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Robert S. Kerr Environmental
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Project Summary

Annotated Literature References on Land Treatment of Hazardous Waste

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This report represents one of a five-part response to the cooperative agreement "Land Treatment Technology Development Systems for Hazardous Wastes." This part provides technical literature annotations of land treatment processes for chemical, hazardous, and industrial solid wastes. Since the concept of land treatment is relatively new for industrial waste, information is widely scattered. Approximately 832 publications, through the year of 1982, were reviewed and annotated for this report.

The other activities of this study were (1) prepare a master research plan for land treatment of hazardous waste, (2) conduct a feasibility study for selecting a pilot plant facility for land treatment, (3) develop the mechanism for a quick data base accessibility, and (4) provide for the peer review of proposals, programs, projects, and publications on land treatment. A sixth activity -- the development of a Land Treatment Technology Panel was added by amendment.

The remaining activities are documented by internal ORD reports since they supply data needs specific to the internal planning and management processes of the Hazardous Waste Land Treatment (HWLT) program. Any portions of interest to designers, managers, or operators of HWLT systems are being incorporated in more comprehensive publications, such as the forthcoming site selection manual.

This Project Summary was developed by EPA's Robert S. Kerr Environmental Research Laboratory, Ada, OK, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

Land treatment is noted in the Resource Conservation and Recovery Act (RCRA, Public Law 94-580) and the proposed regulations issued by the U.S. Environmental Protection Agency's Office of Solid Waste as one of the technologies for management of hazardous waste. This technology currently is being utilized for the disposal of industrial hazardous waste. The term, "land treatment," implies that the land or soil is used as a medium to treat hazardous waste; a land treatment facility is defined as "that portion of a facility of which hazardous waste is applied onto or incorporated into the surface soil." This technology is considered to be a viable waste management option for selected hazardous wastes with potential economic and environmental advantages over other options.

Land treatment must be viewed, planned and managed with the same degree of care and attention given any other technical process operation. The objective of land treatment technology is to design and operate the system to utilize the natural biological, chemical and physical processes in the soil for degrading, attenuating, or otherwise rendering innocuous those wastes receiving such treatment. The waste-soil complexities and natural process interactions must be appreciated and understood if land treatment is to be

acceptably practiced and its use expanded.

Annotated Technical Literature

The available literature on land treatment indicates that a properly designed and operated land treatment facility can provide sound, environmentally safe disposal of waste residuals through the biological, chemical and physical interactions occurring in the soil. Attenuation of the organic constituents occurs largely as a result of degradation by the soil microbiota, while immobilization of metallic contaminants occurs as a result of the physical-chemical properties of the soil. There is, however, considerable information that must be acquired to: (a) satisfy the regulator, designer, operator, and general public on important issues related to this technology, (b) establish a high degree of confidence in soil treatment systems; and (c) utilize this technology to its fullest potential.

Land treatment encompasses a unique and novel approach to degrade noxious and unwanted waste constituents to environmentally acceptable products. This degradation is accomplished by chemical, physical and microbial action analogous to that experienced in biological treatment processes. The upper soil mantle is utilized to trap the contaminants and make them available for microbial action. Through proper management of land processes, soil characteristics may be altered to make a more productive soil, vegetation and a cost-effective treatment process. Concepts of land treatment processes for industrial waste are relatively new, and information is widely scattered, if in existence at all.

An extensive search of the literature was made to secure and summarize that pertinent to this effort. Each piece of information was collated with the major divisions in the research plan. This consisted of: (1) site selection, (2) design, (3) operation and management, (4) monitoring of land treatment systems, (5) closure/post-closure, and (6) economics. A total of 832 articles are summarized.

Results indicate land treatment of selected organic waste to be an attractive alternative cost-effective method. This compilation should be useful to those having a need to rapidly review available information in the areas identified above.

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***M. L. Wood** is the EPA Project Officer (see below).*
The complete report, entitled "Annotated Literature References on Land Treatment of Hazardous Waste," (Order No. PB 84-195 270; Cost: $34.00, subject to change) will be available only from:
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
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The EPA Project Officer can be contacted at:
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