
New reports urge action on acid rain

Scientific data now available seems to show that a broad reduction in sulfur dioxide emissions from coal-fired power plants and other sources will result in an equivalent reduction in the acidity of rain, says a National Academy of Sciences report released this week. The NAS report concludes that there is a direct and identifiable link between the amount of sulfur dioxide spewed into the atmosphere in eastern North America and the problems created by acid rain throughout that region.

The NAS report is one of the strongest statements yet that sulfur dioxide is the main culprit responsible for acid rain. Three weeks ago, a Reagan administration task force report conceded for the first time that man-made air pollution is probably the main contributor to acid rain in northeastern North America (SN: 6/18/83, p. 390). Then earlier this week, the White House Office of Science and Technology Policy released an interim report that recommends steps be taken immediately to start reducing sulfur dioxide emissions. This report estimates that human activities produce ten times the sulfur dioxide and nitrogen oxides that come from natural processes in eastern North America.

The OSTP report warns, "If we take the

conservative point of view that we must wait until the scientific knowledge is definitive, the accumulated deposition and damaged environment may reach the point of "irreversibility." The report summarizes the findings to date of a panel of nine scientists appointed by George A. Keyworth II, presidential science adviser, in 1982 to review U.S. and Canadian scientific studies and provide an independent assessment of the acid rain problem.

The panel report expresses particular concern about the damaging effects of acid rain on microorganisms in the soil. These microorganisms, which are responsible for breaking down organic matter and recycling nitrogen and carbon through the food chain, are especially sensitive to changes in acidity. The report also suggests there is "strong evidence" for the damaging effects of acid rain on limestone monuments, bridges, buildings and other structures. In addition, the panel anticipates that the overall effect of acid precipitation on crops will prove to be comparable to the extent ozone has damaged crops (about 5 percent of the cash value).

The report notes, "Recommendations based upon imperfect data run the risk of being in error; recommendations for inaction pending collection of all of the desirable data entail even greater risk of damage."

In contrast, the NAS study focuses on how pollution sources contribute to acid rain and does not discuss the environmen-

tal effects of acid rain or the costs and benefits of specific regulatory processes. This study was funded entirely by a group of private foundations, unlike the 1981 NAS study, "Atmosphere-Biosphere Interactions: Toward a Better Understanding of the Ecological Consequences of Fossil Fuel Combustion," which had government support. That earlier study called for a reduction of 50 percent in hydrogen ion (acid) deposition.

The new NAS study says that all sulfur dioxide sources in eastern North America must be considered as contributing to acid rain. According to the report, evidence exists that pollutants can travel long distances, although the relative contributions of particular source regions to specific deposition sites remain unknown. The report argues that researchers are a long way from refining mathematical models that describe the interactions and transport of pollutants from sources to receptors. Existing models do not agree with one another and do not fit the scant available field data well. Nevertheless, empirical observations (for example, involving natural tracers in fossil fuels) support the general trend that acid rain in the Northeast comes from sources largely in the Midwest.

These findings, along with the recommendations in the OSTP report, further undermine the Reagan administration's position that more research is needed before an expensive sulfur dioxide emission control program can be implemented. Various bills before both the House and Senate call for emission curbs. For instance, legislation introduced last week by Rep. Henry A. Waxman (D-Calif.) and others requires that sulfur dioxide emissions be gradually reduced by 14 million tons from the present level of about 25 million tons. A tax levy on all consumers of electricity (other than power that comes from nuclear plants) would help pay for the necessary controls. Other bills call for different levels of reductions or other means of paying for emission controls.

Despite these scientific reports and impending government action, John J. Kearney, senior vice president of the Edison Electric Institute in Washington, D.C., which represents the electric utility industry, argues that still more research is needed. "The proposed legislation seems like a multibillion dollar gamble," he says. Based on data supplied by 24 utility companies east of the Mississippi River, Kearney says that proposed acid rain legislation would "hit U.S. consumers very hard" by forcing substantial increases in utility rates so that utilities can pay for mandated controls.

Elizabeth Barratt-Brown of the National Resources Defense Council, a Washington-based environmental group, comments, "The big question, with the growing consensus of calls for action, . . . is how long they will continue to fight controls?"

—I. Peterson

Study shows stress decreases immunity

During times of stress, recent research indicates, people with power-motivated personalities are less able to resist disease than those who are motivated to maintain close relationships.

Writing in the June 25 LANCET, John B. Jemmott III of Princeton University in Princeton, N.J. and in Boston, Joan Z. Borysenko of Beth Israel Hospital, David C. McClelland of Harvard Medical School and colleagues at Tufts University medical and dental schools, measured the levels of an antibody found in saliva — secretory immunoglobulin A — in a group of 64 first-year dental students. During high-stress periods coinciding with major examinations, all the students had significantly lower levels of the antibody than during periods of less stress, such as after returning from a vacation. And those students classified as power-motivated, rather than friendship-motivated, had even lower levels of the antibodies, which fight bacteria that can cause upper respiratory infections and dental cavities.

The researchers say this study verifies a long-suspected belief that stress lowers resistance to infection by temporarily inhibiting some facets of the immune response. Borysenko suspects this inhibition is mediated through the release of hormones, such as epinephrine. Previous

studies have linked stress to serious health problems and early death (SN: 12/15/79, p. 406) and to deficits in cell-mediated immunity in persons who cope poorly with stressful situations (SN: 3/11/78, p. 151). Other studies conducted by McClelland have shown that power-motivated individuals, when confronted with something that challenges their need to have power, excrete abnormally high levels of epinephrine. Still other studies cited in the report demonstrate that epinephrine can inhibit immune function.

"This research," notes Borysenko, "gives us a much clearer view of what the mechanisms [linking a stressful event and illness] might be." Still, she says, "we know very little about how different personality types, emotional reactions and coping styles affect various types of bodily functions — for instance, the output of certain hormones." Borysenko believes that personality type "does make a difference" in how people cope with stress. "Clearly," she says, "what stresses one person is not necessarily stressful to another." Although power-motivated students did not necessarily perceive the program to be more stressful than did their friendship-motivated counterparts, they did express more dissatisfaction with their own performance. —P. Taulbee