



TVA Disposal Facility Assessment Phase 1 Plant Summary Watts Bar Fossil Plant (WBF)

| | | | |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| Location: | Watts Bar Fossil Plant Watts Bar Highway Spring City, Rhea County, Tennessee 37381 | | |
| | Latitude: 35.611 N | Longitude: | 84.782 W |
| Plant Contact: | Kelly Evans TVA Engineer Phone: (423)751-4653 Email: keevans@tva.gov | | |
| Facts and Figures: | <p>WBF, originally named Watts Bar Steam Plant, was the first coal-fired power plant built by TVA. WBF was constructed in stages between 1940 and 1945. The plant operated until 1957 and was then shut down until 1970. The plant was operated from 1970 to 1982, then again placed in extended shutdown mode. In 1996, TVA prepared an EA on the proposed sale of boiler slag stockpiled at the WBF site and subsequently began marketing and removing the boiler slag. Economic analyses indicated no positive benefit to TVA for returning WBF to service, so TVA terminated the air permits for the plant in 1997. In 2007, a closure plan for the slag disposal area was submitted and was still in process at the time of the site visit.</p> | | |
| Coal Combustion Byproduct Disposal: | Inactive fossil plant and disposal areas with no byproduct currently being disposed | | |
| Geology and Seismicity: | <p>The Watts Bar Fossil Plant is located in east-central Tennessee along the west bank of the Tennessee River, just south (downstream) of the Watts Bar Lock and Dam. The plant is situated near the western edge of the Valley and Ridge Physiographic province near the base of the Cumberland Plateau. Numerous faults, trending northeast to southwest as characteristic of the Valley and Ridge Province, are depicted on the geologic mapping and the plant is positioned just south of the Chattanooga Fault. The geologic mapping shows the plant to be underlain by Cambrian age limestone and shale bedrock of the Conasauga Group and Rome Formation. The Conasauga Group at the site is described as consisting of the Nolichucky Shale, a clayey shale with shaley limestone lenses; the Maryville, Rogersville, and Rutledge Formations, consisting of limestone and clayey shale; and the Pumpkin Valley Shale, a dull brown to maroon shale</p> | | |



TVA Disposal Facility Assessment Phase 1 Plant Summary Watts Bar Fossil Plant (WBF)

interbedded with thin layers of blocky, sandy siltstone. The Rome Formation consists of variegated red, green, and yellow shale and siltstone with beds of fine-grained sandstone. Although not depicted on the geologic mapping, alluvial deposits are likely present beneath the portions of the site adjacent to the river.

Seismic events affecting eastern Tennessee, and thus the plant site, primarily emanate from three zones of earthquake activity – the New Madrid Seismic Zone (NMSZ), Southern Appalachia Seismic Zone (SASZ), and the South Carolina Seismic Zone (SCSZ). The most active zone of the SASZ, the East Tennessee Seismic Zone (ETSZ), extends from northwestern Georgia through east Tennessee and is situated in close proximity to the plant. However, most earthquakes emanating from this zone are relatively low in magnitude, with the largest known event in the ETSZ registering a magnitude of 4.6, suggesting a moderate risk of damage from a seismic event. In contrast, if a large earthquake were to occur within the New Madrid zone to the west, damage to East Tennessee would be possible. The “Geologic Hazards Map of Tennessee – Environmental Geology Series No. 5” developed and published by the Tennessee Department of Environment and Conservation (TDEC), Division of Geology and compiled by Robert Miller (1978) shows the plant to be located in Seismic Risk Zone 2.

Facilities Reviewed: Slag Disposal Area (AADA-1)
 Ash Pond / Stilling Pond (AADA-2)



**TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Slag Disposal Area (AADA-1)**

1. General Facility Information

| | | | |
|------------------------------|------------|--------------------------------------|---------------|
| Facility Status: | Closed | NID Identification: | Not Available |
| Surface Area (inside dikes) | 24.5 Acres | Maximum Height (toe to top of dike): | 12 Feet |
| Free Water Volume: | N/A | Maximum Water Storage: | N/A |
| Estimated CCB Storage: | N/A | Dike Length: | N/A |
| Plant Discharge to Facility: | N/A | Current Pool Elevation: | N/A |

2. Site Visit Information

Stantec Assessment Team: Robert Fuller, PE
Benjamin Phillips, EIT

TVA Staff Present: Steve Williams (Exit Interview).

Field Assessment Dates: January 16, 2009.

Weather/Site Conditions: Sunny, Cold.

3. History/Description of Usage

History and Operation: Sluiced Disposal.

Past Failures/Releases: None documented.

4. Owner's Operations, Maintenance and Inspection Information

Emergency Action Plan: N/A

Operations Manual: N/A

TVA Maintenance: Facility is in the process of final closure.

TVA Inspections: Annually.

Problems Previously Identified During Past TVA: Closure needs to be completed.



**TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Slag Disposal Area (AADA-1)**

Inspections:

5. Documents Reviewed

See attached Document Log for complete list of documents provided by TVA for review. In particular, the following provided pertinent information for the assessment of this facility:

| | |
|-----------------------------------|--------------------------------------------|
| TVA Design Drawings: | 10W245-01 through 10W245-08. |
| TVA As-Built Drawings: | No drawings were identified as "As-Built". |
| TVA Construction Testing Records: | N/A |
| TVA Annual Inspection Reports: | 1967 -2008 |
| Geotechnical Data: | N/A |

6. Stantec Field Observations

See attached Concerns/Photo Log, Photos, and Site Plan Drawing.

6.1. Interior Slopes

| | |
|-----------------------|-----------------------------------------------------|
| Vegetation: | Needs additional vegetation for erosion protection. |
| Trees: | None. |
| Wave Wash Protection: | N/A |
| Erosion: | Minor |
| Instabilities: | None observed. |
| Animal Burrows: | None observed. |
| Freeboard: | Measured: N/A Design: N/A |
| Encroachments: | None |
| Slope: | Measured: N/A Design: N/A |



TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Slag Disposal Area (AADA-1)

6.2. Crest

| | |
|------------------------|--------------------------------------------|
| Crest Cover and Slope: | Grass |
| Erosion: | None observed. |
| Alignment: | Consistent. |
| Settlement/Cracking: | None observed. |
| Bare Spots/Rutting: | Minor. |
| Width: | Measured: N/A Design: N/A |

6.3. Exterior Slopes

| | |
|-----------------------------------------------------|---------------------------------------------------------------------------------------|
| Vegetation: | Grass. |
| Trees: | None. |
| Erosion: | Minor. |
| Instabilities: | None observed. |
| Uniform Appearance: | Yes. |
| Seepage: | None observed. |
| Benches: | N/A |
| Foundations, Drains, Relief Wells, Instrumentation: | Sump to the redwater collection pond is located at the south eastern end of the area. |
| Animal Burrows: | None observed. |
| Slope: | Measured: N/A Design: N/A |
| Height: | Measured: N/A Design: N/A |

6.4. Spillway Weirs/Riser Inlets

| | |
|--------------------------|-----|
| Number: | N/A |
| Size, Type and Material: | N/A |



**TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Slag Disposal Area (AADA-1)**

| | |
|----------------------------|-----|
| Height of Riser Inlets: | N/A |
| Access: | N/A |
| Joints: | N/A |
| Mis-Alignment: | N/A |
| Closed/Abandoned Conduits: | N/A |

6.5. Outlet Pipes

| | |
|----------------------------|-----|
| Number: | N/A |
| Size, Type and Material: | N/A |
| Headwall: | N/A |
| Joint Separations: | N/A |
| Mis-Alignment: | N/A |
| Closed/Abandoned Conduits: | N/A |

7. Notable Observations and Concerns

- Minor erosion on embankment slopes.
- Incomplete drainage structure at north end of area.

8. Recommendations

8.1. Phase 2 Engineering and Programmatic Recommendations

- None.

8.2. Maintenance Recommendations

- Continue to monitor areas associated with the closure plan.
- Continue annual facility inspections.
- Monitor areas of erosion and repair as needed.



TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Ash Pond and Stilling Pond (AADA-2)

1. General Facility Information

| | | | |
|------------------------------|-------------|--------------------------------------|---------------|
| Facility Status: | Inactive | NID Identification: | Not Available |
| Surface Area (inside dikes) | 14.3 Acres | Maximum Height (toe to top of dike): | 30 |
| Free Water Volume: | 5 Acre-feet | Maximum Water Storage: | N/A |
| Estimated CCB Storage: | N/A | Dike Length: | N/A |
| Plant Discharge to Facility: | N/A | Current Pool Elevation: | N/A |

2. Site Visit Information

| | |
|--------------------------|---------------------------------------------|
| Stantec Assessment Team: | Robert Fuller, PE Benjamin Phillips, EIT |
| TVA Staff Present: | Steve Williams (Exit Interview) |
| Field Assessment Dates: | January 16, 2009. |
| Weather/Site Conditions: | Sunny, Cold. |

3. History/Description of Usage

| | |
|-------------------------|--------------------------------------------------------------------------------------------------------|
| History and Operation: | Built in 1974 for sluiced disposal. Bottom ash dike constructed in 1976 to form stilling pond portion. |
| Past Failures/Releases: | None documented. |

4. Owner's Operations, Maintenance and Inspection Information

| | |
|------------------------|-----------|
| Emergency Action Plan: | N/A |
| Operations Manual: | N/A |
| TVA Maintenance: | Mowing. |
| TVA Inspections: | Annually. |



TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Ash Pond and Stilling Pond (AADA-2)

Problems Previously Identified During Past TVA Inspections: Minor seepage along toe of embankment. Erosion along riverbank adjacent to toe and at spillway outfall.

5. Documents Reviewed

See attached Document Log for complete list of documents provided by TVA for review. In particular, the following provided pertinent information for the assessment of this facility:

| | |
|-----------------------------------|--------------------------------------------|
| TVA Design Drawings: | 10N245 |
| TVA As-Built Drawings: | No drawings were identified as "As-Built". |
| TVA Construction Testing Records: | N/A |
| TVA Annual Inspection Reports: | 1974 -2008 |
| Geotechnical Data: | N/A |

6. Stantec Field Observations

See attached Concerns/Photo Log, Photos, and Site Plan Drawing.

6.1. Interior Slopes

| | |
|-----------------------|-----------------------------------------------|
| Vegetation: | None. |
| Trees: | None. |
| Wave Wash Protection: | N/A |
| Erosion: | None observed. |
| Instabilities: | None observed. |
| Animal Burrows: | None observed. |
| Freeboard: | Measured: 5 feet Design: N/A |
| Encroachments: | None |
| Slope: | Measured: N/A Design: N/A |



TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Ash Pond and Stilling Pond (AADA-2)

6.2. Crest

| | |
|------------------------|--------------------------------------------------|
| Crest Cover and Slope: | Grass, bottom ash, gravel, and asphalt pavement. |
| Erosion: | None observed. |
| Alignment: | Consistent. |
| Settlement/Cracking: | None observed. |
| Bare Spots/Rutting: | Minor. |
| Width: | Measured: N/A Design: N/A |

6.3. Exterior Slopes

| | |
|-----------------------------------------------------|--------------------------------------------------------------|
| Vegetation: | Grass and some woody growth. |
| Trees: | Yes. |
| Erosion: | Minor. |
| Instabilities: | None observed. |
| Uniform Appearance: | Yes. |
| Seepage: | None observed |
| Benches: | None observed. |
| Foundations, Drains, Relief Wells, Instrumentation: | Well covers were observed on eastern side of the embankment. |
| Animal Burrows: | None observed. |
| Slope: | Measured: N/A Design: N/A |
| Height: | Measured: N/A Design: N/A |

6.4. Spillway Weirs/Riser Inlets

| | |
|--------------------------|-----|
| Number: | 3 |
| Size, Type and Material: | CMP |



**TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Ash Pond and Stilling Pond (AADA-2)**

Height of Riser Inlets: N/A
Access: Deteriorated metal access bridge.
Joints: N/A
Mis-Alignment: N/A
Closed/Abandoned Conduits: N/A

6.5. Outlet Pipes

Number: 3
Size, Type and Material: Concrete.
Headwall: Yes
Joint Separations: N/A
Mis-Alignment: N/A
Closed/Abandoned Conduits: N/A

7. Notable Observations and Concerns

- Excess vegetation, some woody, on the embankment.
- Steep slopes on the embankment.
- Erosion on the riverbank below the embankment toe and at the spillway discharge into the river.

8. Recommendations

8.1. Phase 2 Engineering and Programmatic Recommendations

- It is recommended that a capacity analysis be performed for the Stilling Pond and Ash Pond to check if sufficient volume capacity exists for storm water runoff. Further hydraulic/hydrologic analysis may be needed pending outcome of capacity analysis.
- It is recommended that the submitted closure plan be completed.



**TVA Disposal Facility Assessment
Phase 1 Coal Combustion Product Disposal
Facility Summary
Watts Bar Fossil Plant (WBF)
Ash Pond and Stilling Pond (AADA-2)**

8.2. Maintenance Recommendations

- Cut and maintain heavy/tall cattail and grass growth on interior slopes of ponds to allow better observation.
- Remove trees/brush from downstream dike slope of Stilling Pond and Ash Pond and outlet area.
- Continue to monitor areas associated with the closure plan.
- Continue annual dike and facility inspections.



Drawing Mark AADA-1-4 Lack of vegetative cover on AADA and AADA slopes.



Drawing Mark AADA-1-3 Lack of drainage ditch at toe of AADA embankment.



Drawing Mark P-1-1

Excess vegetation on embankment crest and slopes.



**Coal Combustion Product Disposal Facility Assessment
Phase 1 Document Review Form
Watts Bar Fossil Plant (WBF)**

| Date Reviewed | Reviewed by | File Name | File Type |
|---------------|-------------|------------------------|-----------|
| 4/26/2009 | BLP | 10N235-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10N240-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10N245-Sht -Rev 4.cal | CAL |
| 4/26/2009 | BLP | 10N246-Sht -Rev 2.cal | CAL |
| 4/26/2009 | BLP | 10N247-Sht -Rev 1.cal | CAL |
| 4/26/2009 | BLP | 10N248-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10N249-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10N301-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10N302-Sht -Rev 5.cal | CAL |
| 4/26/2009 | BLP | 10N303-Sht -Rev 7.cal | CAL |
| 4/26/2009 | BLP | 10N325-Sht -Rev 1.cal | CAL |
| 4/26/2009 | BLP | 10N551-Sht -Rev 3.cal | CAL |
| 4/26/2009 | BLP | 10W200-Sht -Rev 9.cal | CAL |
| 4/26/2009 | BLP | 10W243-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W250-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W251-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W252-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W255-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W316-Sht -Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-01 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-02 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-03 Rev 1.cal | CAL |
| 4/26/2009 | BLP | 10W425-03 Rev 1-.cal | CAL |
| 4/26/2009 | BLP | 10W425-04 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-05 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-06 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-06 Rev 0-.cal | CAL |
| 4/26/2009 | BLP | 10W425-07 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-07 Rev 0-.cal | CAL |
| 4/26/2009 | BLP | 10W425-08 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-09 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-10 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-11 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 10W425-12 Rev 0.cal | CAL |
| 4/26/2009 | BLP | 15N420-Sht -Rev 2.cal | CAL |
| 4/26/2009 | BLP | 15N810-Sht -Rev 12.cal | CAL |
| 4/26/2009 | BLP | 15W832-Sht -Rev 2.cal | CAL |
| 4/26/2009 | BLP | 17W301-Sht -Rev 3.cal | CAL |



**Coal Combustion Product Disposal Facility Assessment
Phase 1 Document Review Form
Watts Bar Fossil Plant (WBF)**

| Date Reviewed | Reviewed by | File Name | File Type |
|---------------|-------------|-----------------------------------|-----------|
| 4/26/2009 | BLP | 17W305-1 -Sht -Rev 0.cal | CAL |
| 4/27/2009 | BLP | WBF Agenda Items Restart Plan.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy00.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy01.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy03.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy04.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy05.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy06.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy07.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy67.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy68.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy69.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy70.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy71.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy72.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy73.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy74.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy75.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy76.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy77.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy78.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy79.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy80.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy81.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy82.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy83.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy84.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy85.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy86.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy87.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy88.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy93.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy94.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy95.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy96.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy97.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy98.pdf | PDF |
| 2/18/2009 | BLP | WBF Ash Pond Insp Fy99.pdf | PDF |



**Coal Combustion Product Disposal Facility Assessment
Phase 1 Document Review Form
Watts Bar Fossil Plant (WBF)**

| Date Reviewed | Reviewed by | File Name | File Type |
|---------------|-------------|------------------------------------------------------------------------------------------|-----------|
| 2/18/2009 | BLP | WBF Fauem Study.pdf | PDF |
| 2/18/2009 | BLP | WBF Memo And Attachments On Watts Bar Fossil Restart Kick Off Meeting.pdf | PDF |
| 2/18/2009 | BLP | WBF Memo And WBF Documents From Restart Meeting.pdf | PDF |
| 2/18/2009 | BLP | WBF Memo To Mech Eng Files On WBF Restart Meeting.pdf | PDF |
| 2/18/2009 | BLP | WBF Memo To Those Listed From Glwimberly Dated July 3 1991 On WBF Restart Activities.pdf | PDF |
| 2/26/2009 | BLP | WBF_Ash_Pond_Insp_Fy08.pdf | PDF |