

## Are landfills a major threat to climate?

Most people associate an increase in chlorofluorocarbons and carbon dioxide with such climate-altering changes as ozone destruction and global "greenhouse" warming. However, other trace gas pollutants—including methane—can also affect ozone and warming (SN: 5/18/85, p.308). A new study suggests solid-waste landfills are a substantial source of atmospheric methane right now, and may grow dramatically to become one of the world's largest sources, as developing countries establish more and more waste dumps.

The study, by Paul J. Crutzen and H.G. Bingemer at the Max Planck Institute for Chemistry in Mainz, West Germany, challenges the conclusions of a recently distributed report compiled by the Department of Energy. The Department of Energy report, a five-volume survey of the scientific literature on effects of climate-altering emissions, concludes that sources of atmospheric methane resulting from human activities "seem to be having only a minor influence on the [atmospheric] methane budget."

But the German calculations—based on estimates of the quantity and types of urban wastes disposed in landfills throughout the world—indicate that the anaerobic decay of organic material buried in municipal- and industrial-waste dumps may be contributing between 30 million and 70 million tons of methane per year. If true, that would represent 6 to 18 percent of the methane annually released into the atmosphere, they say, rivaling emissions from such leading natural methane sources as domestic animals, forest burning and wetlands (including rice paddies). In making their calculations, Crutzen and Bingemer ignored wastes generated in rural areas, under the assumption that most of those wastes ultimately are used as fodder or fuel, rather than being dumped.

According to Aslam Khalil, an atmospheric scientist with the Oregon Graduate Center in Beaverton, these landfill estimates "are not inconsistent with any measurements we have made." In fact, he notes, his own tally of source estimates for atmospheric methane, published in 1983, came up about 50 million to 70 million tons short of what could be accounted for in the atmosphere. Landfills might well account for part of that earlier gap, he says.

Writing in the Feb. 20 *JOURNAL OF GEOPHYSICAL RESEARCH*, the German researchers note that although industrialized countries are the main source of landfill-generated methane today, "very large increases in methane production from waste dumps are expected in the coming decades from the developing

world. Consequently, methane production from municipal and industrial wastes could become one of the main contributors to the global atmospheric methane budget."

One way to limit methane emissions from these dumps is to collect the gas before it escapes from a landfill. This will "not only provide an economical energy source, but will also reduce global air pollution significantly," the German researchers say.

Crutzen and Bingemer's thesis "makes sense to me," says Pat Zimmerman, an atmospheric scientist studying methane sources at the National Center for Atmospheric Research in Boulder, Colo. However, he says, the significance of their paper is not in the magnitude of its landfill-methane estimates, which still are subject to large uncertainties. Rather, it may focus researchers' attention on quantifying a new facet of the methane problem, he says.

Zimmerman also cautions against downplaying the contribution of other methane sources. His own work suggests that termites may account for an even higher percentage of methane release (SN: 11/6/82, p.295). "There are a lot of uncertainties throughout this whole problem," he says.

— J. Raloff

## Nuclear licensing on hold

Licensing of nuclear power plants in Seabrook, N.H., and Shoreham, N.Y., has been stalled indefinitely—despite the physical completion of both plants—because some state and local governments have refused to participate in the emergency-evacuation planning for their residents within 10 miles of these plants. Last week, the five-member Nuclear Regulatory Commission (NRC) voted 4 to 1 to endorse a staff recommendation that would make it easier to license nuclear plants held up for this reason (SN: 2/14/87, p.100).

NRC rules currently require state and local government participation in evacuation planning before NRC can grant an operating permit to a new plant. In both the Seabrook and Shoreham cases, the reason given by governments for not participating is that they cannot ensure safe evacuations following a severe plant accident. The new proposal would permit the utilities owning a plant to certify the ability of residents to evacuate safely.

Once the proposed rule change is published in the Federal Register, it will be open to public comment for 60 days. The final rule could go into effect shortly thereafter. However, there is considerable political opposition to the move, and a number of bills are before Congress that would mandate state and local government participation and endorsement of evacuation plans before any new plant could be licensed. □

## GOES-7: Rebuilding the weather watch

Weather satellites used to be viewed as perhaps the classic example of the routine side of the Space Age, but few U.S. space activities are described as "routine" these days. Thus the Feb. 24 liftoff and promising initial checkout of a satellite called GOES-7 have elated officials both at NASA, thanks to the second success in a row of its Delta rocket following a failure 10 months ago, and at the National Oceanic and Atmospheric Administration (NOAA), where hopes are high at last of filling a key gap in its weather coverage.

The usually reliable Delta that failed last May 3 (SN: 5/10/86, p. 292) was carrying what *would* have become GOES-7, sent aloft early to make up for malfunctions that had crippled another GOES and forced NOAA to rely on a single satellite instead of a pair capable of monitoring the entire country. The new GOES-7 is to be positioned in its geostationary orbit above the equator at 75°W longitude, roughly on a line with Philadelphia, while GOES-6 is moved from its present central location at 108°W to 135°W, between the West Coast and the Hawaiian Islands. Restoring the system to its two-satellite spread, says a NOAA official quoted by the Associated Press, is "something to keep everyone jumping for joy from Hawaii to Maine."

GOES-7 also carries an experiment that NOAA hopes will lead to faster alerts via the SARSAT (Search And Rescue Satellite) system, which for more than four years has been monitoring emergency signals from distressed ships and aircraft. The system, which now includes two satellites from the United States and three from the Soviet Union, can relay the signals from suitably equipped vessels to Coast Guard and other facilities that can dispatch rescue forces. Since it went into operation, says James Bailey, chief of NOAA's Search and Rescue Program Management Staff in Suitland, Md., the system has helped in more than 300 separate emergency situations.

The satellites involved so far, however, have been not in geosynchronous orbits, fixed over particular locations on the earth, but in paths that carry them over the planet's poles, so that the entire surface passes beneath them. A limitation has been that in some cases the signals received by the satellite cannot be relayed to their intended recipients until the satellite has come into radio "sight" of a ground station. GOES-7 will enable scientists to test whether the system can be used from the high vantage point of geosynchronous locations, more than 22,000 miles up, both relaying signals from other satellites and sending its own alerts.

— J. Eberhart