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NEWS from Paul Tsongas

U.S. SENATOR FROM MASSACHUSETTS

BACKGROUND FACT SHEET ON ACID RAIN

PURPOSE OF HEARING

The purpose of this hearing is to provide the committee with information concerning the phenomenon of "acid rain" and to assess its implications for our national energy policy.

Scientists warn that a sharp increase in the acidity of rain and snow has been observed spreading over ever wider areas of the Eastern United States in recent decades. This phenomenon, they say, poses a serious threat to our lakes, streams, forests, agricultural crops, drinking water and human health. Any increase in emissions from fossil fuel-burning plants is expected to worsen the problem of acid rain.

These findings raise disturbing questions for our energy future, especially in light of the emergence of proposals designed to increase our reliance on coal, this country's most plentiful domestic fuel source. The acid rain problem thus poses the classic challenge to formulate a national policy that satisfies our dual desires to live in an energy secure and environmentally sound world.

The committee seeks to ascertain:

- the nature, sources and effects of acid rain;
- how a potential growth in emissions from fossil fuel-burning plants will affect the acid rain problem;
- what we know now about acid rain, what we still need to know, and whether what we know now provides a sufficient basis for concern and action;
- to what extent concerns and research findings about acid rain are being integrated into our national energy policies; and
- the international scope of the acid rain problem and its implications for our relations with other countries, especially Canada.

BACKGROUND ON ACID RAIN PROBLEM

"Acid rain" is actually a catchall term for the broader phenomenon of atmospheric acid deposition. Besides rain and snow, acidic materials in the form of dry deposition, dew, fog and frosts, also contribute substantially to the increased acidity of our environment.

Acid rain is produced when water vapor in the atmosphere combines with oxides of sulfur and nitrogen, produced in large measure by fossil fuel-burning power plants, to form strong sulfuric and nitric acids. These pollutants are carried by prevailing winds and fall back to earth, often great distances away, as acid precipitation.

The acidity of precipitation is measured on the lower range of the so-called "pH" scale of 0 to 14, where pure water has a pH of 7.0. Because normal rainfall has a pH of 5.6, rainfall with a pH level below 5.6 is known as "acid rain." The lower the number, the more acid the substance. Each number on the scale signifies a ten-fold difference from any neighboring number.

In the Eastern United States, the average pH of rainfall is now between 4 and 4.5, an increase of about 50 times in the last 25 years. Some rainfall has been reported at pH levels as low as 3.0, almost equivalent to the acidity of lemon juice or vinegar. Acid rain not only appears to be spreading in severity, but also in aerial extent. In 1955-56, the area where rainfall was recorded to be below a 4.6 pH level was located in parts of Ohio, Pennsylvania, West Virginia, New York and New England - precisely where sulfur dioxide emissions were highest. By 1975-76, the area with an average pH below 4.6 had extended as far west as the Mississippi River and as far south as Florida.

The Northeast, particularly New England, has been most heavily impacted by the acid rain problem, largely due to the pattern of prevailing winds which transport pollution from the Midwest eastward. The advent of tall stacks, built to decrease pollution locally, has further contributed to the long-range transport problem. Nevertheless, it is estimated that about one-half of the pollutants emitted from their sources return to earth within 300 miles of the source. For example, in New England, roughly 44% of the acid rain is self-generated, 39% is attributable to pollution from the Midwest and Mid-Atlantic states, and 17% is attributable to Canadian sources. Thus, the acid rain problem is also one of local concern.

Technology is available to reduce acid rain by controlling the emission of precursor pollutants at their source, but such controls have been prohibitively expensive. Scrubbers can be effective for removing 90% of sulfur oxide emissions from power plants. Nitrogen oxides control is less well developed, but new technologies do look increasingly promising.

EFFECTS OF ACID RAIN

Acid precipitation can cause a number of serious environmental problems, notably sterility of lakes and fisheries, damage to crops and forests, decreased soil fertility, corrosion of man-made materials and structures, and visibility reduction, as well as adverse effects on human health. This environmental damage can, in turn, be translated into billions of dollars in economic loss.

Over 100 lakes in the Adirondacks and Eastern Canada have already become devoid of fish life. Lakes in the Adirondacks have become 100 times more acidic, from an average pH of 6.8 in the 1930's to about 4.8 in 1975. Because of certain geologic conditions, water bodies in those areas lack the natural neutralizing minerals, like limestone, which would preserve the acid balance needed by the fish to survive and reproduce. In addition, increased acidity mobilizes certain metals such as aluminum, mercury, cadmium and lead into the water, which metals are normally locked into minerals in the soil and the sediments at the lake bottom. Any sudden elevated concentration of these metals can be extremely toxic to fish.

Acid rain threatens to reduce agricultural crop yields because it can cause nutrients to leach from soils, result in direct damage to leaves and increase plant susceptibility to infection from bacteria and fungal pathogens. Some laboratory experiments have shown increased growth of tomatoes and strawberries under artificial "acid rain" conditions, but it has been questioned whether adding sulfur and nitrogen in this way is the best way for plants to obtain nutrients. Moreover, scientists generally maintain that the potential for damage from acid rain far exceeds any potential benefits.

It is also known that acid rain corrodes automobile and building paint, as well as accelerates the deterioration of cement and marble buildings and monuments. Architectural treasures such as the Acropolis and Parthenon in Greece and Cleopatra's Needle in New York City have been degraded more in the last 50 years than in the preceding 2000 years. Visibility has been reduced by 50% in the last 25 years, to a point where it currently averages less than 8 miles in the Northeast.

In addition to the primary effects attributable to acid rain, evidence of secondary effects on human health are becoming cause for grave concern. Inhalation of acid mist may result in lung problems. Acidity in water can increase the uptake of mercury and other toxic heavy metals by aquatic organisms, including fish, which pollution can "bioaccumulate," or increase in concentration as it moves up the food chain to human consumption. Acid rain can also accelerate the bioaccumulation of toxic metals from the soil, to grain and other agricultural crops, and to cattle. Drinking water supplies are also threatened by the leaching of toxic metals either from the watershed or from pipes that corrode from contact with the acidic water. Ultimately, human exposure to these higher levels of pollutants can cause nervous system, kidney, liver, heart and other disorders.

NEED FOR ACTION

The evidence on acid rain has accumulated to the point where the question is now being asked: What can be done about it? While some maintain that action to control the increase of acid rain is premature until the results of further research are known, others believe that given the irreversible nature and serious magnitude of the effects, it would be unwise and unreasonable to await a perfect data base. In light of this controversy and its impact on our national energy policy, especially with regard to fossil fuels, it is of critical importance that the committee examine the current state of knowledge concerning acid rain and begin to discuss alternative courses of action which will insure attainment of our dual national goals of a safe environment and a secure energy supply.