We Don’t Have No Stinkin’ Dirt!
Coal Ash Pond Closures
(Traditional and an Alternative Method)

Rosanna M. Saindon¹

¹Geotechnology, Inc., 11816 Lackland Road, Suite 150, St. Louis, MO 63146

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INTRODUCTION

Coal ash pond closures often face unique challenges due to coal fueled utility plants being located in areas where finding a sufficient amount of inexpensive soils to comply with Resource Conservation and Recovery Act (RCRA) Subtitle D and coal combustion residuals (CCR) regulations for closure is a challenge. This paper will summarize field constructability for a traditional RCRA Subtitle D cap and an alternative method.

DESIGN STAGE

Each ash pond closure design involves a variety of components. Typically this will include a Closure Plan, Hydrogeologic Report, Plans and Specifications, Construction Quality Assurance (CQA) Plan, Groundwater Monitoring Program, and Post-Closure Plans. At the beginning of the design stage, a site specific feasibility analysis for alternative capping methods is suggested. Many sites now are closing ash ponds with a combination of clean closure and capping in place depending on the volume of CCR and market conditions in their area. When evaluating the capping in place method, the traditional soil/geomembrane cap should be evaluated against other methods such as turf products, and include potential reuse options such as solar and wind power generation in the life cycle evaluation.

A typical RCRA Subtitle D cap includes a smooth subgrade, geomembrane (typically 40-60 mil HDPE), geonet (if required by slope steepness and storm water design), 2.5 feet of cover soil, 0.5 feet of topsoil, and a vegetative cover (Figure 1). Since these are the current industry standard covers, the design and approval process is straightforward. Typical Subtitle D covers have issues such as erosion, high total suspended solids (TSS) in storm water runoff, and difficulties establishing and maintaining vegetation. The availability of soils, lost air space, difficulties in building partial closures, and limited land reuse options affect the cost effectiveness of this cover option.
Turf technologies have advanced to meet the performance requirements of RCRA Subtitle D regulations and provide flexibility in areas with poor quality soils or low soil availability, long term maintenance at decommissioned facilities, or economic challenges over the lifecycle of the project. ClosureTurf™ is the turf product that Geotechnology has used in design and construction quality assurance for ash pond closures and will be the turf technology discussed herein.

Vegetative Cover
0.5-feet of topsoil
2.5-feet of cover soil
Geonet (if needed)
Geomembrane
Smooth subgrade
The ClosureTurfR system involves a smooth subgrade overlain by an LLDPE or HDPE geomembrane (typically 40-50 mil thick) known as Super Gripnet™, a geotextile with turf material, and a 0.5 inch sand or sand/concrete mixture. The knobs on top of the Super Gripnet™ control the water flow down the slopes. The geotextile with turf material protects the geomembrane from impact and solar radiation that damages exposed geomembrane material, while breaking up wind uplift pressures (Figure 3). The 0.5 inches of sand provides protection to the geotextile and allows for vehicles to drive on top of the material. The sand material can be replaced with sand/concrete mixes in channels where the maximum storm water velocity exceeds 4 feet per second (fps).

![Figure 3: ClosureTurfR cap installed](image)

The ClosureTurfR system reduces issues such as erosion, high TSS in storm water runoff, difficulties establishing and maintaining vegetation and long term maintenance. In-place ClosureTurfR systems have had solar systems installed on top for long term beneficial reuse of the land in some areas. However, if soils are readily available, the upfront cost of installing the ClosureTurfR system can be prohibitive.

CONSTRUCTION STAGE

All cover systems types include CCR dewatering, CCR grading, CQA services, and construction management activities during construction. CCR dewatering is variable, not only between sites, but between ash ponds on the same site (Figure 4). Having experienced contractors and providing comprehensive hydrogeologic information will reduce the risks of dewatering and related issues occurring early in the project that affect the project as a whole.
CQA services involve third party quality assurance activities. These include sampling and testing of the subgrade, soils, and geosynthetics both in the field and in the laboratories. CQA activities for geomembranes and the geomembrane components of the ClosureTurf® system are standardized and include air channel testing (Figure 5) and vacuum box testing (Figure 6). A traditional Subtitle D cap requires observation and testing of soil cover (Figure 7) and vegetation while the ClosureTurf® system then requires observation of the turf seaming (Figure 8) and sand installation. Qualified contractors and geosynthetic installers can save a utility company a significant amount of time and money associated with failed CQA testing and repairs during construction.
Figure 6: Vacuum box testing of geomembrane.

Figure 7: Soil cover placement and spreading for a traditional Subtitle D cap.
Construction management services can be performed by the owner, design team, or CQA team. This includes managing the contractors on site, reviewing submittals, conducting safety programs, and addressing security issues. Depending on the size and complexity of the project, this may require a full time person devoted to construction management activities who reports to the owner.

CONCLUSIONS

Utility operators have options for closing ponds that go beyond the typical clean closure or cap in place with a traditional Subtitle D cap approach. Alternative methods require good communication with regulators in states where they have not yet been used, but may net a significant amount of time and monetary savings over the life cycle of the project.