



# tech briefs

Westinghouse Savannah River Company

## Chemically Reactive Barrier Mat

### at a glance

Stabilizes wastes *in situ*

Decreases the cost of waste disposal

Easy to use

Effective with broad range of contaminants

U.S. Patent 6,284,681

### for more information

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## Encapsulates wastes, prevents migration

Scientists at Westinghouse Savannah River Company (WSRC) have developed a multi-layer composite barrier mat to prevent the migration of radioactive and/or hazardous wastes to the environment.

### Background

Geologic disposal is a common approach to the storage of hazardous wastes. Disposal sites are typically designed to include a number of physical barriers. Such barriers can include, for example, waste containers, vaults, engineered backfill materials, and impermeable caps. Adding such multiple physical barriers increases the cost of waste disposal.

Use of the new chemically reactive barrier mat can reduce the degree and cost of physical barriers needed to ensure the integrity of a disposal site.

### Active layers target specific contaminants

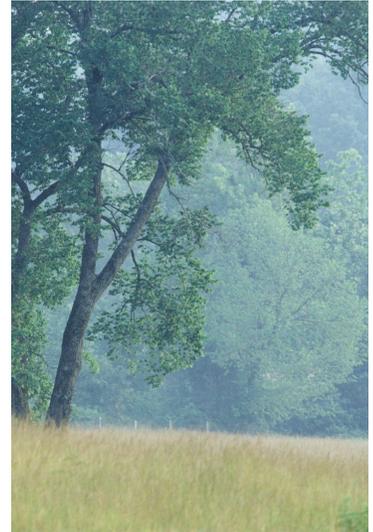
The barrier mat comprises multiple, water permeable, active layers. Each active layer contains at least one reactive agent for stabilizing specific contaminants within the hazardous waste. The active layers are separated by permeable barriers.

The reactive agents are specially selected for the type of waste to be contained. Agents may include ion exchange resins, zeolites, clays, cements, reducing agents, reactive blast furnace slag, reagent chemicals, sodium titanate, magnesium phosphate, amorphous silica, amorphous alumina, calcium hydroxide, kiln dust, and surface active refractories.

Several reactive agents may be mixed in one active layer or may be separated into distinct active layers. The active layers may also include fillers and stabilizing materials. Fillers such as clay, sand, or gravel can be used to control the permeability of the layers.

### Adaptable for different environmental conditions

The active layers are stacked between a bottom layer and a top layer. The material selected for the bottom layer depends on the environmental conditions under which the barrier mat will be used. For example, when the mat is used to line the bottom and sides of a storage pit and the soil surrounding the pit is well drained, the bottom layer may be made of a semi-permeable material. This will allow water entering the storage area to drain into the surrounding soil.



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## Chemically Reactive Barrier Mat

However, if there is a possibility that ground water below the storage area may enter the storage area, the bottom layer may be an impermeable material.

The material used for the top and bottom layers may be woven or nonwoven fabrics, geotextiles, or membranes.

### Easy to install

The barrier mat may come in a long, continuous roll, which could be cut to size in the field. The mat is designed to be flexible to accommodate various surface contours. Active layers may be added to a bentonite-type mat. Such a mat would retain its flexibility and would be easy to construct using traditional mat-forming techniques.

### May be permanent or removable

When used to line a storage area, the mat is designed to provide a permanent barrier to prevent the migration of contaminants.

When used with environmental remediation techniques such as phytoimmobilization, the mat may be removed for disposal. Separating different reactive agents into distinct active layers enables each active layer to be disposed of by a means that is appropriate to the contaminant that has been stabilized in that active layer, thereby reducing the cost of final waste disposal.

### Partnering opportunity

U.S. Patent 6,284,681 has issued on this invention.

WSRC invites interested companies with proven capabilities in this area of expertise to develop commercial applications for this process under a cooperative research and development agreement or a licensing agreement. Interested companies will be requested to submit a business plan setting forth company qualifications, strategies, activities, and milestones for commercializing this invention. Qualifications should include past experience in the commercial uses of similar processes, reasonable schedule for commercial process launch, an established customer base, and evidence of sufficient financial resources for process development and launch.

### Technology transfer

WSRC is the managing contractor of the Savannah River Site for the U.S. Department of Energy. WSRC scientists and engineers develop technologies designed to improve environmental quality, support international nonproliferation, dispose of legacy wastes, and provide clean energy sources.

WSRC is responsible for transferring technologies to the private sector so that these technologies may have the collateral benefit of enhancing U.S. economic competitiveness.

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