EPA Estimates Major Long-Term Ozone Risks

Even halving the current growth in global emissions of CFC-11 and CFC-12 — the two most important chlorofluorocarbons capable of destroying stratospheric ozone — would not be sufficient to prevent serious damage to life now on earth, according to a new five-volume analysis by the Environmental Protection Agency (EPA).

Estimates in the report predict that over the lifetimes of people alive today, increases in the ultraviolet radiation permitted to reach earth as the ultraviolet-shielding ozone layer progressively thins would yield 60 percent more skin cancers in the United States — 20,000 of them fatal — and 600,000 additional cases of cataracts. Moreover, according to the report, the global climatic warming that would accompany thinning stratospheric ozone would raise sea levels dramatically, endangering many coastal communities. The increased ultraviolet irradiation might not only damage crops and sensitive aquatic communities (SN: 9/14/85, p.171), but also increase the generation of photochemical smog — itself a hazard to both human health and crop yields. This increased smog production is a worrisome new angle first reported at an ozone-effects symposium four months ago.

The new EPA study, still in draft form, focuses primarily on the wealth of new findings published since the last National Academy of Sciences report on the subject three years ago (SN: 3/3/84, p.134). Not only does the EPA report assess how changing the emissions of atmosphere-altering pollutants might increase ultraviolet levels reaching earth's surface, but it also provides quantitative new estimates of how such increases could affect the environment.

David Doniger of Washington, D.C., a senior attorney with the Natural Resources Defense Council, says the new study shows that "the ozone situation is more dangerous than we thought it was." As a result, he believes controls on ozone-altering pollutants "are probably going to need to get tighter." He also expects the newfound relationship between stratospheric-ozone depletion and ground-based smog-ozone formation to initiate discussion of a need for greater chlorofluorocarbon (CFC) controls among those state and local government officials charged with reducing smog-ozone levels. One in three U.S. residents lives in an area that already exceeds the current ozone air-pollution standard (SN: 6/28/86, p.405).

Another relatively new focus of the ozone-depletion debate is the role of CFCs as "greenhouse gases." CFCs "can contribute around 20 percent to global warming," says Daniel J. Dudek, senior economist at the Environmental Defense Fund in New York City. Dudek, who has been analyzing the costs of different ozone-protection options, says the new EPA study shows why those worried about about global warming (SN: 9/14/85, p.170) — itself a grave climatic threat — must consider the role of CFCs.

Rafe Pomerance, a senior associate at the Washington, D.C.-based World Resources Institute, points to the report's more quantitative estimates of human health effects from ozone depletion as a factor that "will certainly help motivate governments [to act]." Especially compelling, he and others find, are the new, stronger data correlating malignant melanoma — the most deadly skin cancer — with the wavelengths of solar-ultraviolet radiation that ozone normally screens out.

In 1978, the U.S. government banned the use of CFCs as propellants in aerosol sprays. But as part of a 1984 court settlement, the EPA must now decide whether further U.S. controls on the release of CFCs are needed. The major remaining sources of CFC emissions in the United States are air conditioners, refrigerators and insulating-foam production. The agency must announce the need for further controls by May 1, 1987, and enact them by Nov. 1, 1987.

However, notes EPA spokesperson Chris Rice, "obviously the report will also be used as [background for] our position in the international meeting in Geneva." He's referring to a meeting, scheduled to begin Dec. 1, 1986, of nations that have signed an accord known as the Vienna Convention. Drawn up last year, the convention pledges its members will undertake measures as needed to protect stratospheric ozone.

The U.S. position for this year's round of discussions was unveiled in a Nov. 5 State Department letter sent to all U.S. embassies. It proposes:

- "a near-term freeze on the emissions of all fully halogenated alkanes" — including CFC-11, -12, -113 and Halon-1211 and -1301 — at or near current levels.
- a long-term phaseout in the emissions of these chemicals.
- a periodic review of what is known about ozone modification and its effects on health and the environment — with an eye toward revising as necessary the list of chemicals scheduled for phaseout and individual phaseout dates. It is also possible, the position statement says, that non-phaseout emission ceilings might be allowed for some of the chemicals.

— J. Raloff

Early trials of Alzheimer drug positive

Initial tests of a drug that prevents the breakdown of a neurotransmitter indicate that it may help alleviate some of the symptoms of Alzheimer's disease. But the treatment, described in the Nov. 13 NEW ENGLAND JOURNAL OF MEDICINE, is far from a cure.

Researchers from the University of California at Los Angeles and several other institutions gave tetrahydroaminoacridine (THA) to patients with "moderate to severe" Alzheimer's disease, diagnosed by psychological and biochemical testing as well as by magnetic resonance imaging. THA inhibits the action of an enzyme that breaks down acetylcholine, a neurotransmitter that is deficient in Alzheimer's patients. It also may block potassium channels in neurons, stimulating the release of acetylcholine and improving the action of the neurons.

The cognitive functioning and general orientation of 14 patients alternately given oral THA or placebo improved while they were on the drug, the researchers found. And all 12 of these patients who have continued to get the drug for an average of about a year are doing well. The results suggest, the researchers note, "that THA may be at least temporarily useful in the long-term palliative treatment of patients with Alzheimer's disease."

Further testing will be needed before the treatment can be fully evaluated, the researchers caution, and their concerns are echoed in an accompanying editorial. Kenneth L. Davis of Mt. Sinai Medical Center in New York City, one of the authors of the editorial, told SCIENCE NEWS that other laboratories, including his own, have had some success with drug treatments aimed at maintaining the level of acetylcholine.

But keeping acetylcholine levels up does not address the underlying loss of acetylcholine-producing neurons in the brain. In addition, he says, other neurotransmitters besides acetylcholine become deficient in Alzheimer's patients, making anything that depends entirely on reconstituting the acetylcholine system "a flawed strategy."

"We don't know what effect THA will have on the progression of Alzheimer's," Davis says. "But a conservative assumption would be it will not influence the ultimate course of the disease." *— J. Silberner*