LIQUID WASTES

Questioning deep well disposal

The deficiencies of the old saying, "Out of sight, out of mind," are nowhere better illustrated than in the waste-disposal aspects of the environmental problem. Lessons have come hard, but it is finally being realized that the effluents and byproducts of industrial civilization can no longer be sent down the river, wafted into the air or dumped into the ocean without creating unfortunate and sometimes unexpected consequences.

What is to be done with unwanted wastes is another matter. They have to be eliminated at the source, or put somewhere. And despite the growing awareness of the concept that one never disposes of anything, one only moves it about, the search for ever more isolated and politically safe locations for getting rid of waste products continues.

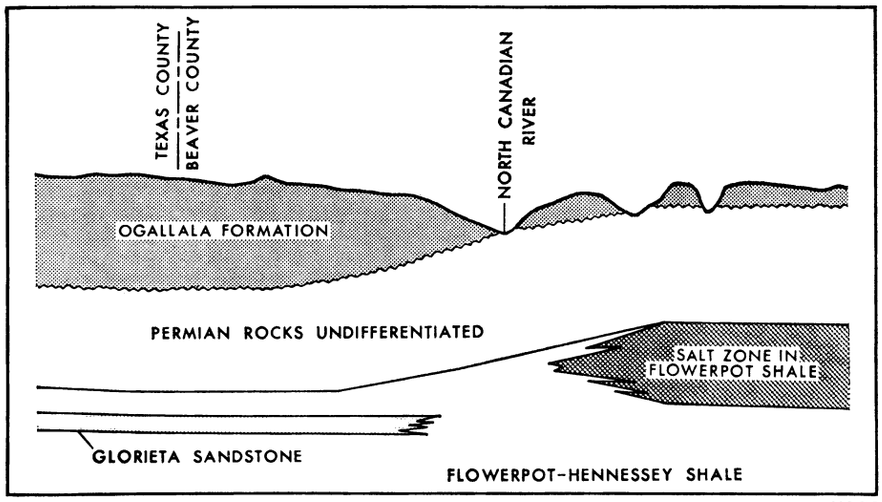
As pressure against pollution of rivers and streams mounts, one possibility for disposal of liquid wastes has become increasingly more attractive: burial deep underground. From 1964 to 1967 more new deep wells for industrial waste injection were put into operation than during all of the previous 14-year period. No survey has been carried out since 1967, but the total number of injection wells is estimated to have increased from 110 to about 150.

Chemical, petrochemical and pharmaceutical plants use wells for injection of everything from alcohols to sulfuric acid. Refineries and natural gas plants dump phenols, acids and spent caustics. Metal products companies flush steel pickling solutions into wells. A paper mill in Pennsylvania, an airliner maintenance facility in Oklahoma, a uranium mill in New Mexico all wash wastes deep into subsurface rocks. Even a large Michigan laundromat has an 1,800-foot-deep well for disposal of its liquid byproducts.

Ground-water experts are becoming troubled by all this acitvity. They are concerned that pressure to protect surface waters is creating a situation potentially dangerous for subsurface water supplies—which furnish one-fifth of the water used in the United States.

"The United States appears to verge on accepting deep injection of wastes as a certain cure for all the ills of water pollution," says Arthur M. Piper, a research geologist for the U.S. Geological Survey. "Uncritical acceptance would be ill advised."

The gist of the complaint by groundwater geologists, such as those in the Geological Survey's Water Resources Division, is that disposal of liquid wastes in deep wells is no more disposal than is the placing of one man's garbage in another man's backyard. Injection is merely storage, and the chemicals—and their potential for water contamination—can never be forgotten.



USGS

Oklahomans fear brine injected into Glorieta rocks may pollute ground water.

An example is the current controversy in the Oklahoma Panhandle and portions of the four adjacent states over the potential for contamination of the Ogallala rock formation, an aquifier that supplies water to 9,000 irrigation and public-supply wells over a 47,000-square-mile area. The USGS has been asked to determine whether disposed oil-field brine injected into the deeper Glorieta Sandstone will move upward into the fresh water. With limited information, its geologists could answer only that it is possible.

As a result of such deficiencies in knowledge, Secretary of the Interior Walter J. Hickel has directed the Geologic Survey to take the lead in a research program to evaluate the effects of underground waste disposal on the subsurface environment, particularly ground-water supplies.

The geologists realize that underground liquid waste injection is here to stay. In many cases it is the most suitable means available for removal of a noxious liquid. But they protest that too little is understood about what happens to the liquids beneath the surface at any particular geological site—where they are liable to go and what they are liable to do.

Piper has a list of what he calls common false premises used in arguments by proponents of liquid waste injection. One is that the total volume of pore space in an injection zone is available to be filled by liquid wastes. In actuality much of that space is already occupied by native brine and other liquids. Another misconception, is that waste placed in a downfolded stratum will remain there, immobile for all time. Hydrodynamic factors commonly determine movement independent of geologic structure.

So far no major contamination of ground water by injected liquid wastes is evident. But so little is known that geologists feel this may be simply temporary good luck on which they don't dare count for long. □

NEW SOCIETY

Toxicity and mutagens

The specter of genetic damage to human beings from environmental contaminants was raised after World War II when it was realized that significant amounts of radioactive fallout from nuclear testing were entering the world's ecosystems and might contribute to genetic aberrations or mutations. The threat was exorcised to an extent by the limited nuclear test ban treaty, which the United States ratified in 1963. New guidelines for X-ray dosages in medical practice reduced another radiation threat to the human gene pool.

Until recent years there has been much less concern about chemical mutagens in the environment. But chemical mutagenicity promises to become a boiling issue in the 1970's with controversies already having erupted over cyclamates, pesticides, LSD and many other substances.

Because some 30,000 new chemicals are discovered annually in the United States, the problem of monitoring both old and new substances for possible mutagenic effects is an immensely complex and difficult one. The Environmental Mutagen Society, which held its first annual meeting in Washington, D.C., this week, was formed last year to bring some structure to a field that has been characterized by fragmented efforts and lack of standardized procedures.

Sorely needed is a standardized set of tests that will allow a positive presumption of mutagenicity, or lack of