

Technical and Regulatory Guidance for Design, Installation, and Monitoring of Alternative Final Landfill Covers

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EXECUTIVE SUMMARY

This Alternative Final Cover Technical/Regulatory Guidance Document is primarily written for decision makers associated with the plan development, review, and implementation of Alternative Final Covers (AFCs). The decision makers include, at a minimum, regulators, owners/operators, and consultants. This group is also referred as “practitioners” in this document. This document focuses on the decisions and facilitating the decision processes related to design, evaluation, construction, and post-closure care associated with AFCs. To facilitate the use of this document and understanding of the decision process, a decision tree is provided at the end of this Executive Summary. In the electronic version of this document, clicking on any process box or decision diamond in the decision tree accompanied by a section number will take you to that place in the document.

Modern engineered landfills are designed and constructed to minimize or eliminate the release of constituents into the environment. Solid and hazardous waste landfills are required by federal, state, and/or local regulations to cover waste materials prior to or as part of final closure. These final covers are only one element of landfill systems. Clearly the solid and hazardous waste regulations include language and provide mechanisms to support the permitting, design, construction, and maintenance of landfills with alternative covers. In fact, while the current federal regulations contain provisions for the construction of a regulation-prescribed landfill cover, there are no specific provisions requiring the use of a “conventional” cover or disallowing the use of an alternative landfill cover. There are several guidance documents available that provide specific construction techniques related to building landfills. Sometimes a more challenging aspect of AFC implementation is the decision related to the project. This document provides input related to key decision steps in the permitting, design, construction, and maintenance of AFCs.

The U.S. Environmental Protection Agency maintains a database tracking 64 alternative landfill cover demonstration projects and full-scale operating facilities in 18 different states. Annual rainfall associated with these alternative landfill cover projects ranges from a low of approximately 3.5 to a high of 56 inches per year. Twenty-four of the AFCs are demonstration projects, and 11 are full-scale covers at operating facilities. There are 20 solid waste/industrial waste/construction debris demonstration projects currently in the database. There are also two hazardous waste and three mixed waste demonstration projects. This database demonstrates the growing use of AFCs in a variety of settings and further supports the ability of regulators and owners/operators to negotiate, approve, and implement AFCs.

Alternative landfill covers are already in use in a variety of settings, or the designs are approved and field testing is being conducted at pre-Subtitle D unlined facilities, Subtitle D lined facilities, pre-Subtitle C unlined facilities, and Subtitle C lined facilities. There are Subtitle D alternative cover designs in place or approved at industrial, municipal, and debris landfills. Alternative final landfill covers have several potential benefits over the conventional landfill covers, while potentially being equally protective of human health and the environment. In addition, some researchers have documented via test plot studies that AFCs can equal the performance of composite covers in some locations and can outperform conventional compacted clay covers in certain settings. Some of the benefits include, but are not limited to, more readily available

construction materials, ease of construction, less complex quality assurance/quality control programs, increased long-term cover integrity, and stability.

This document focuses on a class of landfill final covers (“alternative” covers) as integral parts of an overall landfill system that differs in both design and operational theory from those prescribed in Resource Conservation and Recovery Act regulations as minimum recommended designs. Several primary types of alternative landfill covers have been proposed by solid, hazardous, and mixed waste landfills. The AFC design process is flexible and creative and is predicated on sound scientific and engineering principles and practices. Alternative covers have been constructed and are fully operational at industrial waste, construction debris, municipal solid waste, and hazardous waste landfills. AFCs may be used on bioreactor, conventional, or other types of landfills. Types of AFCs may include, but are not limited to, asphalt covers, concrete covers, capillary barrier covers, and evapotranspiration (ET) covers. This document focuses on ET covers and the decisions associated with their successful design, construction, and long-term care. Therefore, the AFCs discussed in this document are assumed to be ET covers.

The following diagram is a decision tree leading the user through the general questions and decisions required during the earliest regulatory interpretations, cover conceptual design, site characterization, final design, construction quality control and post-closure care. Each point on this decision tree references the section within the document that provides important information on the topic.

