Coal Combustion Residual Management

The Final Coal Combustion Residuals (CCR) Rule which will potentially impact up to 478 coal-fired generating facilities in the US and hundreds of CCR surface impoundments and landfills focuses on 1) reducing the risk of catastrophic and structural failure, 2) groundwater protection and 3) monitoring and recordkeeping/reporting.

The rule imposes location, design, operating and groundwater monitoring criteria on new and existing landfills and surface impoundments and inactive surface impoundments. Golder is helping power clients across the United States develop a compliance strategy to plan and budget for changes that will impact their operations.

Why Golder?

At Golder, we strive to be the most respected global group specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have decades of experience in CCR and byproduct management, Golder can support your coal-fired facility's continued operation while managing the implications that the new rule will have on overall cost and compliance. To the challenges facing our power clients, Golder brings:

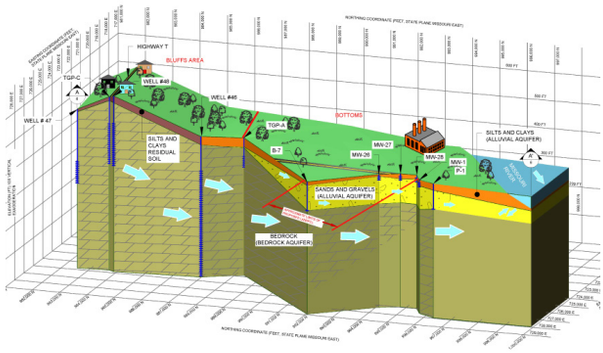
- Experience with siting, design and permitting of power and solid waste disposal facilities
- Understanding of the physical and chemical characteristics of CCRs
- Record of successful impoundment design and construction
- History of innovation in landfill design and the use of geosynthetics

Golder is providing engineering design and environmental services for the design and closure of several ash ponds for a large power client in the Southeast

- World-recognized expertise in impoundment stability analysis and soils engineering
- Current experience in CCR conveyance system design and construction
- Expertise in water management and water treatment
- Long history and detailed knowledge of RCRA Subtitle D
- National CCR team of experts
- Ability to rapidly deploy experienced project teams

COAL COMBUSTION RESIDUAL MANAGEMENT

Golder understands the CCR management issues faced by coal-fired power generation facilities in today's marketplace. Our team of engineers, scientists, permitting specialists and construction managers rely on a history of experience in the mining and solid waste sectors to support clients from the development of a comprehensive CCR management strategy through full-scale implementation and construction of site specific storage and disposal solutions.



Golder is providing hydrogeological services to support the use of the conceptual site model to evaluate surface and groundwater impacts in the vicinity of a CCR landfill.

STRATEGIC PLANNING

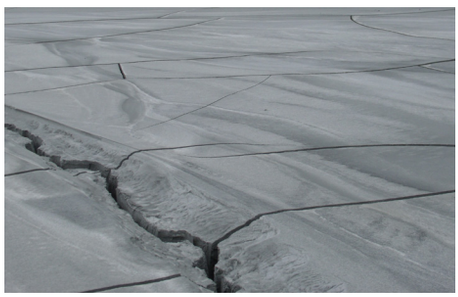
- CCR Rule Review
- Beneficial use evaluation
- Water balance assessments
- Disposal options

- Financial analysis
- Feasibility studies
- Scheduling
- Cost estimation

DESIGN & PERMITTING

- New CCR Landfills
- New CCR Surface Impoundments
- Inactive CCR Surface Impoundments
- Landifill Expansions

- Location restrictions
- Design criteria
- Liner design
- Closure and capping



Golder Paste Engineering and Design performed a feasibility study, pilot plant testing, geotechnical testing, EPCM design, construction and commission of a coal flyash surface paste disposal system to reduce the water in the effluent and minimize the client's environmental concerns with groundwater contamination.

ENGINEERING & CONSTRUCTION

- Hazard potential assessments
- Structural stability assessments
- Safety factor assessments

- Conveyance/materials handling
- Geotechnical, civil, and geophysics
- Soil mechanics
- Construction quality assurance

OPERATIONAL COMPLIANCE

- Groundwater monitoring
- Corrective action
- Post-closure care

- Data management and website development
- Reporting and presentation support

Golder provides facility siting, environmental compliance, remediation, geotechnical, water resource, and civil engineering services to power clients across the country and around the world. Whether you are building a new power plant, operating a facility, divesting, or acquiring generation capacity, Golder has the technical expertise to support your environmental and engineering needs.

In the Northeast, Golder designed a new, lined coal ash landfill expansion to piggyback on the western face of the unlined landfill which meets the EPA CCR rules for CCR disposal. Golder also provided design support and construction quality assurance services during the construction of the 37-acre cap over the original landfill. Our efforts to secure regulatory approval to use fly ash as the intermediate cover and to reduce the intermediate cover thickness from 12 inches to 6 inches helped the client realize a cost savings of $1.9 million.