INCREASED CCR RESALE VALUE USING DRY SYSTEM

• Bottom ash must be dewatered before resale.
• Dry system decreases bottom ash saturation.
• Dry bottom ash can be resold at higher value.
• Applications include concrete, land-fill, and asphalt.

BENEFITS OF BOTTOM ASH REUSE

• Can be reused in a variety of forms.
•Avoids disposal or storage needs and costs.
• Decreases negative environmental impact.
• Minimizes the energy consumed when handling.
• Can become a steady source of revenue.

POTENTIAL FUTURE RESEARCH

• Patents and advanced technologies for bottom ash handling can be further explored.
• Wastewater management solutions in other industries.
• Impact of clean coal technology on proposed solutions.

CCR SOLUTIONS TEAM

Top from left: Shana Burnett, Andrew Gardener, Graeme Port, Daniel Kipp, Joseph Sanchez, & Robert Herman
Bottom from left: Susan Rafalko, Sheena Enriquez, Nicole Firnbach, & Chad Parker
Not Pictured: Jennifer Agosto, Professor Myron Gottlieb, & Professor Don Tijunelis

Majors of Team Members: Business (4), Architecture (2), Computer Science (1), Humanities (1), Mathematics (1), Electrical Engineering (1), Civil Engineering (1)
**Problem Statement:**
Evaluate the impacts of eliminating ash storage pond from a power plant to meet pending EPA regulations and avoid future ash pond disasters.

**BACKGROUND INFORMATION**
- On December 22, 2008 a dike burst at the Kingston ash pond impoundment, spilling an estimated one billion gallons of coal ash containing toxic metals into the surrounding Emory River.
- The Tennessee Valley Authority’s Kingston coal plant dumped an estimated 140,000 pounds of arsenic into the Emory River in 2008.
- These toxic chemicals are harmful to fish, wildlife, the natural ecosystem, and are extremely hazardous to human health.
- As a result, the EPA is proposing significant changes to coal ash classifications that may force many plants to close their existing ash pond containment facilities.

**PROJECT OBJECTIVES**
To Determine:
- Current and pending coal combustion residual (CCR)/ wastewater regulations.
- CCR disposal and reuse alternatives.
- Waste water treatment and disposal alternatives.
- Pond closure and outsourcing opportunities.
- Costs and environmental implications of unlined ash pond.

**IMPlications OF THREE CASES**
The Implications of Dry Ash Include:
- Effectively eliminates ash pond, no water required (eliminates water-based systems), unaffected by any new regulations passed, regardless if Article C or Article D, and low operating costs.
- Major Implications for Article C Include:
  - Ash designated “Special Waste”, ash ponds must be phased out in 7 years, monitoring of all ash dumps is required, and ash generation, storage, transportation, and disposal of coal ash are regulated.
- Major Implications for Article D Include:
  - Ash designated non-hazardous, ash ponds must be upgraded, utilities not required to monitor dumps, and regulations only for disposal.

**RECOMMENDED STEPS**
1. Convert to dry ash handling system.
2. Establish a ground water monitoring zone (GMZ).
3. Outsource wastewater treatment and disposal.

**BENEFITS OF DRY ASH HANDLING**
- No water requirements.
- Improved boiler efficiency.
- Full compliance with EPA regulations.
- Improved bottom ash reuse.

**THREE CASES**
- Existing Pond → Retire Pond → Convert to dry ash-handling system
- Existing Pond → Retire Pond/Upgrade wet system → Article C Hazardous designation
- Existing Pond → Retire Pond/Upgrade wet system → Article D Non-hazardous designation

**RECOMMENDED Option:**
- Retire Pond/Use Dry Ash Technology