

## INTER-OFFICE CORRESPONDENCE

DATE November 19, 1979

TO  H. N. Weinberg	REFERENCE 79CR 184
FROM H. Shaw	SUBJECT Research in Atmospheric Science

Atmospheric Science will be of critical importance to Exxon in the next decade. This area encompasses the complex interdisciplinary research that is needed for in-depth understanding of:

- (1) the long range atmospheric transport of sulfates and nitrates across continents and oceans
- (2) the impact of anthropogenic sources on climate
- (3) the mechanism of acid rain formation
- (4) the formation mechanism and dispersion of fine particulates
- (5) the enhanced sorption of carcinogens and trace metals on fine particulates
- (6) the effect of hydrocarbons, halocarbons and other components on atmospheric ozone depletion
- (7) the effect of oxygen depletion in the oceans
- (8) the potential greenhouse effect

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All these critical ecological questions involve a number of disciplines which generally do not interact at Exxon Research, viz., dispersion modeling, climatology, oceanography, atmosphere chemistry, and environmental engineering. See attached articles on the subject.

*why?* { We should determine how Exxon can best participate in all these areas and influence possible legislation on environmental controls. It is important to begin to anticipate the strong intervention of environmental groups and be prepared to respond with reliable and credible data. Such groups have already attempted to curb the budding synfuels industry because it could accelerate the build-up of CO<sub>2</sub> in the atmosphere. In many respects, the potential environmental problems the energy industry may be facing are similar to those that affected the aircraft industry a decade ago. This industry was caught unprepared when confronted with atmospheric ozone depletion due to Supersonic Transports (SST). As it turned out, this rationale for discontinuing further development of the SST is currently believed to be erroneous by the scientific community. A well prepared aircraft industry should have been able to present data indicating that the ozone layer would not suffer irreparable harm due to the NO emissions from a projected fleet of SST's. On the other hand, the apparent damage that can be caused to the ozone layer by Freons is believed to be significant. When Freon based aerosol containers were baned, the chemical industry was also caught unprepared. If the industry had anticipated the problem, it could have been working on substitute propellants, and might have enhanced its image and public credibility by voluntarily stopping the use of Freons. Such a procedure could have avoided government intervention.

It behooves us to start a very aggressive defensive program in the indicated areas of atmospheric science and climate because there is a good probability that legislation affecting our business will be passed. Clearly, it is in our interest for such legislation to be based on hard scientific data. The data obtained from research on the global damage from pollution, e.g., from coal combustion, will give us the needed focus for further research to avoid or control such pollutants. We should be prepared for, and ahead of the government in making the public aware of pollution problems.

Fall-out from intensive study of climate, oceanography, etc., could provide data to better plan fuel distribution systems, and possibly anticipate fuel needs. A first step in evaluating the importance of an atmospheric science program is to form a small task force of knowledgeable people to assess it. I would recommend that a team consisting of a gas phase kineticist, an environmental engineer, and an oceanographer or climatologist develop a list of specific research questions which would be of relevance to Exxon. We should also invite outstanding consultants to consider the possible impact of global ecological factors to Exxon. At some early point we will need to hire a scientist with a national reputation to provide leadership to the area and attract talent. This individual could head the part of the program that we are already committed to, viz., the greenhouse study. I suggest that Dr. Stephen H. Schneider, who will be visiting us on November 20th, may be such an individual, and we should take advantage of his visit here to begin to discuss the subject.

  
Henry Shaw

HS/lw

Attachment

cc: N. R. Werthamer