

CONF 1310915-56

BNL-49599

Regulatory Issues and Assumptions Associated with Polymers for Subsurface Barriers Surrounding Buried Waste*

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ABSTRACT

One of the options for control of contaminant migration from buried waste sites is the construction of a subsurface barrier that consists of a wall of low permeability material. Subsurface barriers will improve remediation performance by removing pathways for contaminant transport due to groundwater movement, meteorological water infiltration, vapor- and gas-phase transport, transpiration, etc. Subsurface barriers may be used to "direct" contaminant movement to collection sumps/lysimeters in cases of unexpected remediation failures or transport mechanisms, to contain leakage from underground storage tanks, and to restrict in-situ soil cleanup operation and chemicals. Brookhaven National Laboratory is currently investigating advanced polymer materials for subsurface barriers. This report addresses the regulatory aspects of using of non-traditional polymer materials as well as soil-bentonite or cement-bentonite mixtures for such barriers.

The regulatory issues fall into two categories. The first category consists of issues associated with the acceptability of subsurface barriers to the Environmental Protection Agency (EPA) as a method for achieving waste site performance improvement.

The second category encompasses those regulatory issues concerning health, safety and the environment which must be addressed regarding barrier installation and performance, especially if non-traditional materials are to be used. Since many of EPA's concerns regarding subsurface barriers focus on the chemicals used during installation of these barriers we discuss the results of a search of the Federal Register and the Code of Federal Regulations for references in Titles 29 and 40 pertaining to key chemicals likely to be utilized in installing non-traditional barrier materials. The use of polymeric materials in the construction industry has been accomplished with full compliance with the applicable health, safety, and environmental regulations. Therefore, it is anticipated that such compliance is achievable when using these materials as subsurface barriers, the installation of which is essentially a construction operation. We also discuss here EPA's injection well regulations, which may apply to installation of subsurface barriers.

INTRODUCTION

One of the options for control of contaminant migration from buried waste sites is the construction of a subsurface barrier that consists of a wall of low permeability material. Subsurface barriers will improve remediation performance by removing pathways for contaminant transport due to groundwater movement, meteorological water infiltration, vapor- and gas-phase transport, transpiration, etc. Subsurface barriers may be used to "direct" contaminant movement to collection sumps/lysimeters in cases of unexpected remediation failures or transport mechanisms, to contain leakage from underground storage tanks, and to restrict in-situ soil cleanup operation and chemicals. (See, for example, Figure 1.) They may be used alone or in combination with techniques such as groundwater pumping, subsurface drains, and *in-situ* biological or chemical treatment methods. Slurry walls are the most commonly used subsurface barriers because they are relatively inexpensive, but grouted barriers such as grout curtains and sheet piling cut-off barriers are also used.¹ The purpose of this report is to identify the regulatory issues and assumptions associated with the use of barriers in the vadose zone to improve the performance of buried waste sites.

*This work was performed under the auspices of the U.S. Department of Energy.

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