# REINHOLD ENVIRONMENTAL Ltd.


# 2010 APC Round Table
# & Expo Presentation

July 18-20, 2010, in Concord, NC / Hosted by Duke Energy

## Coal Combustion Product (CCP) Management –
# Weathering the Storm of Change

## Impacts Related to the Proposed CCP Rules

**Presented by Mark D. Rokoff, PE, National Practice Leader for CCP Management** (Cleveland, OH)

July 2010

*Business as usual will no longer be business as usual!*

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# Overview

- Introductions
- Trace a brief history of the regulatory actions for CCP materials
- Discuss the current regulatory atmosphere and events that changed "business as usual"
- Present an overview of the draft regulations and next steps
- URS Corporation Capabilities in Coal Combustion Management
- Questions

# Before the Storm – *What are CCPs?*

- Coal combustion products (CCP) affected by the change:
  - Waste products from the combustion of coal and emission control systems, including:
    - Fly ash
    - Bottom ash
    - Flue gas emission control products
    - Boiler slag
    - Fluidized bed ash
    - Cenospheres

# Before the Storm – *CCP Management*

- All aspects of CCP management performed by the states - No federal programs in place
  - 1980 Bevill Amendment – CCP not hazardous waste!
    - The 'Bevill exclusion' excludes CCP from regulation as hazardous waste under Subtitle C.
  - 1993 report
    - Subtitle D designation upheld from Bevill Amendment.
  - 2000 report
    - Final Rule - the agency concluded that CCP are nonhazardous (maintains exemption); also the report calls for federal disposal and reuse guidelines.
  - 2002 report
    - EPA sponsored beneficial use summits focused on barriers to utilization of CCP within the states…Beneficial reuse (or recycling) is now on the rise.

*We have seen similar "storms" in the past.*

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# Approaching Storm – *Lightning Strikes*

- December 22, 2008
  - TVA failure at Kingston
    - Ash dike ruptured-largest fly ash release in U.S. history
    - 5.4 million cubic yards of fly ash sludge into the Emory River and surrounding land
    - Clean up costs approaching $1.2 billion

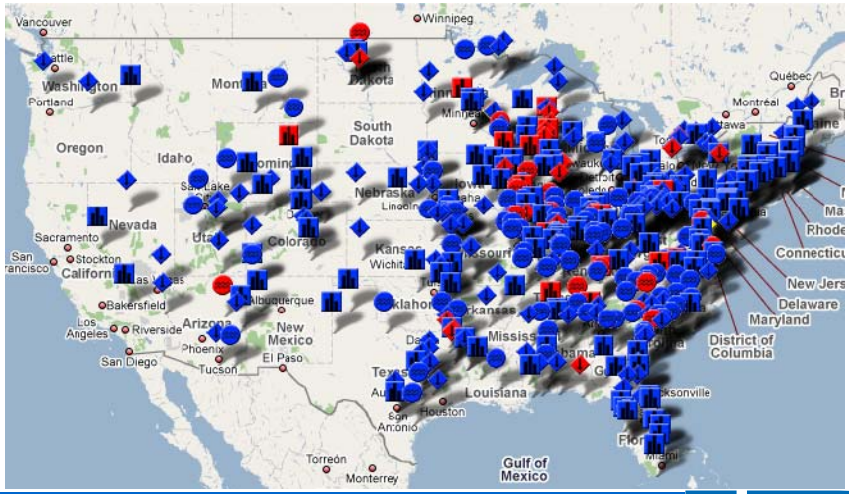
- January 9, 2009
  - Widows Creek Fossil Plant Gypsum Pond
    - Water and gypsum flowed into the settling pond, which filled to capacity and then overflowed after a cap dislodged from a 30-inch standpipe
    - Some material overflowed into Widows Creek, although most of the gypsum remained in the settling pond

# Weathering the Storm – *The First Front*

- Politics push EPA
  - SR 64 - U.S. Senator Barbara Boxer (D-CA)
  - HR 493 – February 2009 - Representative Nick Joe Rahall II (D-WV)
- EPA pushes politics
  - Drafting regulations based on Surface Mining Control and Reclamation Act of 1977 (SMCRA)
  - Congress agrees to wait for EPA action and new programs

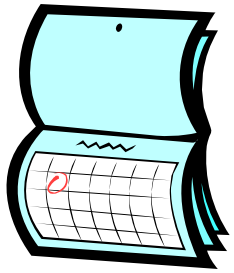
# Weathering the Storm – *The Second Front*

- March 9, 2009
  - EPA sends letters to utility companies requesting information about ash impoundments
  - Compile the data, prioritize sites (determine number of impoundments), and require corrective measures
- Led to announcement of the 44 (or 49) High Hazard sites
- EPA released collection of ash pond data for **584** impoundments at **219** plants in **35** states and final reports for dam inspection site visits (continues to be updated on website)



# Proposed Rule – *Draft and Comment Timeline*

- **On May 4, 2010** – EPA issued an early version of the proposed Rule
- **On May 18, 2010** – EPA issued a correction memorandum to the May 4 version
- **On June 21, 2010** – The rules are published in the Federal Register; 90 Day Comment Period Begins



# Proposed Rule – *Draft and Comment Timeline*

- **Five public hearings:**
  - August 30, 2010 - Arlington, Virginia
  - September 2, 2010 - Denver, Colorado
  - September 8, 2010 – Dallas, Texas
  - September 14, 2010 - Charlotte, North Carolina
  - September 16, 2010 - Chicago, Illinois
- **On September 20, 2010** – The 90 Day Comment Period Ends
- An extension is possible

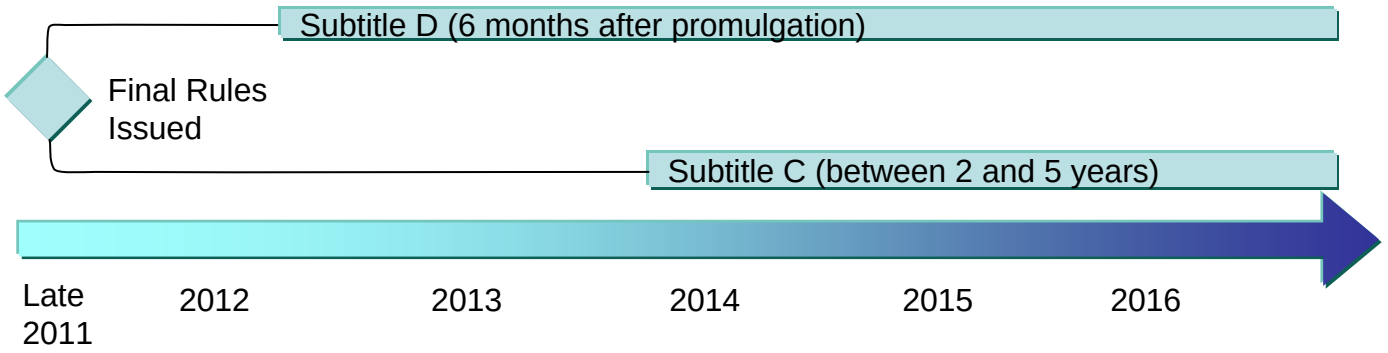
# Proposed Rule – *Possible Timeline*

- Should take a minimum of one year for EPA to issue final
- Final rule subject to judicial review in US Court of Appeals (could last 2 years)
  - Rules will become effective during judicial review process
  - May or may not change significantly (100%)
- Possible completion in September 2013…could be early still

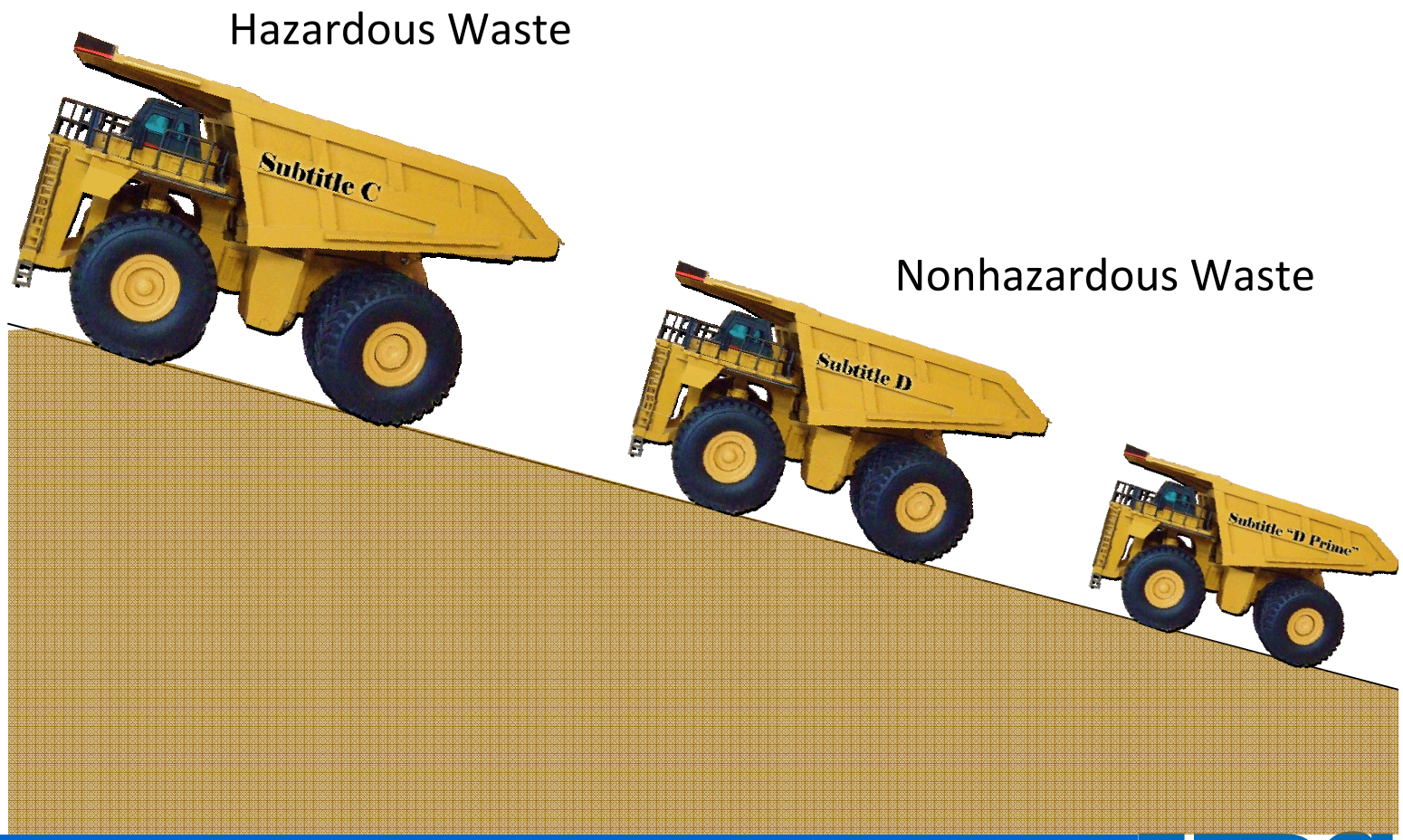
# Proposed Rule- *Implementation*

The proposed rule for the Disposal of Coal Combustion Residuals (CCRs) from Electric Utilities presents two possible approaches for managing CCRs:

- Subtitle C Regulations (Hazardous)
- Subtitle D Regulations (Nonhazardous)- including "D Prime" Option



# An Overview- *No Longer Business as Usual!*



# An Overview- *No Longer Business as Usual!*

Cost of compliance over and above current baseline disposal costs:

| *Option* | *Cost * (millions)* |
|---|---|
| Subtitle C – Special Waste** | $ 1,474 |
| Subtitle D – Nonhazardous Waste | $ 587 |
| Subtitle D Prime | $ 236 |

* Average annualized as equivalent values over 50 years??, 7% discount rate

** These costs do not include upstream costs.

# Subtitle C- *Overview*


- Bevill Amendment reversed
- "Special Waste"- A new category of waste will be created
- CCRs managed from point of generation to disposal
- Compliance will be enforced by Federal and authorized State regulations

- Existing landfills will not require retrofitting, but will operate as a Subtitle C unit (ground water monitoring, corrective action, etc.)
- Existing surface impoundments must stop receipt of CCRs within 5 years and close within 2 yrs after that
- New landfills will be upgraded to engineered systems
- No new surface impoundments

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# Subtitle D- *Overview*


- Bevill Amendment upheld
- CCRs managed at point of disposal
- Compliance will be not be enforced Federally
- Requirements are self implementing

- Existing landfills will continue operation but be subject to wetlands and unstable area restrictions
- Existing surface impoundments must install composite liner systems, and meet location standards, or close within 5 years
- New landfills will be upgraded to composite liner systems
- New surface impoundments must adhere to composite liner system and stability requirements

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# Subtitle “D Prime”- *Overview*


- Same regulations as Subtitle D, with one major exception:
  - Existing surface impoundments may continue to operate without modifications to the liner systems for the remainder of their useful life

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# Comparison of Approaches - *Similarities*



| | Subtitle C | Subtitle D |
|---|---|---|
| • Beneficial Reuse- encapsulated | ✓ | ✓ |
| • No modifications to existing landfill liners | ✓ | ✓ |
| • New landfills must have composite liner systems | ✓ | ✓ |
| • Groundwater monitoring systems required | ✓ | ✓ |
| • Corrective Action | ✓ | ✓ |
| • Closure /post closure requirements[1] | ✓ | ✓ |
| • Record keeping requirements | ✓ | ✓ |
| • Annual inspections | ✓ | ✓ |

1. Requirements are not the same

# Comparison of Approaches - *Differences*



- Hazardous ✓
- Managed from generation ✓
- Land disposal requirements ✓
- Permit required ✓
- Financial assurance ✓
- New surface impoundments ✓
- Weekly impoundment inspections ✓

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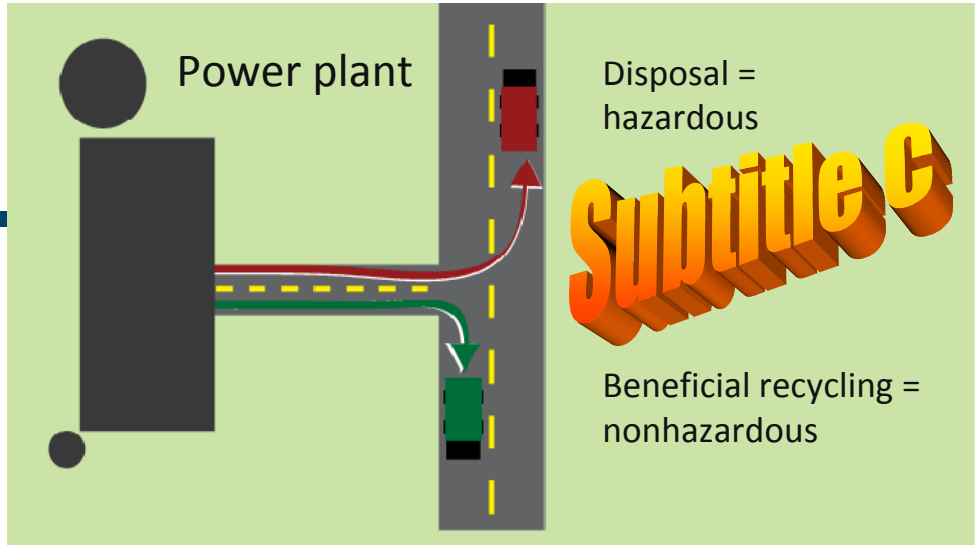
# …..But Wait, There's More


- Challenges with Subtitle C
  - All water that contacts CCRs is now hazardous
  - LDRs and treatment standards apply
  - Plants will need to convert to dry systems…manage wastewaters
  - CCRs disposed in sand and gravel pits, and other large fill operations also regulated as landfills
  - All employees and craftspersons will need to be trained with 40 hour HAZWOPR training, etc.
  - Manage ubiquitous releases
  - Federal standards are Minimums, authorized states can add more

# …..But Wait, There's More


- Challenges with Subtitle D
  - Required to establish a company website, and post all site data and reports
  - All design, monitoring, and operations reports must be verified by an independent registered Professional Engineer …AND… increased frequency and standards
  - The regulations are self implementing
  - CCRs disposed in sand and gravel pits, and other large fill operations also regulated
  - No federal enforcement (instead enforsement through citizen suits)

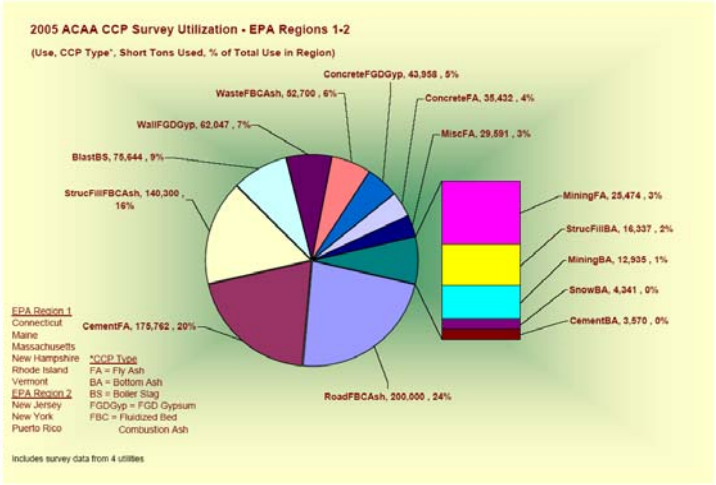
# Beneficial Reuse




- The Bevill determination would remain in place and only encapsulated reuse applications will be allowed (no definition is provided)

# Before the Storm – *Beneficial Recycling*

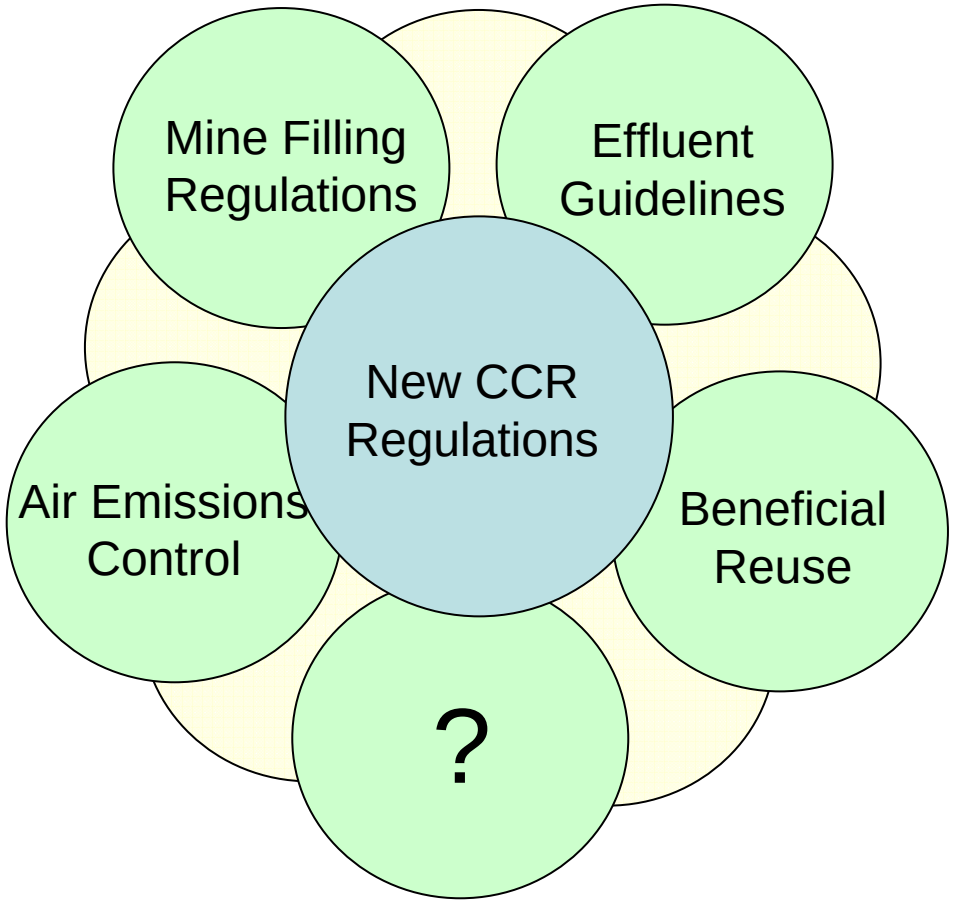
- Types of Beneficial Recycling:
  - Ready-mix concrete (*dependent on quality)
    - Portland cement substitute
    - Additive for high strength concrete mixtures
  - Feedstock for cement kilns
  - Structural fill and waste stabilization
  - Flowable fill
  - Mine reclamation
  - Road construction
  - Agriculture
  - Cosmetics




- Federal Regulations for Beneficial Reuse have been proposed… Nothing formal has been completed
- Several states responded by generating their own regulations

*Other Beneficial Reuse projects have resulted in environmental concerns and have clouded the success of the industry.*

# Welcome to Storm Season

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# Weathering the Storm – *Preparing for Change*

## Planning

- Be proactive
- Prepare
- Be thorough
- Remain informed
- Get involved

**…But HOW DO YOU PREPARE FOR THE STORMS?**

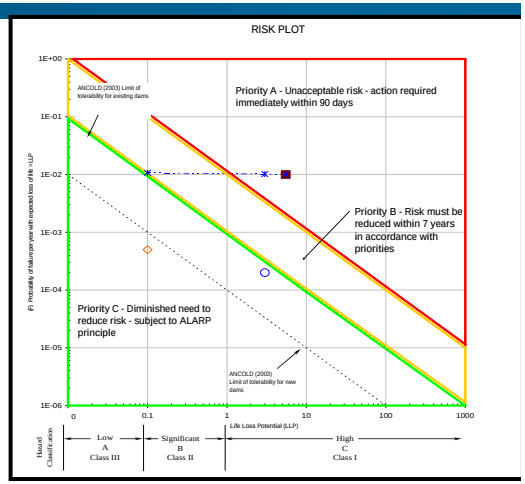
- Proactive Clients – Will begin projects now because it is right/necessary
- Responsive Clients – Will begin projects when they see the directions (i.e., rules are draft)
- Reactive Clients – When the regulations require action

# Weathering the Storm – *Preparing for Change*

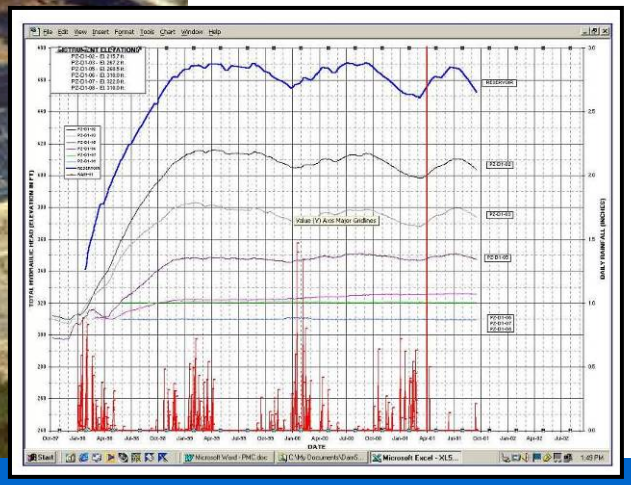
- Review all current CCP Management Practices
  - Disposal
  - Beneficial Recycling
  - Operations
  - Inspections
  - CCP Response Plan
  - Sampling Data

- Corporate standards

- Controlling documents




- Gather and review all records…Take Action
  - Permits and supporting permits (and where there are none)
  - Existing facility designs
  - Documentation previously gathered during inspections
  - Contracts with contractors (operations and sub-consultants)
  - Facility classifications
  - Identify outstanding compliance issues…and resolve
  - Review Inspection Reports



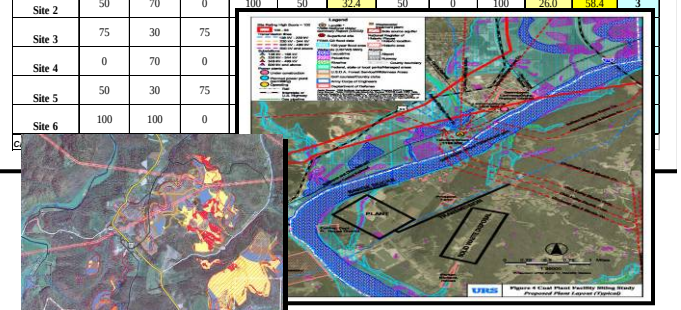
# Weathering the Storm – *Preparing for Change*

- Inspect (and document) existing conditions at CCP facilities
  - Identify and prioritize stability, water management, and other issues
  - Develop monitoring program(s) and action levels
  - Engineer and implement solutions
  - Prepare for USEPA site visits and follow-up responses
- Review status of existing CCP facilities and plan for the future
  - Develop contingency disposal plans (alternate off-site options; initiate contracting)
  - Develop emergency response plans
    - Communication Matrix (internal, regulatory, public)
    - Initial and Follow-up Actions
    - General Solutions

# Weathering the Storm – *Preparing for Change*

- Review status of existing CCP facilities and plan for the future (continued)
  - Review remaining life in existing facilities
    - Initiate first steps of developing new facilities (siting, property acquisitions, investigations, permitting, etc.)
    - Close existing ash impoundments
  - Pursue beneficial recycling markets but cautiously and with potential alternatives
  - Shift plant technology/systems from wet generation to dry generation….wet storage to dry disposal
  - Close existing ash ponds

| | Environmental | | | | | | Engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Criterion / Site Name | Land Ownership | Permitting Difficulty | Ash Disposal | Catastrophic Loss | Public Acceptability | Environmental Score | Transmission Congestion Risk | Water Availability | Fuel Flexibility | Engineering Score | Total Score | Ranking |
| Weight | 10 | 17 | 5 | 8 | 15 | | 8 | 15 | 22 | | | |
| Site 1 | 0 | 0 | 100 | 100 | 0 | 13.0 | 25 | 0 | 40 | 10.8 | 23.8 | 5 |
| Site 2 | 50 | 70 | 0 | 100 | 50 | 32.4 | 50 | 0 | 100 | 26.0 | 58.4 | 3 |
| Site 3 | 75 | 30 | 75 | | | | | | | | | |
| Site 4 | 0 | 70 | 0 | | | | | | | | | |
| Site 5 | 50 | 30 | 75 | | | | | | | | | |
| Site 6 | 100 | 100 | 0 | | | | | | | | | |



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# Be Forward Thinging…Siting Studies (URS Opti-Site)

- A site selection process based on decision analysis providing a technically sound tool

| | Environmental | | | | | | Engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
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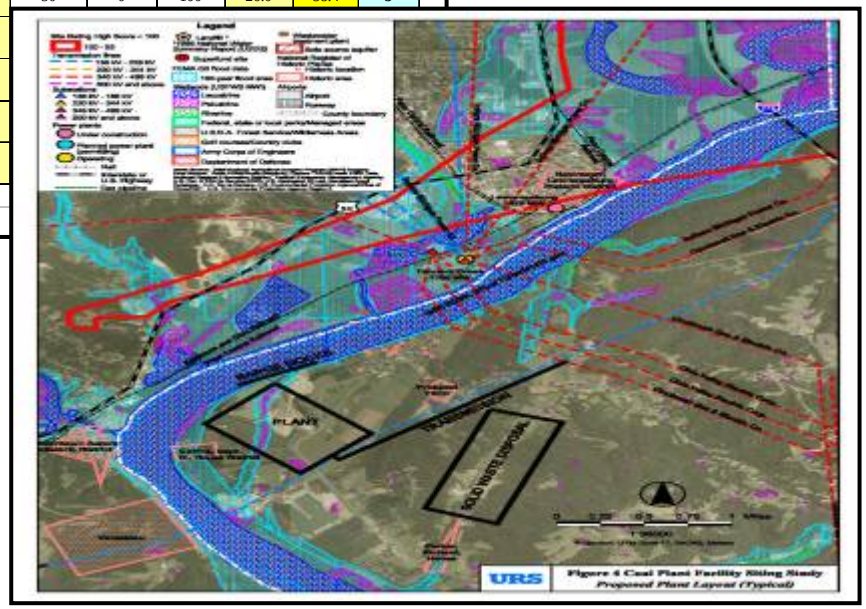
| | 50 | 70 | 0 | 100 | 50 | 32.4 | 50 | 0 | 100 | 26.0 | 58.4 | 3 |
| | | | | | 100 | 31.4 | | | | | | |
| | | | | | 0 | 19.9 | | | | | | |
| | | | | | 50 | 29.4 | | | | | | |
| | | | | | 100 | 50.0 | | | | | | |



# Remain Innovative…Find Innovative Solutions

- Challenges:

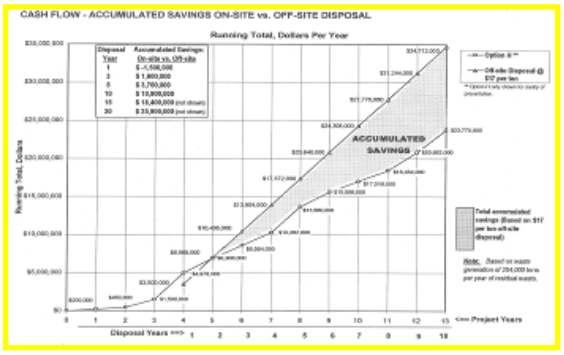
  1) Construct a dry fly ash land fill over a recently closed fly ash pond
  2) Depositional nature of fly ash

- Innovations:
  - 80-ft landfill over the ponds
  - Aggressive investigation and testing
  - 4-part pore water management system
  - Beneficial reuse of fly ash
  - Monitoring

**Today – A huge success near completion of 5+ years of service**

# Pursue Beneficial Recycling of CCPs

- Through careful planning and long-term assessments, continue to pursue cost effective and efficient applications
  - Planning and market studies (including assessment of new technologies)
  - Bench-scale testing and performance assessment
  - Permitting, engineering, design, and construction support
  - Groundwater/water modeling
  - Economic studies and demonstrations



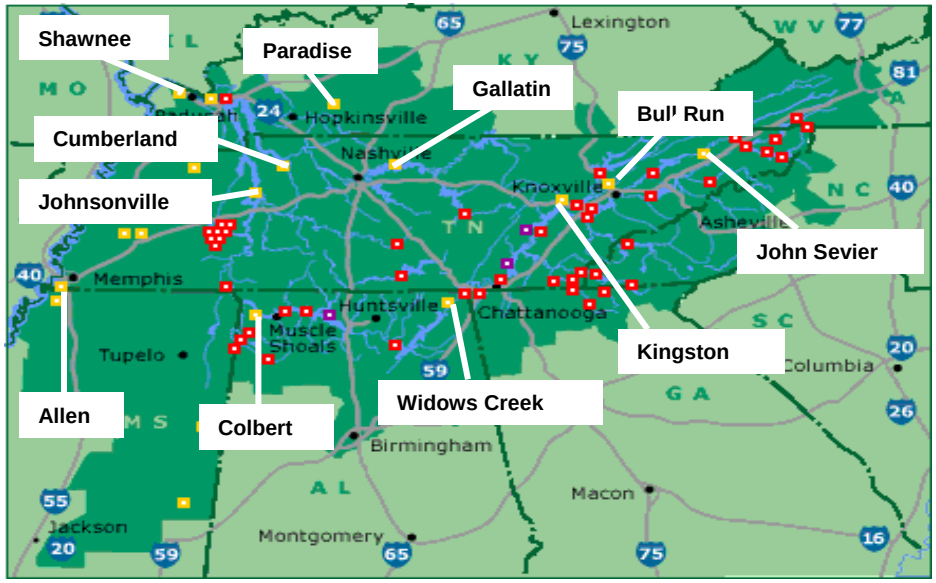

# What are others doing???
# Example Project – *TVA Coal Ash Program*

- Since May 2009, key role in providing strategic and technical support in the following:
  - assessments of capital project development, planning,
  - modification of current practices, and
  - technical guidance on significant repairs.

- Programmatic Document – programmatic policies and metrics for the CCP Management group
  - The Document encompasses best practices within the industry
  - provides standards for the design, permitting, construction, operation, monitoring and inspection
  - Recently completed training for TVA

# What are others doing???
# Example Project – *TVA Coal Ash Program*

- URS' services at each of the 5 plants address:
  1. siting, permitting, and construction of new landfills;
  2. evaluation and removal of existing high hazard classification for ash impoundments;
  3. remedial tasks to address stability concerns and other issues;
  4. engineering design for new spillways; and
  5. closure of existing wet and dry ash facilities.

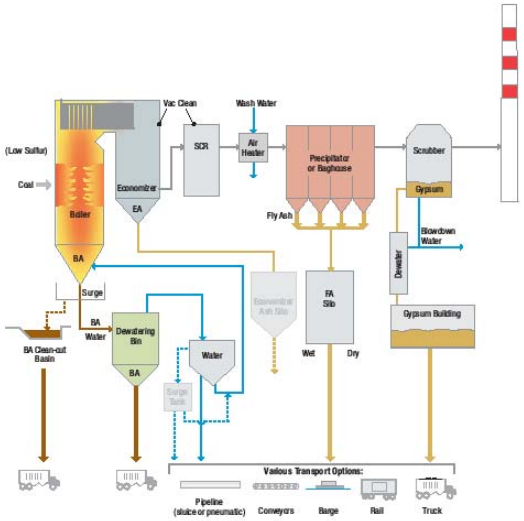


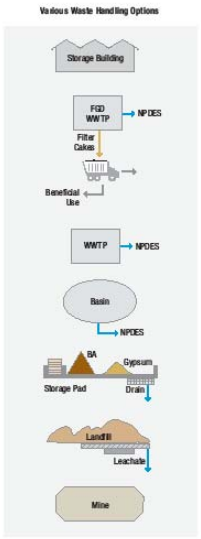

## NEW TASKS:

- **Operations Support**
- **DWF Engineering**
- **Material Testing**
- **Training / Programmatic**

# What are others doing???
# Example Project – *EPRI Economic Assessment*

- URS assembled a team of subject area experts
  - power plants,
  - hazardous waste, and
  - CCP management
- Based on general models of power plants from the point of generation to the point of disposal, develop the additional requirements necessary to comply with the Subtitle C requirements and establish corresponding costs.
  - URS began June 16 with the first site visit
  - Anticipated completion is mid August 2010
  - EPRI will make the findings publically available



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