



# Macroencapsulation: An Economic and Environmental Framework for Using Coal Combustion Residuals as Beneficial Reuse

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## BENEFICIAL REUSE FRAMEWORK - 5 C'S

**Commitment** to process

**Creation** of proper, adequate storage

**Consolidation** into smallest footprint

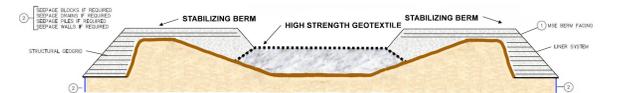
**Compliance** with environmental regulations

**Clean** closure - clean up once!

EnCAP-IT's beneficial use framework utilizes CCRs in berms and engineered structural fills for the closure, retrofit and construction of ash disposal units consolidating the disposal footprint in an environmentally protective manner. EnCAP-IT solutions enable a utility to create an on-site beneficial use program that controls facility liability and minimizes compliance costs.

### EnCAP-IT SOLUTION: CAP IN PLACE

By converting to dry storage and combining EnCAP-IT's encapsulated berm technology with standard geosynthetic capping, existing wet CCRs impoundments/basins could utilize a "hybrid cap." EnCAP-IT's solution moves liability away from waterways, maximizes on-site capacity while consolidating the CCR footprint, minimizes permitting time, and reduces cost.



### ADVANTAGE: CONSOLIDATE FOOTPRINT

Consolidate Multiple Impoundments

Where there are multiple existing wet basins, the dewatered CCRs from additional wet basins can supply the construction fill material for the EnCAP-IT berm system utilized in the final capped wet basin. This approach consolidates multiple impoundments into one lined containment area. The perimeter embankment can be replaced with an EnCAP-IT coal ash-geosynthetic wall using the soils for final cap or used to stabilize "left-in-place" CCRs in the center of a wet basin.

### EnCAP-IT SOLUTION: DRY DISPOSAL CAPACITY

New dry lined disposal capacity can be created by using encapsulated berm technology at power plants with adequate available property or at nearby solid waste disposal facilities.

The solution moves coal ash disposal away from waterways, thereby reducing liability. By using encapsulated CCRs in the construction of MSE berms, the financial burden of construction is dramatically decreased.

### EnCAP-IT SOLUTION: ENGINEERED STRUCTURAL FILL

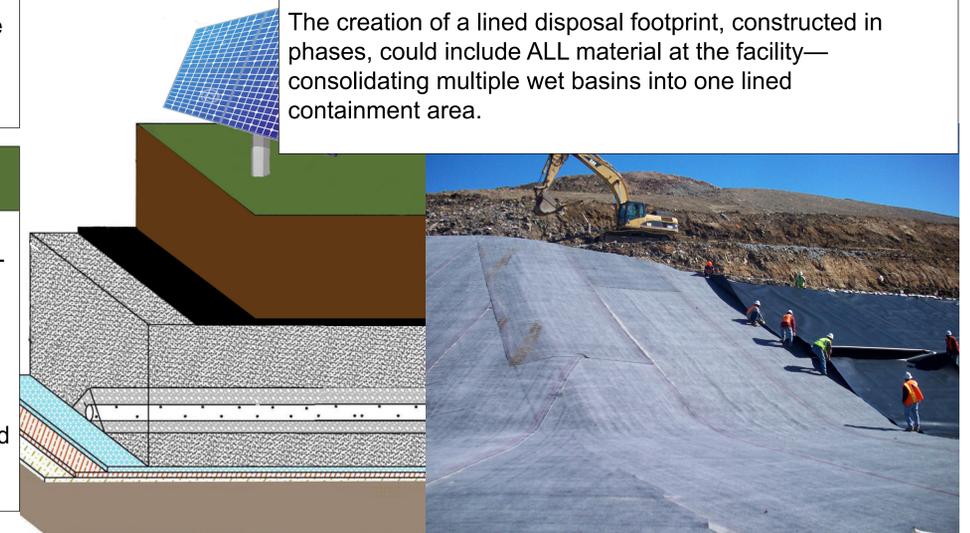
Large-scale structural fill projects have utilized CCRs as fill material for many years. However, due to environmental concerns and new EPA regulations, these projects must now be designed with environmental controls to be considered "beneficial use."

ENCAP-IT macroencapsulation technology with internal drainage allows for the continued use of CCRs as engineered structural fill material.

### EnCAP-IT SOLUTION: WET TO DRY CONVERSION

The ultimate in "clean closure," EnCAP-IT's encapsulated berm technology can cost-effectively convert wet basins to dry lined storage facilities.

The creation of a lined disposal footprint, constructed in phases, could include ALL material at the facility—consolidating multiple wet basins into one lined containment area.



EnCAP-IT has developed retaining berm and engineered structural fill designs that provide a unique and economical solution for every facet of CCR management - from cap and closure to retrofit to the construction of new structural fills.

Encapsulated berms can be utilized for the stabilization of in-place structures, impoundment closure or conversion from wet to dry disposal.

EnCAP-IT technology supports a range of closure, new construction and consolidation solutions.

