McIlvaine Hot Topic Hour
Coal Ash/CCR Issues, Standards and Solutions

[→] October 3, 2013
Why? Impact to Waters

Coal Ash Disposal and USEPA Documented Groundwater Contamination
Current Political/Regulatory Situation

1. House of Representatives passes HR 2218

   **US HR clear message – Non-hazardous; Subtitle D RCRA**

2. Legal Action vs. US EPA - Force CCW rule-making
   - Environmental Coalition; Beneficial Use Industry; Utility Group
   - Judge ruling set for October/November
   - Deadline for Rule

3. US EPA - Attempting to respond to rulemaking/reuse concerns.
   - No statutory requirement to do its work by a certain date.
   - Needs a 1-year minimum to respond/change/etc. and certainly not 6-months.
   - A year might not be enough time to develop a set of regulations that are scientifically sound and legally defensible.

4. All options currently call for liner systems - Geosynthetic Opportunities

5. EPA Effluent Guideline Rule – RCRA Subtitle D is likely adequate.
Solid Waste Filter Layer

Compacted Clay Liner (CCL)
Permeability $\leq 1 \times 10^{-7}$ cm/sec

Soil Subgrade

Leachate Collection
Permeability $\geq 1 \times 10^{-2}$ cm/sec

Leak Detection
Permeability $\geq 1 \times 10^{-2}$ cm/sec

Subtitle C

Subtitle D

Solid Waste Filter Layer

Compacted Clay Liner (CCL)
Permeability $\leq 1 \times 10^{-7}$ cm/sec

Soil Subgrade

Leachate Collection
Permeability $\geq 1 \times 10^{-2}$ cm/sec

Compacted Clay Liner (CCL)
Permeability $\leq 1 \times 10^{-7}$ cm/sec

Geomembrane

EPA Minimum Technical Guidance

Geomembrane
Cover Systems

Subtitle C

- Top Soil
- Filter Layer
- Drainage Layer
  - Permeability \( \geq 1 \times 10^{-2} \) cm/sec
- Compacted Clay Liner (CCL)
  - Permeability \( k \leq \) bottom liner \( \leq 1 \times 10^{-5} \) cm/sec
- Solid Waste

Subtitle D

- Top Soil
- Compacted Clay Liner
  - Permeability \( k \leq \) bottom liner \( \leq 1 \times 10^{-5} \) cm/sec
- Gas Vent (if necessary)
- Solid Waste

EPA Minimum Technical Guidance

- Cover Systems
- Subtitle C
  - \( \geq 24" \)
  - \( \geq 12" \)
  - \( \geq 24" \)
- Subtitle D
  - \( \geq 6" \)
  - \( \geq 18" \)

GSE Environmental™
RCRA Subtitle “D” vs. Coal Ash Barrier System

Minimum Subtitle D

Coal Ash Barrier System
Coal Ash Barrier System - Cap

- Top Soil
- Drainage Geocomposite
- Geomembrane [≥40mils]
- Compacted Clay Liner [CCL]
- Intermediate Cover [if necessary]
- Waste
Geosynthetic vs Earthen Materials

- Greater durability, consistency and reliability
- Reduced risk of groundwater contamination
- Ensured compliance with regulations
- Increased landfill capacity; optimized land use
- Easier and quicker to install
- Lower installed cost
- Reduced impact to borrow areas and plant operations
GCL Good for Environment & Neighbors

150 Truckloads of Clay = 1 Truckload of GCLs
CoalDrain:
Engineered to be Effective Geocomposite

✓ More consistent than earthen
✓ More cost-effective than earthen
✓ No piping
✓ No clogging
Performance Issue – Membrane Damage

Survey Data - Defect Perforation Sizes, Nosko & Touze Foltz (2000)

- >10.0 cm² - 76%
- 2.0-10.0 cm² - 18%
- 0.5-2.0 cm² - 6%
- <0.5 cm² - 0%

Innovative Leak Location Liner allows location construction damage even after placement of protective cover soil.
Performance Issue – Chemical Compatibility

Hydraulic Conductivity (cm/s) vs. Time (Days)

≈ 1.21E-07 cm/sec
Or
≈ 70 Pore Volumes
≈ 3,155 cc

≈ 1.00E-09 cm/sec
Or
≈ 598 cc

“Coal Ash Resistant GCL” required in place of Standard GCL to reach equivalence with Compacted Clay Liner
RCRA Subtitle “D” vs. Coal Ash Barrier System