

Another approach is to mix the fuel with certain materials, such as limestone or dolomite and other materials which combine with the sulfur in the furnace and form a sulfate which remains with the ash and can be removed from the effluent as a particulant. There are areas where this is possible.

We believe there is no single approach to solve this problem. The real problem at this stage of the game is to determine the cost of these various methods and to see under what range of circumstances they are feasible.

Our present program is, again, a systems approach, and the items involved here are to study the coal and oil resources in terms of their sulfur content, develop selective mining operations for leaving behind the sulfur-containing materials, the fixation of sulfur during combustion, or the desulfurization of the waste gases. With this combination I believe, when successful, we will have the techniques to help solve this problem.

A second major area—

Mr. VIVIAN. Mr. Chairman?

Mr. DADDARIO. Yes, Mr. Vivian?

Mr. VIVIAN. The question I have is this:

What is the impact of having a large amount of sulfur oxide dispersed into the atmosphere?

Dr. HIBBARD. Our mission is technical in this case, and we are not competent in the health aspects of these effluents.

We have been working very closely with the Air Pollution Division of the Public Health Service, coordinating our activities and relying entirely upon them for the appraisal of the health aspects and the discussions which involve what are threshold amounts of sulfur oxide. They set the goals in effect and we are trying to achieve them.

Mr. VIVIAN. I presume that some of the sulfur oxides wash out with rains and are deposited on the earth's surface.

Dr. HIBBARD. Yes.

Mr. VIVIAN. Is there any observable reaction that results from this?

Dr. HIBBARD. In general any combination of sulfur oxide in the presence of oxygen and water will result in some form of acid either sulfurous or sulfuric acid, and the concentration of this is dependent upon the particular situation involved.

Mr. VIVIAN. I am trying to find out the impact. I take it that this is a subject you people don't get into?

Mr. PERRY. The concern with sulfur oxides relates only to health effects, and not with respect to the appearance of sulfuric acids.

Those concentrations would be very low.

Dr. HIBBARD. This is a breathing effect, or an interaction of plants.

With respect to auto exhausts, this is a very serious problem because the approaches which are now being taken, and very ably so, are based on existing technology and will not solve the long-range problem of the mounting number of automobiles.

We believe therefore, as we mentioned before, that there should be a systems approach to the long-range solution which will permit a minimum amount of harmful effluent. The problem should be looked at from the basic principles problem and not simply the conversion of existing systems as they now are used.