

# safeBERM® Structural Fill System

Cost Effective and Environmentally Friendly Option for Coal Ash Storage

## BENEFICIAL REUSE FRAMEWORK - 5 C's

**Commitment** to process

**Creation** of proper, adequate storage

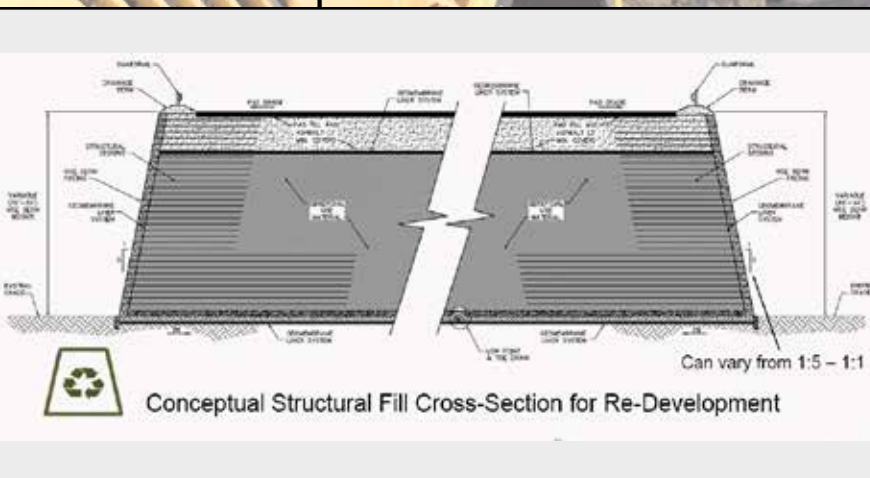
**Consolidation** into smallest footprint

**Compliance** with environmental regulations

**Clean** closure - clean up once!

Utility companies are facing enormous costs to manage coal ash basins. Solutions vary from cap in place to off-site disposal at lined landfills. Using a Beneficial Reuse approach would provide a Better, Faster and Cheaper solution to the storage problem that coal ash producers are faced with today.

EnCAP-IT® has developed a method using its safeBERM® technology to beneficially reuse all of the coal ash excavated from old wet basins as a local beneficial reuse project, while satisfying environmental concerns. EnCAP-IT's safeBERM® Structural Fill System provides proper management of CCR's in an environmentally safe and sustainable manner that supports post-project beneficial development. It is the ideal compromise between the controversial option of capping in place, and the costly option of removal and offsite disposal.



Conceptual Structural Fill Cross-Section for Re-Development

## safeBERM® Structural Fill Storage System

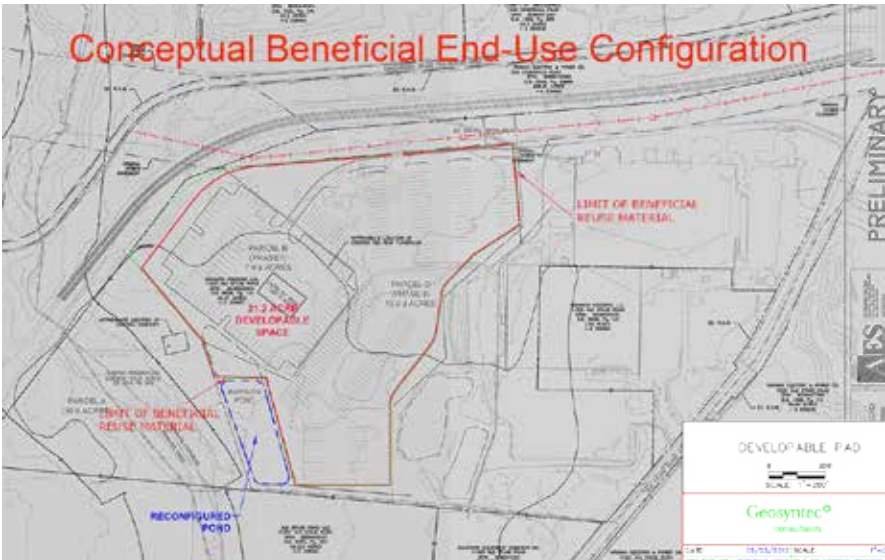
All coal ash is contained within a Subtitle D equivalent or other approved liner system and cap system.

Coal ash mass stability is improved as EnCAP-IT's fully encapsulated berms eliminate moisture from entering the system thereby reducing or eliminating seismic liquefaction.

Coal ash is beneficially used to construct an entombed (not just capped) storage facility at lower cost compared to traditional dry-storage construction or off-site disposal.



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**ADVANTAGES:**

- Beneficially Reuses coal ash to construct long term storage;
- Fully encapsulates (entombs) the ash instead of a single cap;
- Meets coal ash management regulations;
- Flexibility of *safeBERM*<sup>®</sup> design accommodates site-specific configurations;
- Uses the same long-term proven protections the waste industry has been using for decades;
- Reduces the costs of construction and costs of imported construction materials;
- Single handling of material, immediately placed over lined area;
- Creates developable acreage (plateaus) for post-closure applications.

EnCAP-IT's *safeBERM*<sup>®</sup> Structural Fill approach is a viable alternative solution where CCR's can be stored safely at half the cost and timeframe as compared to off-site disposal, while providing much needed developable land.

**Specifications:**

- **Macroencapsulated structural fill is fully lined with internal drain systems;**
- **Reuse of beneficial reuse materials (coal ash) to construct *safeBERM*<sup>®</sup>;**
- **Geomembrane liner above the water table;**
- **Meets EPA Coal Ash Regulations.**

The following is a table representing a conceptual comparison.

OPTION	Amount of Coal Ash (cy)	Dewater Costs**	Excavation Costs	Local Beneficial Reuse Project	Transportation & Disposal Costs	Final Land Reuse (Bring site to final conditions)	Total Cost	Environmental Protection Index (Min 1 to 10 Max)
<b>Cap-In-Place</b> Cheapest option, provides the least amount of environmental protection	3,000,000	N/A - - doesn't meet EnCAP-IT's environmental protection standards					1	
<b>Excavate, <i>safeBERM</i><sup>®</sup> Structural Fill System</b> Reasonable cost option; provides highest degree of public safety; same maximum on-site environmental protection; Ideal Option	3,000,000	managed savings available	\$70.7M	\$46.1M	\$22.5M (trans only - assumes project within 25 mile radius)	\$6.1M	\$145.4M	9
<b>Excavate, Off-Site Disposal</b> Most expensive option; provides maximum on-site reclamation via removal	3,000,000	N/A	\$70.7M	-	\$213.8M	\$5.3M	\$289.7M	9

\* Related to on-site impacts only.

\*\* Working face of dewatering process can be minimized to reduce costs.

^Some information (above) derived from various media outlets