jr.
U.S. Senator

Tom Harkin
Tom Harkin
U.S. Senator

Frank R. Lautenberg
Frank R. Lautenberg
U.S. Senator

Brock Adams
Brock Adams
U.S. Senator

Timothy E. Wirth
Timothy E. Wirth
U.S. Senator

Donald W. Riegle, Jr.
Donald W. Riegle, Jr.
U.S. Senator

Alfonse M. D'Amato
Alfonse M. D'Amato
U.S. Senator

Bob Graham
Bob Graham
U.S. Senator

Patrick J. Leahy
Patrick J. Leahy
U.S. Senator

Quentin N. Burdick
Quentin N. Burdick
U.S. Senator

Dennis DeConcini
Dennis DeConcini
U.S. Senator

Bob Kasten
Bob Kasten
U.S. Senator

Arlen Specter
Arlen Specter
U.S. Senator

Steven D. Symms
Steven D. Symms
U.S. Senator

Jeff Bingaman
Jeff Bingaman
U.S. Senator

Edward M. Kennedy
Edward M. Kennedy
U.S. Senator

Bob Packwood
Bob Packwood
U.S. Senator

Thomas A. Daschle
Thomas A. Daschle
U.S. Senator

Pete V. Domenici
Pete V. Domenici
U.S. Senator

Daniel J. Evans
Daniel J. Evans
U.S. Senator

Nancy Landon Kassebaum
Nancy Landon Kassebaum
U.S. Senator


Thad Cochran
Thad Cochran
U.S. Senator



William S. Cohen
U.S. Senator




Richard G. Lugar
U.S. Senator



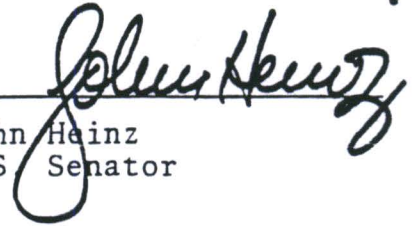
Dan Quayle
U.S. Senator



Claiborne Pell
U.S. Senator



William V. Roth, Jr.
U.S. Senator



John Heinz
U.S. Senator



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 16 1988

THE ADMINISTRATOR

Honorable John F. Kerry
United States Senate
Washington, DC 20510

Dear Senator Kerry:

Thank you for your March 31, 1988 letter to President Reagan, co-signed by forty-one of your colleagues, regarding international initiatives on global climate change. Despite considerable uncertainty regarding the extent of man's influence on the global atmosphere, the possibility of global climate change warrants high-level attention in the international arena. Accordingly, the United States is engaged in a wide range of cooperative research activities -- both bilateral and multilateral -- to improve our scientific understanding of this issue. The U.S.-Soviet Summit in May and the Toronto Economic Summit in June could provide good opportunities to discuss this issue.

At the December 1987 Summit in Washington, President Reagan and General Secretary Gorbachev agreed to develop cooperative atmospheric science programs between our two nations, including a detailed study on the climate of the future. The United States and the Soviet Union are now negotiating a range of proposed projects for the acquisition, coordination and exchange of space-based data related to global climate change.

Cooperative research with the Soviet Union to help establish the scientific base for documentation and assessment of global climate change has also been conducted for years under the U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection. A "protocol", which lays out joint activities in this area for 1988, includes over 30 possible projects, exchanges and experiments.

2 of 4

-2-

The United States is also engaged in bilateral programs with other nations with active research programs on this issue. Cooperation with the People's Republic of China, for example, will be carried out under the U.S.-PRC Science and Technology Agreement which covers exchanges on atmospheric science and environmental protection and the US-PRC Protocol for Scientific and Technical Cooperation which specifies five major areas of atmospheric research. Studies on the role of the ocean in climate change are conducted under the U.S.-PRC Bilateral Agreement on Cooperation in Marine and Fisheries Science and Technology. Both countries also support related training and educational exchange programs.

In addition to bilateral activity, the United States supports the establishment by the United Nations Environment Program (UNEP) and World Meteorological Organization (WMO) of an intergovernmental panel to develop methodology for and carry out internationally coordinated assessments of the scientific understanding, magnitude, timing and possible effects of climate change. The results of these assessments, along with other pertinent information, will provide a basis for considering a wide range of options to deal with the global climate issue, including the possibility of a climate convention. The United States will be an active participant in the work of the WMO/UNEP intergovernmental panel.

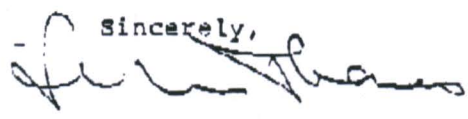
In addition to UNEP and WMO, over seventy nations including the United States and Soviet Union have endorsed the International Geosphere-Biosphere Program (IGBP). Established in 1986 by the International Council of Scientific Unions, this transdisciplinary research program is directed at improving our understanding of the interactive physical, chemical and biological processes that regulate the total Earth system.

In short, the United States is engaged in numerous cooperative research programs which will improve our scientific understanding of man's influence on the global atmosphere. The upcoming summits will provide us with excellent opportunities to discuss this international cooperation. Our interest in international cooperation serves to supplement our domestic research programs related to global climate change which show an increase in the President's budget request for 1989.

3 of 4

We appreciate your continued interest in global environmental issues and look forward to working with you in the future.

Sincerely,



Lee M. Thomas

4 of 9

DRAFT
August 15, 1988

U.S. STRATEGY FOR IMPLEMENTATION OF WMO-UNEP
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

1.0 TERMS OF REFERENCE

The terms of reference of the IPCC should include four subject areas:

- 1.1 SCIENTIFIC ASSESSMENT
- 1.2 IMPACT ASSESSMENTS
- 1.3 RESPONSE STRATEGIES
- 1.4 INFORMATION TRANSFER

2.0 U.S. OBJECTIVES

- 2.1 At the first session of the IPCC, the US should be prepared to offer constructive suggestions with regard to: Clearly defining the terms of responsibilities of the IPCC, the setting up of attainable and reasonable goals, and the establishment of a timetable for action. Discussion points for the specific goals of the U.S. strategy follow:
- 2.2 To play a leadership role by offering experts to chair or cochair working groups in areas 1.1 and 1.3 and by providing expertise in other areas. It is anticipated that financial support will be required from U.S. agencies.
- 2.3 To make the IPCC a forum for evaluating the desirability of a global convention. Calls for a global convention are likely to be made by several other countries. The U.S. believes that the scientific and other assessment activities of the IPCC are a predicate to determining the need for such a convention. The U.S. could consider a framework convention that does not call for the adoption of response strategies prior to completion of the assessments. A legal working group should be established to explore the desirability of a framework convention.
- 2.4 To encourage the IPCC, in executing its work to draw on the technical capabilities of WCP, IGBP, UN and other international agencies, governments, and non-governmental scientific groups. The IPCC should encourage the WCP and IGBP to address specific issues raised by the international scientific assessment.

2.5 To propose that the Second World Climate Conference (SWCC) be an integral part of the IPCC "process". The timing and organization of this conference should be reviewed by the IPCC and delayed from the proposed date of June 1990 to allow the scientific assessment to be completed.

2.6 To use the activities of the IPCC as a means to review and strengthen the related programs of WMO and UNEP, and to foster closer collaboration with other international programs.

3.0 STRUCTURE

3.1 The U.S.G. proposes that the IPCC establish four working groups to address the issues of scientific assessment, impact assessment, response strategies, and information transfer.

4.0 SCIENTIFIC ASSESSMENT

4.1 The U.S. should encourage that work on the scientific assessment begin immediately and that a working group on science (about 10 countries) should be established to oversee the development of this task.

4.2 The working group on science should determine how to organize and implement the scientific assessment (US proposal to be developed).

4.3 The U.S. should propose that the IPCC be briefed on the results of the scientific assessment by December 1990 and that the assessment be presented to the Second World Climate Conference (SWCC) by mid 1991.

4.4 The scientific assessment should consider as input to their analysis scenarios for greenhouse gas emission to be developed by the response strategy working group (see 6.3.1).

5.0 IMPACT ASSESSMENT

5.1 The U.S. should propose the creation of a working group on Climate Impacts Assessment (about 10 countries) who would organize the objectives and work of IPCC in this area.

5.2 The objectives of the working group should be to establish a process for the conduct of impact assessments.

- 5.3 The working group should review what assessments are currently underway by member governments, UNEP, OECD and other organizations. It should examine the regional coverage, methodologies and schedule of existing assessments. The Working Group also should recommend what additional assessments need to be undertaken.
- 5.4 In particular, UNEP's long term plan should be reviewed in light of the IPCC activities with a view to recommending further strengthening of UNEP's impact assessment activities.
- 5.5 The working group should prepare recommendations to the IPCC on necessary additional studies and data. The working group should prepare summary reports to IPCC on impacts likely to affect the common interests of several countries. The IPCC should encourage the WCIP and IGBP to address specific issues raised by the impact assessment working group.
- 6.0 RESPONSE STRATEGIES
- 6.1 The U.S. should propose the creation of a working group on "Response Strategies" composed of government experts from selected countries, (about 10 countries) to oversee studies for evaluating alternative policies to adapt to climate change or limit emissions of greenhouse gases. Governments should be encouraged to appoint representatives from energy, natural resources, and environmental protection agencies to participate in this working group.
- 6.2 The objectives of the response strategy working group should be to:
- 1) review available information and encourage the development of policy analyses of strategies for adapting to climate change and for stabilizing emissions,
 - 2) conduct work on issues for which early attainment of an international consensus is possible, e.g., emissions forecasting and methodology development, and
 - 3) to engage agencies of member governments and other international agencies which are responsible for policy development on energy, resource protection and development, industrial and agricultural strategies.

The long range goal of the working group should be to prepare recommendations to governments on response strategies and policy options.

6.3 The initial activity of this committee would include the development of:

- 1) internationally acceptable scenarios for greenhouse gas emissions under currently projected conditions,
- 2) methodologies for evaluating mitigation and emission reduction strategies, (including engineering/technological approaches).

The U.S. should propose to host a meeting of the working group and to organize seminars on emission forecasting and methodologies, assessments of the status of technological development, and assessments of adaptation strategies.

6.4 Appropriate national and international agencies (e.g. FAO/IBRD/WMO/IEA/OECD) should be invited to participate in the activities of the working group.

7.0 INFORMATION TRANSFER

7.1 The U.S. should encourage that a working group be established (about 10 countries) to develop program plans for activities in this area.

7.2 The U.S. should propose that existing WMO/UNEP/ICSU programs be used to inform the public worldwide on climate change issues.

8.0 INTERNAL ORGANIZATION/COORDINATION OF IPCC ACTIVITIES

8.1 The U.S. Delegation to the first IPCC meeting should include:

8.2 Funding arrangements for the IPCC will be determined by the final functions of the ICPP. The chairman of the delegation is authorized to indicate that the U.S. is willing to contribute up to \$___ K in FY___ to support the IPCC. Funding for these activities will come from the following agencies.

Leach

33

NATIONAL SECURITY COUNCIL
WASHINGTON, D.C. 20506

6063

August 26, 1988

ACTION

MEMORANDUM FOR COLIN L. POWELL

FROM: TYRUS W. COBB *TC*

SUBJECT: Letter to Verity on the Drought Pamphlet

Secretary Verity sent you a copy of the report, U.S. Drought 1988, prepared by the National Oceanographic and Atmospheric Administration (NOAA). The 28-page pamphlet came out in July and is intended for the general public. It explains the how, when, where, and why of the drought and concludes that there is very little that the Government can do about it in the short term. It also says that the evidence is inconclusive that the 1988 drought is caused by the "greenhouse effect."

RECOMMENDATION

That you sign the thank-you note to Verity at Tab I.

Approve _____ Disapprove _____

Attachment

- Tab I Letter to Secretary Verity for Signature
- Tab II In-coming Letter plus Cover and Contents of the NOAA Pamphlet

Prepared by: *JW*
Jerry W. Leach

THE WHITE HOUSE
WASHINGTON

Dear Bill:

Thank you very much for the impressive pamphlet on the 1988 drought prepared by NOAA. It was remarkable how quickly you were able to get it out. It will be useful, I am sure, in clearing up certain popular misconceptions about the drought. We will be interested to hear your conclusions, when more data comes in, about whether or not the summer's weather was in any way related to the "greenhouse effect."

Sincerely,

The Honorable C. William Verity
Secretary of Commerce
Washington, D.C. 20230

T
A
B
II



37
THE SECRETARY OF COMMERCE

Washington, D.C. 20230

AUG 11 1988

6063

Honorable Colin L. Powell
Assistant to the President
for National Security Affairs
The White House
Washington, D.C. 20500

Dear Colin,

I am enclosing a copy of U.S. DROUGHT 1988: A CLIMATE ASSESSMENT which has been prepared by the Department of Commerce, National Oceanic and Atmospheric Administration. I trust this information, which includes a current updated historic comparison of 20th century droughts, will be helpful to you in understanding this national problem.

Sincerely,

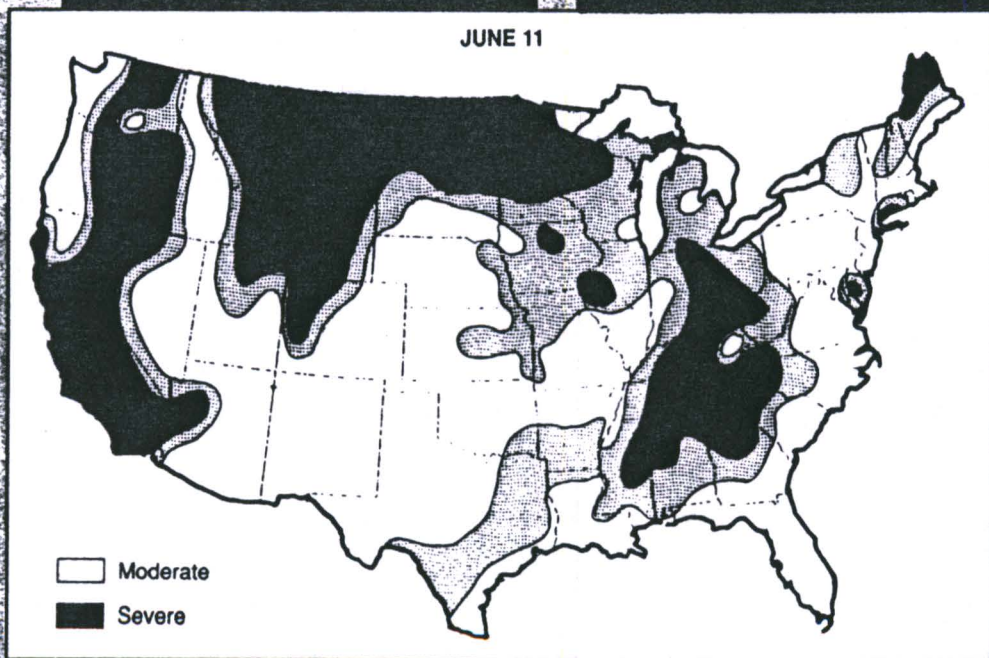
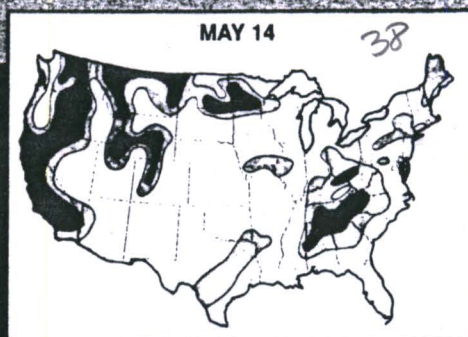
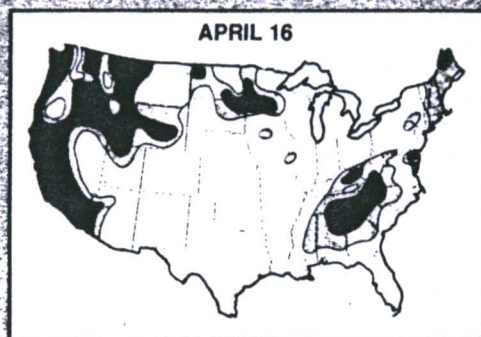
A handwritten signature in cursive script, appearing to read "Bue".

Secretary of Commerce

Enclosure

U.S. DROUGHT 1988: A CLIMATE ASSESSMENT

July 11, 1988



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

September 9, 1988

ONGOING GLOBAL CLIMATE CHANGE ACTIVITIES

Committee on Earth Sciences

Public Law 94-282, in 1976, provided for establishment of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) composed of the Director, OSTP and representatives of key agencies including DOA, DOC, DOD, HHS, HEW, HUD, DOI, DOS, DOT, VA, NASA, DOE, NSF, EPA. By law the Council is to consider problems and developments in science, engineering, and technology and related activities affecting more than one Federal agency, and is to recommend policies and other measures designed to:

- (1) Provide more effective planning and administration;
- (2) Identify research needs, with areas needing more emphasis;
- (3) Achieve more effective use of Federal scientific, engineering, and technological resources and facilities, and eliminate unwarranted duplication; and
- (4) Further international cooperation in science, engineering, and technology.

The legislation provides that standing subcommittees may be established and that each Federal agency represented on the Council shall furnish necessary assistance.

The Director of OSTP has established a Committee on Earth Sciences (CES) under FCCSET to address the need for interagency coordination of Federal research programs dealing with all earth sciences including global change.

Research Programs

Although global change includes changes other than global climate change, the vast majority of Federal global change research dollars are for global climate change. The President's FY 1989 budget includes roughly \$200 million in research focused specifically on understanding and assessing global climate change. Additional amounts of about \$1 billion are for related programs, some of which may more properly be described as also focused on global climate change research. For comparison, the interagency budget for the National Acid Precipitation Assessment Program initially totalled \$17 million in FY 1982 and grew to annual levels between \$80-90 million after 1985.

NOAA Stratospheric Monitoring

Section 210 of the NOAA Authorization amended to the NASA Authorization Bill (S. 2209) requires the Secretary of Commerce to submit a plan to construct and operate a worldwide system of ground-based remote sensors to monitor stratospheric levels of chemicals which can affect the amount of ozone in the stratosphere. This plan would be due no later than July 1, 1989 to the Senate Committee on Commerce, Science, and Transportation and the House Committee on Science, Space and Technology. The NASA Authorization Bill was passed by the Senate on August 9, 1988.

NASA Upper Atmosphere Program

The 1976 NASA Authorization Act, P.L. 94-39, authorized a comprehensive program of research, technology, and monitoring of the phenomena of the upper atmosphere so as to provide for an understanding of and to maintain the chemical and physical integrity of the Earth's upper atmosphere.

Clean Air Act

Section 126 of the Clean Air Act (Public Law 95-95) requires NOAA to submit a biennial report to Congress on the findings of research and monitoring of the stratosphere for early detection of change and climate consequences of such change. This report is due in 1988 and is currently being written within OAR.

The 1977 Clean Air Act Amendments, P.L. 95-95, in Sections 153-154, direct EPA to coordinate research and studies related to the stratosphere, NOAA to establish a continuing program of research and monitoring to detect changes in the stratosphere and climatic effects of such changes, and NASA to continue programs of research, technology, and monitoring of the stratosphere for the purpose of understanding the physics and chemistry of the stratosphere and for the early detection of potentially harmful changes in the ozone in the stratosphere. In addition, the Act directs the continuation of related research programs by USDA, HHS, and NSF. Each agency is required to report biennially to the Congress, "with any appropriate recommendations for legislation or regulation (or both)."

National Climate Program

The National Climate Program Act of 1978 established an Interagency Climate Program Policy Board and the National Climate Program Office within the Department of Commerce to, among other things:

- Administer a comprehensive and coordinated national climate program of research, monitoring, assessment, and information use.

- 41
- Coordinate interagency participation in international climate-related activities.
 - Prepare and submit to the President and the Congress: (1) a 5-year programmatic and budgetary plan, (2) by January 30, 1990, and every 5 years thereafter, a report on climate change trends, state of knowledge, projections, and potential policy responses, and (3) by March 31st, annually a report on the status of climate program activities.

Carbon Dioxide Research Program

The interagency Carbon Dioxide Research Program was organized in 1978 and is coordinated by the Department of Energy.

International Activities

Federal agencies are conducting cooperative research activities on global climate change under bilateral agreements with many countries including India, Brazil, Canada, the U.S.S.R., the P.R.C., and others. A U.S. delegation may meet with Soviet scientists this fall to discuss additional scientific projects on global climate change, including potential responsive measures.

As specified in the joint Summit communique of President Reagan and General Secretary Gorbachev, December 1987, the US and USSR will prepare a special report on future climate. The report is being prepared under US-USSR Bilateral on Environmental Protection, specifically Working Group VIII, chaired by the NCPO.

The report will focus on joint research, specifically the reconstruction and use of paleoclimate models as analogues for the future, validation of general circulation model projections, estimates of emissions of greenhouse gases, and analysis of long term climate trends.

Federal agencies also participate in multilateral activities related to global climate change, including the World Climate Program (WCP), which was launched in 1979 under the auspices of World Meteorological Organization (WMO), the U.N. Environment Program (UNEP), and the International Council of Scientific Unions (ICSU). WCP is placing increasing emphasis on the decades-to-centuries time scale in its efforts to narrow the range of uncertainties regarding climate change and to refine prediction capabilities. Other multilateral activities include the related programs of the International Oceanographic Commission (IOC) and the Food and Agriculture Organization's Tropical Forest Assessment. New OECD and IEA research programs focus on impacts of climate change and the interaction of energy and environment policies.

On a broader scale, the United States' governmental and non-governmental scientific community is participating in planning for ICSU's International Geosphere-Biosphere Program (IGBP), a major long-term effort to describe and understand the interactive physical, chemical and biological processes that regulate the total Earth system, the changes that are occurring in this system, and the manner in which they are influenced by human activities.

The Intergovernmental Panel on Climate Change, established by UNEP and WMO, will meet for the first time in November 1988. Under the auspices of the Panel, reviews of the scientific knowledge of natural and man-induced climate change, possible societal responses, and their impact on society will be carried out.

Global Climate Protection Act

The Global Climate Protection Act of 1987 states that "The President, through the Environmental Protection Agency, shall be responsible for developing and proposing to Congress a coordinated national policy on global climate change", considering the research and assessments of the National Climate Program Office, the research findings of the FCCSET/CES, the National Academy of Sciences, and the Federal agencies doing scientific research. It also states that the Secretary of State is responsible for coordination of U.S. global climate change policy in the international arena. State and EPA are to submit jointly, by December 1989, a report describing the state of current international understanding about climate change and its consequences, assessing U.S. efforts to gain international cooperation, and describing the U.S. strategy to seek further international cooperation.

THE WHITE HOUSE
WASHINGTON

DPC WORKING GROUP ON ENERGY, NATURAL RESOURCES AND ENVIRONMENT

Monday, September 12, 1988
10:30 a.m.
208 Old Executive Office Building

AGENDA

"GLOBAL CLIMATE CHANGE"

Fletcher ~~is~~
briefing at OMB
later this week

1. National Climate Program Office Analysis

Dr. Joseph O. Fletcher
National Oceanic and Atmospheric Administration

Dr. Daniel L. Albritton
National Oceanic and Atmospheric Administration

2. Draft Workplan for Developing Administration Policy

Linda Fisher
Environmental Protection Agency

Donna Fitzpatrick
Department of Energy

3. Statutory Responsibilities of Agencies

Robert K. Dawson
Office of Management and Budget

4. Briefing on Intergovernmental Panel on Climate Change

Dr. Frederick Bernthal
Department of State

5. Update on OSTP's Committee on Earth Sciences

Dr. Beverly Berger
Office of Science and Technology Policy

GLOBAL CLIMATE CHANGE:
KEY SCIENCE POINTS & REVIEW PLANS

WORKING GROUP ON CLIMATE
DOMESTIC POLICY COUNCIL

12 SEPTEMBER 1988

DAN ALBRITTON, NOAA

THIS 1/2 HOUR...

● THE CLIMATE SYSTEM:

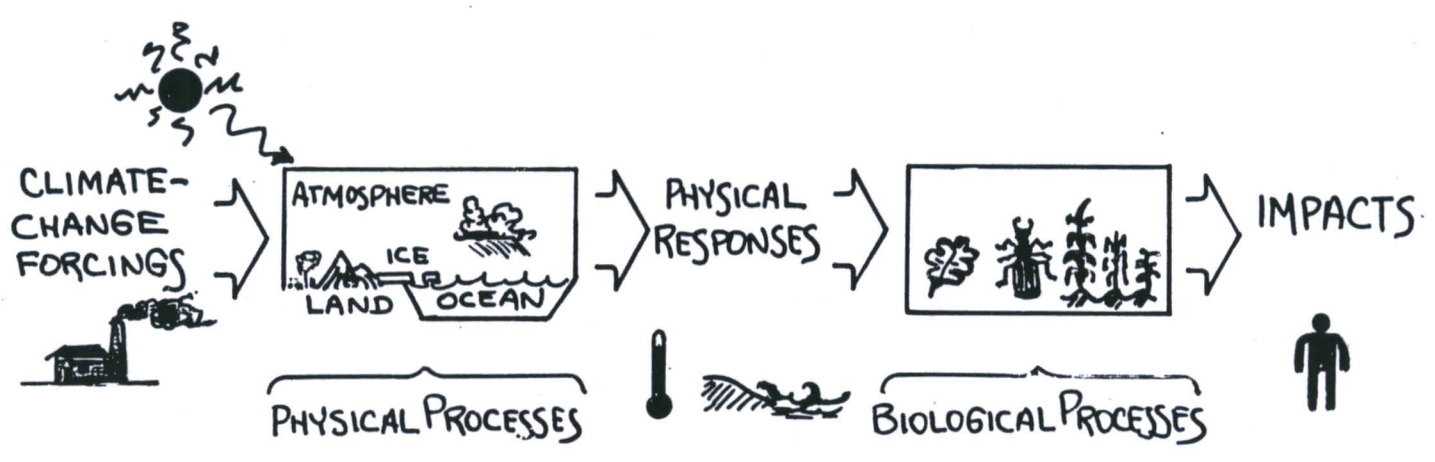
- ITS MAJOR COMPONENTS (IN A "NUTSHELL")
- THE KNOWN & UNKNOWN (EXAMPLES)
- WHERE THE SCIENCE NOW STANDS (FROM "!" TO "?")

● A STATE-OF-SCIENCE REVIEW - THE PLANS:

- CONTEXT (SCIENCE/POLICY)
- SCOPE (MAJOR TOPICS)
- PRODUCT (WHY IS IT USEFUL?)
- APPROACH (HOW WILL IT BE DONE?)
- TIMETABLE (WHEN?)

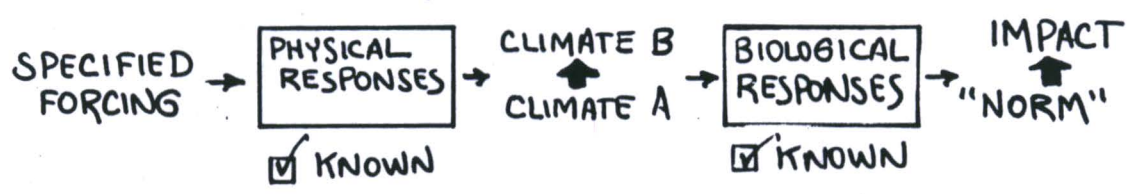
(A) THE CLIMATE SYSTEM & HOMO SAPIENS

● THE MAIN FEATURES: ("TERMS OF REFERENCE")



● IN CAPITAL CITY, UTOPIA:

○ THE SCIENCE...



○ THE POLICY...

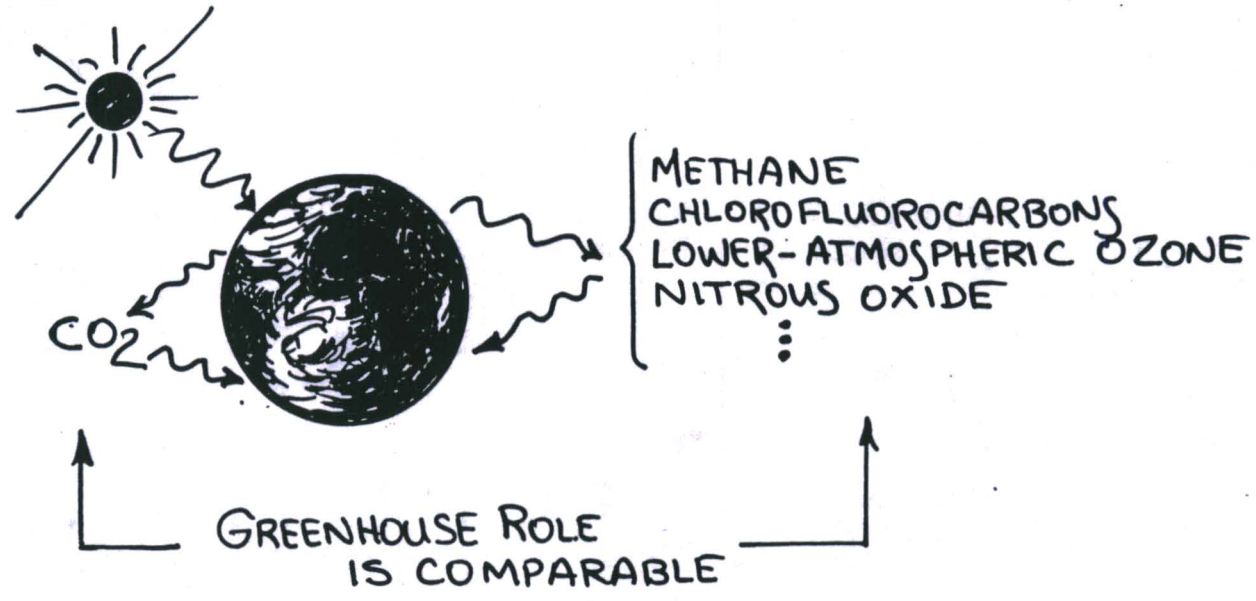
- (A) NATURAL CHANGE → WE KNOW HOW TO ACCOMMODATE IT. → SAVE \$
- (B) HUMAN FORCING → WE KNOW HOW TO MEND OUR WAYS. → $\frac{\text{COST}}{\text{BENEFIT}} \ll 1$

● BUT HOW ABOUT IN WASHINGTON, D.C.?

KNOWN & UNKNOWN

● CLIMATE-CHANGE FORCINGS: (TWO EXAMPLES)

(A) RADIATIVELY IMPORTANT TRACE SPECIES...



○ THEIR ABUNDANCES ARE INCREASING. UNEQUIVOCAL DATA

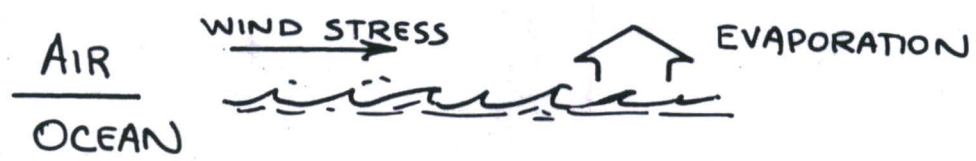
○ EMISSION SOURCES? • CO₂ ~FOSSIL FUELS
 • METHANE LIKELY CANDIDATES (BUT STRENGTHS ARE UNCERTAIN)

(B) SOLAR IRRADIANCE...

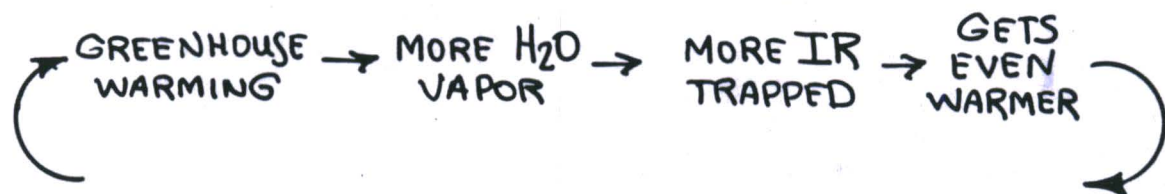


● PHYSICAL RESPONSE PROCESSES: ("THE CLIMATE MACHINE")

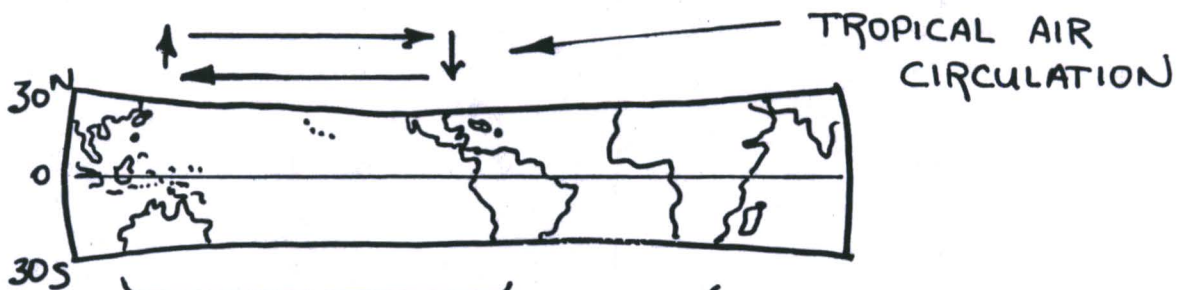
○ PHYSICAL AIR/SEA COUPLING... (A "PART")



○ WATER VAPOR FEEDBACK... ("LINKAGES")



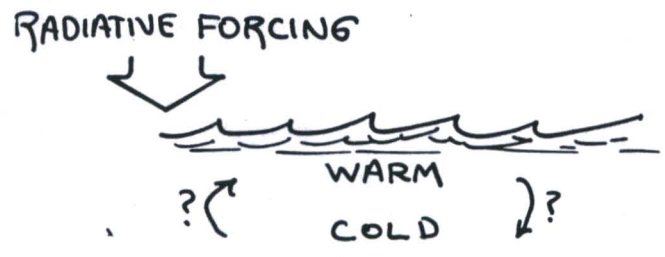
○ EL NIÑO/SOUTHERN OSCILLATION... ("SUB-ASSEMBLY")



WAXES/WANES ~ 2 YRS

CURRENT RESEARCH IS FOCUSED ON PREDICTING IT.

○ OCEANIC THERMAL INERTIA... ("WARMUP PERIOD")



RESULT: DELAYED WARMING BUT HOW LONG?

● BIOLOGICAL RESPONSE PROCESSES: (EXAMPLES)

○ MICROSCALE...



LEAF STOMATA

PRODUCTIVITY: FORESTS/CROPS

MECHANISMS: • CO₂ STIMULATES GROWTH

• WARMER TEMPERATURES AID GROWTH

▶ BUT HIGH VARIATION IN RESPONSES!

○ MIDDLE SCALE...



FOREST COMPOSITION

MECHANISMS: • RAINFALL/TEMPERATURE AND REGENERATION

• MOISTURE LEVEL AND FOREST FIRES

• WARMER WINTERS AND PEST MORTALITY

▶ LARGE MAGNITUDE RESPONSES TO SMALL CLIMATE CHANGES

○ MACROSCALE...



AREAL EXTENT OF FORESTS

MECHANISMS: • TEMPERATURE CHANGE AND MIGRATION

• LATITUDE/ALTITUDE COUPLING

▶ "UNDERSTANDING" IS LARGELY EMPIRICAL & BASED ON SPARSE DATA.

WHERE THINGS STAND NOW

(EXAMPLE: PHYSICAL CLIMATE)

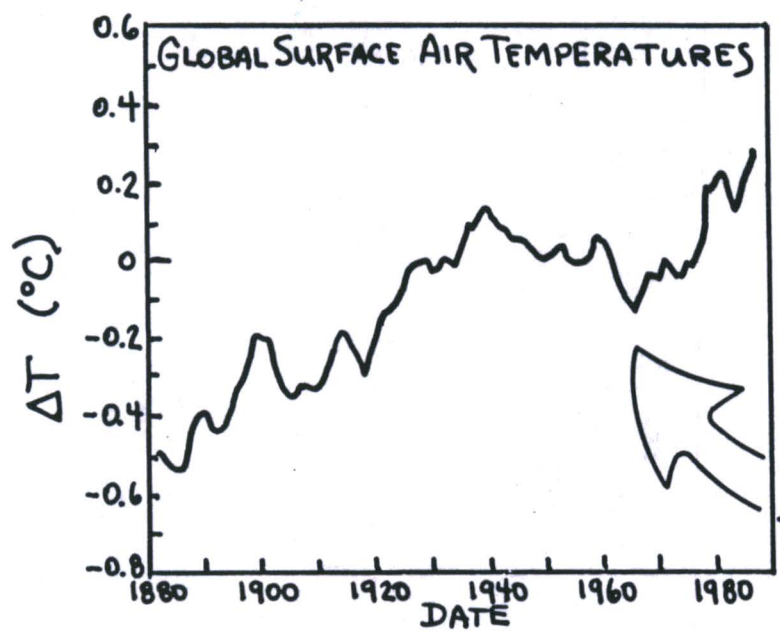
● CURRENT THEORY (I.E., PREDICTIONS):

GLOBAL CIRCULATION MODELS (GCM'S): { TEMPERATURE PREDICTIONS ARE THEIR "BEST" OUTPUT.

○ THE FUTURE: DOUBLED CO₂ → 1.5 - 5.5°C TEMPERATURE INCREASE EVENTUALLY.

○ NOW: 0.3 - 1.1°C INCREASE FROM PAST TRACE-GAS EMISSIONS.

● CURRENT OBSERVATIONS:



○ MAGNITUDE CONSISTENT WITH PREDICTION!

0.3 - 0.7°C WARMING OVER PAST 100 YRS

○ BUT THE SHAPE IS NOT CONSISTENT.

THE UNNERVING POINT: GCM'S CANNOT EXPLAIN THIS VARIATION.

★ SO HOW GOOD ARE THEIR CO₂ PERTURBATION CALCULATIONS?

WHAT DOES ALL OF THIS MEAN?

(A SUBJECTIVE REPLY)

Q: WILL TRACE-GAS GROWTH INCREASE RADIATIVE FORCING?

YES. UNDOUBTEDLY. EVERYONE AGREES.

Q: HOW WILL THE PLANET RESPOND?

MOST (BUT NOT ALL) BELIEVE THAT EVENTUAL WARMING IS "LIKELY".

Q: HAS A GREENHOUSE SIGNAL BEEN SEEN (I.E. THE WARM 1980'S)?

THERE IS NO CONSENSUS AND, INDEED, THERE IS A WIDE SPECTRUM OF OPINION.

Q: IS THE CURRENT U.S. DROUGHT DUE TO THE GREENHOUSE EFFECT?

NO ANSWER. CURRENT MODELS CANNOT PREDICT EVENTS OF A GIVEN REGION OR YEAR.

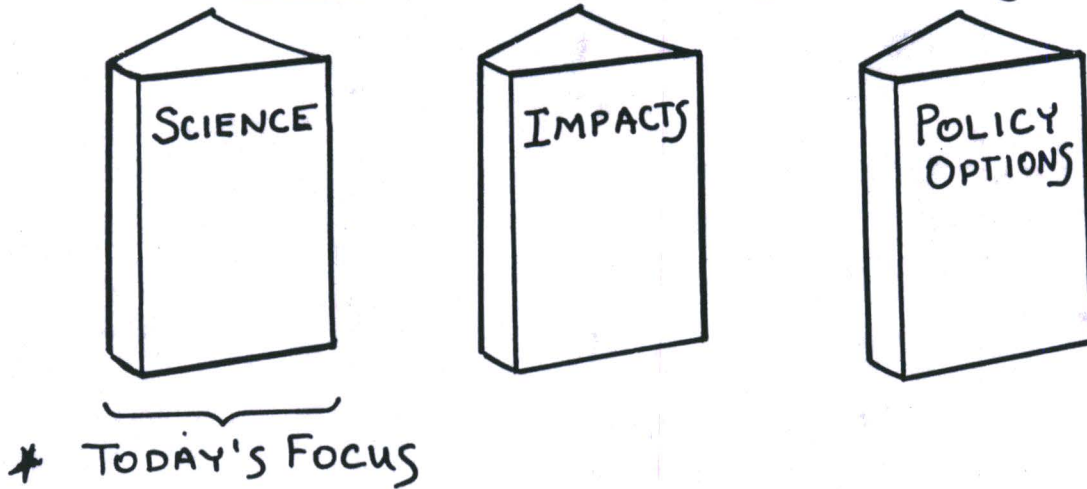
CAN THIS PICTURE BE SHARPENED UP?

QUITE LIKELY...

B) STATE-OF-THE-SCIENCE REVIEW OF CLIMATE CHANGE

● CONTEXT:

RECENT CALLS FOR CLIMATE "ASSESSMENTS":



● RESPONSE: SCIENCE

CEJ SUBGROUP REQUESTED A DRAFT PLAN FOR A REVIEW FROM NASA, NOAA, NSF.

THE RESULT...

● GOAL:

TO PRODUCE A SET OF: PHYSICAL/EFFECTS RESPONSES (w/ \pm)
 THAT FOLLOW FROM: A SET OF SPECIFIED CLIMATE FORCINGS (NATURAL & MAN-MADE),
 CALCULATED FROM THE CURRENT UNDERSTANDING OF CLIMATE/EFFECTS PROCESSES.

• SCOPE : MAJOR TOPICS

① THE FORCING FUNCTIONS

- REVIEW THE TYPES
- A "STANDARD" SET :
 - NATURAL
 - MAN-MADE: -- MAX
 - "BUSINESS AS USUAL"
 - MIN

② RESPONSE MECHANISMS

- REVIEW THE PROCESSES

③ DIAGNOSTIC TESTS OF UNDERSTANDING OF MECHANISMS

- THEORY VIS-A-VIS OBSERVATIONS } I.E., HOW WELL DO WE KNOW THESE

④ PREDICTED CHANGES

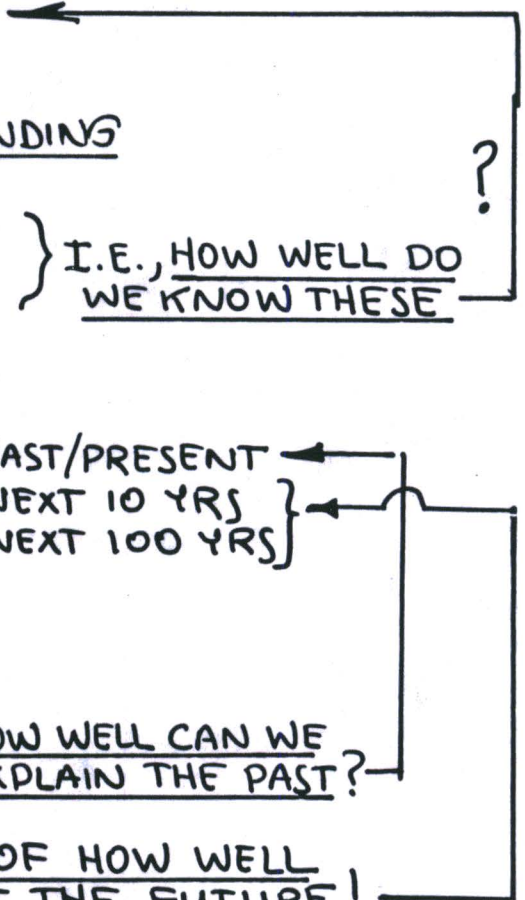
- FOR THE 4 SCENARIOS :
 - THE PAST/PRESENT
 - THE NEXT 10 YRS
 - THE NEXT 100 YRS

⑤ PAST/PRESENT CLIMATE

- DIRECT-DATA EPOCH
- PROXY-DATA EPOCH } I.E., HOW WELL CAN WE EXPLAIN THE PAST?

TO SERVE AS A MEASURE OF HOW WELL WE CAN PREDICT THE FUTURE!

[② - ⑤ INCLUDE BOTH PHYSICAL & BIOLOGICAL VARIABLES]



• PRODUCT: ITS UTILITY

MAJOR POINTS...

◆ INFORMATION AVAILABLE "AT A GLANCE"

THE 4 INPUTS:

CORRESPONDING PREDICTIONS

> NATURAL

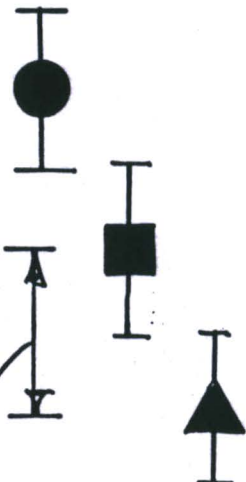
"BASELINE" CLIMATE

LESSON → • AVERAGE
• FREQUENCY OF SEVERE EPISODES

> MAN-MADE:
- WORSE CASE →

"BUSINESS AS USUAL" →

- HEROIC EFFORT TO "CLEAN UP THE ACT" →



↑ ↓
LESSON:
HUMAN-CAUSED
cf.
NATURE:
COMPARABLE
OR
OVERWHELMED?

LESSON: WAS IT WORTH IT?

◆ ONE "VOICE", RATHER THAN:



HOW WILL IT BE ACCOMPLISHED?

- APPROACH:

- COORDINATORS (2-4)
 - CHAPTER CHAIRS (DOZENS)
 - CO-AUTHORS & REVIEWERS (FEW 100)
- } INTERNATIONAL

- TIMETABLE:

- REQUEST FROM CES SG. (24 JUN)
- CONCEPT DESCRIBED TO CES SG. (8 JUL)
- REVIEW BY U.S. SCIENTISTS (29 JUL)
- DESCRIPTION TO DPC W.G. (12 SEP)
- REVIEW BY NAS & CES PRINCIPALS SEP
- INTERNATIONAL DISCUSSIONS EARLY FALL
- STEERING GROUP - WORK PLAN LATE FALL
- PREPARATION (W/PROGRESS REPORTS) 1989
- REVIEW SPRING 1990
- COMPLETION FALL 1990

- REPORT:

- AVAILABLE TO ALL INTERESTED
(OF COURSE, IT CAN THEN BE INTERPRETED: -NATIONALLY)
- BY AGENCY
-
- NO INTERIM CONCLUSIONS
(POTENTIALLY TOO CONFUSING)

**A STATE-OF-THE-SCIENCE REVIEW OF CLIMATE CHANGE:
A PROPOSED PLAN**

Bob Watson (NASA)
Dan Albritton (NOAA)

12 September 1988

Contents:

- o **AN OUTLINE OF THE DOCUMENT**
(A "prediction/uncertainty"-oriented review.)
 - I. **SCOPE**
(Goals of the review, rationale for the organization, major research topics, examples, and key questions.)
 - II. **TABLE OF CONTENTS**
(Details within each of the major research topics.)
- o **THE PROCESS OF THE REVIEW PREPARATION**
(Document preparation team, interactions, and timetable.)
- o **U. S. AGENCY INTERFACE COMMITTEE**
(Agency and organizational scientific representatives who are the contact points.)
- o **AD HOC U. S. SCIENTIFIC "SCOPING" GROUP**
(Small group of U. S. scientists who provided initial comments on the scope and approach proposed above.)
- o **INTERNATIONAL SCIENTIFIC STEERING COMMITTEE**
(Group of worldwide scientists who - when approached with a sound plan, momentum, and a challenging undertaking - will be willing and interested in providing scientific guidance from an international perspective.)

STATE-OF-THE-SCIENCE REVIEW ON CLIMATE CHANGE: AN OUTLINE

Perhaps the best structure for the Review is something resembling (i) the way the atmosphere works and (ii) the way that the research proceeds; namely:

- o from cause to effect [i. e., (1) -> (2) -> (4) -> (6) below],
- o with tests of the understanding of both the individual parts [i. e., (3)] and the whole [i. e., (5)] to define the uncertainty range in the predictions.

I. SCOPE AND MAJOR RESEARCH TOPICS

The Review will consist of an introduction and six major parts:

INTRODUCTION; an explanation of the goal of the review. It is the following:

To produce a *set of predicted physical/effects responses* (with, of course, quantified uncertainty bands) that follow from a *set of specified climate-forcing inputs* (natural processes and human-caused perturbations, the latter being simple and generic), calculated based on the current understanding of *climate/effects processes*.

(1) THE FORCING FUNCTIONS; i. e., the changing natural and human-caused *inputs* (e. g., solar irradiance changes and trace-gas increases) to the climate system. {**What initiates climate changes?**}

(2) THE PLANETARY RESPONSE PROCESSES; i. e., the climatic-response processes (e. g., water-vapor greenhouse feedback and ocean-atmosphere interactions) that are the "*machinery*" wherewith the climate system responds to the changed input. {**What is our picture of the working mechanisms?**}

(3) THE TESTS OF THE UNDERSTANDING OF THE SYSTEM; i. e., *diagnostics*, namely, the process-oriented experiments, calculations, and their comparisons that evaluate the level of understanding of the structure of the climate system (e. g., lower-stratospheric warming observed in the tropics after El Chichon vis-à-vis the predictions of local heating rates based on the calculated amounts of IR absorbed by sulfuric acid droplets). {**What are the indications that the parts of our picture are realistic?**}

(4) THE PREDICTED CLIMATIC CHANGES; i. e., *prognostics*, namely, the new climate state(s) (i. e., greenhouse warming from IR forcing and surface cooling from dust forcing) that are predicted to follow from the input forcings in (1) above. {Based on our picture of the climate mechanisms: What inputs are contributing to the current climate scene? For selected future climate-input scenarios, what is the range of climates that may lie ahead?}

(5) THE PAST CLIMATE RECORD; i. e., the long-term record of past responses (i. e., *paleoclimate*) to climate forcings, which can be used, within limitations, to test, retrospectively, the ability to rationalize cause and effect on time scales of decades to centuries (since we can't wait for the next century of data before starting such testing of our overall understanding of how the climate machine works!). {How well do our climate models "predict" the past, since we will likely do no better in predicting the future?}

(6) THE CONSEQUENCES OF CLIMATE CHANGE; i. e.; "effects", namely, the predicted environmental consequences (e. g., perturbations of sea level and alteration of agricultural processes) of natural or human-induced climate changes. {How well do we understand those aspects of climate change that cause *Homo sapiens* the most concern?}

II. TABLE OF CONTENTS

The table below gives examples of some of the details that would be in each major category. There may well have to be more than one chapter for each category.

(1) THE FORCING FUNCTIONS

- (a) Anthropogenic
 - Carbon dioxide
 - Other radiatively important species
 - Land use
- (b) Natural
 - Solar irradiance
 - Volcanoes
- (c) Historical trends
- (d) Future projections and sample scenarios

(2) THE PLANETARY RESPONSE PROCESSES

- (a) Water vapor greenhouse feedback
- (b) Ice-albedo feedback
- (c) Cloud feedback
- (d) Ocean - atmosphere interactions
 - Global SST - circulation/precipitation
 - Heat capacity - ocean circulation
- (e) Land (soil/vegetation) - atmosphere interactions
- (f) Stratospheric chemistry and radiation balance
- (g) Tropospheric chemistry and radiation balance
- (h) Aerosol (natural-anthropogenic) - cloud interactions
- (i) Trace-gases and the biosphere: source, sink, and response

(3) THE DIAGNOSTIC TESTS OF THE UNDERSTANDING OF THE PROCESSES

- Theory vis-à-vis observations
- (a) Seasonal cycles
 - (b) Biennial oscillations
 - (c) Response to episodic events

(4) THE PREDICTED CLIMATIC CHANGES

- (a) The environmentally important response variables
- (b) The nature and variance of natural changes
- (c) Characteristic signatures of human-caused effects
- (d) The present
- (e) The next ten years
- (f) The next century

(5) THE PAST CLIMATE RECORD

- (a) The direct-measurement epoch
 - Patterns and trends
- (b) The proxy-data epoch
 - Methods
 - Patterns and trends
- (c) Hindcasting: Can we explain the past?

(6) THE CONSEQUENCES OF CLIMATE CHANGE

- (a) Agriculture
 - Forest
 - Crops
- (b) Natural ecosystems
 - Forests
 - Grasslands
 - Tundra
 - Wetlands
- (c) Sea level
- (d) Frequency/magnitude of severe weather
- (e) Ground water
- (f) Human health
- (g) Multiple stresses
 - Climate/ultraviolet radiation/oxidants/acidity/...

THE PROCESS OF THE REVIEW PREPARATION

- o THE DOCUMENT PREPARATION GROUP:
 - Two to four review coordinators.
 - Chapter chairs and co-chairs (dozens).
 - Co-authors (a few hundred).
 - Peer reviewers.
 - Logistical assistance.
 - In all of the above, international in composition.

- o INTERACTIONS WITH:
 1. U. S. Agency Interface Committee.
 2. Ad Hoc U. S. Scientific "Scoping" Group (one time only).
 3. International Scientific Steering Committee.

- o PREPARATION TIMETABLE:
 - Presentation of the initial concept to the CES working group on climate. [8 July 1988]
 - Discussion of the scope/content with Group (2). [29 July 1988]
 - Presentation of the plan to the DPC working group on climate. [12 September 1988]
 - September: Present the plan to the NAS and the principals of the CES.
 - Early fall: International connections established.
 - Late fall: First planning meeting of steering group and authors.
 - 1989: Chapter-preparation meetings.
 - Spring 1990: Review.
 - Fall 1990: Completion.

- o REPORT:
 - Available to all interested.
 - Progress briefings to Committee (1), WMO/UNEP Intergovernmental Panel, et al.
 - No interim findings/conclusions/recommendations.

U. S. AGENCY INTERFACE COMMITTEE

These individuals provide the contact points with the agencies and other governmental organizations. Generally, there will be one representative from the science or R & D side of each agency or organization. Members could include:

- o Science agencies
- o National Academy of Sciences
- o National Climate Program Office
- o Office of Science & Technology Policy
- o Committee on Earth Sciences
- o Office of Technology Assessment
- o Others, as appropriate

AD HOC U. S. SCIENTIFIC "SCOPING" GROUP

This small group of U. S. scientists provided early and initial comments on the scope, content, and approach of the above outline. The selectees were characterized by (i) being scientific leaders in a balance of climate-related fields, (ii) possible liaisons with U. S. scientific organizations, and (iii) *the willingness to provide comments and advice on short notice*. The members are also likely to be involved later as authors.

This initial "scoping" process will take place in two parts. The first took place at a meeting at the NSF on 29 July with Albritton, Watson, and the people listed below. The second step will be written comments from the group.

Baker	o <i>Expertise</i> :	physical oceanographer
	o <i>Institution</i> :	Joint Oceanographic Institute
Mahlman	o <i>Expertise</i> :	general circulation models
	o <i>Institution</i> :	NOAA Geophysical Fluid Dynamics Lab
Malone	o <i>Expertise</i> :	international institutions
	o <i>Institution</i> :	Saint Josephs College
Melillo	o <i>Expertise</i> :	ecosystem biologist
	o <i>Institution</i> :	Woods Hole
Mooney	o <i>Expertise</i> :	plant physiology
	o <i>Institution</i> :	Stanford University
Moore	o <i>Expertise</i> :	ecosystem modeling
	o <i>Institution</i> :	University of New Hampshire
Perry	o <i>Expertise</i> :	meteorologist
	o <i>Institution</i> :	National Academy of Sciences
Rosenberg	o <i>Expertise</i> :	agriculturist
	o <i>Institution</i> :	Resources For The Future

INTERNATIONAL SCIENTIFIC STEERING COMMITTEE

This group of international scientists will provide scientific guidance from the international perspective. The selectees will be characterized by (i) expertise in climate-related fields, (ii) international balance, and (iii) liaisons with international scientific organizations. They are unlikely to be involved later as authors.

The list below is only illustrative, and none on have been contacted in this regard. Many of the examples were suggested by the Ad Hoc U. S. "Scoping" Group at the meeting on 29 July 1988.

Alusa	o <i>Expertise</i> :	cloud physics
	o <i>Country</i> :	Kenya
Bolle	o <i>Expertise</i> :	land-atmosphere interactions
	o <i>Country</i> :	Austria
Bolin	o <i>Expertise</i> :	carbon cycle
	o <i>Country</i> :	Sweden
Crutzen	o <i>Expertise</i> :	atmospheric chemistry
	o <i>Country</i> :	FRG
Duick	o <i>Expertise</i> :	hydrology
	o <i>Country</i> :	DDR
Golitsyn	o <i>Expertise</i> :	climate modeling
	o <i>Country</i> :	USSR
Goudriaan	o <i>Expertise</i> :	ecosystem modeling
	o <i>Country</i> :	The Netherlands
Hassleman	o <i>Expertise</i> :	oceanography
	o <i>Country</i> :	FRG
Houghton	o <i>Expertise</i> :	meteorology
	o <i>Country</i> :	United Kingdom
Kondratyev	o <i>Expertise</i> :	atmospheric science
	o <i>Country</i> :	USSR
Landsberg	o <i>Expertise</i> :	forestry
	o <i>Country</i> :	Austria

Manabe*	o <i>Expertise</i> :	climate modelling
	o <i>Country</i> :	United States
Matsuno	o <i>Expertise</i> :	dynamics
	o <i>Country</i> :	Japan
McBain	o <i>Expertise</i> :	longe-range forecasting
	o <i>Country</i> :	Canada
McCarthy*	o <i>Expertise</i> :	biological oceanography
	o <i>Country</i> :	United States
Moore*	o <i>Expertise</i> :	ecosystem modeling
	o <i>Country</i> :	United States
Oeschger	o <i>Expertise</i> :	ice-core paleoclimatology
	o <i>Country</i> :	Switzerland
Rodda	o <i>Expertise</i> :	hydrology
	o <i>Country</i> :	United Kingdom
Salati	o <i>Expertise</i> :	Amazonia ecoscience
	o <i>Country</i> :	Brazil
Singh	o <i>Expertise</i> :	ecology
	o <i>Country</i> :	India
Sinha	o <i>Expertise</i> :	plant physiology
	o <i>Country</i> :	India
Swift	o <i>Expertise</i> :	soil science
	o <i>Country</i> :	Zimbabwe
Walker	o <i>Expertise</i> :	vegetation
	o <i>Country</i> :	Australia
Washington*	o <i>Expertise</i> :	climate modeling
	o <i>Country</i> :	United States
Wiin-Nielsen	o <i>Expertise</i> :	meteorology
	o <i>Country</i> :	Denmark
Ye	o <i>Expertise</i> :	climate dynamics
	o <i>Country</i> :	People's Republic of China

* Subject to discussions with NAS.