

DATE October 31, 1977

TO  John W. Harrison	REFERENCE  77GR 961
FROM  Henry Shaw	SUBJECT  Environmental Effects of Carbon Dioxide

On October 15, 1977, I attended a meeting in Atlanta of the study group on global environmental effects of carbon dioxide. The group is chaired by Dr. Alvin Weinberg of the Institute for Energy Analysis. Dr. Ralph M. Rotty of the Institute for Energy Analysis is the secretary. Other members of the group include Dr. Melvin Calvin of Lawrence Berkeley Laboratory, Dr. Wilmot Hess, Director of the Environmental Research Laboratories of the National Oceanic and Atmospheric Administration (NOAA), Dr. Norman Hackerman, President of Rice University, Dr. Thomas Malone, Director of the Holcomb Research Institute, and Dr. Ruth Patrick of the Philadelphia Academy of Scientists. Drs. Hess and Hackerman were absent from this meeting. Also present at the meeting were Mr. David Slade, Deputy Manager of Environmental Programs and Acting Director of the special office to address carbon dioxide questions, and Mr. Phillip A. Garron of the U. S. Department of Energy, Office of Public Affairs. The public was represented by Mr. L. A. McReynolds, Manager of Environment, Consumer Protection and Standards for the Phillips Petroleum Company, and myself.

Dr. Alvin Weinberg opened the meeting by explaining that the study group had been empowered, as a subgroup of the Environmental Advisory Committee to the Department of Energy, to make recommendations to Dr. Liverman. The formation of the Environmental Advisory Committee had been requested by Dr. Liverman, but the committee never got underway. Therefore, the study group was a subgroup of a committee that had yet to be formed. These organizational considerations are apparently a result of OMB's attempt to reduce the number of federal committees.

Dr. Rotty discussed the minutes of the May 21 meeting (previous meeting), and in the discussion of the minutes it became apparent that Dr. Rotty is Dr. Weinberg's right-hand man in this study group. Mr. Slade followed on the agenda with a discussion of the establishment of the Office of Carbon Dioxide and Environmental Effects, and on organizational questions concerning his office, the study group, and the plans for research in the future. He distributed a rough draft of his research plans for the next two to three years, but would not give me a copy, claiming that it was much too rough to be disseminated to the public. Mr. Garron promised me a copy as soon as it is polished. From the discussion, I gathered that the government's plan centers around finding an acknowledged expert, a key individual who, as part of a research institute or other type organization, will take the lead in the CO<sub>2</sub> program. The current funding is on the order of \$1 million which will be increased in FY'78 to about \$1.5 million, and in FY'79 to \$9.3 million. This funding level was arrived at from the recommendations made at a meeting of experts in CO<sub>2</sub> effects held in Miami Beach (March 7-11, 1977).



The Miami Beach Workshop was attended by about 70 experts in climatology, ecology, forestry, agriculture, geochemistry, and oceanography. Based on the discussions at this Workshop, the Weinberg study group recommended that DOE research money be committed to three specific projects which must be started immediately:

1. The determination of the amount of carbon stored, and the rates of fixation and release from the major forest types of the world.
2. The verification of the carbon dioxide buffer factor in ocean water.
3. The measurement of carbon dioxide in the atmosphere and on the surface of oceans.

In addition, a small amount of research money should be given to acknowledged experts in these areas to write "research program development papers". A list of these research papers is appended to this memorandum.

Dave Slade reiterated that the key step in carrying out the required work to assess the potential environmental damage of CO<sub>2</sub> was to select a key individual and organization as the focal point for this work. He plans to use an RFP route to select the individual. Dr. Weinberg strongly suggested that this individual be a high caliber scientist willing to devote the next ten or more years to this type of work, and who will be protected in an organization that has all the required support facilities. This does not imply that all the research will be done by the organization that wins the contract, but it does indicate that the key individual will be the focal point and administrator of the program. The committee emphasized a number of times that this individual be primarily a scientist, and the program be one of basic research rather than engineering or development-type research. The consensus of the group was that an aerospace type approach, i.e., PERT charts, etc., would not be likely to achieve the desired results.

Dr. Malone then discussed the report recently completed by the National Academy of Sciences on Energy and Climate. He distributed a 40-page summary of the report to all attendees. The National Academy of Sciences report concludes that:

1. The climatic effects of carbon dioxide release may be the primary limiting factor on energy production from fossil fuels over the next few centuries.
2. It does not now appear that the direct generation of heat from the production and consumption of energy over the next few centuries will cause a rise of more than 0.5°C in global average air temperature.
3. There are profound uncertainties regarding the carbon cycle, climate, and their interdependence. These uncertainties can be resolved only by a well-coordinated effort of extraordinarily interdisciplinary character.

The National Academy therefore recommended:

1. The possibility of modification of the world's climate by carbon dioxide release should be given serious prompt consideration by concerned national and international organizations and agencies. Two kinds of action are needed:
  - a. organization of a comprehensive world-wide research program, and
  - b. new institutional arrangements.
2. A world-wide comprehensive research program should include studies on the carbon cycle, climate, future population changes and energy demands, and ways to mitigate the effective climatic change on world-food production.
3. All the foregoing recommendations for research relate to global concerns, and therefore the cooperation of such international agencies as the World Meteorological Organization, the Intergovernmental Oceanographic Commission, and the International Council of Scientific Unions should be sought in responding to them.

A high degree of international government cooperation is called for because of the need for a world-wide set of measurements and network of observing stations. As to the United States, consideration should be given to the establishment at the national level of a mechanism to weave together the interests and capabilities of the scientific community and the various agencies of the federal government in dealing with climate-related problems.

Dr. Malone further indicated that he had recently met with Dr. B. J. Mason of the British Meteorological Service (apparently the world's authority in this area) who was not convinced that CO<sub>2</sub> accumulation in the atmosphere was a very significant problem. Dr. Mason did not question the rule of thumb that a doubling of the current level of carbon dioxide from 330 ppm to about 700 ppm would cause a change of about 2°C on the average in the atmosphere. Dr. Mason did acknowledge that the CO<sub>2</sub> problem is the most important man-made weather problem that we have to contend with. Dr. Malone also reported that Dr. Chatwick of Harwell, on the other hand, considers the CO<sub>2</sub> a major problem and was very receptive to the report from the National Academy of Sciences.

The discussion then returned to the methodology for choosing the director of a CO<sub>2</sub> program task force. Dave Slade visualized the director's role as similar to the role of the director of the sulfate program with EPRI and EPA which is currently funded at about \$5 million level. Another example of a scientist who is the focal point of a major program is Dr. J. D. Balcomb of the Los Alamos Scientific Laboratory. He is heading the area of passive solar cooling and heating which has a program of about \$15 million. Finally, the discussion turned to the recently completed program that assessed the ozone problem relative to the SST.



This was a \$21 million program that lasted about three years and was headed by Dr. Alan Grobecker, who was with the Department of Transportation. He is currently a Division Chief in the National Science Foundation. Dr. Grobecker was both the chief scientist and the manager of the ozone program. The members of the study group seemed to agree that the program was carried out very poorly, and that much of that money was wasted. Dr. Malone indicated that Dr. John Tukey of Princeton University was trying to put together a final document that might salvage some of the results of this program.

Dr. Weinberg then discussed the best political moves to alert the administration to the problems that the study group foresees in climate as a result of fossil fuel combustion. He was careful to indicate that discussions of the potential CO<sub>2</sub> problems should be led by individuals who are not nuclear advocates, since this problem is associated with fossil fuel burning and could be viewed as a political method to promote nuclear technology. Dr. Weinberg mentioned that he would discuss this further with Dr. John M. Deutch who has recently been appointed Head of the Office of Energy Research as an Assistant Secretary of the DOE. Dr. Patrick, a personal friend of Jim Schlesinger, indicated that she would write him a letter outlining the CO<sub>2</sub> problem. Dr. Weinberg felt that this would be an excellent idea and offered to have Dr. Rotty draft the letter for her. Dr. Patrick also offered to bring the subject up at the next EPA Advisory Committee meeting, and this was also strongly endorsed. Finally, it was decided that both Jim Schlesinger and Dr. Frank Press, the Presidential Science Advisor, must be briefed so that they can jointly explain the magnitude of the problem to President Carter. With regard to starting an international effort in this very important area, Dr. Weinberg, who is also chairman of the International Organization for Applied Systems (IOSA), indicated that this organization had taken a lead in assessing the global climatic effect of CO<sub>2</sub>, and at the next meeting he would take a strong stand for the initiation of a world-wide coordinated effort in this area.

A brief discussion was held regarding the desirability of another meeting similar to the Miami Workshop. It was felt that another meeting of this kind would be premature, and Dave Slade was asked to cancel the tentative meeting that was to take place in March 1978. The next meeting of a scientific nature that will discuss the CO<sub>2</sub> effect on climate will probably take place in January 1979.

Before leaving, Phil Garren gave me copies of a press release concerning the establishment of a special office to address carbon dioxide questions, a statement for the record delivered by Jim Liverman to the Subcommittee on Energy and the Environment of the House of Representatives Committee on Interior and Insular Affairs of June 9, 1977, and the testimony presented by Dr. Weinberg before the subcommittee on the Environment and the Atmosphere, Committee on Science and Technology, U. S. House of Representatives, July 21, 1977.

  
Henry Shaw

HS/jep

Attachment



cc: List 1  
W. Bartok  
J. F. Black  
R. W. Scott - FP 101



ATTACHMENT

APPENDIX

Research Program Development Papers  
Commissioned as of July 15, 1977

1. Present and Future Global Fuel Use  
Dr. R. M. Rotty
2. CO<sub>2</sub> Storage and Exchange Rates in Terrestrial Biomass I  
Dr. G. Likens
3. CO<sub>2</sub> Storage and Exchange Rates in Terrestrial Biomass II  
Dr. R. S. Loomis
4. CO<sub>2</sub> Storage and Exchange Rates in Terrestrial Biomass III  
Dr. G. Woodwell
5. Geochemical Determination of Biomass Change  
Dr. M. Stuiver
6. Response of Biota to Increased Atmospheric CO<sub>2</sub>  
Dr. O. Bjorkman
7. CO<sub>2</sub> Storage and Exchange Rates in Oceans I  
Dr. C. D. Keeling
8. CO<sub>2</sub> Storage and Exchange Rates in Oceans II  
Dr. W. S. Broecker
9. Atmospheric Monitoring of CO<sub>2</sub>  
Dr. K. Hanson
10. Improvement of Prediction of Effect of CO<sub>2</sub> on Climate  
Dr. W. Kellogg
11. Modeling of Carbon Cycle and Budget  
Dr. L. Machta
12. Workshop on Plant Responses to Global CO<sub>2</sub> Enrichment  
Dr. B. Strain



AGENDA FOR STUDY GROUP

October 15, 1977 MEETING

10:00 a.m. Atlanta Airport

Delta Group Room 3, Seventh Floor

1. Call to order, remarks, and agenda. A. M. Weinberg
2. Minutes of May 21 meeting. R. M. Rotty
3. Office of Carbon Dioxide Environmental Effects Research D. Slade
  - a. Establishment
  - b. Organizational questions: Office, Study Group, Scientific Directorate
4. General Institutional Arrangements All
  - a. ERDA and nationally
  - b. International
5. Discussion of Report of Miami Beach Meeting All
6. Report on Research Program Development Papers R. M. Rotty
7. Guidance for emphasis (priorities) in FY 1978 Research All
8. Other items
9. Summary and Adjournment (by 5:00 p.m.)

