Stantec Consulting Services Inc.
1409 North Forbes Road, Lexington KY 40511-2024

March 26, 2018
File: rpt_001_let_175655041
Revision 0

Tennessee Valley Authority
1101 Market Street
Chattanooga, Tennessee 37402

RE: Initial Structural Stability Assessment
Bottom Ash Pond
EPA Final Coal Combustion Residuals (CCR) Rule
TVA John Sevier Fossil Plant
Hawkins County, Tennessee

1.0 PURPOSE

This letter documents Stantec's certification of the initial structural stability assessment for the TVA John Sevier Fossil Plant's (SHF) Bottom Ash Pond. Based on this assessment, the Bottom Ash Pond is in compliance with the structural stability requirements in the EPA Final CCR Rule at 40 CFR 257.73(d).

2.0 INITIAL STRUCTURAL STABILITY ASSESSMENT

As described in 40 CFR 257.73(d), documentation is required on how the Bottom Ash Pond has been designed, constructed, operated, and maintained according to the structural stability requirements listed in the section. The combined capacity of all spillways must also be designed, constructed, operated, and maintained to adequately manage flow from the 100-year storm event based upon a hazard potential classification of "low."

3.0 SUMMARY OF FINDINGS

The attached report presents the initial structural stability assessment of the Bottom Ash Pond. The results show that the impoundment meets the structural stability requirements set forth in 40 CFR 257.73(d)(1)-(2).

4.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Don Fuller, being a Professional Engineer in good standing in the State of Tennessee, do hereby certify, to the best of my knowledge, information, and belief:

1. that the information contained in this certification is prepared in accordance with the accepted practice of engineering;

2. that the information contained herein is accurate as of the date of my signature below; and

Re: **Initial Structural Stability Assessment**
Bottom Ash Pond
EPA Final Coal Combustion Residuals (CCR) Rule
TVA John Sevier Fossil Plant
Hawkins County, Tennessee

3. that the initial structural stability assessment for the TVA John Sevier Fossil Plant's Bottom Ash Pond meets the requirements specified in 40 CFR 257.73(d)(1) -(2).

SIGNATURE Don W. Fuller II DATE 03/26/18

ADDRESS: Stantec Consulting Services Inc.
3052 Beaumont Centre Circle
Lexington, Kentucky 40513-1703

TELEPHONE: (859) 422-3000

ATTACHMENTS: Initial Structural Stability Assessment Report

Initial Structural Stability Assessment

John Sevier Fossil Plant – Bottom Ash Pond
Hawkins County, Tennessee

Prepared for:
Tennessee Valley Authority
Chattanooga, Tennessee

Prepared by:
Stantec Consulting Services Inc.
Lexington, Kentucky

March 26, 2018
Revision 0

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1.0 PROJECT BACKGROUND

On April 17, 2015 the Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities (RIN-2050AE81; FRL-9149-4) (EPA Final CCR Rule) was published in the Federal Register. A Direct Final Rule in response to a partial vacatur became effective on October 4, 2016. This revision eliminated the exemption for inactive surface impoundments to meet the same requirements as active surface impoundments. An extended timeline was given to inactive surface impoundments with an NOI that complied with §257.105(i)(1), §257.106(i)(1) and §257.107(i)(1). The Bottom Ash Pond at John Sevier Fossil Plant (JSF) is an Inactive CCR Surface Impoundment as defined by the EPA Final CCR Rule that meets the requirements for an extended timeline under the Direct Final Rule and has completed closure activities. Stantec Consulting Services, Inc. (Stantec) was contracted by the Tennessee Valley Authority (TVA) to determine whether the Bottom Ash Pond at JSF meets the initial structural integrity criteria for existing CCR surface impoundments as defined in §257.73(d) of the Environmental Protection Agency (EPA) Final CCR Rule.

2.0 UNIT DESCRIPTION

The John Sevier Fossil Plant (JSF) is a former coal-fired, electric generating plant located in Hawkins County, Tennessee. The plant was constructed along the southern bank of the Holston River in the headwaters of Cherokee Lake. TVA ceased operations at JSF at the end of calendar year 2012 and the facility retired its four coal-combustion generating units as of December 31, 2013.

As part of the Final Closure Project, ash has been removed from the west end of the Bottom Ash Pond and stacked in the east end. An earthen berm was also constructed to serve as the western boundary of the capped area. A geosynthetic cap system was completed in July 2017. This project has reduced the ash footprint within the Bottom Ash Pond facility to approximately 20 acres. The Bottom Ash Pond closure limits are shown as Figure 1.

The subsections under §257.73(d) address conditions of appurtenances categorized as embankments, spillways, or hydraulic structures. Sections 2.1 to 2.3 below provide descriptions of the individual unit elements that fall within these appurtenance categories. Figure 1 provides an overview of the Bottom Ash Pond and appurtenances.

Elevations included in this document and appendices are referenced to the National Geodetic Vertical Datum of 1929 (NGVD29).

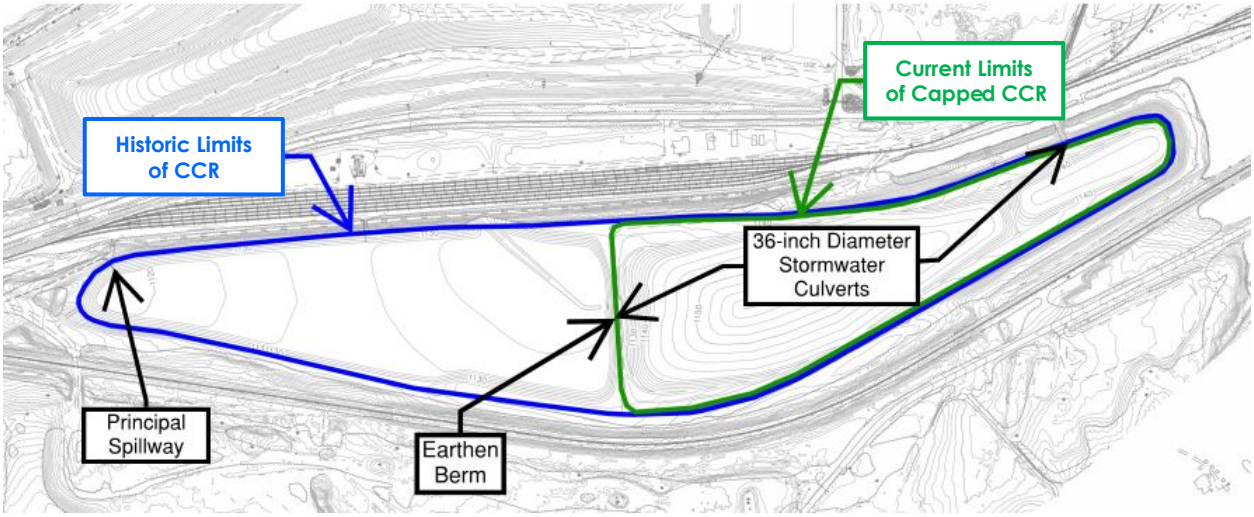

Figure 1 JSF Bottom Ash Pond – Project Location Map

2.1 EMBANKMENTS

2.1.1 Perimeter Dike

The Bottom Ash Pond original limits encompassed an approximate 42-acre area, and was enclosed by a perimeter dike system. The dike was originally constructed in 1979 and modified in 2017 to its current height and configuration to accommodate closure plans (Stantec, 2016). The dike is primarily constructed of compacted clay with elastic silt in some areas.

The overall constructed height of the perimeter dike system varies from approximately 15 to 25 feet. Dike side slopes are approximately 2H:1V to 3H:1V along the exterior and 4H:1V on the interior.

2.1.2 Earthen Berm

An approximate 670-foot long earthen berm was constructed in 2016 within the original limits of the Bottom Ash Pond that now forms the western limit of the capped area. The berm was constructed with a crest elevation of 1140 feet at the junction with the original perimeter dikes, sloping down to minimum elevation of 1133 feet at the center. Additionally, the berm was constructed with a 3H:1V slope and with a uniform crest width of sixteen feet.

2.2 SPILLWAYS

2.2.1 Principal Spillway

The principal spillway for the Bottom Ash Pond originally consisted of two riser and outlet pipe structures. Both spillways discharged to a junction box that conveyed flows to the Holston River through a pipe. As part of the Final Closure Project, both riser structures were removed. One of the outlet pipes was partially removed and the end was plugged with grout. The remaining pipe was shortened, and a concrete headwall was installed at the pipe inlet. The pipe is approximately 64 feet long with an inlet invert of 1118.8 feet and an outlet invert of 1117.3 feet.

2.3 HYDRAULIC STRUCTURES

2.3.1 36-Inch Diameter Stormwater Culverts

Two 36-inch diameter high-density polyethylene (HDPE) stormwater culverts were installed in the eastern portion of the Bottom Ash Pond. The East Capped Area Culvert penetrates the Perimeter Dike on the north side. The culvert on the north side is approximately 81.5 feet long with an inlet invert of 1128.2 feet and an outlet invert of 1127.3 feet. The north side culvert discharges to a riprap lined ditch to Polly Branch. The culvert on the west side penetrates the earthen berm, near the center. The west side culvert is approximately 68 feet long with an inlet invert of 1120.9 feet and an outlet invert of 1120.2 feet. The culvert discharges to a riprap lined ditch to Polly Branch.

3.0 FOUNDATIONS AND ABUTMENTS (§257.73(d)(1)(i))

Per §257.73(d)(1)(i), the initial structural stability assessment must document whether the unit has been designed, constructed, operated, and maintained with stable foundations and abutments. The Bottom Ash Pond unit has the following features that fall within this requirement:

- Perimeter Dike
- Earthen Berm

Assessment of the foundations and abutments associated with these features considering the following criteria related to the CCR rule:

- Review inspection reports of the facility, considering frequency of inspections, and if the inspections included review and/or assessment of features including cracking, settlement, deformation, or erosion of the foundations/abutments. Inspections should indicate that there are no significant signs of tension cracking, settlement, depressions, erosion, and/or deformations at the crest, slope, and toe of the structure.
- Confirm that an assessment of seepage conditions of the foundation, with considerations for heave and vertical exit gradient, has been performed. Verify that the seepage assessment follows appropriate methodologies (such as USACE EM 1110-2-1901) and that the foundations exhibit acceptable factors of safety (i.e. FS for piping greater than or equal to 3.0).

3.1 PERIMETER DIKE

3.1.1 Background

The Bottom Ash Pond was completed in 1979 to receive sluiced bottom ash and infrequent sluiced fly ash. Based on review of historic drawings, the dikes were constructed with slopes varying between 2H:1V and 3H:1V. The top of the dike was constructed at an elevation of 1145 feet and having a uniform width throughout of sixteen feet. Based on cross-section presented in a geotechnical study of Bottom Ash Pond (TVA, 1980), clay earth fill was placed in a cutoff trench and toe area of interior dike slope to control seepage through the foundation soil.

Based on previous geotechnical work (Stantec, 2010), the foundation of the perimeter dike generally consists of a layer of residual clay underlain by Ordovician age Sevier Shale Formation which consists of silty to sandy calcareous share with thin limestone layers and lenses of siltstone and sandstone (Stantec, 2010).

3.1.2 Assessment

Annual site inspections for the Bottom Ash Pond, including the perimeter dike, were conducted, and documented regularly from 1971 to 2014. Some of the inspection reports in the late 1980s and early 1990s are not available. However, over 40 years of inspections are available and document the operation and maintenance practices implemented for this facility. As reported in daily, weekly, monthly, and quarterly inspections of Bottom Ash Pond (including the perimeter dike) are conducted by qualified TVA personnel; seepage areas are monitored on a quarterly basis.

No indications of foundation issues (i.e. cracking, settlement, depressions, and/or deformation) have been noted on historic inspection reports. Recent inspections of the perimeter dike, performed by Stantec (2010, 2012 and 2014) noted no significant signs of tension cracking, settlement, deformations, or similar instabilities.

Seepage analysis for the original dike construction is not available. Recent seepage analyses conducted for the Perimeter Dike, however, were available for review. These analyses were performed by Stantec in February 2010 and provided in *Report of Geotechnical Exploration* (Stantec, 2010). Results from the analyses indicated Factor of Safety meet or exceed USACE (United States Army Corps of Engineers (USACE), 1993) minimum recommended value of 3.0.

The perimeter dike encircles the original limits of the Bottom Ash Pond and does not tie to natural abutments.

3.1.3 Conclusion

Based on the assessment of the foundation and abutments for the perimeter dike, the CCR Rule-related criteria listed above have been met.

3.2 EARTHEN BERM

3.2.1 Background

As part of the closure following JSF plant retirement in 2013, the Pre-Closure Project included construction of a earthen berm to serve as the western boundary of the capped area.

Prior to fill placement, the Construction Quality Assurance (CQA) Team observed the subgrade. Clayey fill material was placed in 8-inch thick loose lifts and compacted with a sheepsfoot roller. Nuclear density gage testing was performed on each lift in accordance with the CQA Plan (Stantec, 2017).

Based on previous geotechnical work (Stantec, 2010), the foundation at the earthen berm generally consists of Ordovician age Sevier Shale Formation which consists of silty to sandy calcareous share with thin limestone layers and lenses of siltstone and sandstone (Stantec, 2010).

3.2.2 Assessment

Construction of the earthen berm is documented in daily field reports as part of the Pre-Closure Project which included nuclear density 2016. Field reports indicate that prior to placement of clay fill, ash was removed per criteria set forth by TVA (Stantec, 2017). No indications of foundation issues (i.e. cracking, settlement, depressions, and/or deformation) have been noted in reports. Seepage analysis for the earthen berm was not performed, an no known seepage issues are known at this time

The earthen berm ties to the perimeter dike at each end and does not tie natural abutments.

3.2.3 Conclusion

Based on the assessment of the foundation and abutments for the earthen berm, the CCR Rule-related criteria listed above have been met.

4.0 SLOPE PROTECTION (§257.73(d)(1)(ii))

Per §257.73(d)(1)(ii), the initial structural stability assessment must document whether the unit has been designed, constructed, operated, and maintained with adequate slope protection to protect against surface erosion, wave action, and adverse effects of sudden drawdown. The Bottom Ash Pond has the following features that fall within this requirement:

- Perimeter Dike
- Earthen Berm

Assessment of the slope protection associated with these features was completed considering the following criteria related to the CCR rule:

1. Regular (weekly) inspections for erosion. Inspections should show there are no significant signs of deterioration in the slope protection configuration of the Item.
2. Appropriate slope protection shall be provided based on anticipated flow velocities. [Hydrologic / hydraulic calculations of flow velocities on the slope of the Item for the appropriate erosive forces. Some common slope protection measures include: Riprap, Gabions, Paving (concrete or asphalt), or appropriate vegetative cover.]
3. If slope protection is riprap, filter layer(s) under the riprap shall be designed according to established filter criteria. However, existing riprap cover may be evaluated based on performance and observations during inspections.

4.1 PERIMETER DIKE

4.1.1 Background

Slope protection for the perimeter dike is vegetative cover.

4.1.2 Assessment

Refer to Section 6.1.2 for information on the vegetative cover for the perimeter dike.

4.1.3 Conclusion

Based on the assessment of the slope protection for the perimeter dike, the CCR Rule-related criteria listed above have been met.

4.2 EARTHEN BERM

4.2.1 Background

Slope protection for the earthen berm is vegetative cover.

4.2.2 Assessment

Refer to Section 6.2.2 for information on the vegetative cover for the earthen berm.

4.2.3 Conclusion

Based on the assessment of the slope protection for the earthen berm, the CCR Rule-related criteria listed above have been met.

5.0 EMBANKMENT DIKE COMPACTION (§257.73(d)(1)(iii))

Per §257.73(d)(1)(iii), the initial structural stability assessment must document whether the unit has been designed, constructed, operated, and maintained with dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit. The Bottom Ash Pond has the following feature that fall within this requirement:

- Perimeter Dike
- Earthen Berm

Assessment of the dike compaction associated with these features was completed considering the following criteria related to the CCR rule:

1. Documentation showing the dike was mechanically compacted. Acceptable documentation may include construction drawings, field notes, construction photographs, correspondences, or any evidence showing the dike was mechanically compacted during construction.
2. If no construction documentation is available specific data from geotechnical explorations of dike may be used. Geotechnical borings with continuous SPTs may be used to assess compaction of the dike.

5.1 PERIMETER DIKE

5.1.1 Background

Construction records related to dike material placement or compaction were not available during this review. TVA design drawings 10W293 R2 (TVA, 1980) provide proposed dike construction and compaction methods and were referenced in the assessment described below.

5.1.2 Assessment

TVA Drawings 10W293 1 through 3 (TVA, 1980) include documentation of criteria related to the placement and compaction of materials to be utilized for construction of the perimeter dike embankments. Construction criteria related to dike embankment materials and dike compaction as noted on these drawings include:

- Dike embankments were to be compacted to 95 percent of Standard maximum dry density (per ASTM D698) with an allowable moisture content within 3 percent of optimum.
- Embankment clayey materials were to be obtained primarily from excavations within the planned perimeter dike. Any exposed pervious material exposed was to be blanketed with a 2-foot layer of compacted suitable soil materials (TVA, 1980).

Stantec completed a report of geotechnical exploration and slope stability evaluation for TVA in 2010. The subsurface exploration program included drilling and sampling locations at and around the Bottom Ash Pond including the perimeter dike. The exploration also evaluated the perimeter dike embankment materials using in-situ and laboratory moisture-density testing. The evaluation indicated that compaction of the dike is generally in excess of 95 percent of Standard Proctor density. Comparison of laboratory and in-situ moisture-density test results indicate that required compaction (TVA, 1980) exists within the embankment of the Perimeter Dike.

5.1.3 Conclusion

Based on the assessment of the embankment dike compaction for the perimeter dike, the CCR Rule-related criteria listed above have been met.

5.2 EARTHEN BERM

5.2.1 Background

The earthen berm was constructed in 2016 and the earthen berm embankment construction requirements are included in the Technical Specifications (Stantec, 2016). Requirements indicate, fill materials were to be placed in 8-inch thick controlled lifts and compacted to at least 95 percent compaction with moisture content within 2 percent of optimum. As part of testing during construction, nuclear density gage testing was performed in accordance with the CQA Plan. Test results are documented in the Pre-Closure Construction Certification Report (Stantec, 2017).

5.2.2 Assessment

The earthen berm construction specification (Stantec, 2016) includes criteria related to the placement and compaction of materials. Construction criteria related to earthen berm materials and compaction as noted on these drawings include:

- Earthen berm foundation materials were to exclude weak deleterious materials, and placed following verification of foundations suitable for fill placement (Stantec, 2016).
- Earthen berm embankments were to be compacted using sheepsfoot rollers, to a minimum of 95 percent of Standard maximum dry density (as per ASTM D698) with an allowable moisture content within 2 percent of the optimum moisture content.
- Embankment clayey materials were to be obtained primarily from the adjacent Sanders Property Borrow Area (Stantec, 2017).

Stantec issued a Closure Certification Report (Stantec, 2017) and included earthen berm construction documentation. Additional testing and analysis was performed, included as part of the Basis of Design Report (Stantec, 2016).

During construction, soils placed in controlled lifts were field tested for obtaining dry density and moisture content of the placed fill. Also, bulk samples were collected for testing representative samples and obtaining Proctor Density characteristics. Nuclear density testing was performed in accordance with the CQA Plan. Summaries of field tests performed are documented in daily field reports (Stantec, 2017). Test results indicated the berm was constructed with at least 95 percent compaction. The results indicate that appropriate compaction exists within the embankment of the earthen berm.

5.2.3 Conclusion

Based on the assessment of the embankment compaction at the earthen berm, the CCR Rule-related criteria listed above have been met.

6.0 VEGETATED SLOPES (§257.73(d)(1)(iv))

Per §257.73(d)(1)(iv), the initial structural stability assessment must document whether the unit has been designed, constructed, operated, and maintained with vegetated slopes of dikes and surrounding areas, except for slopes which have an alternate form or forms of slope protection. The Bottom Ash Pond has the following features that fall within this requirement:

- Perimeter Dike
- Earthen Berm

Assessment of the vegetated slopes associated with these features was completed considering the following criteria related to the CCR rule:

1. Regular inspection records showing vegetative cover sufficient to prevent surface erosion while allowing an unobstructed view to visually inspect the slope.

6.1 PERIMETER DIKE

6.1.1 Background

The exterior and interior slope of the perimeter dike is vegetated.

6.1.2 Assessment

Annual site inspections were conducted and documented regularly following construction of the perimeter dike. Annual inspection reports for over 40 years are available and document the vegetative cover over the dike structures. The vegetative cover of the dike exterior slopes is typically mowed twice annually as reported by TVA maintenance personnel. TVA Engineering performs the annual inspections and prepares reports addressing site conditions and directives for needed repairs and maintenance activities. These reports indicate that maintenance has been routinely performed.

6.1.3 Conclusion

Based on the assessment of the vegetated slopes for perimeter dike at the Bottom Ash Pond, the CCR Rule-related criteria listed above has been met.

6.2 EARTHEN BERM

6.2.1 Background

The exterior and interior slope of the earthen berm was recently constructed (Stantec, 2017). Measures have been taken in conformance with the construction specification and ongoing maintenance activities to maintain vegetated cover to prevent surface erosion.

6.2.2 Assessment

The slope surfaces are adequately vegetated VA Engineering performs the annual inspections and prepares reports addressing site conditions and directives for needed maintenance activities. Routine maintenance will also be performed to inspect vegetation on slopes.

6.2.3 Conclusion

Based on the assessment of the earthen berm at the Bottom Ash Pond, the CCR Rule-related criteria listed above has been met.

7.0 SPILLWAY CONDITION AND CAPACITY (§257.73(d)(1)(v))

Per §257.73(d)(1)(v), the initial structural stability assessment must document whether the unit has been designed, constructed, operated, and maintained with a single spillway or combination of spillways that meet the condition and capacity requirements as outlined in this section of the CCR Rule. The combined capacity of all spillways are to be designed, constructed, operated, and maintained to adequately manage flow during and following the peak discharge from the event specified in this section. The Bottom Ash Pond has the following features that fall within this requirement:

- Principal Spillway

Assessment of the spillway condition and capacity associated with these features was completed considering the following criteria related to the CCR rule:

1. Outlet channel must be of non-erodible material designed to carry sustained flow velocities based on the required flood events. [Estimate flow velocities and select appropriate material using hydraulic analysis for the following flood events: PMF (high hazard potential unit), 1000-year flood (Significant hazard unit), 100-year flood (low hazard potential unit).]

2. Must adequately manage flow during and following the peak discharge. [Estimate combined capacity of all spillways based of hydraulic analysis for the following flood events: PMF (High hazard potential unit), 1000-year flood (Significant hazard potential unit), and 100-year flood (Low hazard potential unit).]

3. Must be structurally stable. [Assess stability of structure using stability and stress analyses according to an appropriate methodology. Some acceptable methodologies may include: EM 1110-2-2400, EM 1110-2-2100, ACI 350, etc.]

4. Must maintain structural integrity. [Structural integrity may be warranted by periodic inspections of existing conduits. Inspections must show no significant presence of deformation, distortions, cracks, joint separation, etc.]

5. Must be free from significant amounts of obstruction and anomaly which may affect the operation of the hydraulic structure [Perform periodic pipe inspections to detect deterioration, deformation, distortion, bedding deficiencies, and sediment, and debris accumulations.]

7.1 PRINCIPAL SPILLWAY

7.1.1 Background

The Bottom Ash Pond is classified as a low hazard structure requiring the combined capacity of all spillways be adequate to manage the flow during and following the peak discharge from a 100-year flood.

The original principal spillway construction is documented on drawings 10N296, 10N297, and 10N298 (Tennessee Valley Authority (TVA), 1977).

The spillway was altered during the closure construction as documented on the construction drawings (Stantec, 2017).

7.1.2 Assessment

7.1.2.1 Spillway Capacity

The Initial Inflow Design Flood Control System Plan for Bottom Ash Pond (Stantec, 2018) documents the assessment of the Primary Spillway System related to the capacity requirements outlined in §257.73(d)(1)(v) of the CCR Rule. The assessment demonstrates that the Principal Spillway does meet the capacity requirements.

7.1.2.2 Structural Stability

As shown in the final closure plan drawings (Stantec, 2016), the Perimeter Dike was lowered, and the interior slopes were regraded reducing the overall load on the outlet pipes. During the original construction, the outlet pipes were bedded on compacted soil as shown in the detail on drawing 10N296 (Tennessee Valley Authority (TVA), 1977).The bottom of the pipe trench up to 0.15D of the pipe (approximately 6 inches) was shaped to fit the pipe. The next 0.15D of the pipe trench was formed by compacting soil in 3-inch lifts on each side of the pipe.

A CCTV inspection of the spillway outlet pipes was completed on December 7, 2012 (Stantec, 2013). No defects requiring remedial action were observed during the CCTV inspection. The modification of the western spillway outlet pipe is documented in the closure plan drawings (Stantec, 2016) and observations during construction are noted in the daily field reports (Stantec, 2017). As documented in the closure plan drawings (Stantec, 2016)and the daily field reports (Stantec, 2017), the right outlet pipe was grouted and no longer conveys flow.

7.1.3 Conclusion

Based on the assessment of the spillway condition and capacity for the Bottom Ash Pond Principal Spillway, the CCR Rule-related criteria listed above have been met.

8.0 HYDRAULIC STRUCTURES CONDITIONS

Per §257.73(d)(1)(vi), the initial structural stability assessment must document whether the unit has been designed, constructed, operated, and maintained with hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure. The East Ash Disposal Area has the following features that fall within this requirement:

- 36-inch Diameter Stormwater Culvert

Assessment of the hydraulic structures condition associated with these features was completed considering the following criteria related to the CCR rule:

1. Must be able to manage the required flows. [Estimate size of pipes based on hydraulic analysis for the following flood events: PMF (High hazard potential unit), 1000-year flood (Significant hazard potential unit), and 100-year flood (low hazard potential unit).]
2. Must maintain structural integrity. [Structural integrity may be warranted by periodic inspections of existing conduits. Inspections must show no significant presence of deformation, distortions, cracks, joint separation, etc.]
3. Must be free from significant amounts of obstruction and anomaly which may affect the operation of the hydraulic structure. [Perform periodic pipe inspections to detect deterioration, deformation, distortion, bedding deficiencies, and sediment, and debris accumulations.]

8.1 36-INCH DIAMETER STORMWATER CULVERTS

8.1.1 Background

The Bottom Ash Pond is classified as a low hazard structure requiring the combined capacity of all spillways be adequate to manage the flow during and following the peak discharge from a 100-year flood. The 36-inch diameter stormwater culverts were installed in conjunction with the closure plan in 2017 to convey stormwater runoff from a portion of the Bottom Ash Pond. Details of the culverts are documented in the closure plan drawing series 10W522 (Stantec, 2016).

8.1.2 Assessment

The *Inflow Design Flood Control System Plan* for the Bottom Ash Pond (Stantec, 2018)documents the assessment of the Bottom Ash Pond related to the capacity requirements outlined in §257.73(d)(1)(v) of the CCR Rule. The assessment demonstrates that the 36-inch Diameter Stormwater Culverts in combination with the other stormwater structures located at the Bottom Ash Pond does meet the capacity requirements.

As shown in Stantec (2016),the subgrade was compacted prior to placing the pipe bedding for the 36-inch-diameter HDPE. The pipe bedding and backfill consisted of compacted No. 57 crushed stone with a minimum thickness of 6 inches below the culvert. The No. 57 crushed stone was placed at a minimum thickness of 12 inches for the left and right sides and top of the culvert. A minimum cover of 2 feet of backfill was placed over the top of the pipes prior to allowing construction equipment to traffic over the pipe.

Daily field reports from the closure construction from November 4, 2016 to November 15, 2016 and February 10, 2017 to February 14, 2017 (Stantec, 2017) indicate the culverts were installed with no noted deficiencies.

8.1.3 Conclusion

Based on the assessment of the hydraulic structure condition for the 36-Inch Diameter Stormwater Culverts, the CCR Rule-related criteria have been met.

9.0 SUDDEN DRAWDOWN ASSESSMENT (§257.73(d)(1)(vii))

Per §257.73(d)(1)(vii), the initial structural stability assessment must document whether the unit has been designed, constructed, operated, and maintained with downstream slopes that can be inundated by an adjacent water body (such as a river, stream, or lake) to determine if structural stability is maintained during low pool or sudden drawdown of the adjacent water body. Ash Pond 2 has the following features that fall within this requirement:

- Perimeter Dike

Assessment of the sudden drawdown associated with these features was completed considering the following criteria related to the CCR rule:

1. Maintain slope stability during sudden drawdown of adjacent water body.

Guidance provided by USEPA (2015)described the basis of the CCR Rule's factor of safety criteria and methodology as EM 1110-2-1902 (USACE, 2003)or other appropriate methodologies. Table 3-1 of USACE (2003) recommends a required minimum factor of safety of 1.1 for maximum surcharge pool under rapid drawdown conditions.

9.1 PERIMETER DIKE

9.1.1 Background

The nearest adjacent body of water to the Bottom Ash Pond is the Holston River located approximately 900 feet to the north. The 100-year peak water surface elevation of the Holston River in this location is approximately 1,075 feet (FEMA, 2006).

9.1.2 Assessment

The low point along the exterior slope toe of the perimeter dike of the Bottom Ash Pond is approximately elevation 1110 feet; therefore, the exterior slope of the perimeter dike will not become inundated by the Holston River for the 100-year flood event.

9.1.3 Conclusion

Based on the assessment of the sudden drawdown for the Bottom Ash Pond Perimeter Dike, the CCR Rule-related criteria listed above have been met.

10.0 REFERENCES

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APPENDIX A
FIGURES

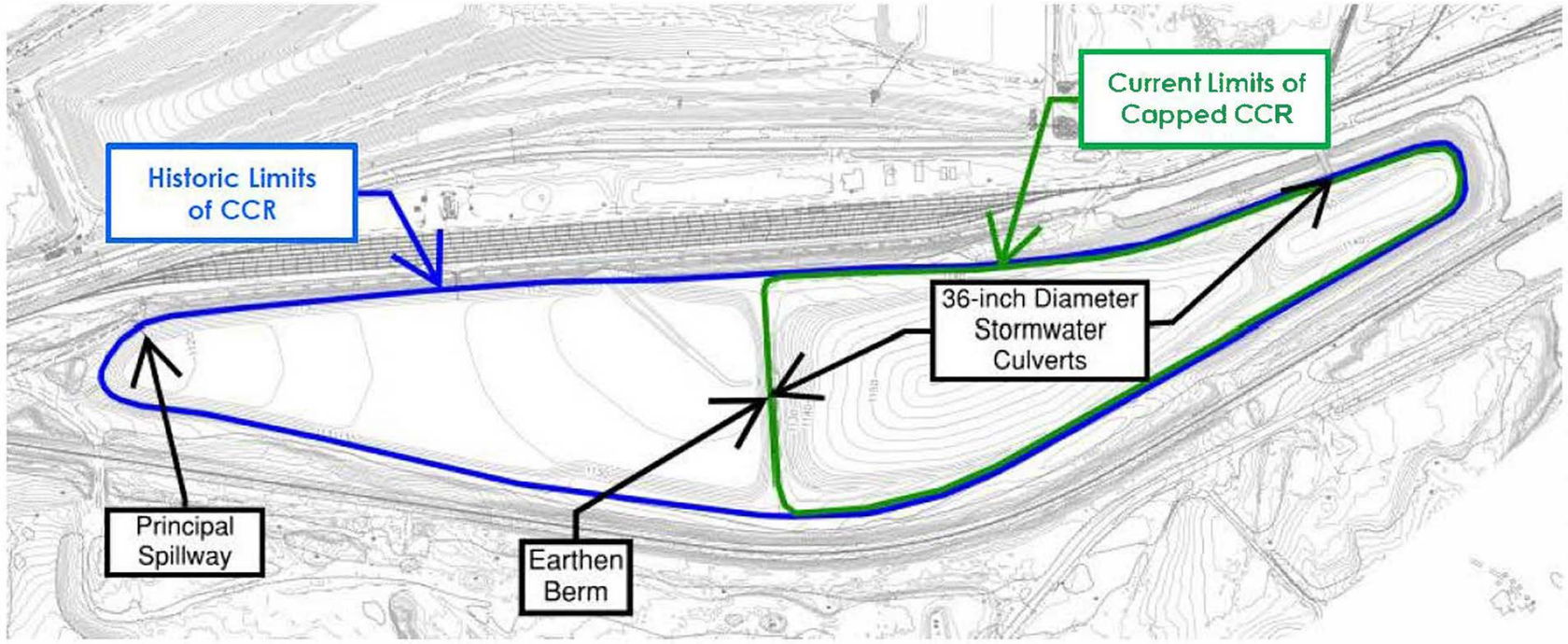
Figure No.
1

Title
Bottom Ash Pond

Client/Project
Tennessee Valley Authority (TVA)
John Sevier Fossil Plant

Project Location:
Rogersville
Hawkins County, Tennessee

175655042
Prepared by ECG on 2017-04-19
Technical Review by AWG on 2017-04-19



Notes

1. Coordinate System: NAD 1927 StatePlane Tennessee FIPS 4100

Stantec

TVA

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