



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

This report addresses problems municipalities face in selecting and implementing sludge management systems that dispose of sludge in a safe, beneficial, and cost-effective manner and actions the Federal Government should take to help them. Sewage sludge disposal is a growing problem because the Nation's sludge volume is increasing dramatically; it is expected to double in size by 1987. At the same time, certain sludge disposal methods are being phased out, and use of others is being restricted. Also, development and implementation of new disposal methods is being hampered for a number of reasons.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), the Accounting and Auditing Act of 1950 (31 U.S.C. 67), and the Legislative Reorganization Act of 1970 (31 U.S.C. 1152).

Copies of this report are being sent to the Director, Office of Management and Budget; the Administrator, Environmental Protection Agency; the Secretaries of Agriculture, Energy, the Interior, and Health, Education, and Welfare; Members of Congress; and interested congressional committees.

A handwritten signature in black ink, appearing to read "Percy A. Street".

Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

SEWAGE SLUDGE--HOW
DO WE COPE WITH IT?

D I G E S T

The Nation must change its attitude toward sludge use and disposal if it is to cope with rapidly increasing volumes. Solutions to the problem of sludge disposal must be developed and carried out. The Federal Government, particularly the Environmental Protection Agency, must take the lead in this. The best solution is to use sludge as a resource.

In the past, sludge had been treated primarily as a waste to be disposed of as inexpensively as possible. Now, while sludge volumes are increasing (about 5 million tons annually and expected to double by 1987), generally accepted methods for its disposal are being phased out or subjected to more and more regulations and increased restrictions on use. Landfill sites are dwindling, use of incineration is being restricted because of air pollution standards and fuel shortages, and ocean dumping has endangered human and marine life and will be phased out by December 1981. The question is: How will we dispose of sludge in the future as safely, economically, and beneficially as possible? (See pp. 4, 5, 6, 8, and 11.)

Sludge has many beneficial qualities which have been generally disregarded. It contains essential plant nutrients (phosphorus and nitrogen) which make it suitable as a land conditioner or fertilizer, and it can be converted to energy in several ways. However, some pitfalls to this solution exist. Sludge also contains disease-causing bacteria and varying amounts of toxic substances which limit its use on agricultural lands. Further, the technical and economic feasibility of some energy conversion methods have not been conclusively proven. (See pp. 1, 11, 12, 18, and 22.)

Nevertheless, sludge use as a resource appears to be the most viable solution currently available. This use, however, has not been widely accepted because Federal and State authorities cannot agree and guidance was

lacking for some time on the safe uses of sludge as a land conditioner and fertilizer. Compounding the problem are institutional, political, and legal barriers which often discourage and sometimes prohibit sludge use on agricultural and nonagricultural lands. Furthermore, sludge use as an energy source in pyrolysis and copyrolysis (in combination with solid waste) systems has been demonstrated in small-scale pilot projects but not in large-scale operations needed for most communities. Local officials do not believe that energy conversion systems, particularly copyrolysis systems, will be considered locally because the related costs and risks are too great for communities to bear without substantial Federal support. (See pp. 12, 18, and 22.)

In GAO's opinion, the principal reasons sludge has not been used as a resource are (1) such use was not encouraged, (2) guidance was lacking, and (3) a comprehensive national sludge disposal policy does not exist. As a result, full advantage has not been taken of many opportunities to use sludge as a resource. (See p. 27.)

GAO recommends that the Administrator, Environmental Protection Agency, develop a national sludge management policy emphasizing sludge use as a resource. Such a policy should, at a minimum, discuss agricultural and nonagricultural land uses, sales and giveaways of sludge, and the feasibility of thermal combustion systems. Also, the Agency should

--fund full-scale demonstration projects if the engineering consensus within the Agency is that the feasibility of thermal combustion cannot be determined on the basis of current demonstration projects,

--communicate the results of successful demonstrations to interested communities, and

--monitor the growth and development of systems which have been successfully demonstrated to determine the need, if any, for additional Federal support of these systems. (See p. 28.)

AGENCY COMMENTS

The Environmental Protection Agency fully concurred with GAO's conclusions and recommendations. (See p. 29.)



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ABBREVIATIONS

EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FWPCA	Federal Water Pollution Control Act, as amended
GAO	General Accounting Office
HEW	Health, Education, and Welfare
ISC	Interstate Sanitation Commission
MPRSA	Marine Protection, Research, and Sanctuaries Act
NSF	National Science Foundation
PCBs	Polychlorinated biphenyls
RCRA	Resource Conservation and Recovery Act
USDA	U.S. Department of Agriculture

GLOSSARY

Aquifer	An underground bed or stratum of earth, gravel, or porous stone that contains water.
Conditioning	The treatment of sludge with chemicals or heat so that the water may be readily separated.
Copyrolysis	A method of sludge reduction accomplished by thermal decomposition of solid waste and sludge in an oxygen-free or oxygen-starved environment.
Dewatering	Further separation of water by subjecting the sludge to vacuum pressure or drying processes.
Effluent	The wastewater discharged by an industry or municipality to a receiving water body.
Ground water	The supply of fresh water under the Earth's surface in an aquifer or soil that forms the natural reservoir for public use.
Heavy metals	Metallic elements--such as mercury and cadmium--with high atomic weights, generally toxic in low concentrations to plants and animal life. Such metals are often residual in the environment and exhibit biological accumulation.
Industrial waste	A broad category of wastes from manufacturing operations or processes. These wastes include acids, chemicals, poisons and insecticides, heavy metals, nutrients, and other toxic and nontoxic substances.
Leachate	Liquid that contains extracted, dissolved, or suspended materials from filtering through solid waste or other media.
Oncogen	Causes tumors, both benign and malignant.
Organic	Referring to or derived from living organisms. In chemistry, any compound containing carbon.