



# TVA Kingston Ash Recovery Project Roane County, TN

Status Update – December 8, 2011

Craig Zeller, P.E.

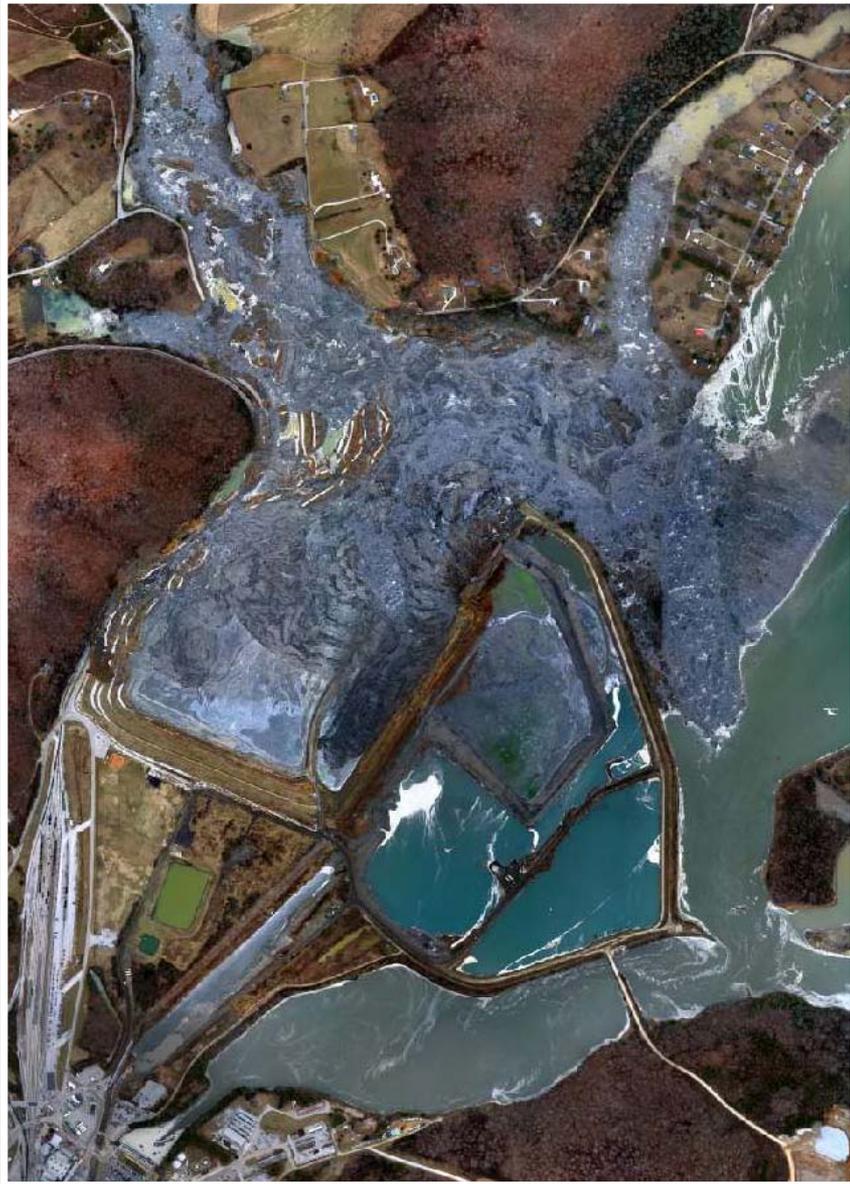
US EPA Region 4 – Superfund Division



# CERCLA Removal Action Strategy

- **Phase 1 (Time-Critical Action Removal)**
  - 3.5 million CY **removed** (excavated and dredged)
  - 4.0 million tons **disposed** at Perry County, AL (completed 12/01/10)
  - May 29, 2010 Emory River **reopened**
- **Phase 2 (Non-Time Critical Action Removal)**
  - 2.8 million CY to be **removed** (north and middle embayment)
  - Consolidate in reinforced, on-site disposal area
  - **Construct** robust subsurface perimeter containment system to withstand earthquake loads
- **Phase 3 (Residual Ash Study)**
  - River **ecosystem** and **human health** risk assessments
  - **Long-term** monitoring (5-year reviews)

# 3 Years of Recovery



December 23, 2008



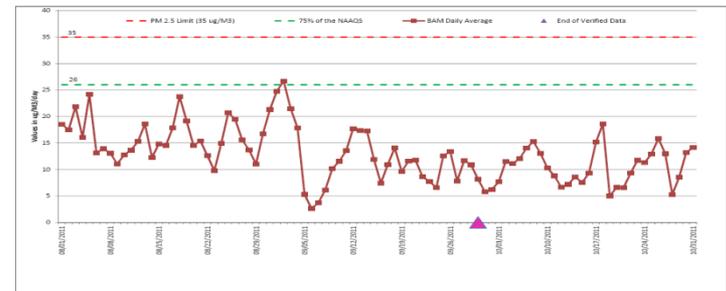
October 26, 2011

# Phase 2 Work Description

- **Excavate ash**
  - Pan scrapers
  - Excavators/dump trucks
- **Short-Term Storage**
  - Dry to optimum MC (17 to 27%)
  - Lime (6% by weight)
- **Long-Term storage in dredge cell**
  - Placed in 1 foot lifts
  - Compacted to 90% proctor
  - In-situ density/piezos/inclinometers
- **Perimeter Wall Stabilization**
- **Perimeter Air & IH Monitoring**
- **Storm water mgmt & monitoring**
- **Health & Safety program**

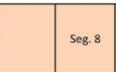
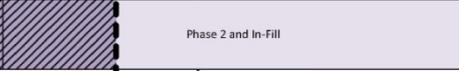


BAM PM 2.5 Daily Average



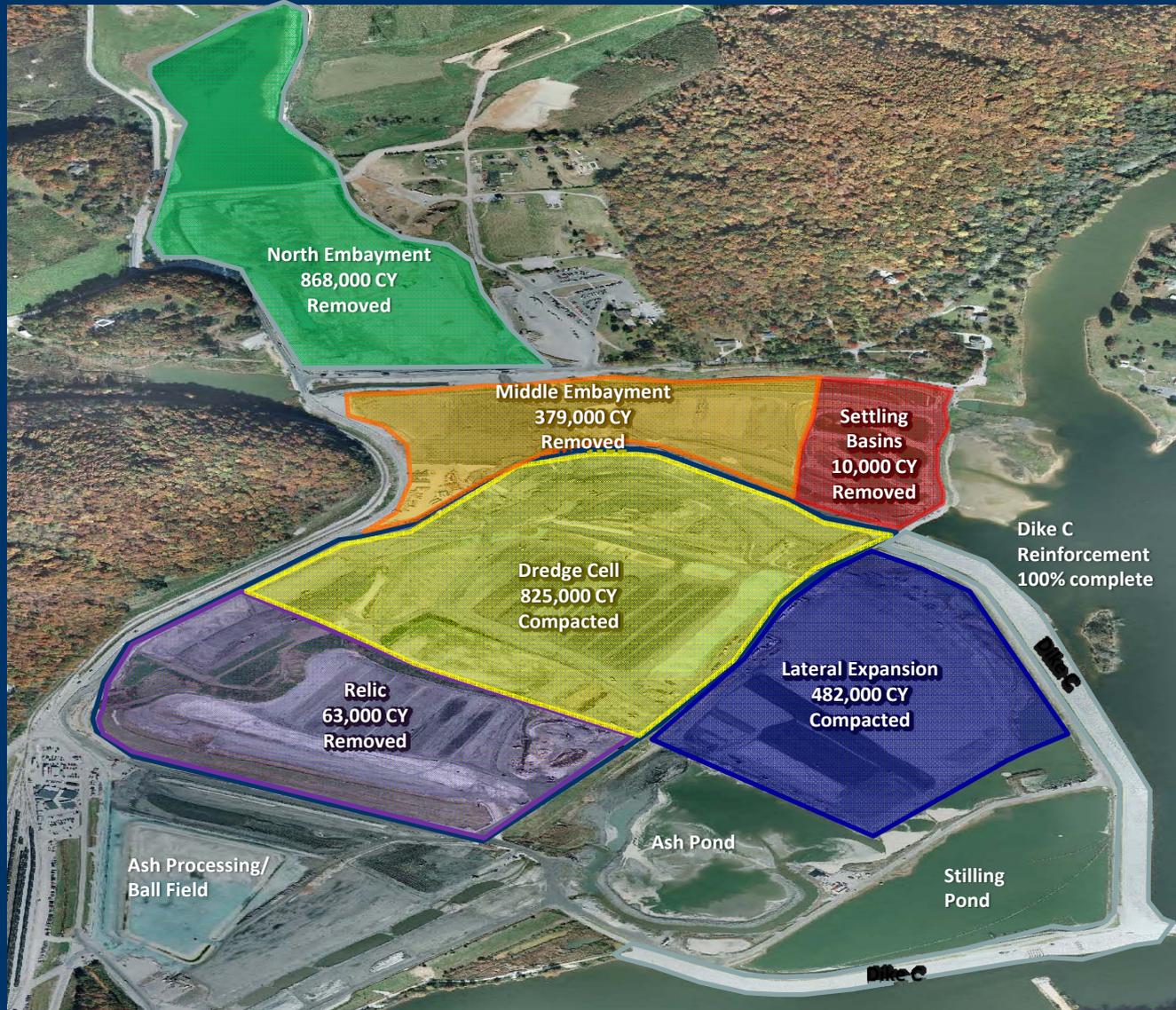


# Schedule

Task	CY-2010	CY-2011	CY-2012	CY-2013	CY-2014		
Perimeter Stabilization Wall		<b>North</b>  Segment 1	Seg. 8 	<b>SPR</b>  Segment 7	<b>LEA</b>  Segment 2	<b>Ash Pond</b>  Segments 3, 4 & 5	<b>Ball Field</b>  Segment 6
	Embayment Ash Removal	<b>Middle</b>  Middle	<b>North Embayment</b>  Mechanical Excavation	<b>Middle Embayment</b>  Mechanical Excavation	<b>Middle Embayment</b>  Hydraulic Dredging		
Ash Stacking		<b>Central Dredge Cell</b>  Phase 2		<b>North Dredge Cell</b>  Phase 2	<b>North/Central Dredge Cell</b>  In-Fill		
		<b>LEA</b>  Subgrade	<b>LEA</b>  Phase 2 and In-Fill	<b>Ash Pond</b>  Dredge Ash	<b>Ash Pond</b>  Relic Cutdown		
Final Closure Cap		<b>Legend:</b> LEA = Lateral Expansion Area SPR = Swan Pond Road  = Completed	October 31	<b>North/Central Dredge Cell</b>  Clay/Soil	<b>Ash Pond</b>  Clay/Soil	<b>LEA</b>  Clay/Soil	<b>South Dredge Cell</b>  Clay/Soil
	Restoration			<b>East Embayment</b>  East Embayment	<b>North Embayment</b>  North Embayment	<b>Middle Embayment</b>  Middle Embayment	<b>Gupton Borrow Area</b>  Gupton Borrow Area

# Phase 2 Work Areas

\*amounts representative of in-place estimates as of December 1, 2011

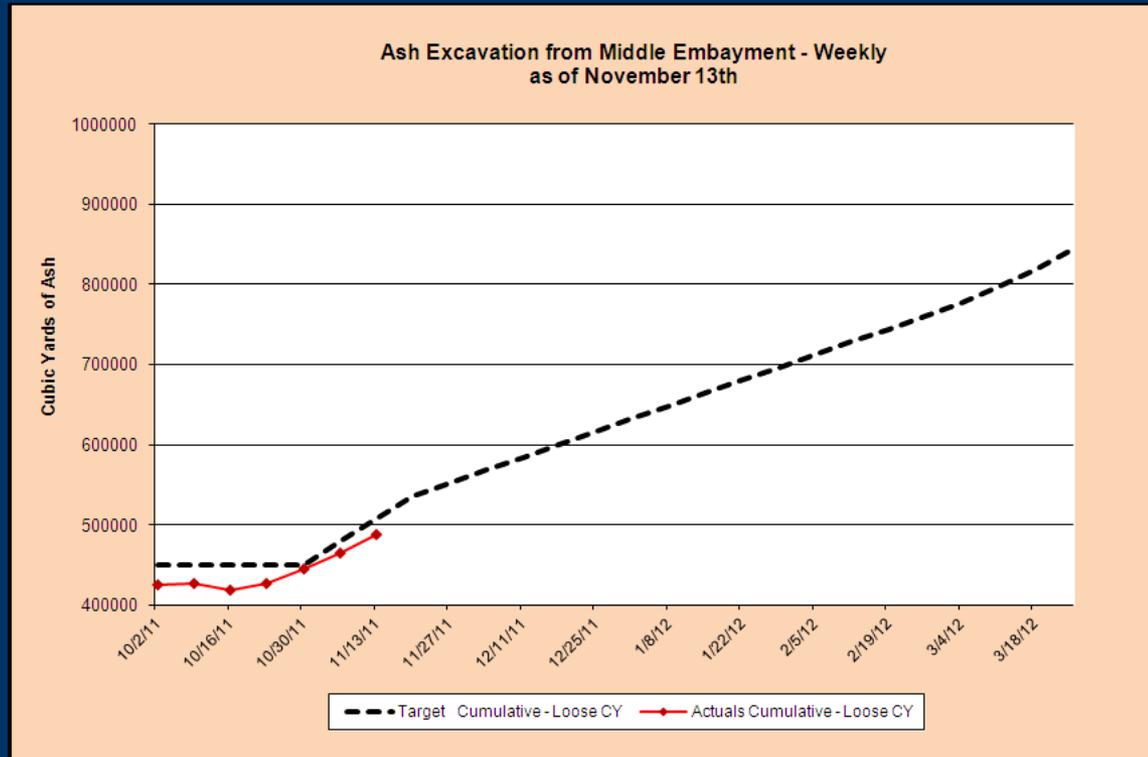


# Ash Excavation



\*amounts representative of in-place estimates

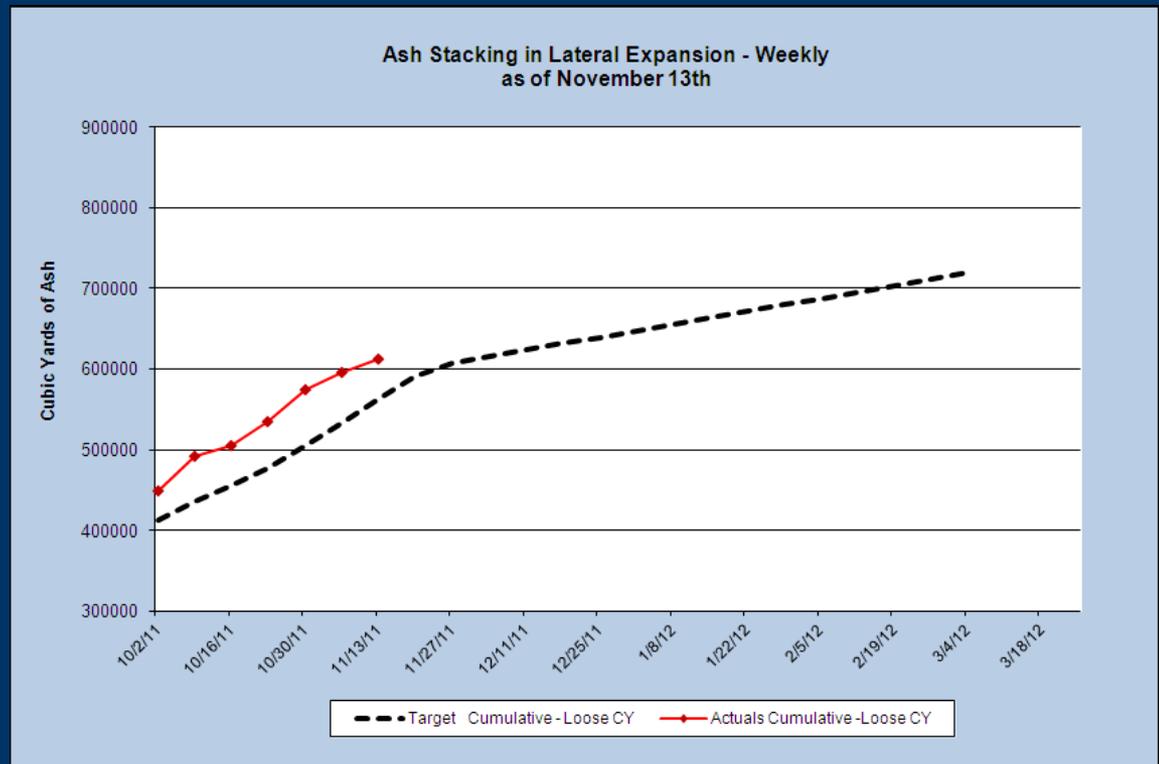
- North embayment ash excavation complete
  - 868,000 CY removed (1,212,000 CY loose)
- Excavate middle embayment ash
  - 379,000 of 1, 048,000 (492,000 CY loose)
  - Stacked in dredge cell and lateral expansion
  - Expected completion **November 2012**



\*amount in loose CY

# Ash Stacking

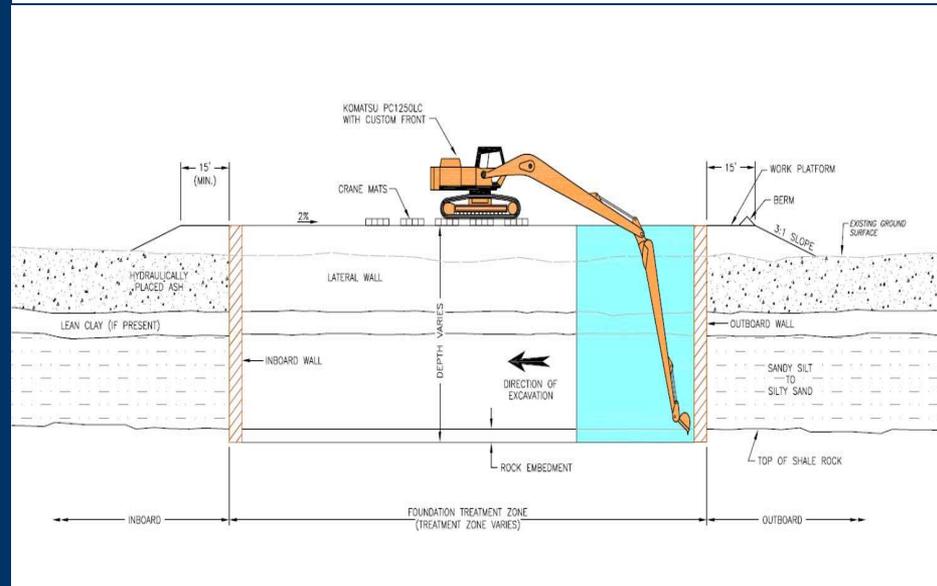
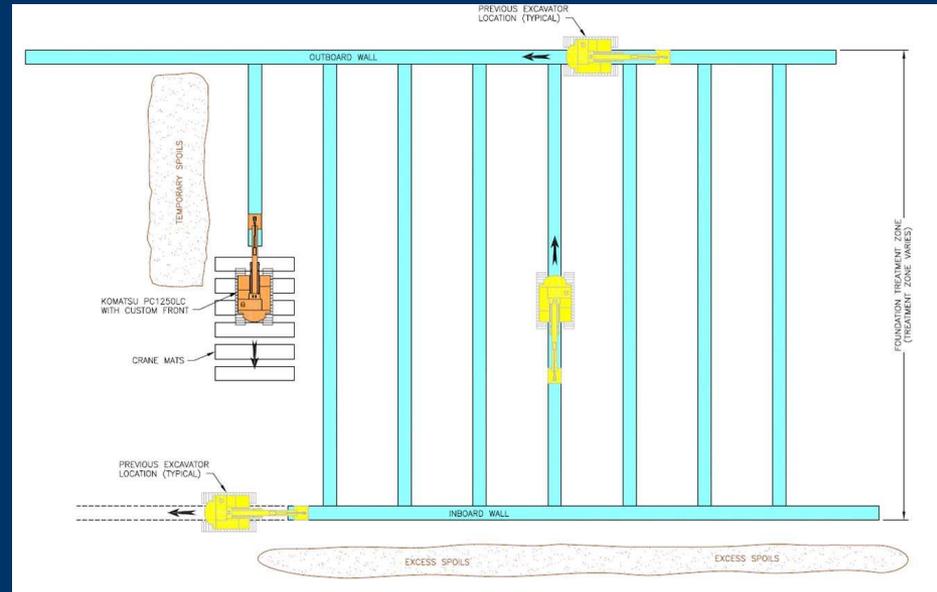
- Dredge Cell
  - 53% complete (1.3 of 2.5 million cy)
- Lateral Expansion
  - 43% complete (640k of 1.5 million cy)
- Ash Pond
  - Recently initiated



# Perimeter Wall Stabilization



- Design based on 3-D Seismic Model (FLAC)
  - 6.0 earthquake on East TN fault
  - 7.6 earthquake on New Madrid fault
- ≈11,500 linear feet (around perimeter of cell)
- 50-70 feet BGS
- Keyed 2-3 feet into shale bedrock
- Average UCS is 280 psi
- GeoCon contracted to construct

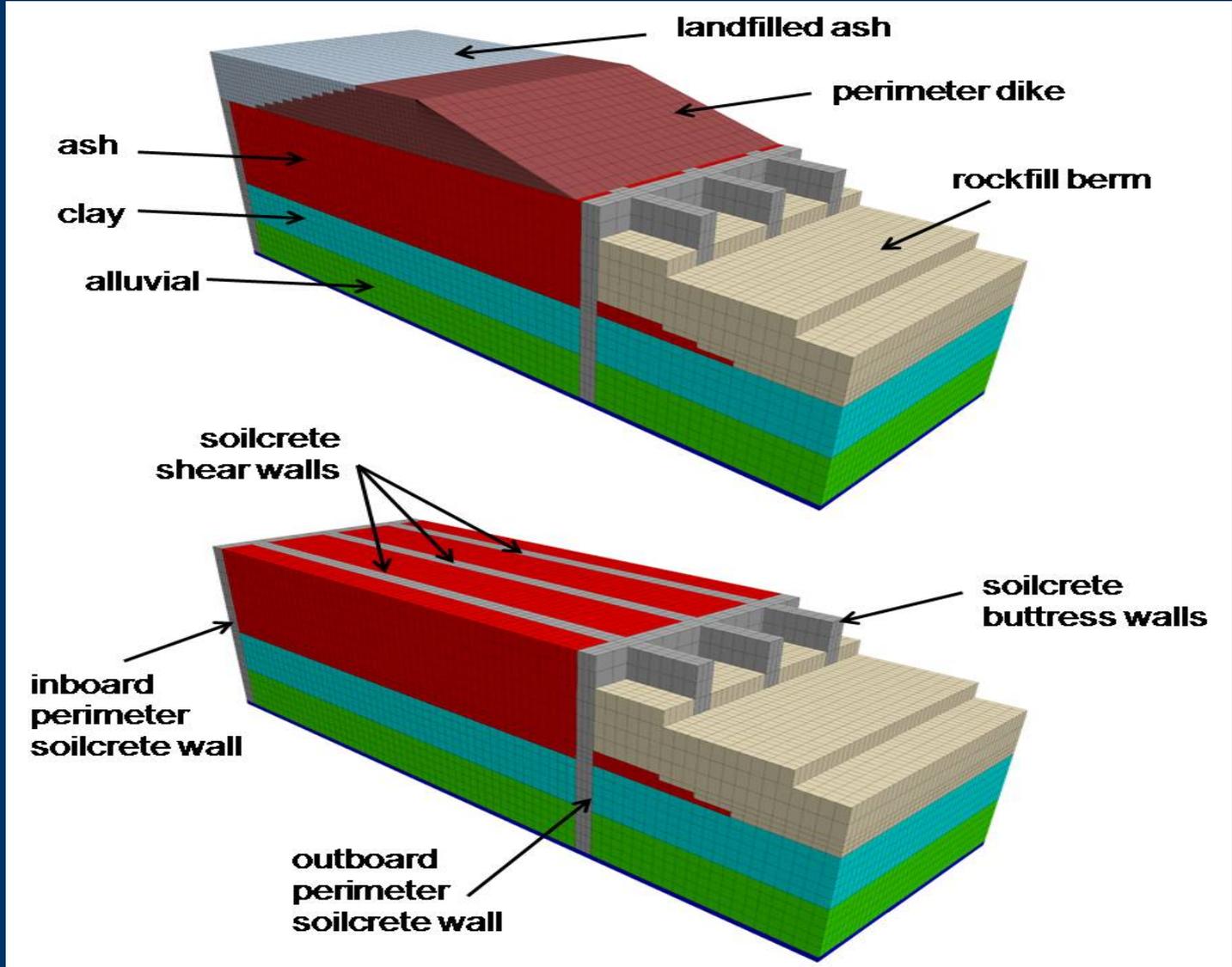


# Perimeter Wall Stabilization Project

- Batch plant for slurry recipe
  - Up to 25% fine blast furnace slag
  - 3% bentonite
  - 0.5% portland cement
- Long-stick Komatsu 1250 excavator
- 4' wide bucket with teeth

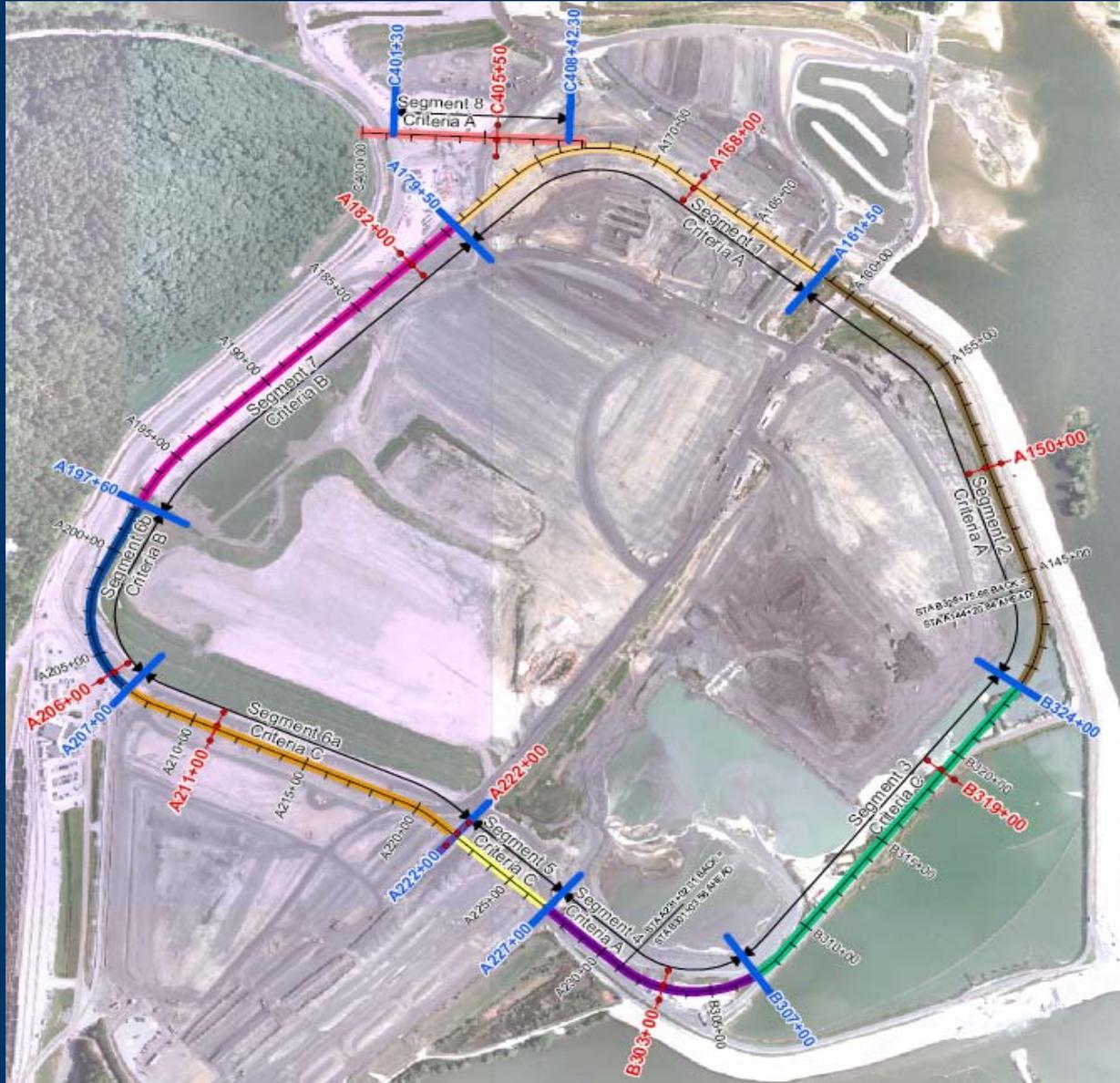


# Perimeter Wall Design



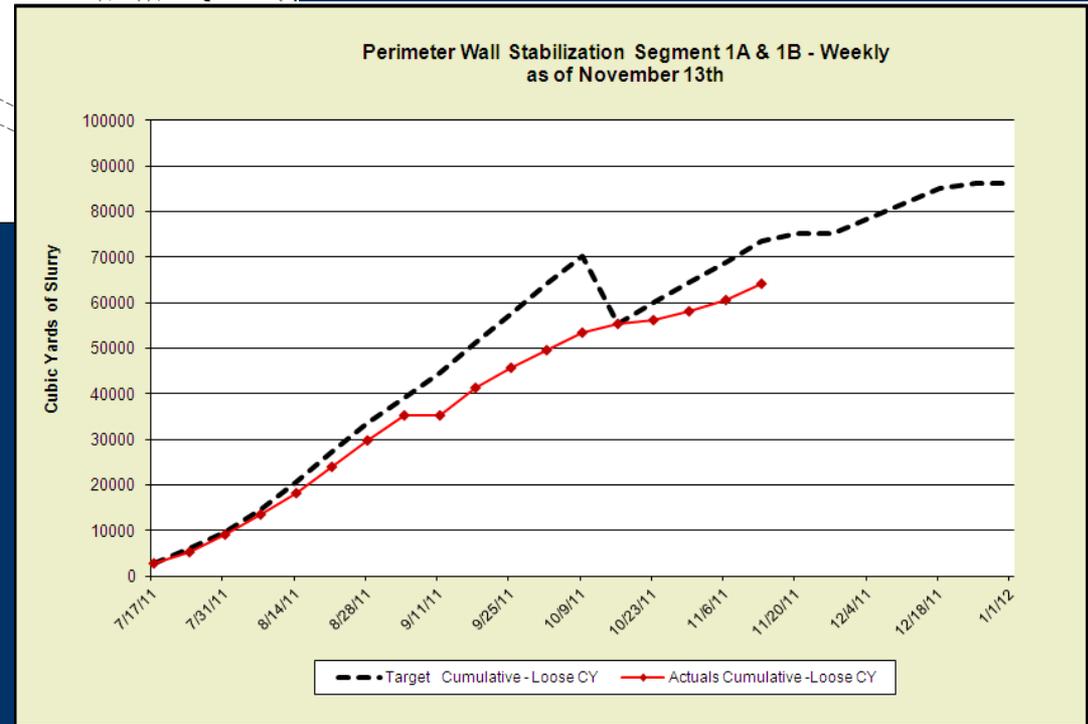
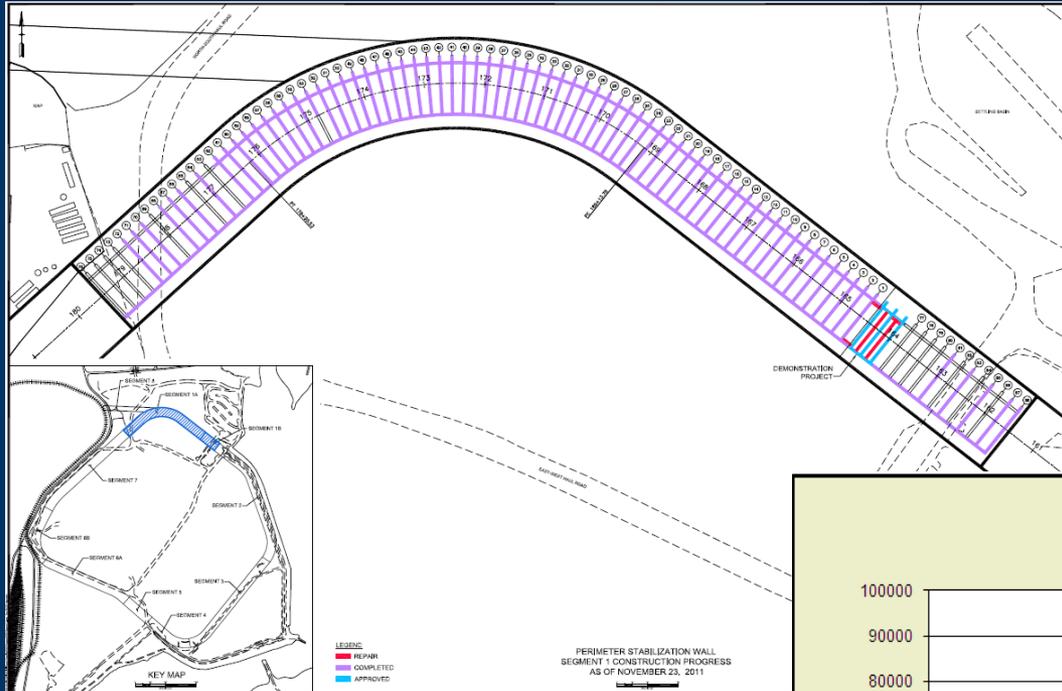


# Perimeter Wall Layout



# Perimeter Wall Progress

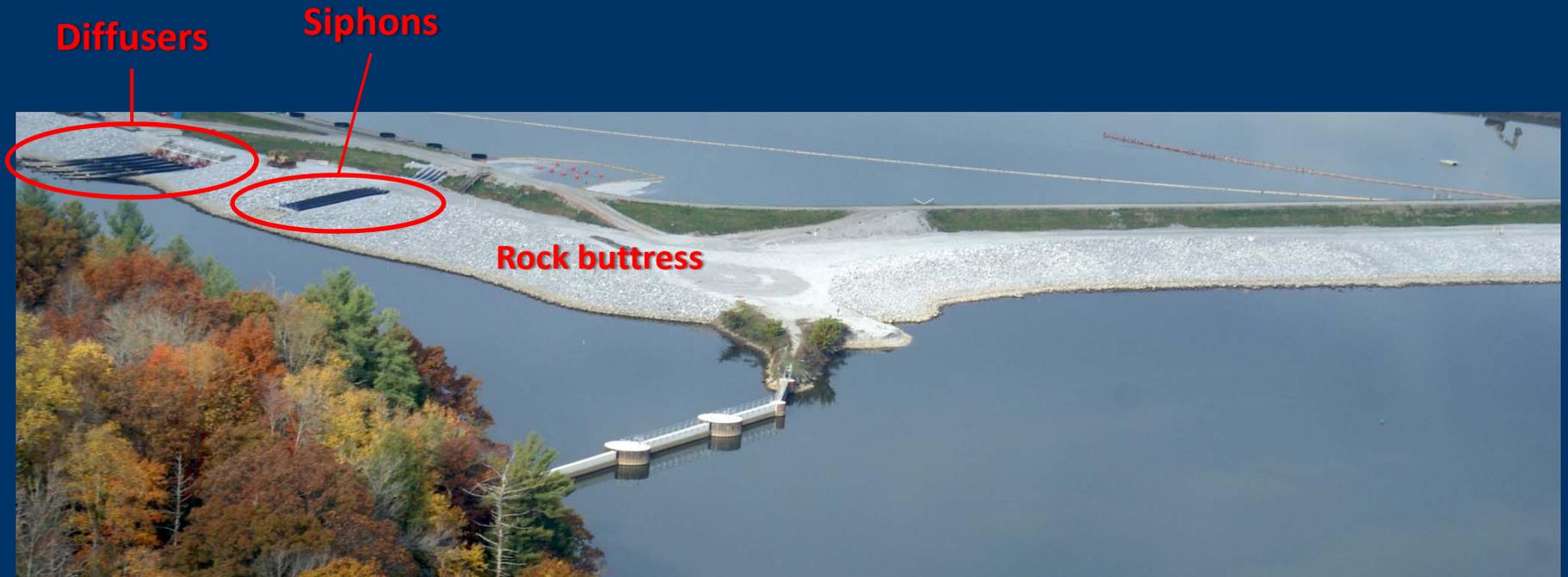
- Eight segments
- Segment 1 = 70% complete



# Dike C Buttress

- Complete

- Siphon installation
- Diffuser removal
- Bridge demolition
- Causeway excavation
- Rock buttress complete August 6, 2011
- Diffusers re-installed October 14, 2011



# Surface Water Monitoring

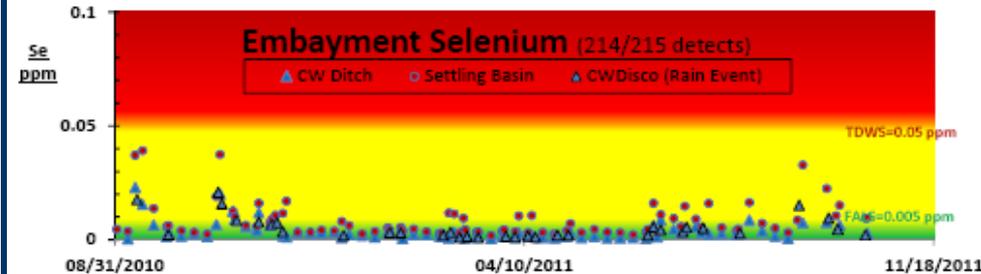
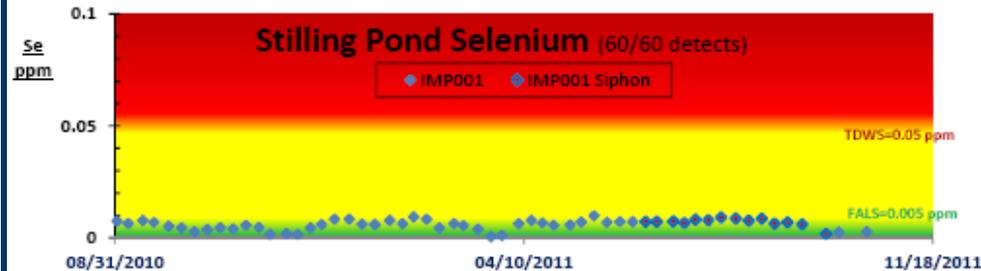
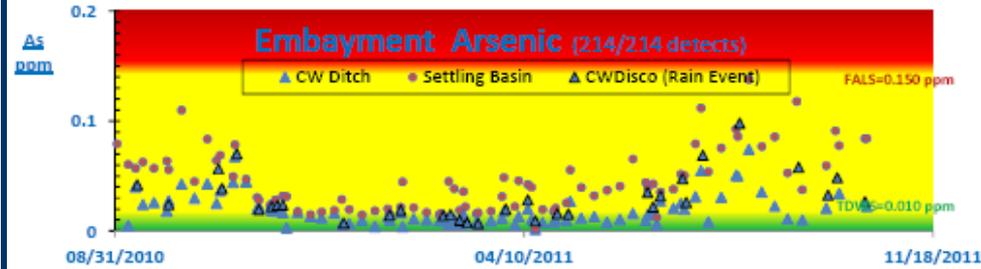
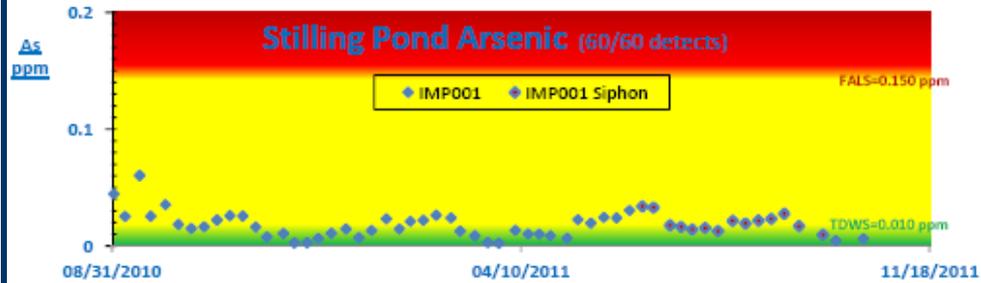


Kingston Ash Recovery NTC Environmental Monitoring November, 2011

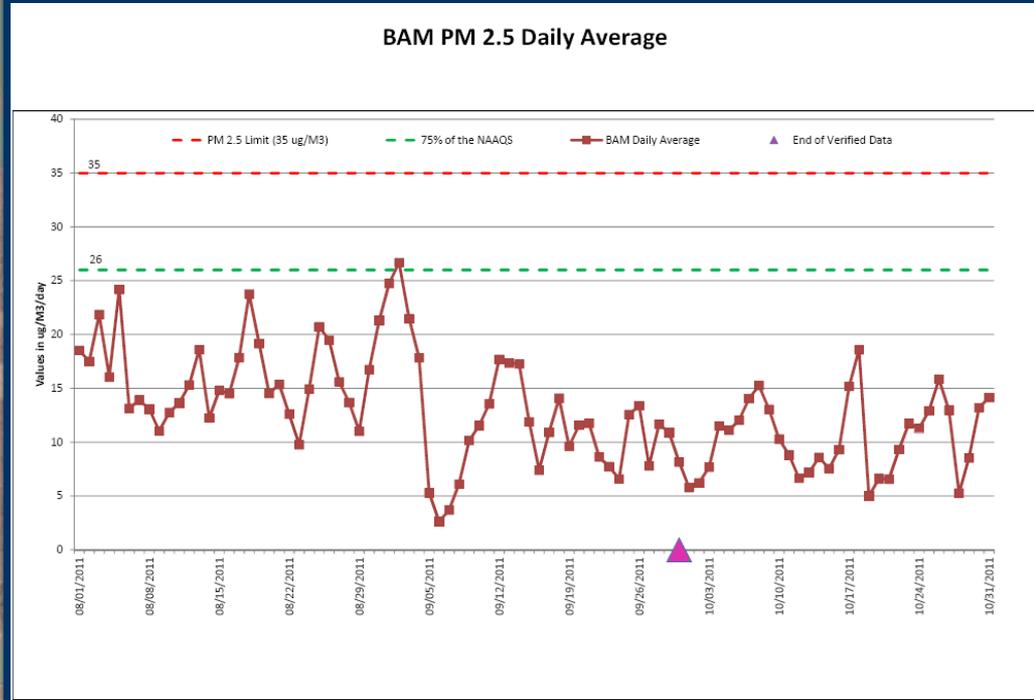


■ Stationary Air Monitoring Locations  
● Monitoring Well Location  
▲ HydroLab Monitor and NTC Sample Location  
+ Settling Basin Effluent  
● Embayment Auto Sampler

Date of Photography  
 10/26/2011  
 Map Compiled  
 12/01/2011  
 Tennessee Valley Authority  
 Geographic Information & Engineering



# Air Monitoring





# Conclusions

- North Embayment ash removal complete
- Perimeter Wall Progress = 70% of Segment 1 complete
- Base Line Ecological Risk Assessment (BERA) sampling completed Sept 2011
- BERA - April 2012
  - Tech memos available to public on EPA website
    - Amphibians, birds, turtles, tree swallows, fish, and raccoons
    - Surface water, ground water, aquatic vegetation and periphyton
    - Ash deposits, submerged sediment, and seasonally exposed sediment
- River System EE/CA - June 2012
- Action Memo for Phase 3 (River System) - end of 2012
- Construction schedules currently run thru 2014
- Questions?
  - [Zeller.Craig@epa.gov](mailto:Zeller.Craig@epa.gov)
  - [www.epakingstontva.com](http://www.epakingstontva.com)

# Ash Stacking



# Dike C



# Dike C



Then

Now



# North Embayment



Now



Then



# East Embayment



Then



Now