



TVA Kingston Ash Recovery Project Regulatory Overview

Craig Zeller, P.E.
U.S. EPA Region 4

November 8, 2010

Dredge Cell Area Pre-Spill



Spill Progression



**FILLS IN
BERKSHIRE
SLOUGH**

**FILLS IN
SWAN POND
SLOUGH**

**EMPTIES INTO
EMORY RIVER
MAIN CHANNEL**

Dredge Cell Area Post-Spill



Root Cause Analysis

Kingston Dredge Cell Failure Conditions

Increased Loads Due to Higher Fill

Hydraulically Placed
Loose Wet Ash



Fill Geometry
&
Setbacks

Unusually Weak Silt/Ash Slime Foundation

Examples of Inorganic Concentrations in Coal Ash



(Ash) Element	Avg. ppm	Est. lbs.
Aluminum	22,700	177 million
Iron	17,961	140 million
Copper	59	462,000
Arsenic	66	515,000
Selenium	6	51,000

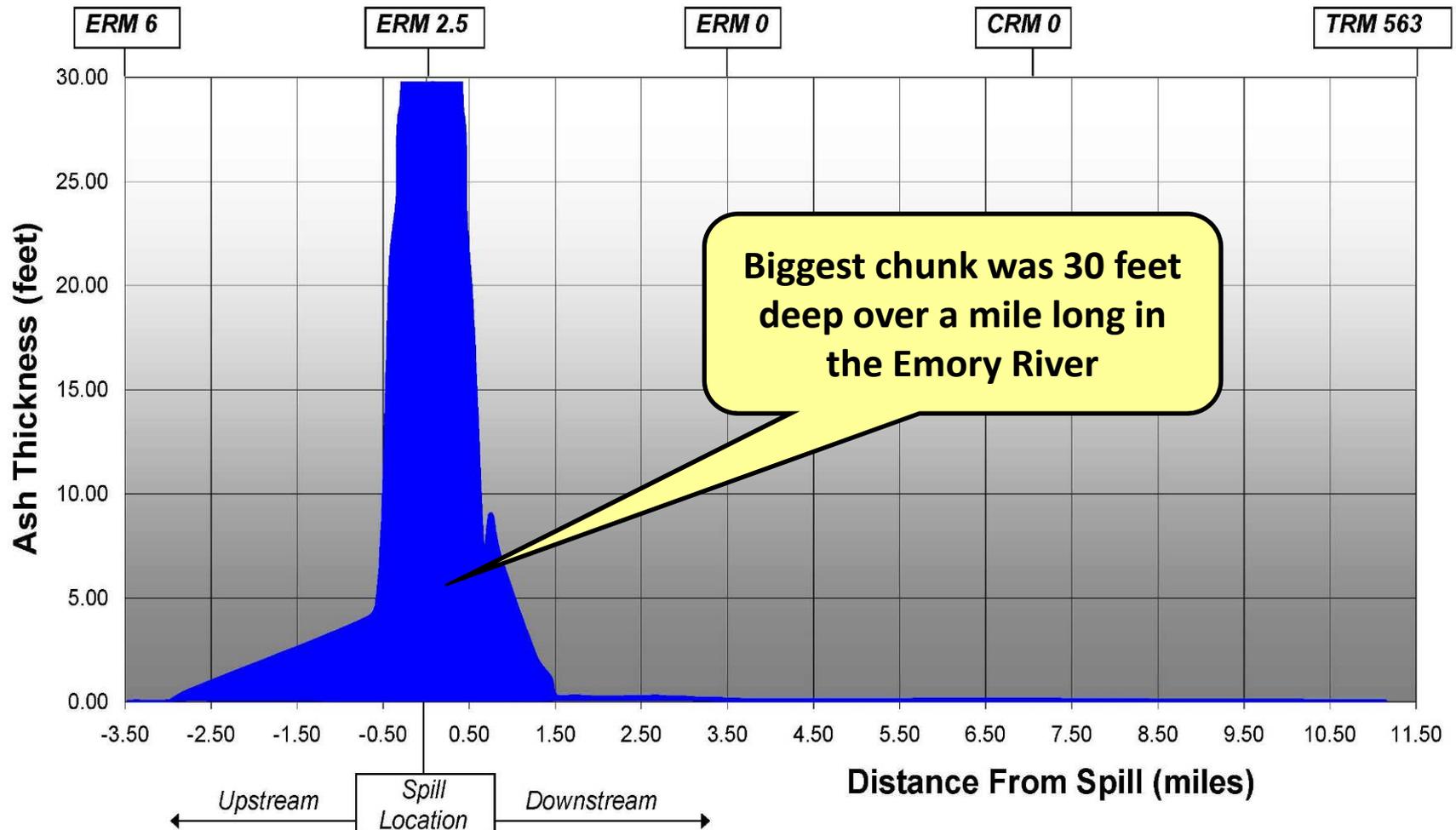
Uses an est. of 3 million CYs of coal ash.

(Soil) Element	Avg. ppm	Est. lbs.
Aluminum	18,905	147 million
Iron	27,304	213 million
Copper	16	129,000
Arsenic	24	183,000
Selenium	1	8,600

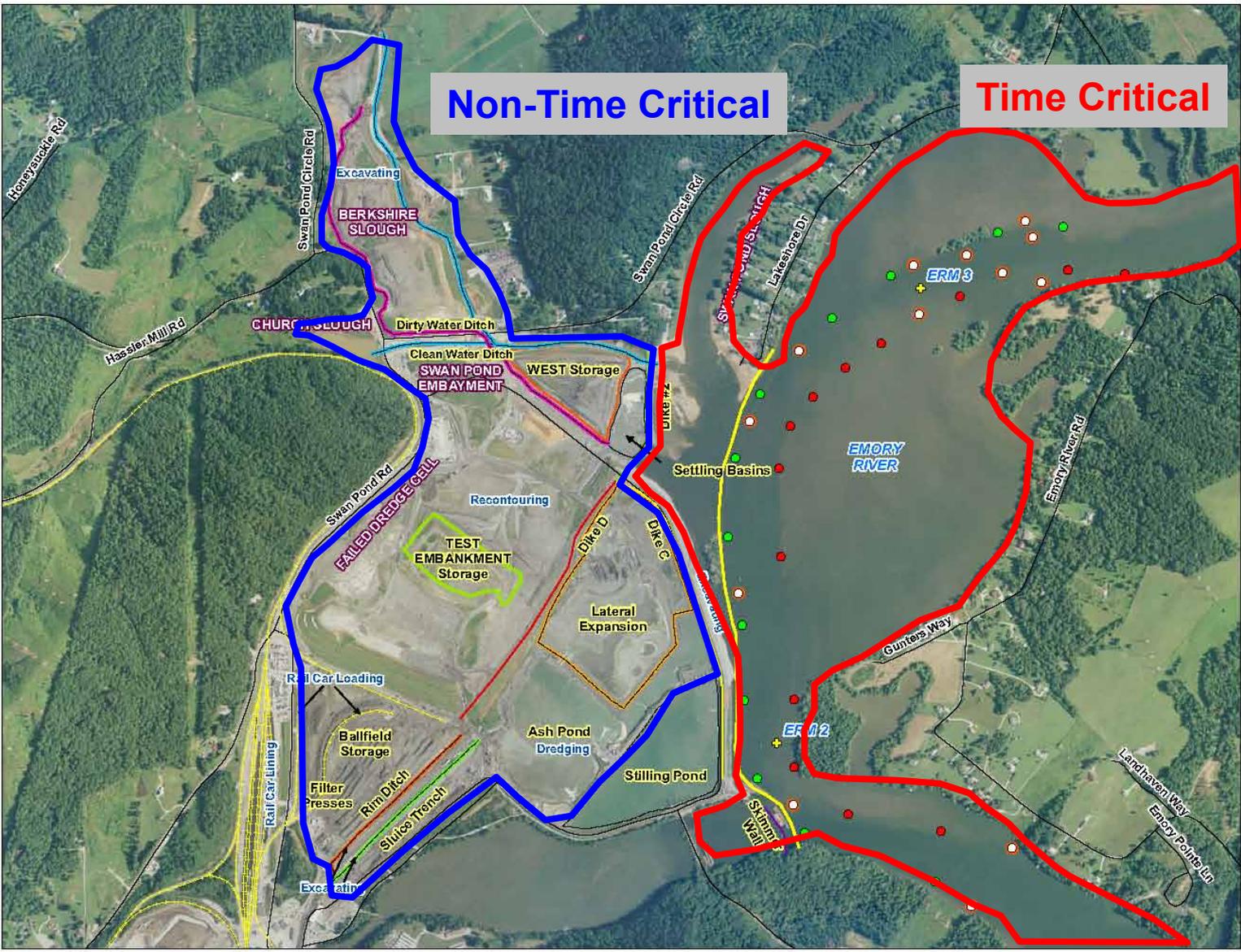
Uses an est. of 3 million CYs of regional soil.

Ash Thickness in Rivers

Ash Thickness Profile



Ash Recovery Project Layout



Non-Time Critical

Time Critical

Legend

- Green Buoys
- No Wake Buoys
- Red Buoys
- + RiverMiles
- Construction Booms
- Railroads
- Roads
- Dike D
- Dike C
- Dike 2
- Rim Ditch
- Sluice Trench
- Dirty Water Ditch
- Clean Water Ditch
- Lateral Expansion
- Settling Basins
- Test Embankment
- Skimmer Wall
- WEST Storage

0 500 1,000 2,000

 Feet



United States Environmental Protection Agency

TVA KINGSTON FOSSIL PLANT
HARRIMAN, ROANE COUNTY, TENNESSEE
TDD No. TNA-05-001-0079

SITE OPERATIONS
JULY 21, 2010

GIS_Workspace\TVA_Kingston\mxd\3\SiteOperations\072110.mxd



Removal Action Strategy

- **Phase 1 (Time-Critical Action Removal)**
 - 3.5 million cys **removed** (excavated and dredged)
 - 3.8 million tons **disposed** at Perry County, AL (continue thru Dec. 2010)
 - May 29, 2010 Emory River **reopened**
- **Phase 2 (Non-Time Critical Action Removal)**
 - 2.8 million cys to be **removed** (north and middle embayment)
 - **Place** in reinforced, on-site disposal area
 - **Construct** robust perimeter containment with cement columns (Deep Soil Mixing technology)
- **Phase 3 (Residual Ash Study)**
 - River **ecosystem** and **human health** risk assessments
 - **Long-term** monitoring (5-year reviews)

No Liner or Leachate Collection

- **Groundwater Flow to Site**

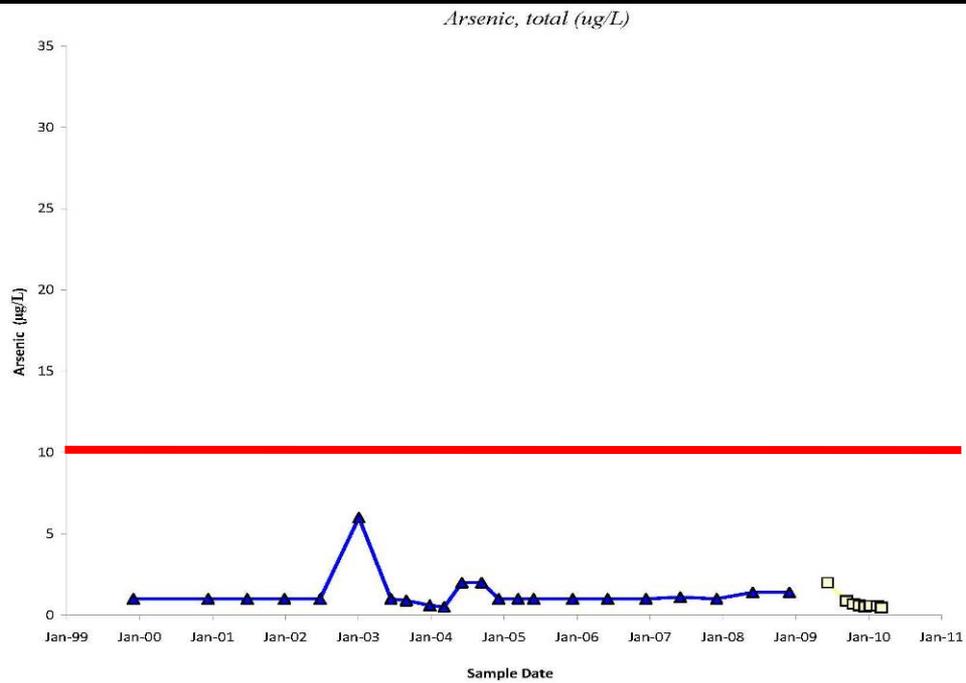
- Silty clay layer beneath site acts as **barrier to metal migration**
- Groundwater **does not migrate** to drinking water wells, moves downgradient to river
- New perimeter dike will **reduce lateral groundwater movement**
- Clay and soil cover will **reduce water infiltration**



No Liner or Leachate Collection

- No Metals Leaching**

- After over 50 years of groundwater in contact with ash, water quality **does not currently exceed drinking water standards**
- EPA Science Panel and USACE/ERDC studies after spill conclude **metals not readily leaching** off ash under site-specific conditions
- **TCLP (leaching test) does not exceed limits**, thus ash is not a hazardous waste

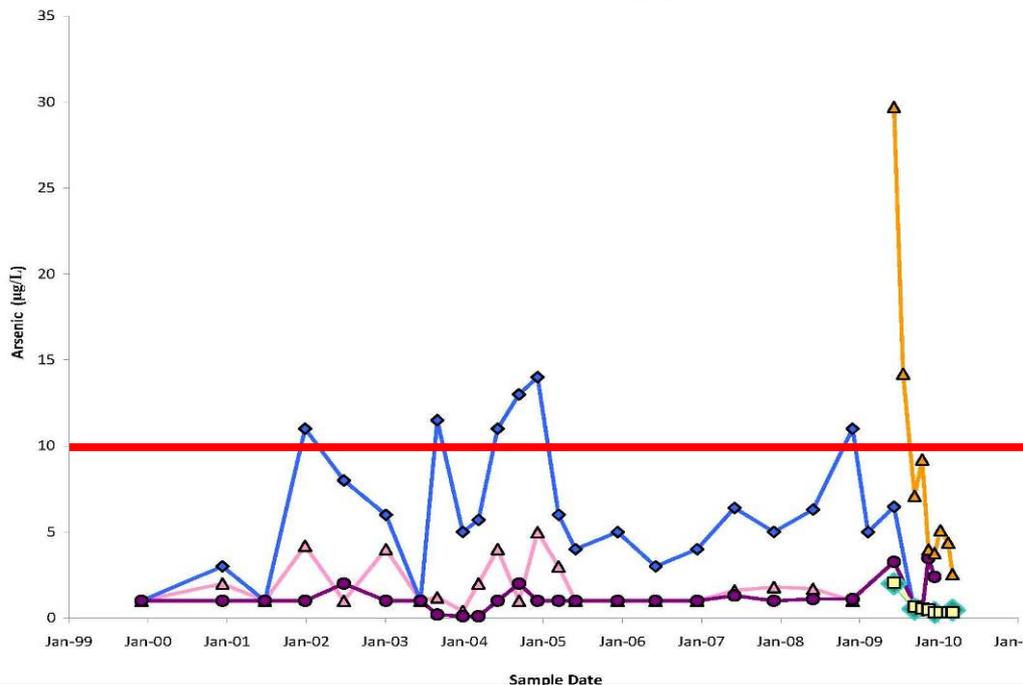


No Liner or Leachate Collection

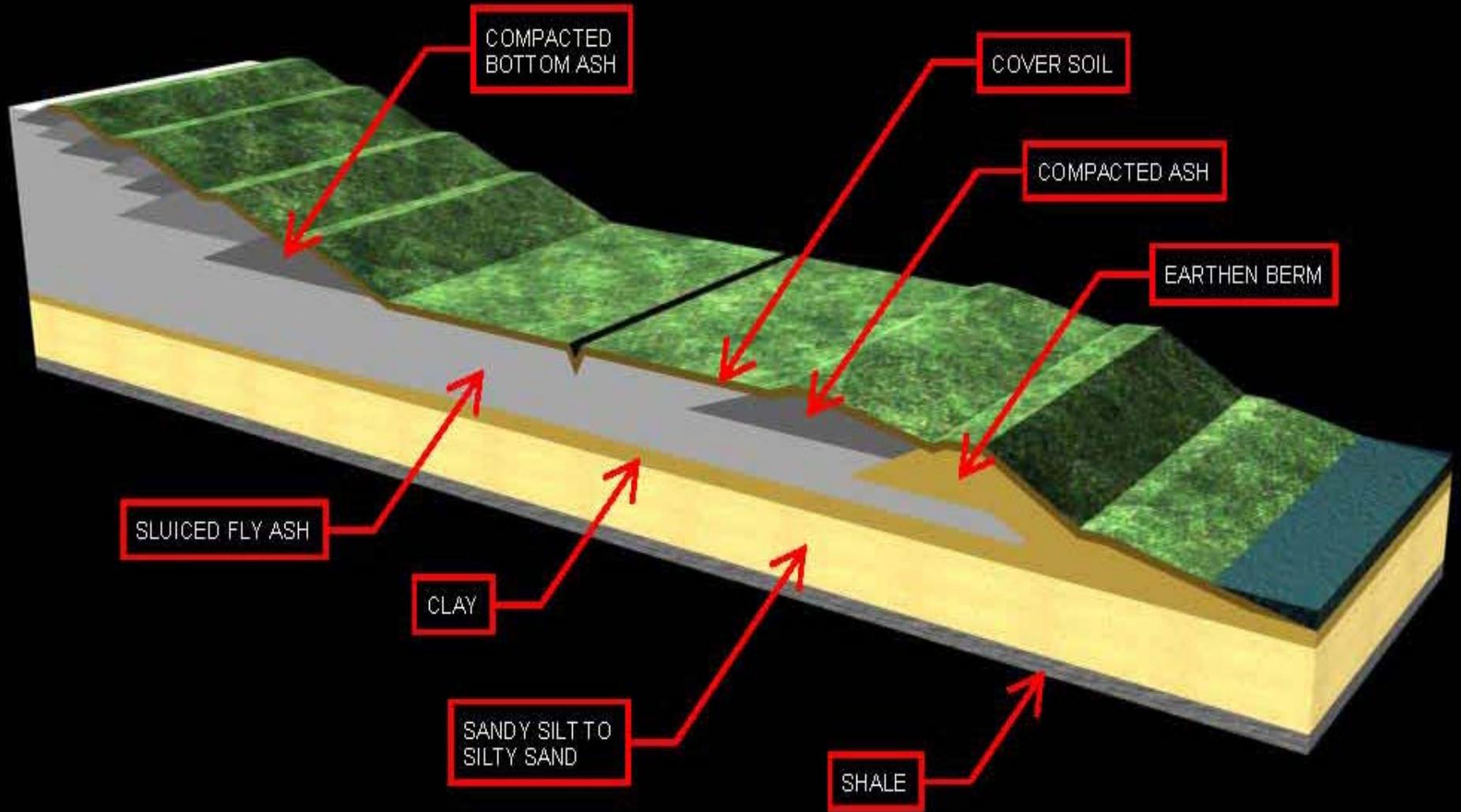
- **No Groundwater Plume**

- Semiannual monitoring over past 10 years
- 2 of 40 samples since release in ballfield exceeded arsenic levels
- No arsenic exceedances in past 7 months

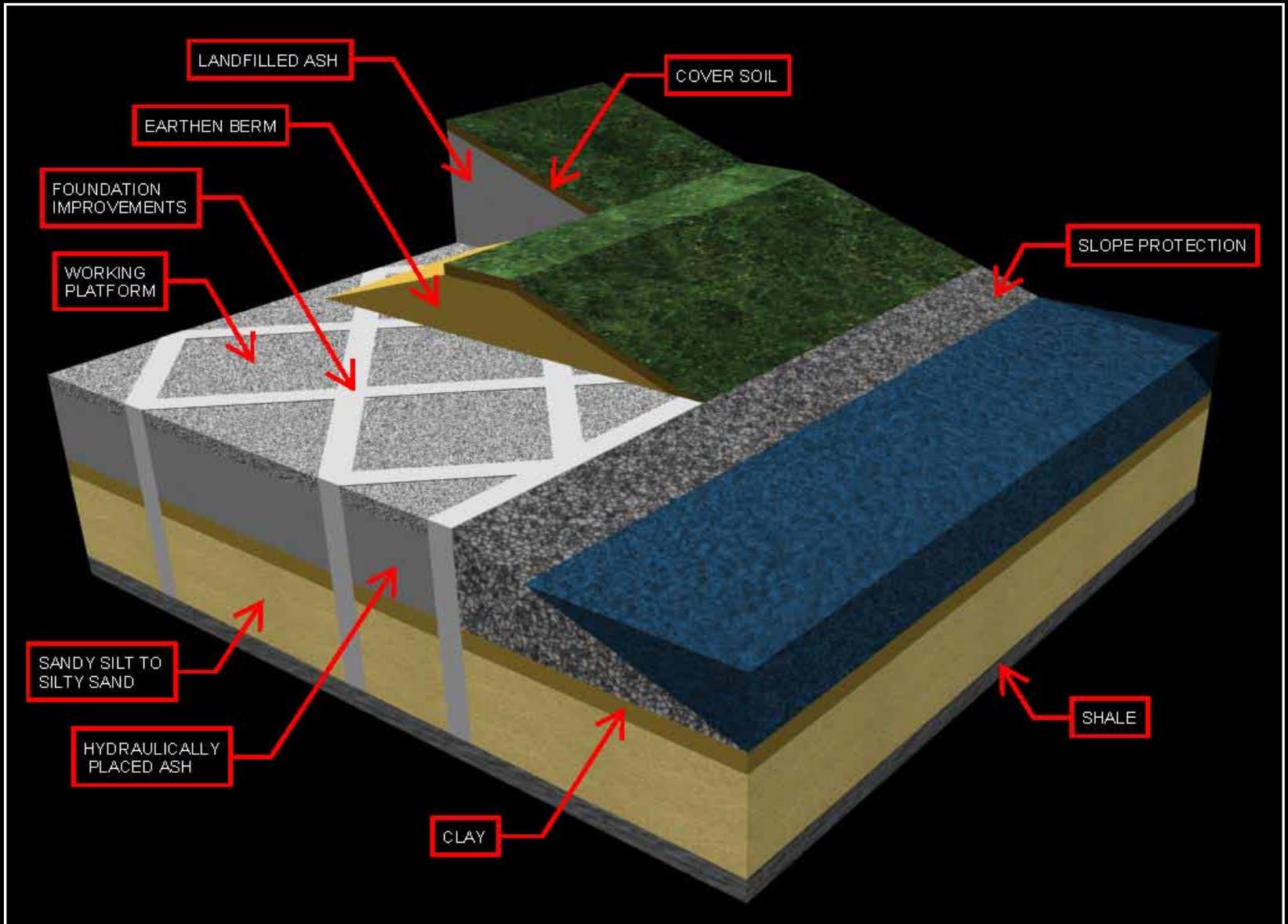
Arsenic, total (ug/L)



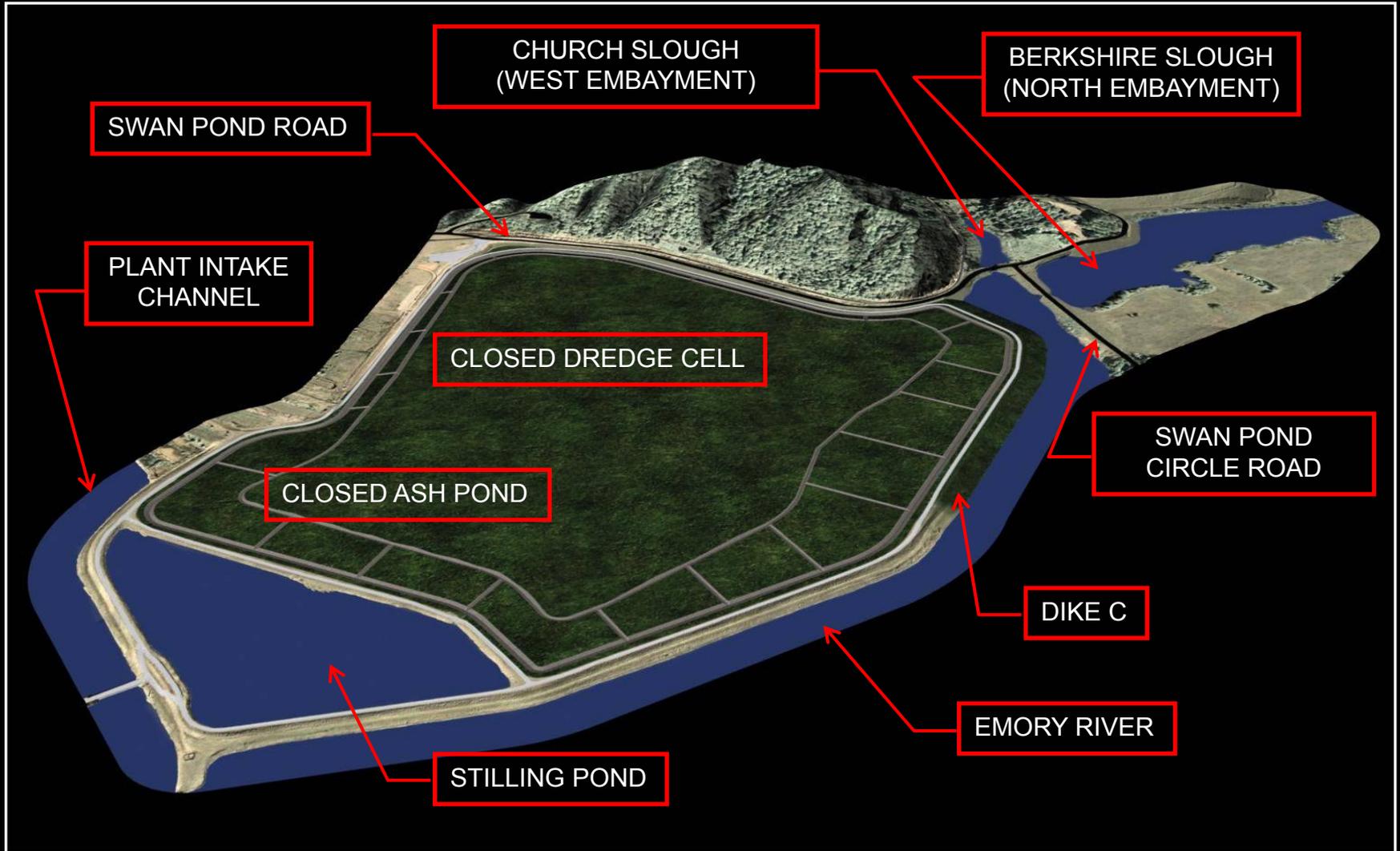
Dike Construction Before Failure



New Perimeter Dike



Aerial View of Impoundment



Phase 3

River System Sampling & Analysis Plan



- **Presentations to Follow:**

- Dennis Callaghan, Environmental Standards – Data Management
- Steve Scott, US Army COE/ERDC – Ash Fate & Transport Modeling
- Mark Chappell, US Army COE/ERDC – Geochemical Investigations
- Mark Greeley, ORNL – Fish Reproduction Evaluations
- Marshall Adams, ORNL – Health Assessment of Fish Populations
- William Hopkins, VA Tech – Bioaccumulation in Wildlife
- Dan Jones, Arcadis – Environmental Assessment /Mgmt Programs

- **Poster Session:**

- Integrated EcoTox Research Programs
- Surface Water Quality Monitoring
- Survival/Growth of *Hyalella Azteca*
- Benthic Macroinvertebrate Assemblages
- Insectivorous birds, *corbicula*, wildlife....and MANY more!

QUESTIONS?

