GALE WARNER

Low-level Lowdown

High-level radioactive waste grabs most of the headlines, but its less-publicized cousin poses many of the same problems—not the least of which is where to put it.

THIRTY-FIVE MILES north of New York City, Union Carbide Corporation operates a chemical reprocessing plant and a small nuclear reactor. The facility produces some materials used for medical purposes and others used in making nuclear weapons. It also produces a liquid that is considered high-level radioactive waste under one section of the Nuclear Regulatory Commission's regulations. But when the waste is put into 55-gallon barrels with only slightly contaminated paper and metal, the average concentration of radioactivity drops, and the resultant mixture fits within the commission's definition of low-level radioactive waste. The barrels then make the 500-mile journey to the low-level waste dump near Barnwell, S.C., where they are placed in one of 32 trenches and covered with dirt.

While the Barnwell dump is considered a shining star in the waste-management business, significant levels of tritium, a suspected carcinogen, have been detected 200 feet southwest of its trenches.

This story is played out hundreds of times a year. The names and places change, but the problems of low-level radioactive waste stay the same: No one knows how to define it, who should be responsible for it, or how and where it should be discarded.

Currently defined by exclusion, low-level waste is that which does not fall into the high-level category, which includes spent nuclear fuel, reprocessing wastes, and mill tailings from uranium mining. What remains is a hodgepodge of trash from nuclear power plants, factories, research institutions, and hospitals—everything from laboratory animal carcasses and irradiated reactor components to emergency exit signs and residues from the manufacture of luminous watches. Much of this waste is relatively harmless. But some, particularly wastes from radiopharmaceutical companies and contaminated filters from nuclear reactor cooling systems, remain extremely potent for a long time.

Until the 1960s, disposal of low-level waste posed little difficulty. It was simply put into 55-gallon drums, loaded onto Navy ships, hauled out to sea, and unceremoniously dumped overboard. At 6,000 feet below sea level, experts believed, it would

never be heard from again. (But it was, of course; the EPA has since found elevated levels of radioactivity in the seabed and marine life near California's Farallon Islands, where 47,000 barrels of low-level waste were jettisoned.)

With the increase in waste caused by the arrival of commercial nuclear power, it became more viable economically to replace ocean dumping with landfills, and to go from federal to private control. Commercial landfills were patterned after those at a dozen defense installations. Wastes were packaged in steel drums or wooden boxes and dumped into trenches that, when full, were covered with earth.

Apart from their design, low-level waste dumps went corporate with virtually no comprehensive planning or federal oversight. The first commercial dump opened near Beatty, Nev., in 1962. Maxey Flats, Ky., and West Valley, N.Y., opened in 1963; Richland, Wash., in 1965; Sheffield, Ill., in 1967; and Barnwell, S.C., in 1971.

Three of the dumps were short-lived. West Valley closed in 1975, Maxey Flats in 1977, and Sheffield in 1978. Each facility stopped operating because radioactive materials had migrated off the sites. "There isn't a radioactive landfill in any area with 30 to 40 inches of rainfall a year that hasn't leaked," says Marvin Resnikoff, co-director of the Sierra Club Radioactive Waste Campaign. "Landfills act a lot like teabags: The water goes in, the flavor goes out."

But closure has not meant the end of problems at the dumpsites. At Maxey Flats, the largest of the closed dumps, plutonium has been detected more than a mile from the site. Groundwater contaminated with tritium continues to move out of the Sheffield site at the rate of a half mile per year. At West Valley, trenches have been infiltrated with water, creating a "bathtub effect" that has spilled tritium and strontium into nearby streams.

The three remaining commercial dumpsites in Richland, Barnwell, and Beatty have handled all the nation's low-level waste for the last seven years. Residents and state officials are now getting tired of the situation. In October 1979 the governors of Washington and Nevada temporarily shut down the Richland and Beatty sites—the former because waste kept arriving "improperly packaged," in some cases with liquid oozing from the barrels, and the latter because of safety violations.

The governor of South Carolina, fearing that his state would become the low-level dumpsite for the entire country, immediately announced restrictions on the amount of waste the state would accept. Utilities and other producers of low-level waste protested that soon they would have nowhere

to send their radioactive trash. All three states' actions were later rescinded, but they had created a crisis atmosphere that prompted Congress to pass the Low-Level Radioactive Waste Policy Act in December 1980.

Although several studies had recommended that low-level burial sites be returned to federal jurisdiction, the act dumped the problem into the laps of the states. It called on them to form interstate compacts and construct regional burial sites to handle each region's waste. Once negotiated, compacts were to be submitted to Congress for ratification.

The carrot—and the stick—of the bill was a clause allowing regions with ratified compacts to refuse to accept low-level waste from outside the region after January 1, 1986. The theory was that this would motivate states to reach agreement swiftly and begin constructing new dumpsites. Members of Congress patted themselves on the back for having permanently solved the problem of low-level waste while promoting interstate cooperation.

Putting the law into practice, however, has not been quite that easy. Some states have formed compacts, particularly those that now have dumpsites and are anxious to take advantage of the 1986 deadline. But others have delayed, hoping to leave the issue to political successors. In some areas negotiations have broken down or are in limbo as individual states flirt with several different regions, looking for the best deal. And even in regions that have formed compacts, new sites will not be ready until well past the 1986 deadline.

The Northeast, which generates 37 percent of the volume and 57 percent of the radioactivity of the nation's low-level waste, is in the worst shape. Negotiations for a Northeast compact fell apart when the three largest waste-generating states, New York, Pennsylvania, and Massachusetts, refused to join, leaving four smaller states that had already ratified the compact—Connecticut, Delaware, Maryland, and New Jersey—in the lurch. "They thought some big state would join and take the site, and now they don't know what to do," says Priscilla Chapman of the Sierra Club's New England Chapter. The comparatively tiny waste-generating states of Maine, New Hampshire, Vermont, and Rhode Island are adopting a wait-and-see attitude.

Massachusetts is in a unique position. In 1982 voters passed by a two-to-one margin a referendum requiring that any low-level waste facility not exclusively set aside for medical and institutional wastes be approved by the voters.

Meanwhile, the 24 states that do belong to regional compacts are waiting for congressional approval. It may be a long wait. Few members of Congress are likely to vote for anything that might cut off their state's access to the three current dumpsites.

In an attempt to bring order out of chaos, Rep. Morris Udall (D-Ariz.) has introduced a bill amending the 1980 act. The Udall bill recognizes that the 1986 deadline is unrealistic. At the same time it attempts to appease the states that have formed compacts and prod other states into action. The bill would postpone until 1993 the date that regions can refuse nonregional waste, but in the meantime it specifies reduced volume allocations for these sites.

"The Udall bill is on the right track," says Sierra Club Washington lobbyist Brooks Yeager, "but we don't think it goes far enough in addressing some of the key problems." Among these is the present definition of low-level waste, which lumps together wastes that are hazardous for a few years with those that must be isolated for hundreds or thousands of years. The Sierra Club believes the latter should be taken out of the low-level waste category and considered high-level, or perhaps put into a new category of intermediate waste. "Of course, just creating a new category and a new label isn't going to solve the problem," says Chapman. "You still have to figure out

what to do with the wastes. But at least it recognizes that we can't just throw them all into one trench."

Still another question is whether shallow landfills are the most appropriate method for disposing of low-level waste. While the Nuclear Regulatory Commission remains committed to using trenches, others are not so sure. The states of Illinois and Kentucky, for example, will not make the same mistake twice; their two-state compact calls for "above-ground facilities and other disposal technologies providing greater and safer confinement."

Segregating wastes at the source and storing them in above-ground facilities significantly lessens the amount of low-level waste to be dealt with, since wastes that decay to harmless levels of radioactivity in just a few years could then be disposed of as regular trash. Wastes with hazardous lives longer than the expected lifespan of a facility could be removed and sent to a high-level waste repository when one becomes available.

While the initial costs of above-ground storage facilities are higher than the cost of simply digging a ditch, they have several advantages: Waste can be easily monitored and leaking packages identified; the costs of pumping out leaky landfills are eliminated; and storage can be located in any part of the country because siting is less dependent on climate and geology. Logical places to put above-ground facilities might be the sites of defunct nuclear reactors, which "are going to be de facto waste sites for some time to come," says Resnikoff.

The utilities, however, have been reluctant to take any role in either temporary or long-term storage of low-level waste, says Yeager. "They get upset any time someone asks them to take responsibility for the waste they produce."

"Waste disposal is already very expensive, and our concern is that utilities will have to increase rates, hospitals will have to increase fees, and universities will have to cut back on their research," says Mary Paris of the New York State Low-Level Waste Group, a coalition of utilities, hospitals, universities, and manufacturers. "We could do above-ground storage, but it's a question of how much that would cost over the long term," she says.

According to Resnikoff, this kind of argument simply "runs interference" for the utilities, whose current expenses for low-level waste disposal are "so low that you couldn't measure it on your electricity bill." Medical wastes account for 7 percent of the volume and less than 1 percent of the radioactivity of the nation's low-level waste stream; in contrast, utilities produce 54 percent of its volume and 24 percent of its radioactivity. Medical wastes contain mainly short-lived isotopes that can be safely stored in a warehouse for several years and then disposed of as regular trash.

Meanwhile, South Carolina is threatening to close its dump if Congress doesn't stop dragging its feet on ratification of the Southeast compact. Should the Barnwell site actually close, "it would create quite a problem," says Yeager. "The utilities really hold the key to the short-term capacity crisis. It would cost them money, but they can afford to store it and they have the room."

Overall, Resnikoff is encouraged by what he sees as a movement away from landfills, and the opportunity presented by the Udall bill to redefine low-level waste. However, it is crucial that the public be informed if the problems are to be resolved safely. "If we weren't around looking over industry's and regulators' shoulders, my guess is that all this stuff would just be tossed into the backyard," says Resnikoff. "Only with a tremendous amount of citizen activity on this issue can we continue to make headway."

GALE WARNER, *an environmental writer based in Massachusetts, has written for* New Age *and the* Christian Science Monitor. *Her article "Staking Claims on the Last Frontier" appeared in the July/August 1984* Sierra.