JOHNSONVILLE FOSSIL PLANT

Tennessee Valley Authority welcomes you to the

Environmental Investigation Plan
Johnsonville Fossil Plant

COMMUNITY INFORMATION SESSION

JOHNSONVILLE FOSSIL PLANT

EVENT GUIDE

This event is to provide information about the Environmental Investigation Plan (EIP) for the Johnsonville Fossil Plant. We welcome your feedback and comments on the EIP.

The following acronyms appear frequently on the boards:

- Environmental Investigation Plan (EIP)
- Environmental Assessment Report (EAR)
- Coal Combustion Residuals (CCR)
- Tennessee Valley Authority (TVA)
- Tennessee Department of Environment and Conservation (TDEC)
- Sampling and Analysis Plan (SAP)
- Environmental Protection Agency (EPA)

The information boards are color-coded according to the technical focus area they cover in the EIP. For instance, if they contain general information regarding the EIP process, the information board will be color-coded in blue.

General Information

Below are the main areas of technical focus in the EIP, divided by study area. More information on the activities within each area has been provided at the stations around the room.

The evaluation of existing site data serves as the foundation to support the additional studies planned for each focus area.

Geotechnical	Civil/Mapping Activities	Hydrogeologic	Environmental
• Exploratory Drilling	• Coal Combustion Residuals Material Quantity	• Hydrogeologic Investigation	• Benthic Investigation
• Slope Stability		• Groundwater Investigation	• Surface Stream Investigation
		• Water Use Survey	• Fish Tissue Investigation
		• Background Soil Investigation	• Seepage Investigation
		• Dye Trace Study	• CCR Material Characteristics

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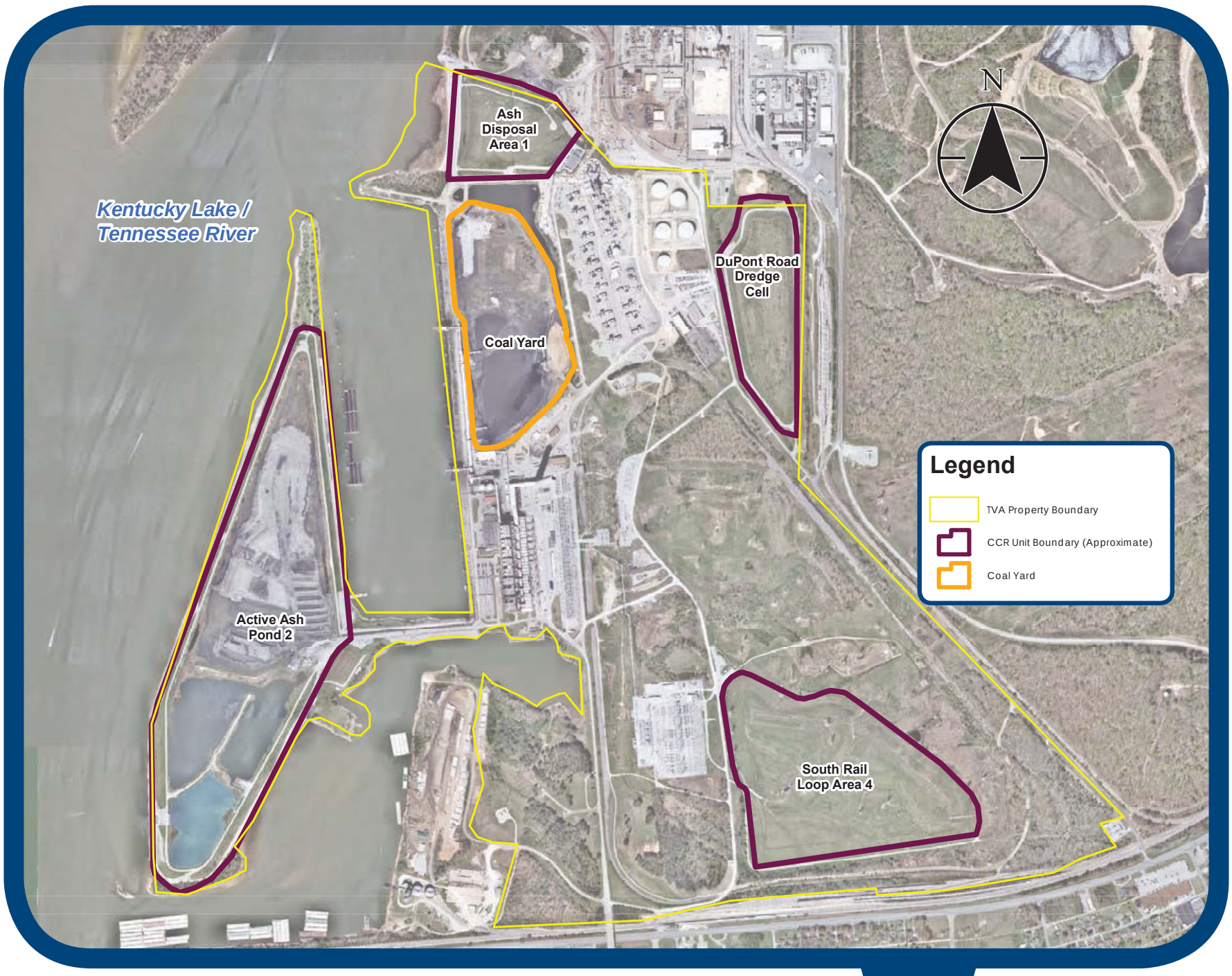

Facility Overview

1951 Johnsonville Fossil Plant began commercial operation

66 years in operation when it closed in 2017

TVA's oldest fossil plant when closed

10 Coal-fired units (closed)

1,500 billion kilowatt-hours generated annually, enough to power **800,000** homes

TDEC Order CCR Units:

- Ash Disposal Area 1 (Closed)
- DuPont Road Dredge Cell (Closed)
- Active Ash Pond 2
- South Rail Loop Area 4 (Closed)

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COAL COMBUSTION RESIDUALS COMPLIANCE ORDER

What is the TDEC Order and why was it put in place?

On August 6, 2015, the Tennessee Department of Environment and Conservation (TDEC) issued Commissioner's Order No. OGC15-0177 to the Tennessee Valley Authority (TVA) for Coal Combustion Residuals (CCR) compliance pursuant to the provisions of Tennessee's solid waste management and disposal laws.

This order establishes a transparent, comprehensive process to investigate, assess, and remedy any unacceptable risks resulting from the management and disposal of CCR at TVA coal-fired power plants within the state:

Plant	Comment Period
Cumberland	April 12 to May 25
John Sevier	July 25 to September 7
Kingston	August 15 to September 28
Watts Bar	September 5 to October 19
Bull Run	September 19 to November 2
Johnsonville	September 26 to November 9
Allen	October 15 to November 28

What is the EIP?

What it is and why we do it

TDEC has requested certain information about Johnsonville's CCR management.

What TVA has already done

TVA has ongoing programs and monitoring that can help answer TDEC's questions.

Proposed EIP Activities

The Environmental Investigation Plan (EIP) lays out the proposed investigation TVA will conduct to provide additional information that TDEC has requested.

Did you know…

The last coal-fired units at Johnsonville were retired in 2017 and power generation has been replaced by 20 natural gas Combustion Turbine Units.

What are coal combustion residuals?

Coal combustion residuals, commonly known as coal ash, are created when power plants burn coal to produce electricity.

These residuals include fly ash, bottom ash/ slag, and gypsum, and are collected separately from different areas of the facility.

Fly ash originates from the flue gas electrostatic precipitators, bottom ash from the boilers, and gypsum from the sulfur dioxide scrubbers.

Bottom Ash/Slag

Gypsum

Fly Ash

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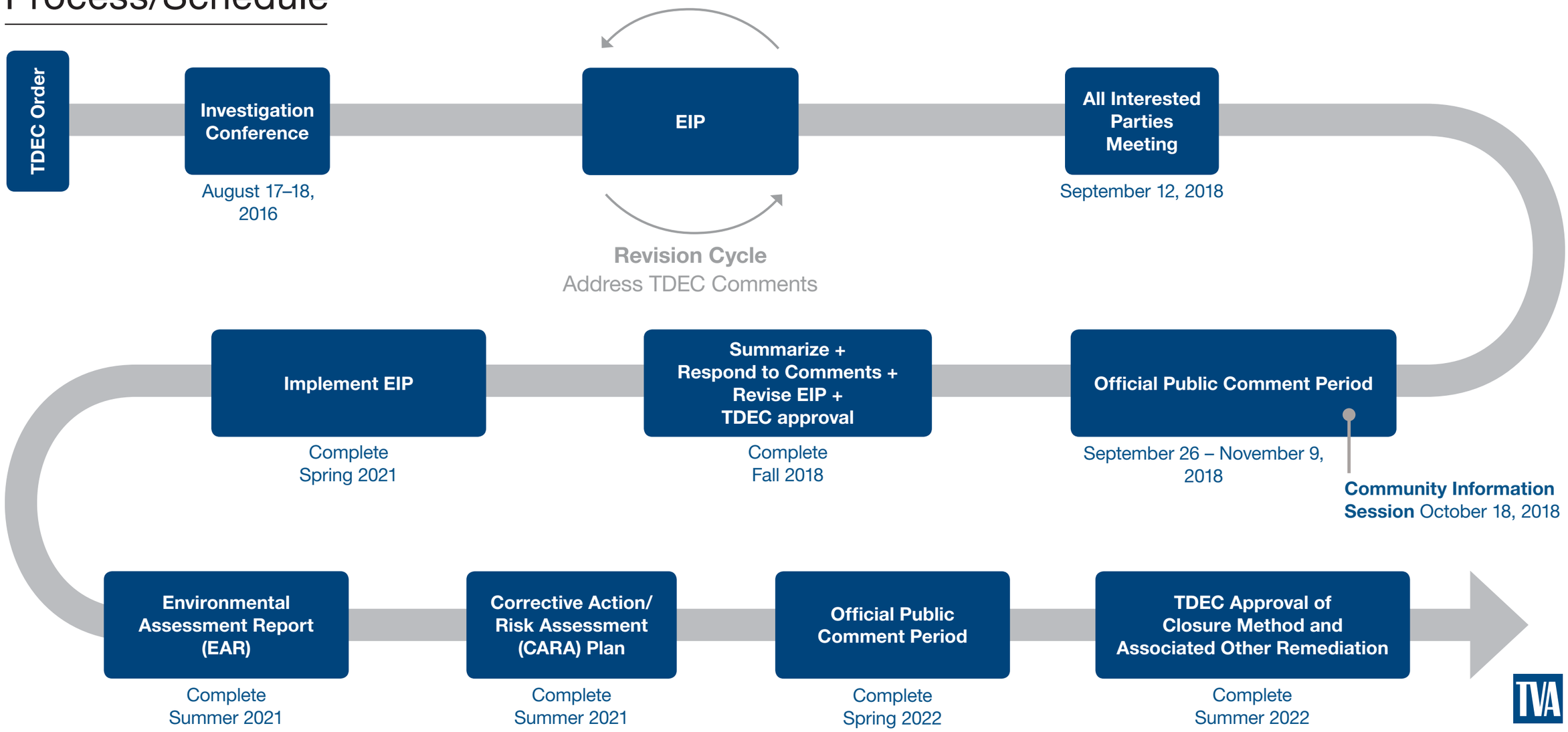
ENVIRONMENTAL INVESTIGATION PLAN

Process/Schedule



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ACTIVITIES MATRIX

FOCUS AREA	EXISTING INFORMATION	PROPOSED EIP ACTIVITIES
Exploratory Drilling	• Performed as required for specific projects • More than 450 existing borings and 160+ water level instruments	• Geotechnical drilling and soil/rock sampling • Install water level instruments • Laboratory testing
Slope Stability	• Routine visual monitoring and instrumentation monitoring • Existing analyses (available for some units) meet industry standards • Existing drilling and laboratory data support new analyses	• New analyses (for some units) for normal and earthquake conditions • Compare existing models to new data • If needed, update models and reanalyze • Compare slope stability results to acceptance criteria
Coal Combustion Residuals (CCR) Material Quantity	• As built/record drawings • Aerial surveys performed for specific projects • Drilled borings history beginning in 1948	• Review existing surveys, drawings, and borings • Develop three-dimensional models of CCR units • Update three-dimensional models with new boring data and water levels • Confirm CCR volumes
Hydrogeologic Investigation	• Monitoring well networks in place for CCR Rule and state permitting requirements	• Install 3 background wells • Install 7 downgradient wells
Groundwater Investigation	• Groundwater monitoring has been ongoing since 1982	• Bimonthly groundwater sampling for 1 year (6 events)
Water Use Survey	• Existing TDEC water well database	• Review existing water supply information and compare to addresses listed for these water sources • Perform a door-to-door water use survey • Record water use data and GPS locations of identified water sources • Conduct one round of sampling and compare to United States Environmental Protection Agency drinking water standards • Test for CCR constituents and geochemical parameters

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ACTIVITIES MATRIX

FOCUS AREA	EXISTING INFORMATION	PROPOSED EIP ACTIVITIES
Background Soil Investigation	Soils samples taken from development of three existing wells: • JOF-10-AP1 • JOF-10-AP2 • JOF-10-AP3	• Test additional background sampling locations for CCR constituents • Visually inspect accessible rock and residuum outcrops in the vicinity of the Plant in an attempt to determine if naturally occurring sources of CCR constituents are present in the area • Review existing data for comparative analysis
Dye Trace Study	• Over 200 borings advanced at Active Ash Pond 2	• Bench Study • Background Study • Placement of Dye Receptors • Injection of Dye(s) • Retrieval and Replacement of Dye Receptors (for approximately 6 months) • Analyses of Dye Receptors • Data Collection and Conclusion of Dye Trace Study
Benthic Investigation (sediment, benthic macroinvertebrate and mayfly sampling)	• From 1990 to 2015, sediment samples periodically collected from several locations in the Kentucky Lake for analysis of multiple parameters including some of the CCR constituents • In August and October 2011, benthic invertebrate community samples collected from transects located upstream and downstream of the Plant	• Collect sediment, benthic macroinvertebrate, and mayfly samples • Analyze sediment samples for CCR constituents and percentage of ash • Analyze benthic macroinvertebrate samples for community composition • Analyze mayfly samples for CCR metals constituents • Report on analytical assessment
Surface Stream Investigation	• No existing data has been identified to date	• Collect water samples • Analyze samples for CCR constituents • Conduct comparative analysis against upstream samples and existing surface data • Report on analytical assessment

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ACTIVITIES MATRIX

FOCUS AREA	EXISTING INFORMATION	PROPOSED EIP ACTIVITIES
Fish Tissue Investigation	• Multiple fish population studies completed since 1957 • Biological monitoring completed in 2012 • No adverse impacts identified	• Capture target fish species at sampling locations • Remove and transport fish tissue samples to laboratory • Analyze tissue samples for CCR constituents • Comparative analysis against upstream samples • Report on analytical assessment
Seepage Investigation	Under NPDES permit: • Daily dike inspections • Special inspections (after intense, large or extended rain events) • Annual inspection • Annual inspection report submitted to TDEC	• Conduct seepage investigation to identify active seeps • Collect soil and water samples at identified seeps • Analyze samples for CCR constituents • Comparative analysis against background soils • Report on analytical assessment
CCR Material Characteristics	• Trace metals and leachability analysis of fly ash and bottom ash conducted 1995 • Total metals and leachability analysis of fly ash and bottom ash conducted 2002 • Total metals and leachability analysis of bottom ash conducted 2013	• Collect CCR material samples from borings in units • Collect pore water samples from temporary wells in units • Analyze samples for CCR constituents • Comparative analysis against existing data • Report on analytical assessment

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HISTORIC TIMELINE

1949

Construction of the Johnsonville Fossil Plant begins

1951

Unit 1 of the 10-unit fossil plant begins commercial operation

1952

TVA sells shoreline property North of plant to DuPont (now Chemours)

1952

Construction of Active Ash Pond 2 dikes

1953

Construction of the 6 original generating units complete

1959

4 additional generating units complete

Final Unit 10 begins commercial operation

1975

TVA adds 16 combustion turbine units at the Johnsonville site which can burn fuel oil or natural gas and are designed to start quickly and typically are operated only during peak demand period

1999

2000

TVA adds another 4 combustion turbine units at the Johnsonville site

2011

Unit 1 had the second longest run of a coal plant worldwide, with continuous operation for 1,082 days

In an agreement with the Environmental Protection Agency (EPA) under the *Clean Air Act*, TVA announced it would shut down the coal units at Johnsonville by 2017

2012

Units 5–10 are idled

2015

Unit 4 had the 3rd longest run worldwide, with continuous operation for 1,073 days

Units 5–10 are shut down

Three projects were completed at Ash Disposal Area 1 to improve cap and mitigate seepage

2017

Remaining units are shut down in December after 66 years of record-breaking service

TVA opened its first gas co-generation facility at the Johnsonville site

TVA's co-generation partnership with Chemours preserved approximately 1,100 jobs in Middle Tennessee. TVA constructed a heat-recovery steam generator on a combustion turbine at the Johnsonville Combustion Turbine plant to take over steam supply to Chemours.

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TVA'S ADVANCED TECHNOLOGY FOR IMPOUNDMENT MONITORING CENTER

Automated Instrumentation

TVA's Advanced Technology for Impoundment Monitoring (ATIM) Center

$2 million to develop the ATIM center

helps to **identify** and **respond** to any coal ash issues before they become an emergency

More than **11,000 real-time sensors** to monitor ash impoundments send data (24/7/365) to a centralized computer monitoring system

Only facility of its kind in the utility industry in the U.S.

LED wall displays Geographic Information System (GIS) maps, weather, earthquakes, sensor data

ATIM Center

Operations has **real-time data** or can watch what's happening at TVA impoundments via **live video**

System sends **alerts** on any irregularities

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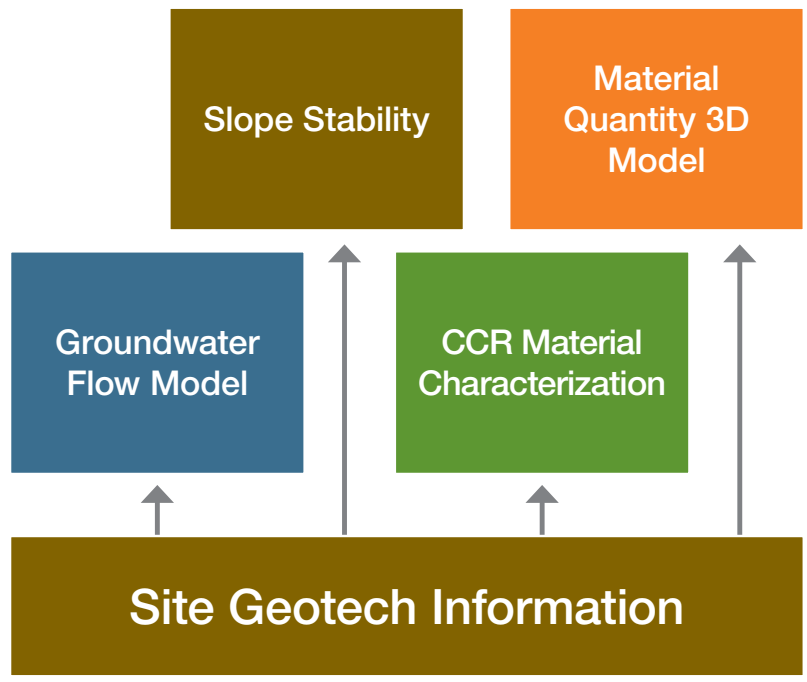
EXPLORATORY DRILLING (1 of 3)

What it is and why we do it

Exploratory drilling provides a better understanding of what is in and under each CCR unit.

It tells us:

- What is there: material types (CCR, soil, rock) and properties (strength, permeability, etc.)
- Where it is (material locations)
- Where the water level(s) are located (material saturation)



What TVA has already done

The EIP includes an evaluation of existing geotechnical data. This includes a review of design and construction records, inspection records, field data (including more than 450 existing borings and 160+ water level instruments), laboratory data, and engineering analyses.

Each piece of information has been evaluated to confirm that it was collected and analyzed properly in the past. This existing data is very valuable to understand the CCR unit conditions.

What are borings

Drilled holes from which to take samples of CCR, soil, and rock

The field geologist/engineer will prepare boring logs to describe the recovered samples.

Proposed EIP Activities

- Additional borings within the interior of the CCR units
- Install temporary wells in CCR material
- Hydraulic conductivity testing in select water level instruments at Active Ash Pond 2
- Shallow bedrock characterization
- Laboratory testing
- Share data with hydrogeological, environmental, and civil/mapping discipline teams

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EXPLORATORY DRILLING (2 of 3)

Where will the drilling be done?

Active Ash Pond 2

- **5** Borings
- **5** Borings with Temporary Wells and No Rock Coring

Hydraulic conductivity testing of 30+ existing water level instruments

Legend

- Proposed Temporary Well (Screened Interval)
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

What are Water Level Instruments/ Piezometers?

Sensors that measure water pressures in CCR, soil, and rock

Example of a vibrating wire piezometer

Slotted well screen

Surface protection for top of well

PVC well pipe with slots that allow water to enter at a selected depth in the boring

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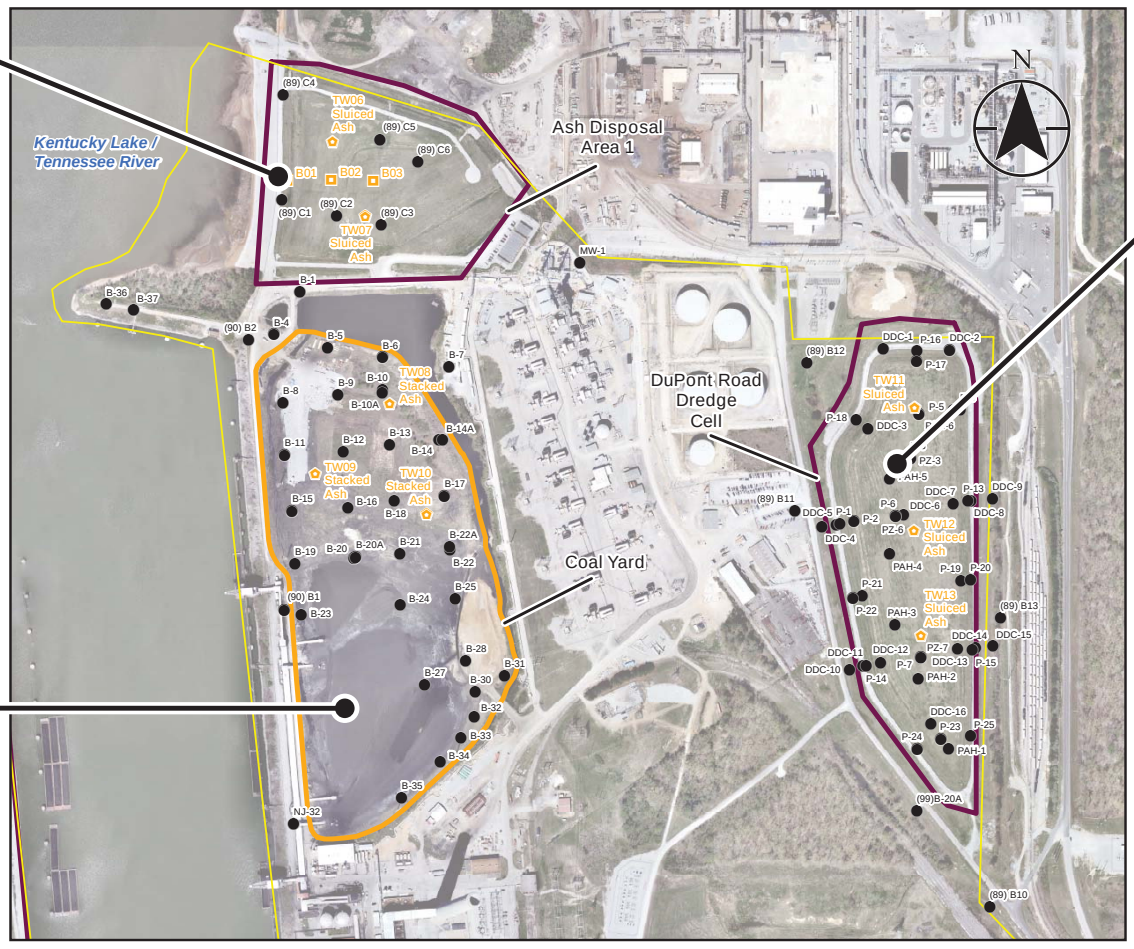
EXPLORATORY DRILLING (3 of 3)

Ash Disposal Area 1

- **5** Borings
  - **2** Borings with Temporary Wells and No Rock Coring
  - **3** Borings with Vibrating Wire Piezometers and Rock Coring

Coal Yard

- **3** Borings
  - **3** Borings with Temporary Wells and No Rock Coring

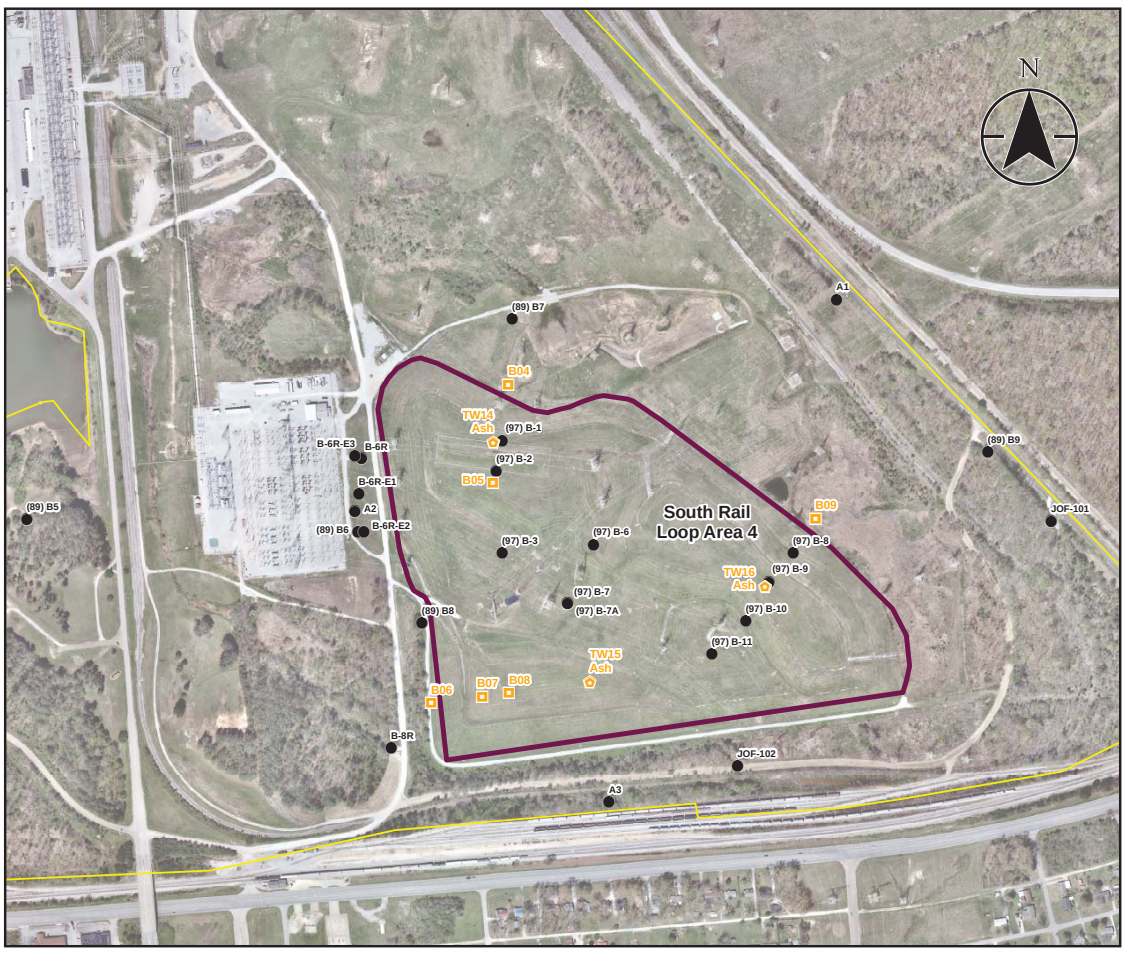


DuPont Road Dredge Cell

- **3** Borings
  - **3** Borings with Temporary Wells and No Rock Coring

Legend

- Proposed Boring with Piezometer Vibrating Wire
- Proposed Temporary Well (Screened Interval)
- Existing Boring
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary



South Rail Loop Area 4

- **9** Borings
  - **3** Borings with Temporary Wells and No Rock Coring
  - **6** Borings with Vibrating Wire Piezometers and Rock Coring

Legend

- Proposed Boring with Piezometer Vibrating Wire
- Proposed Temporary Well (Screened Interval)
- Existing Boring
- Unit Boundary (Approximate)
- TVA Property Boundary

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SLOPE STABILITY (1 of 3)

What it is and why we do it

These analyses tell us if the slopes of the CCR units are stable. Multiple locations around each CCR unit are checked for stability.

Normal (long-term) conditions and earthquake conditions are evaluated.

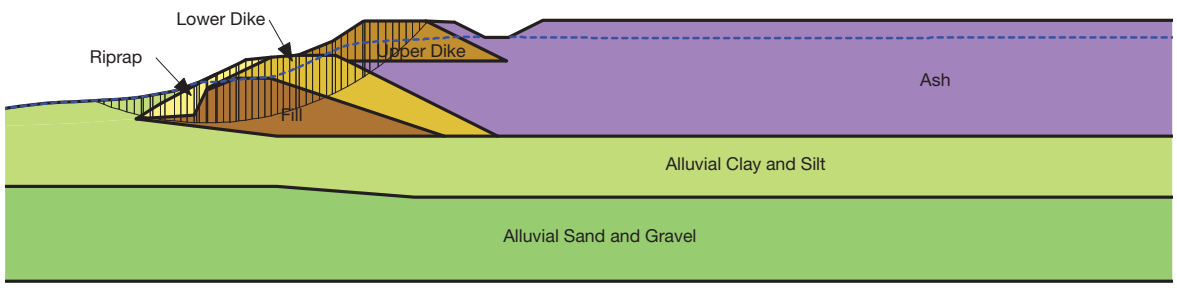
What TVA has already done

Slope stability has been analyzed many times over the years, for various conditions and at multiple units.

The existing analyses were reviewed as part of the evaluation of existing geotechnical data.

Each analysis was reviewed for adequate documentation, appropriate methods, and representative conditions.

Example of Existing Slope Stability Analysis



Inputs: Surface and subsurface geometry/zones, engineering properties, water levels/pressures, external loads

Outputs: Factor of safety against sliding

Existing and proposed analyses satisfy EIP requirements

CCR Unit	Normal	Earthquake
Ash Disposal Area 1	P	P
Active Ash Pond 2	E	E
DuPont Road Dredge Cell	E/P	P
South Rail Loop Area 4	P	P

E = Existing analysis **P** = Proposed analysis

Proposed EIP Activities

- Compare existing models to new data from the Exploratory Drilling Sampling and Analysis Plan
  - If models are representative, no changes
  - If not, update models and reanalyze
- New analyses (for some units) for normal and earthquake conditions
- Compare slope stability results to acceptance criteria

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SLOPE STABILITY (2 of 3)

What it is and why we do it

Slope stability is influenced by water levels/pressures (among other factors).

Monitoring water levels also supports the hydrogeologic investigation and the CCR material quantity estimate (saturated vs. unsaturated CCR material).

What TVA has already done

TVA has multiple types of water level instruments on site, as well as a number of monitoring wells, to track water levels in many areas. These instruments have been installed over many years, for various purposes. More than 80 water level instruments (including piezometers) are currently installed.

TVA has operated an Instrumentation Monitoring Program since 2012 that includes automated and manual readings of select piezometers. These monitoring instruments will send warnings to site personnel if water levels rise enough to start affecting slope stability.

Data are routinely assessed and correlated to rainfall, river levels, etc.

Water Level Instrumentation

- New instruments are added
  - due to Exploratory Drilling Sampling and Analysis Plan
  - due to Hydrogeological Investigation Sampling and Analysis Plan (monitoring wells)

Existing instrumentation: Active Ash Pond 2

Legend

- Existing Piezometer Open Standpipe (Screened Interval)
- Existing Piezometer Vibrating Wire (Tip Interval)
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

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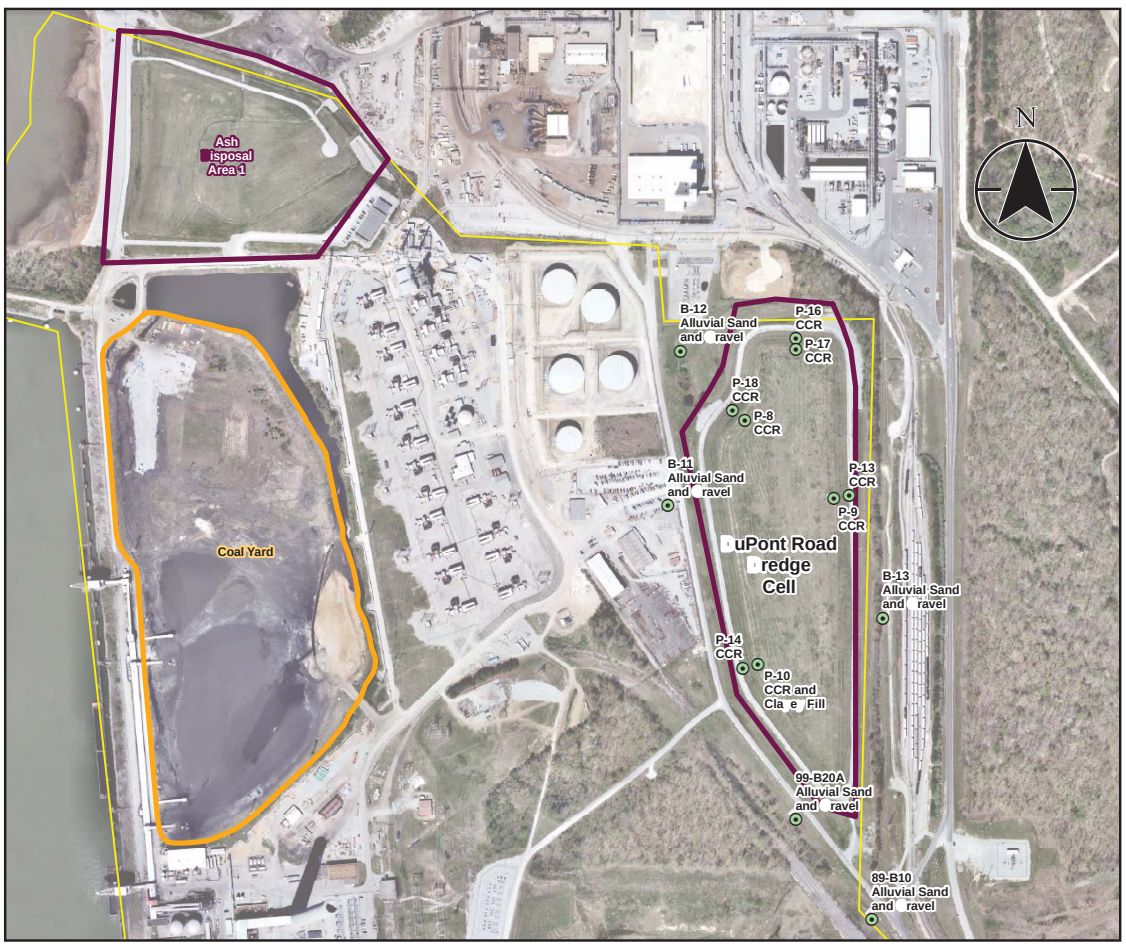
SLOPE STABILITY

(3 of 3)

Existing instrumentation:
Ash Disposal Area 1, Coal Yard, & DuPont Road Dredge Cell



Legend

- Existing Piezometer Open Standpipe (Screened Interval)
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

Existing instrumentation:
South Rail Loop Area 4

Legend

- Existing Piezometer Open Standpipe (Screened Interval)
- CCR Unit Boundary (Approximate)
- TVA Property Boundary

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CLOSURE AND CAP

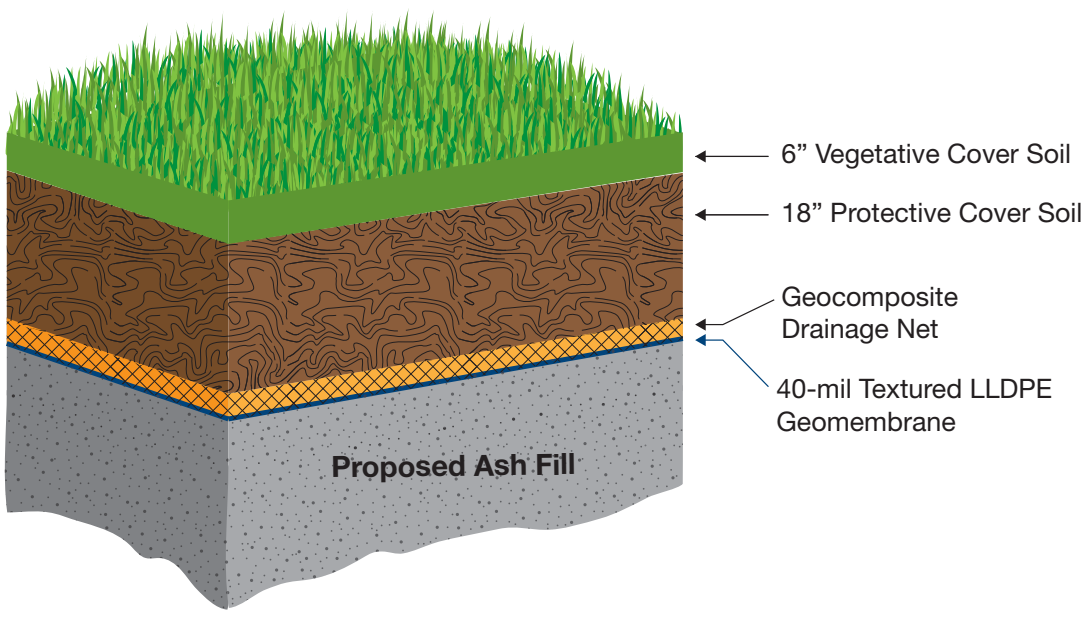
What it is and why we do it

CCR Units are closed and capped with a liner system to promote surface runoff and reduce infiltration.

The following CCR units have been capped and closed:

- DuPont Road Dredge Cell
- Ash Disposal Area 1
- South Rail Loop Area 4

Typical CCR Unit closure cap liner system



Making the DuPont Road Dredge Cell closure cap

Remove temporary cover soil

Smooth remaining cover soil with roller equipment

Install 40-mil geomembrane

Install geocomposite drainage layer over geomembrane

Place protective cover soil

Place final sod cover

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COAL COMBUSTION RESIDUALS MATERIAL QUANTITY

What it is and why we do it

Frequent surveys of the site tracked the location and quantity of coal combustion residuals (CCR) to aid overall site management.

What TVA has already done

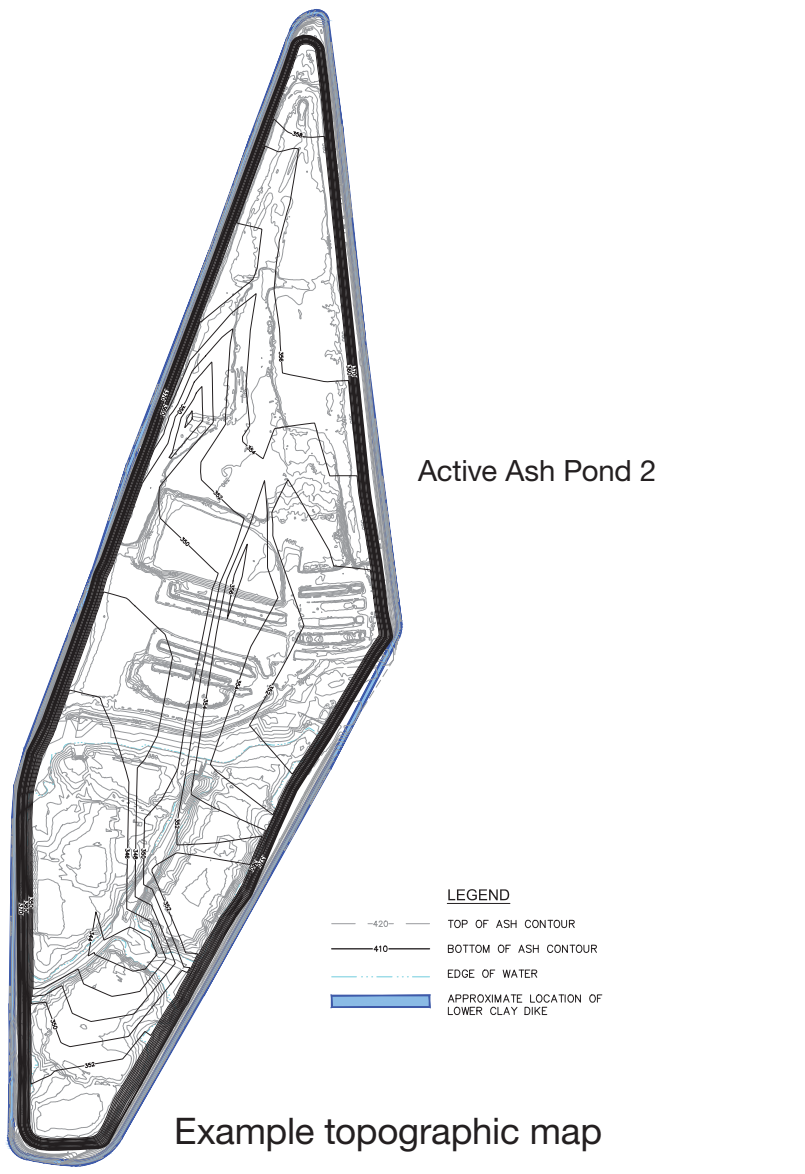
- Pre-development topographic maps
- As built/record drawings
- Aerial surveys performed for specific projects
- Drilled borings history beginning in 1948

Before construction began, the facility had been mapped with pre-development topographic maps and construction drawings.

Site mapping and aerial photographs were updated when significant changes where made to the layout of the site.

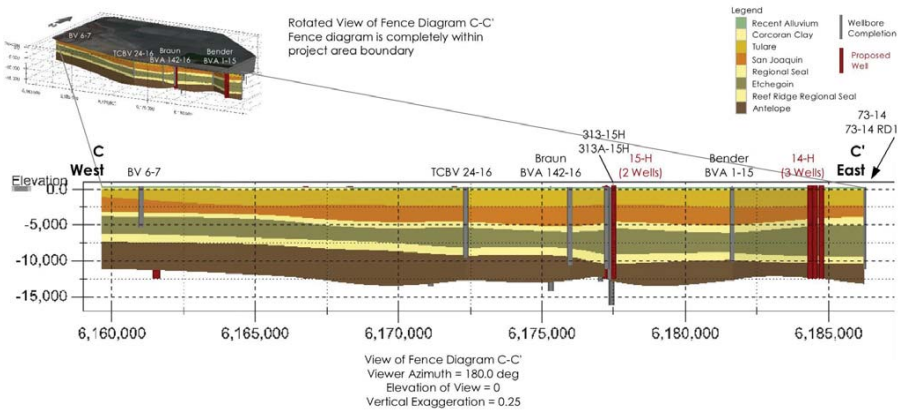
Record drawings of the Ash Disposal Area 1, DuPont Road Dredge Cell, and South Rail Loop Area 4 closure projects provide final grades of CCR units.

Borings were drilled for various CCR unit design and closure projects.



Active Ash Pond 2

Example topographic map



Example of a 3-dimensional model developed and used to calculate volumes

Proposed EIP Activities

- Review existing surveys, drawings, and borings
- Develop three-dimensional models of CCR units
- Update three-dimensional models with new boring data and water levels
- Confirm CCR volumes

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HYDROGEOLOGIC INVESTIGATION

What it is and why we do it

Hydrogeologic investigations are used to better understand how groundwater moves in a particular area, as well as its interaction with the surrounding soils and rocks.

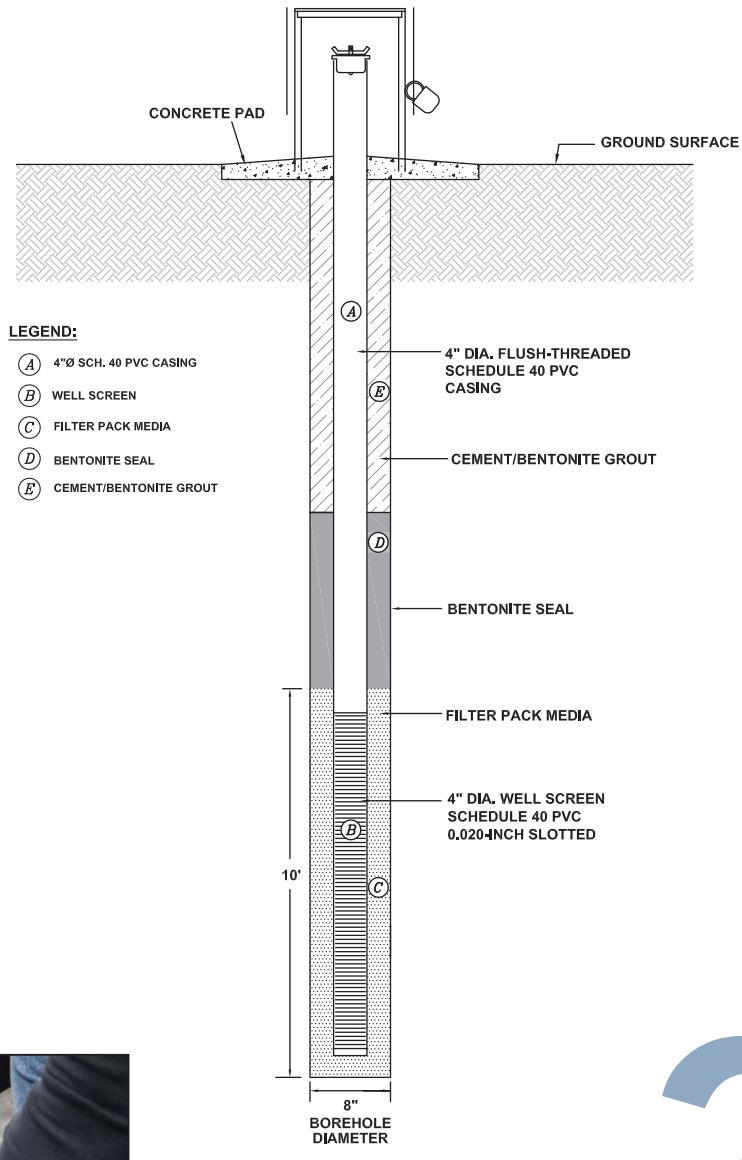
These investigations consist of installing groundwater monitoring wells, which are used to collect information about groundwater.

Background (i.e., unaffected by the Johnsonville site) and downgradient wells are used to study water quality changes.

What TVA has already done

Several hydrogeologic investigations have been conducted at the Johnsonville Plant to monitor groundwater quality and flow direction to determine compliance with CCR Rule and state requirements.

Groundwater Monitoring Well



What is a groundwater monitoring well?
A well specially designed and installed to obtain representative groundwater quality samples and hydrogeologic information.

Proposed EIP Activities

- Additional monitoring wells will be installed to supplement current groundwater monitoring well networks to further investigate groundwater quality and flow direction:
  - 3 background wells and 1 alternate
  - 7 downgradient monitoring wells
- Report the analytical results in the Environmental Assessment Report (EAR)

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GROUNDWATER INVESTIGATION

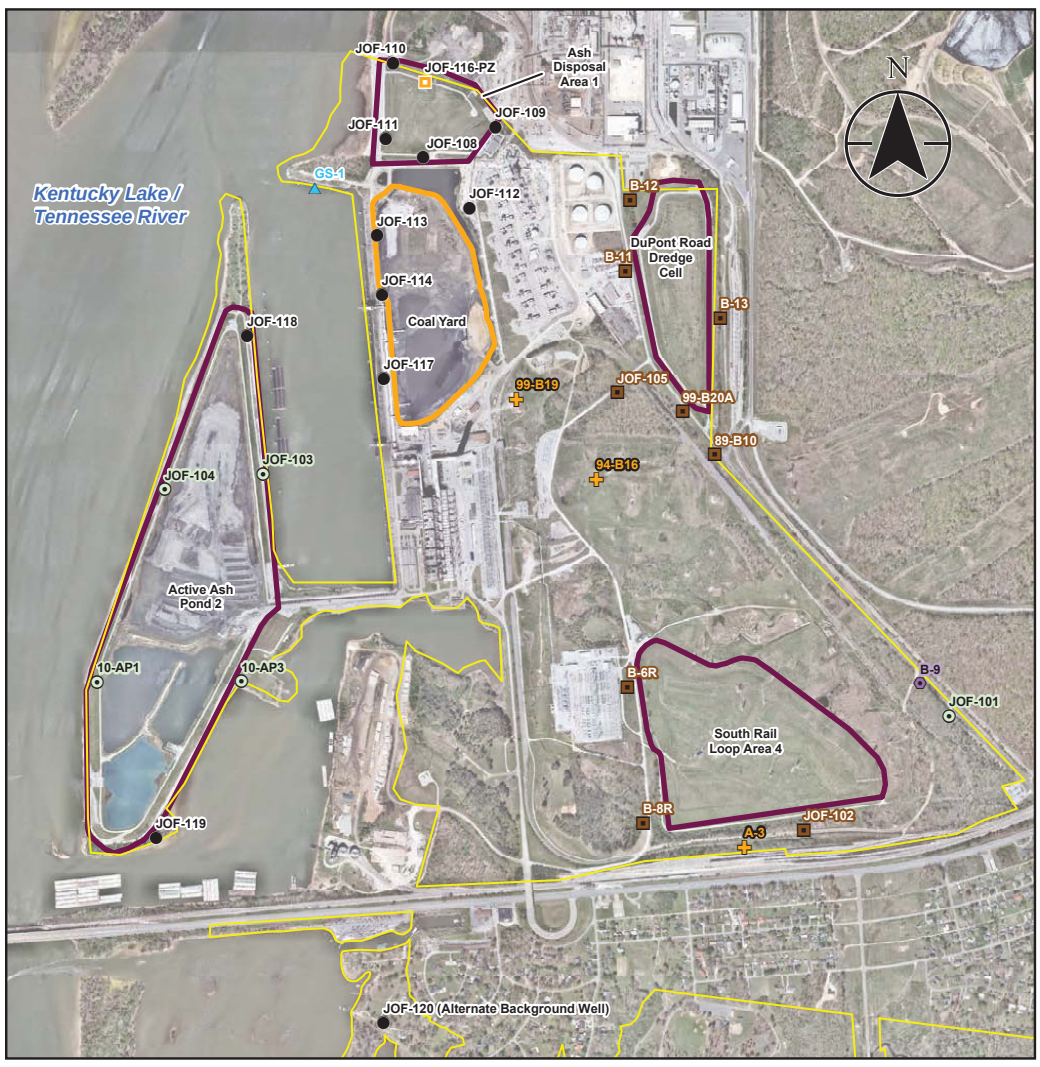
What it is and why we do it

Groundwater samples are collected frequently to test for a number of quality measures. By testing groundwater regularly, TVA can track compliance with regulatory permits and requirements.

What TVA has already done

Groundwater has been monitored at the Johnsonville Fossil Plant since 1982. Monitoring currently consists of CCR Rule sampling at Active Ash Pond 2, and state-permit compliance sampling at South Rail Loop Area 4 and the DuPont Dredge Cell.

Proposed groundwater well locations



Legend

- Proposed Vibrating Wire Piezometer
- Proposed Groundwater Monitoring Well
- CCR Well
- CCR/State Monitoring Well
- State Compliance Monitoring Well
- Observation Well
- Surface Water Gauging Station
- TVA Property Boundary
- CCR Unit Boundary (Approximate)
- Coal Yard

Proposed EIP Activities

- Bimonthly groundwater sampling for 1 year (6 events)
  - Sample 10 new wells
  - Groundwater samples will be collected from background and downgradient locations
  - Conduct an investigation to understand the movement of groundwater
  - Investigate how the CCR units affect groundwater movement and quality

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WATER USE SURVEY

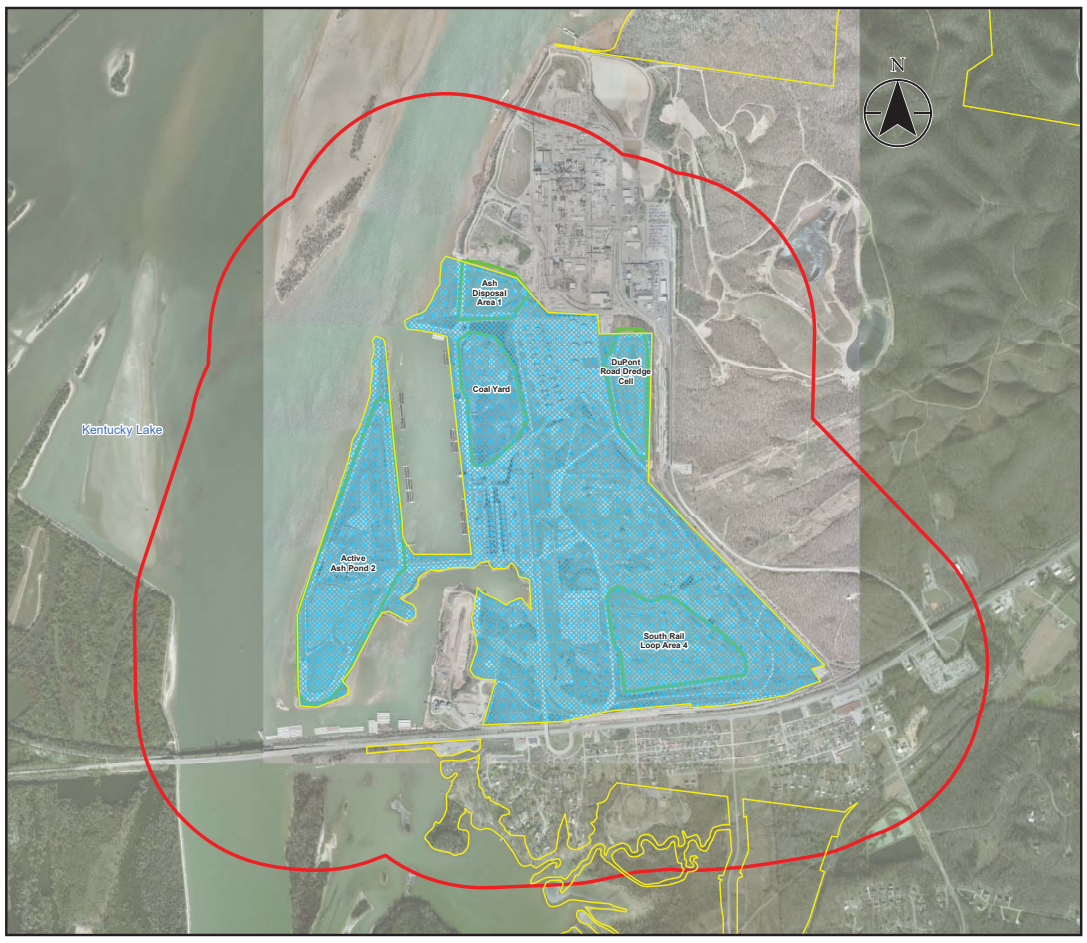
What it is and why we do it

A water use survey is a search for private water supplies (e.g., domestic wells, springs) located within a ½-mile radius of the Johnsonville Plant. It is used to evaluate the quality of groundwater used in these private wells.

What TVA has already done

A survey of this type has not been conducted recently. The purpose of the water use survey is to understand local groundwater quality.

Water supply wells



Legend

- Approximate TVA Property
- TVA Property 1/2 Mile Buffer
- Unit Boundary
- TVA Property Boundary

Proposed EIP Activities

- Review existing information on private water wells and springs
- Perform a door-to-door water use survey
- Record water use data and GPS locations of identified water wells and springs
- Conduct sampling for CCR parameters and compare to United States Environmental Protection Agency drinking water standards
- Test water for potential impacts from CCR constituents
- Report the analytical results in the Environmental Assessment Report (EAR)

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BACKGROUND SOIL INVESTIGATION

What it is and why we do it

The constituents found in CCR are also found in nature. This investigation would detect CCR constituent levels in background soils.

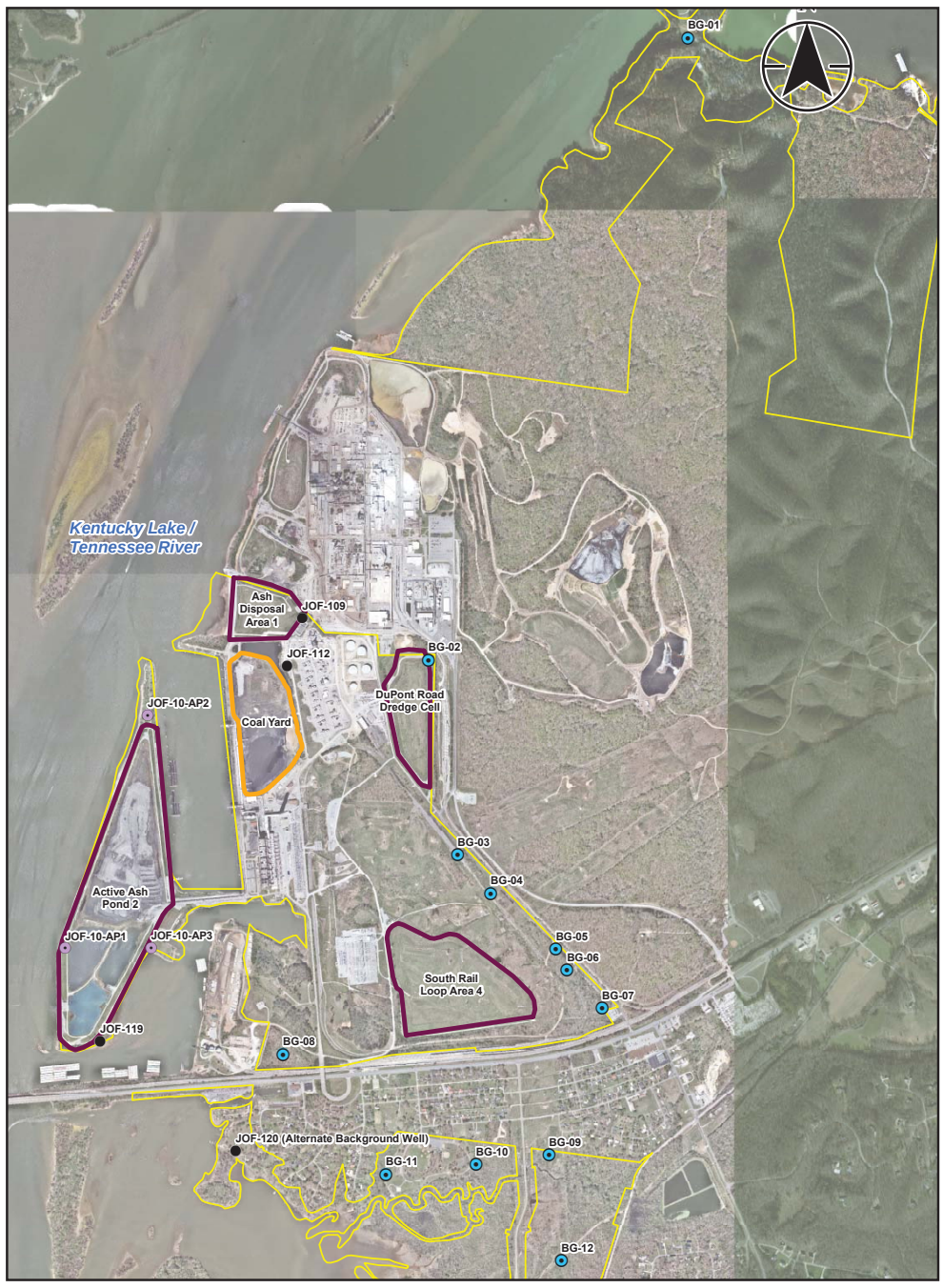
These levels can be compared to other soils to determine if they are higher than natural levels and used to determine if CCR constituents are naturally occurring in native soils.

What TVA has already done

Soils samples were collected during the installation of three existing wells:

- JOF-10-AP1
- JOF-10-AP2
- JOF-10-AP3

Proposed soil sampling locations



Proposed EIP Activities

- Test additional background sampling locations for CCR constituents
- Visually inspect accessible rock and residuum outcrops in the vicinity of the Plant in an attempt to determine if naturally occurring sources of CCR constituents are present in the area
- Review existing data for comparative analysis
- Report the analytical results in the Environmental Assessment Report (EAR)

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DYE TRACE STUDY

What it is and why we do it

A dye trace study is conducted when an artificial dye is introduced into a surface or underground water body, or is injected into the ground, in order to estimate flow velocities and direction of flow (in both surface water and groundwater). The study helps determine how the water travels from the point of introduction through features or areas along the flow path.

A dye trace study has been selected to identify whether groundwater flow pathways are present between Active Ash Pond 2 and Kentucky Lake.

What TVA has already done

TVA has advanced over 200 borings at Active Ash Pond 2 with results demonstrating a continuous, low permeability clay layer beneath the entire CCR unit and low permeability clay within the perimeter dikes.

Proposed Dye Trace Injection Points Active Ash Pond 2

Proposed EIP Activities

- Bench Study
- Background Study
- Placement of Dye Receptors
- Injection of Dye(s)
- Retrieval and Replacement of Dye Receptors (for approximately 6 months)
- Analyses of Dye Receptors
- Data Collection and Conclusion of Dye Trace Study

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BENTHIC INVESTIGATION–BIOLOGICAL STUDIES (1 of 3)

What it is and why we do it

The Tennessee River is evaluated to compare the health of aquatic wildlife upstream and downstream of the plant.

These evaluations have two parts:

- Testing selected benthic macroinvertebrates to see if CCR constituents are in their tissues
- Counting the types and numbers of different benthic macroinvertebrates in the river adjacent to site

What are benthic macroinvertebrates?

Aquatic organisms that live in and on the sediment substrate.

Why do we study them?

They are an important part of the local food chain, and are good indicators of changes in the environment.

Examples of benthic macroinvertebrates

Nymphs are immature mayflies found in the sediment.

What TVA has already done

In Fall 2010 and in August and October 2011, benthic invertebrate community samples collected from transects located upstream and downstream of the Plant.

Proposed EIP Activities

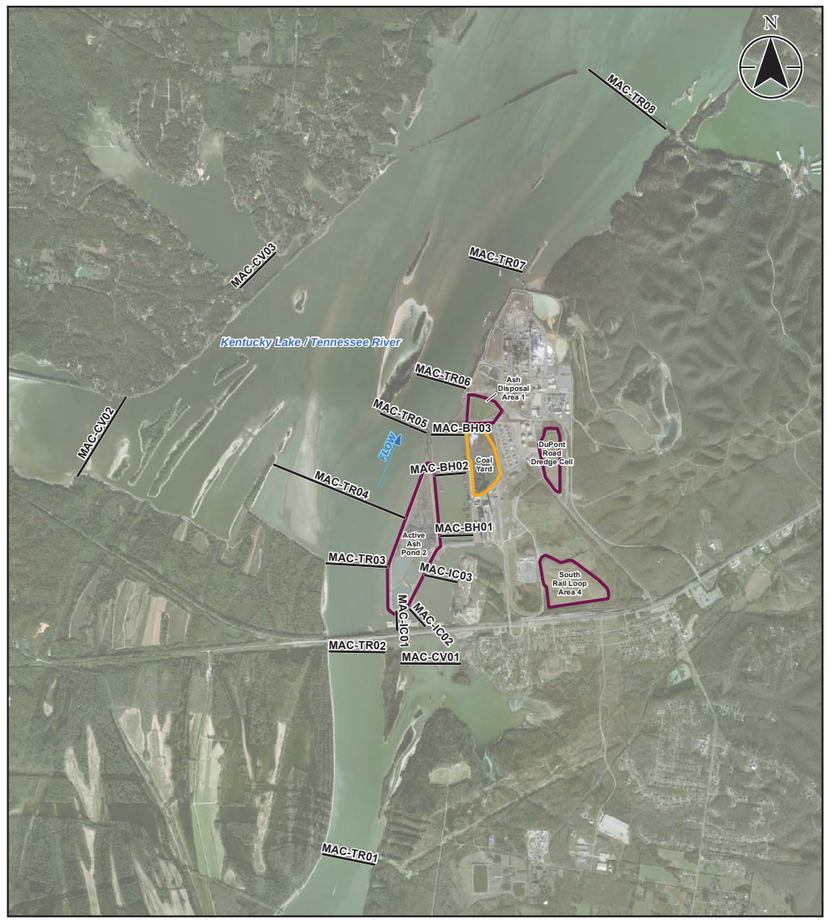
- Collect sediment, benthic macroinvertebrate, and mayfly samples
- Analyze benthic macroinvertebrate samples for community composition
- Analyze mayfly samples for CCR metals constituents
- Report the analytical results in the Environmental Assessment Report (EAR)

JOHNSONVILLE FOSSIL PLANT

BENTHIC INVESTIGATION–BIOLOGICAL STUDIES

Where will the sampling be done?

Benthic macroinvertebrates community sampling



Off-site benthic macroinvertebrates community sampling

Legend

- Transect
- CCR Unit Boundary (Approximate)
- Coal Yard

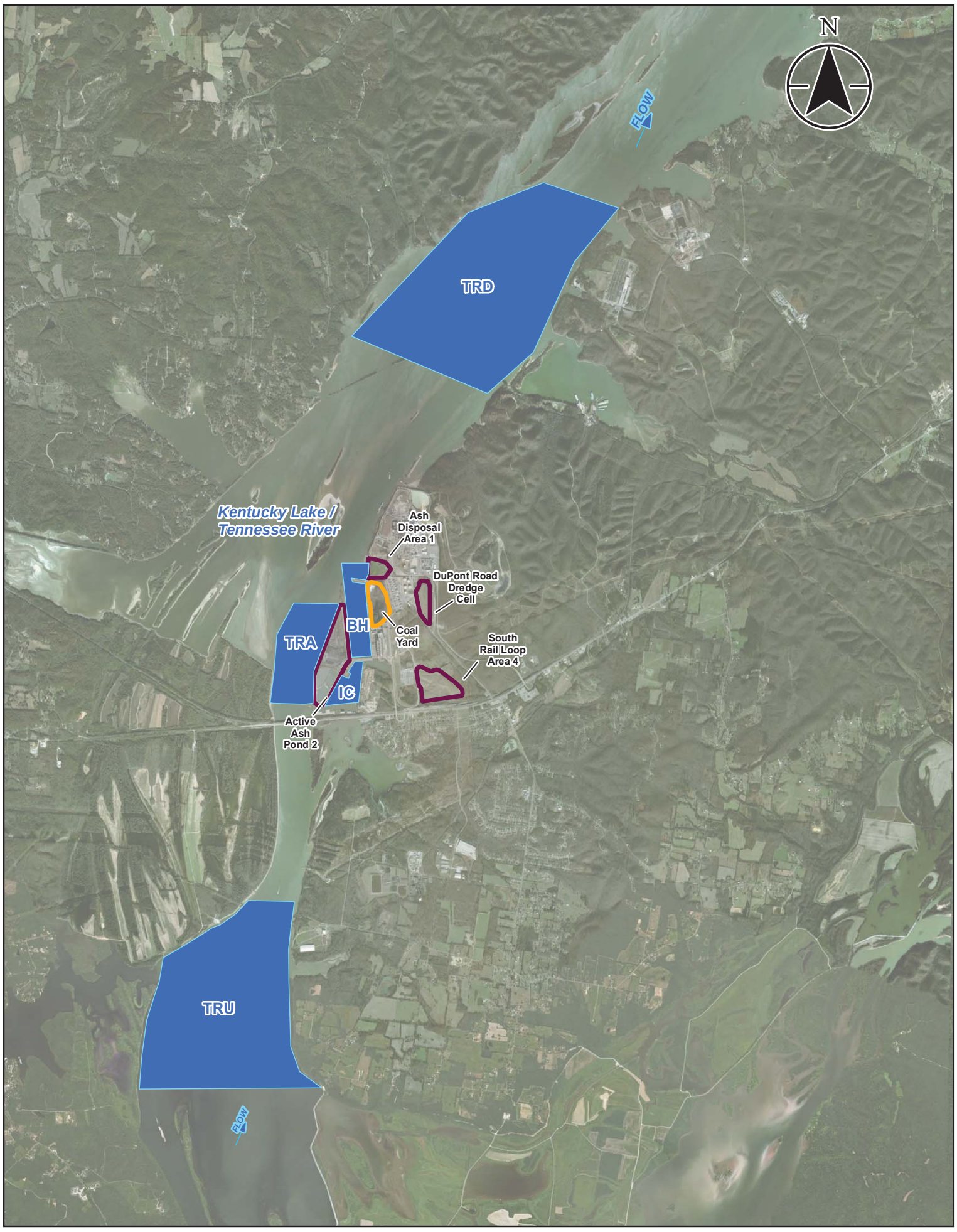
Legend

- Transects
- CCR Unit Boundary (Approximate)
- Coal Yard

JOHNSONVILLE FOSSIL PLANT

BENTHIC INVESTIGATION–BIOLOGICAL STUDIES (3 of 3)

Mayfly (or other representative species) sampling



Legend

- Mayfly Sample Location
- CCR Unit Boundary (Approximate)
- Coal Yard

JOHNSONVILLE FOSSIL PLANT

BENTHIC INVESTIGATION– SEDIMENT STUDIES

What it is and why we do it

Sediment samples are taken from the river bottom to determine whether CCR material and/or constituents have migrated from the site to Tennessee River and other surface waters.

What TVA has already done

From 1990 to 2015, sediment samples periodically collected from several locations in the Tennessee River for analysis of multiple parameters including some of the CCR parameters.

Sediment sample locations

Legend

- Sediment Sampling Transect
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

Proposed EIP Activities

- Collect sediment samples
- Analyze sediment samples for CCR constituents and percentage of ash
- Report the analytical results in the Environmental Assessment Report (EAR)

JOHNSONVILLE FOSSIL PLANT

SURFACE STREAM INVESTIGATION

What it is and why we do it

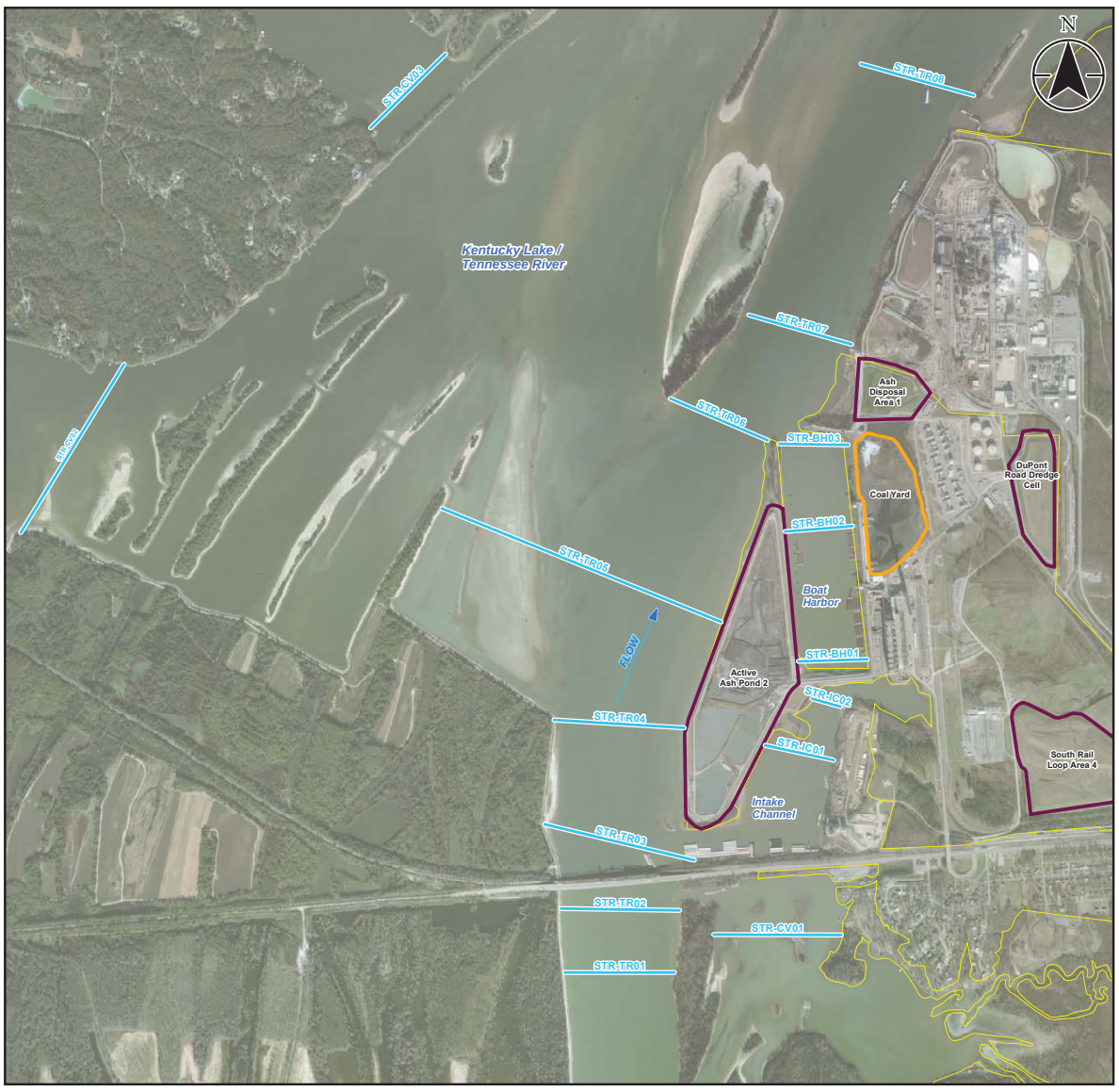
Surface stream sampling is performed both upstream and downstream to determine if CCR materials and/or constituents have migrated from the site to adjacent water bodies.

What TVA has already done

No existing data has been identified to date.

A discussion of any current information identifying the movement of potential dissolved CCR constituents into surface streams on or adjacent to the site, will be provided in the EAR.

Surface water sample locations



Legend

- Stream Sampling Transect
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

Proposed EIP Activities

- Collect water samples
- Analyze samples for CCR constituents
- Conduct comparative analysis against upstream samples and existing surface data
- Report the analytical results in the Environmental Assessment Report (EAR)

JOHNSONVILLE FOSSIL PLANT

FISH TISSUE INVESTIGATION

What it is and why we do it

Fish are captured using electrofishing and gill netting, and tissue samples are taken.

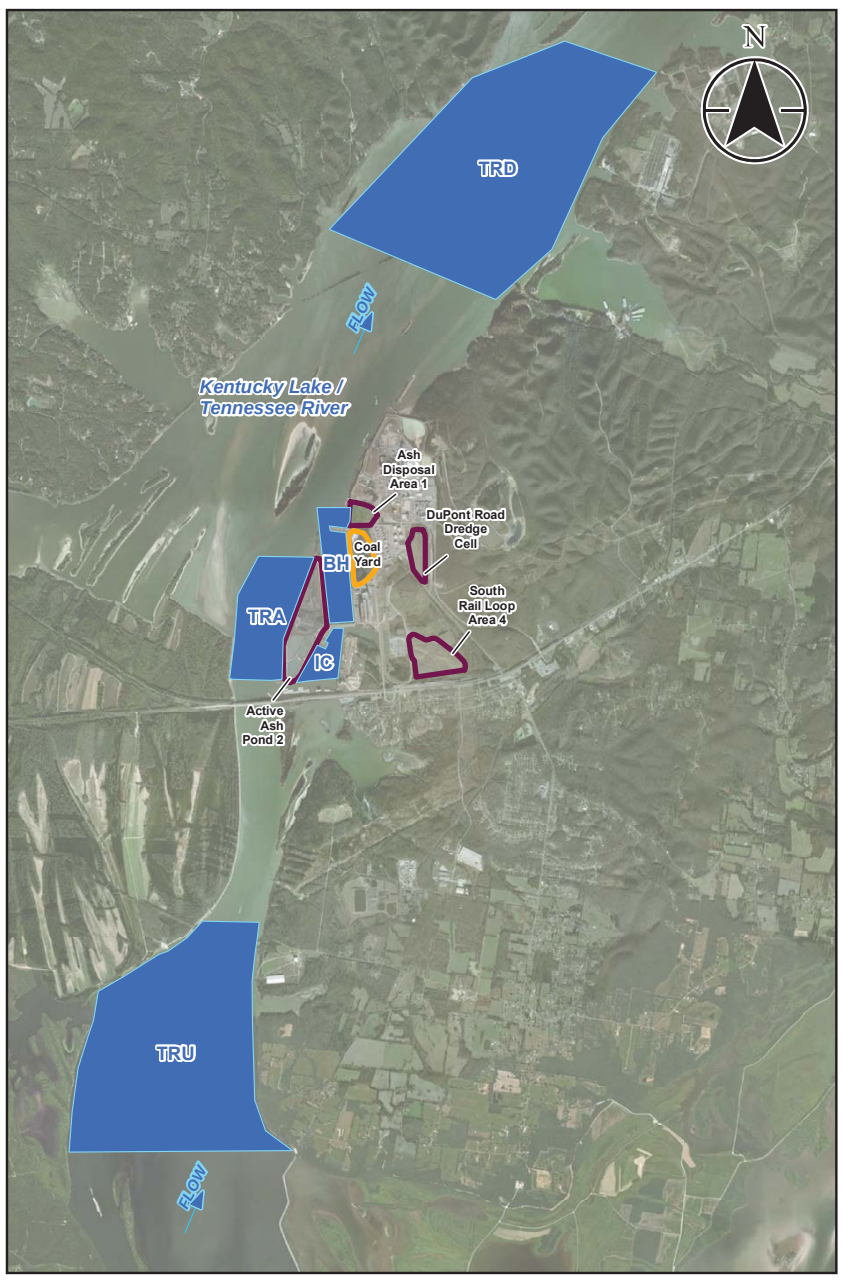
These tissues samples are used to test the levels of CCR constituents in fish.

What TVA has already done

- Multiple fish population studies completed since 1957
- No adverse impacts identified
- No previous fish tissue studies conducted at site
- Spring sport fish surveys performed from 2002 to 2014
- Fish community surveys performed from 2001 to 2011

Electroshock fishing

Fish sampling locations



Proposed EIP Activities

- Capture target fish species at sampling locations
- Remove and transport fish tissue samples to laboratory
- Analyze tissue samples for CCR constituents
- Comparative analysis against upstream samples
- Report the analytical results in the Environmental Assessment Report (EAR)

JOHNSONVILLE FOSSIL PLANT

SEEPAGE INVESTIGATION (1 of 2)

What it is and why we do it

Dikes on the property are checked frequently to identify active seeps.

What TVA has already done

Under National Pollutant Discharge Elimination System (NPDES) permit:

- Daily dike inspections
- Special inspections (after intense, large or extended rain events)
- Annual inspection
- Annual inspection report submitted to TDEC

Historic seep locations
Ash Disposal Area 1

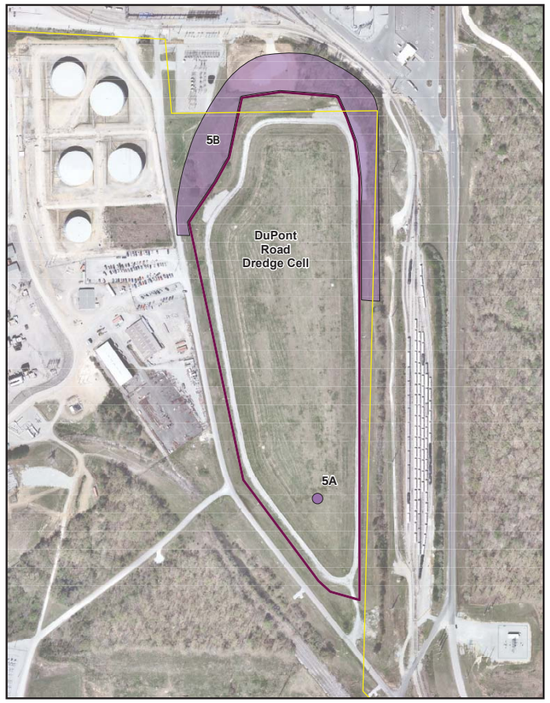
Proposed EIP Activities

- Conduct seepage investigation to identify active seeps
- Collect soil and water samples at identified seeps
- Analyze samples for CCR constituents
- Comparative analysis against background soils
- Report the analytical results in the Environmental Assessment Report (EAR)

JOHNSONVILLE FOSSIL PLANT

SEEPAGE INVESTIGATION

Historic seep locations
DuPont Road Dredge Cell



Legend

- Approximate Historic Seep Location
- Approximate Historic Seep Location
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

Historic seep locations
Active Ash Pond 2

Legend

- Approximate Historic Seep Location
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

Historic seep locations
South Rail Loop Area 4

Legend

- Approximate Historic Seep Location
- Approximate Historic Seep Location
- CCR Unit Boundary (Approximate)
- TVA Property Boundary

JOHNSONVILLE FOSSIL PLANT

COAL COMBUSTION RESIDUALS MATERIAL CHARACTERISTICS (1 of 2)

What it is and why we do it

The different CCR materials on site are tested for levels and types of chemical constituents. This helps us understand whether they leach from (or leave) the ash and enter the water in the CCR units.

What TVA has already done

- Trace metals and leachability analysis of fly ash and bottom ash conducted 1995
- Total metals and leachability analysis of fly ash and bottom ash conducted 2002
- Total metals and leachability analysis of bottom ash conducted 2013

Proposed temporary wells Active Ash Pond 2

Legend

- Proposed Temporary Well (Screened Interval)
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

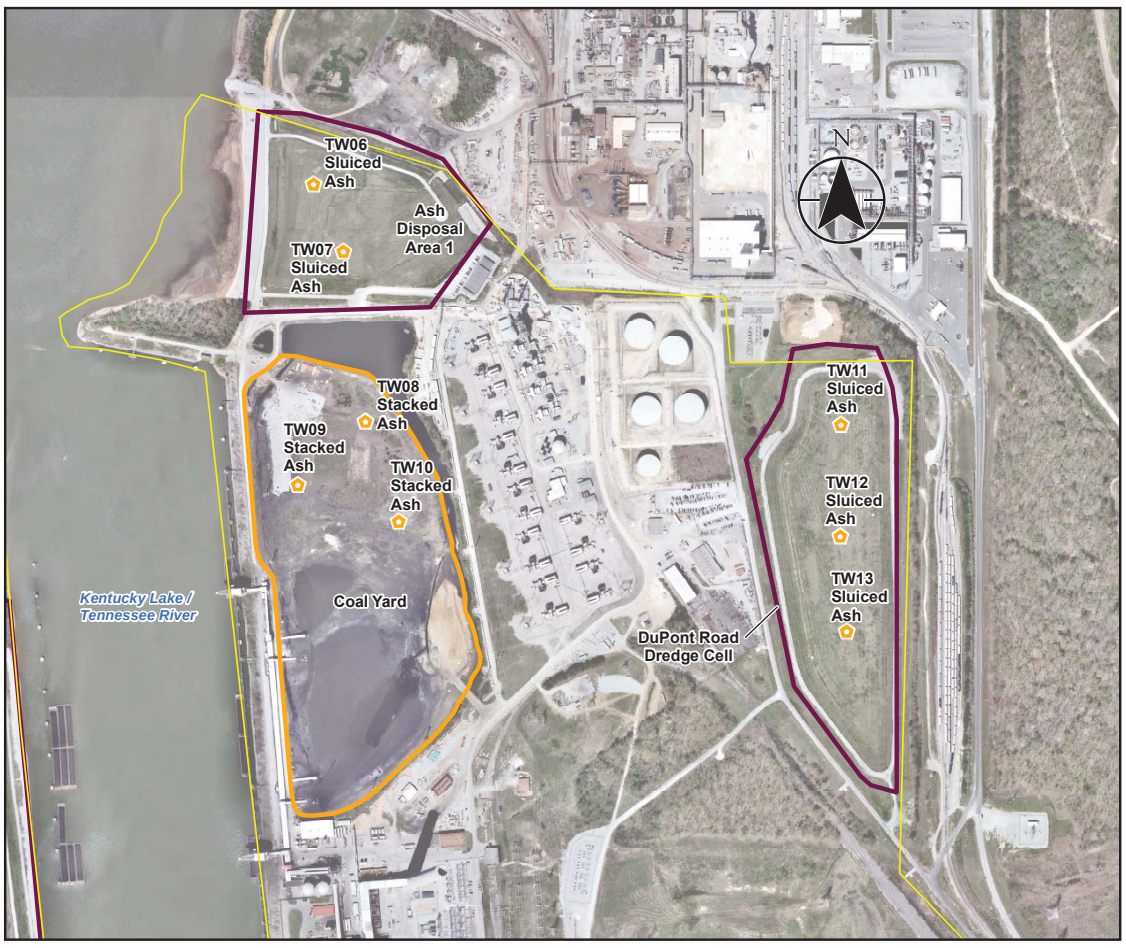
Proposed EIP Activities

- Collect CCR material samples from borings in units
- Collect pore water samples from temporary wells in units
- Analyze samples for CCR constituents
- Comparative analysis against existing data
- Report the analytical results in the Environmental Assessment Report (EAR)

JOHNSONVILLE FOSSIL PLANT

COAL COMBUSTION RESIDUALS MATERIAL CHARACTERISTICS (2 of 2)

Proposed temporary wells
Ash Disposal Area 1, Coal Yard, & DuPont Road Dredge Cell



Legend

- Proposed Temporary Well (Screened Interval)
- CCR Unit Boundary (Approximate)
- Coal Yard
- TVA Property Boundary

Proposed temporary wells
South Rail Loop Area 4

Legend

- Proposed Temporary Well (Screened Interval)
- Unit Boundary (Approximate)
- TVA Property Boundary