

Quality Control Plan
Perimeter Containment
North Dredge Cell (Dike C)
Segment 1 Sta. A161+50 to Sta. A179+50
Kingston Fossil Plant
Harriman, Roane County, Tennessee

1. Purpose and Scope

This document is a site specific Quality Control (QC) Plan for the earthwork components for this project. This plan addresses construction and monitoring in association with the Perimeter Stabilization of the North Dredge Cell (Dike C), Segment 1 Sta. A161+50 to A179+50. The QC Plan is intended to present minimum project requirements and shall serve as an outline for use in developing site specific protocols based on conditions encountered during the work. The Perimeter Wall Stabilization (PWS) component will be addressed under a separate QC Plan prepared by the CONTRACTOR as referenced in Master Answers Addendum 3, Response No. 28 received from Tennessee Valley Authority (TVA) on November 16, 2010. Refer to Section 02650 of the Specifications for Perimeter Wall Stabilization (PWS) requirements.

2. Responsibility and Authority

A summary of QC personnel and associated responsibilities is presented below and on the attached Organization Chart for Quality Management.

2.1. Regulatory Agency

Work conducted under this project shall be coordinated with the U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC). Designated EPA and TDEC personnel shall serve as the regulatory contact. TVA will provide direct interface with EPA and TDEC personnel.

2.2. Quality Control Manager and Team

A professional engineer licensed in the state of Tennessee shall be designated as the QC Manager and shall be responsible for overall management of construction monitoring, testing and related documentation as outlined herein. The QC Manager shall be the Engineer of Record for project construction. The QC Manager shall determine appropriate test standards and methods for designated field observations and/or laboratory testing and shall be responsible for review of QC data to assess conformance with project requirements.

The QC Team shall consist of qualified personnel working under the direct supervision of the QC Manager. The QC Team shall be familiar with the materials used and the functional intent of the respective QC Plan components.

2.3. Owner

The plant and its ancillary functions are owned by TVA (Owner). The Owner shall be responsible for overall management of construction activities to include but not be limited to contracting, administration and retaining the services of qualified consultants as required during the project. The Technical Contract Manager (see Section 2.5) is the Owner's representative.

The Owner and/or their Designee shall appoint one representative to serve as the Construction Manager. The Construction Manager shall be responsible for the overall planning, coordination and control of project construction. This includes but is not limited to the character and sequence of work, coordination, scheduling, and management of cost, time and contract administration as related to the execution of the project. The Owner shall be responsible for providing qualified professionals to establish and enforce safety protocols related to the project.

2.4. Contractor

The CONTRACTOR will be the entity with which the Owner has entered into an agreement to construct earthwork aspects of this project. The CONTRACTOR shall designate a Site Superintendent responsible for construction activity and communication with the QC Manager and Construction Manager. Any portion(s) of the work designated to others shall be conducted under the direct supervision of the CONTRACTOR.

2.5. Technical Contract Manager

The Technical Contract Manager (TCM) is the designated TVA representative responsible for the administration and oversight of the work, including but not limited to the duties outlined herein.

3. Quality Control Activities

3.1. Meetings

Meetings shall be coordinated and conducted by the Technical Contract Manager and attended by the QC Manager and/or the Construction Manager on a weekly basis. The primary purpose of these meetings shall be to confirm that all parties involved are familiar with the project, required procedures and associated QC objectives along with any safety issues related to construction. Specific safety issues shall be the responsibility of designated safety professionals. Minutes of each meeting shall be documented for inclusion with the project records.

Pre-construction meetings shall be held prior to initiating individual phases of construction. The QC Manager, Construction Manager, Site Superintendent, and other parties that will actively participate in the construction activities shall attend these meetings.

3.2. Alternative Methods

Consistent with the overall objectives of the project, alternative construction and QC methods may be used during the course of the work. Proposed modifications shall be developed by

the QC Manager and submitted to the Owner for review prior to incorporation into the project. Documentation of these alternative methods shall be prepared with copies retained for inclusion with the project records.

3.3. Contractor Submittals

CONTRACTOR submittals shall be submitted to TVA procurement and distributed to the TCM, QC Manager and Construction Manager. These submittals shall be reviewed and approved by the QC Manager prior to delivery and/or use of the respective construction materials. Copies of all submittals shall be included with the project records.

3.4. Conformance Testing

Conformance testing consists of periodic testing of materials and/or constructed products. Conformance testing shall be conducted by the QC Team as required by this plan and additional testing may be added at the discretion of the QC Manager. Results of conformance testing shall be reviewed by the QC Manager to assess conformance with project requirements. Copies of all conformance testing results shall be included with the project records.

3.5. Field Observations

The QC Team shall observe and document (as outlined herein) all construction activities associated with the project. Results shall be reported to the QC Manager and Construction Manager (with the Owner copied) on a daily basis.

4. Embankment Construction

4.1. General

The term subgrade references the ground surface after PWS activities have occurred and immediately prior to Earthen Berm Construction.

Earthen Berm is the perimeter containment dike constructed of compacted soils.

Embankment Platform is a layer of Tennessee Department of Transportation (TDOT) No. 10 screening product material placed to provide structural support for Earthen Berm construction.

4.2. Subgrade QC Requirements

Prior to placement of any embankment the QC Manager or qualified representative shall verify the following:

The exposed surface was inspected to:

- a. Evaluate the suitability of the subgrade;
- b. Confirm that the subgrade surface is properly compacted, smooth, and uniform;

- c. Observe proof roll of subgrade using heavy equipment with a minimum gross weight of 100,000 pounds and providing a minimum ground contact pressure of 35 pounds per square inch prior to placement of overlying materials. This proofroll shall not be performed within perimeter stabilization areas until design strength has been met. QC personnel shall provide written approval of proof roll operations. Significant pumping or rutting observed during proof rolls shall be corrected as directed by the QC Manager until satisfactory proof roll results are attained.
- d. Confirm that elevations are consistent with the approved construction plan.

4.3. Embankment Platform QC Requirements

1. Material Requirements:

- a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.
- b. Conformance testing shall consist of one gradation at every 5,000 tons of each material at the final stockpile location prior to incorporation into the work or as directed by the QC Manager.
- c. Construction monitoring and field acceptance of No. 10 screening product and TDOT No. 57 coarse aggregate placement shall be documented by the QC Team.
- d. The following protocols will be adhered to regarding conformance testing:
 - i. A running average of the last 10 conformance tests must have a result of 12.0% or less on average passing the No. 200 sieve for the No. 10 screening product.
 - ii. In the event that conformance testing for the No. 10 screening product does not meet the criteria designated above, subject in-place material shall be removed as practicable and replaced with a minimum of 6 inches of No. 10 screening product. Required removal of the rejected material shall not result in disturbance of the underlying subgrade.
 - iii. If the average of the last 10 conformance tests for the No. 10 screening product is not in compliance with (ii) above, the working panel(s) that contains the conformance test that has exceeded 12.0% passing the No. 200 sieve by the greatest margins shall be removed and replaced until the revised running average is in compliance with (i) above. This may result in more than one panel requiring removal and replacement.
 - iv. TDOT No. 57 coarse aggregate shall meet the gradations specified and fall within the ranges noted in Table 1 of Section 903.22 of the

TDOT Standard Specifications for Road and Bridge Construction. This material shall be tested at the last stockpile prior to incorporation.

2. Inspect fill placement and compaction operations to:
 - a. Evaluate the suitability of the compacted material,
 - b. Document that No. 10 screening product fill is placed in uniform 6-inch lifts,
 - c. Document that No. 57 aggregate is placed to a minimum thickness of 3-inches, not exceeding 6-inches.
 - d. Verify that fill is compacted by 3 passes of a smooth drum roller,
 - e. Confirm that each lift is properly bonded to the adjacent lift by blading and scarification techniques, and
 - f. Verify that elevations and grades are consistent with the approved construction plan.
3. Confirm that conformance testing of the Embankment Platform material is performed in accordance with the Testing Schedule.

4.4. Earthen Berm QC Requirements

Earthen Berm QC requirements include construction monitoring by the QC Team, laboratory conformance testing as well as review, approval and generation of appropriate QC documentation by the QC Manager.

Embankment specifications are provided in Section 02300 of the Technical Specifications. Prior to and during placement of any Earthen Berm material the QC Manager or a qualified QC Team representative shall:

1. Coordinate sampling of borrow soils proposed for use as Earthen Berm with the CONTRACTOR and TVA and related conformance documentation.
2. Inspect fill placement and compaction operations to:
 - a. Evaluate the suitability of the Earthen Berm material,
 - b. Document that fill is placed in uniform 8-inch lifts,
 - c. Verify that fill is compacted to a minimum 95% of the standard Proctor density at a moisture content $\pm 2\%$ of optimum,
 - d. Verify that compaction around pipes and structures is performed in 4-inch lifts using hand operated tamping devices when within 2 feet horizontally or vertically of the pipe or structure,

- e. Confirm that each lift is properly bonded to the adjacent lift by blading and scarification techniques,
 - f. Verify that elevations are consistent with the approved construction plan, and
 - g. Confirm that the finished surface of the Earthen Berm has been prepared for revegetation efforts.
3. Confirm that conformance testing of the Earthen Berm material is performed in accordance with the Testing Schedule.

4.5. Ash Backfill QC Requirement

4.5.1. Inside the Inboard Perimeter Wall

The sequence of backfilling shall commence at the lowest section (in elevation) of the subject footprint and proceed upward in maximum 12-inch loose lifts in a manner to maintain positive drainage as practicable. Each embankment lift shall be compacted with a appropriate tamper or rubber tired equipment as approved by the QC Manager for the subject material. Materials shall be compacted to a minimum of 90 percent of standard Proctor maximum dry density at a moisture content within minus four percent and plus two percent of optimum. The QC Manager may make adjustments to this moisture range based on field observations and testing.

Ash Backfill specifications are provided in Section 02150 of the Technical Specifications. Prior to and during placement of Ash Backfill material, the QC Manager or a qualified QC Team Representative shall:

- 1. Inspect fill placement and compaction operations to:
 - a. Document that fill is placed in 12-inch maximum lifts.
 - b. Verify that fill is compacted in accordance with ash stacking.
- 2. Confirm that conformance test of the Ash Backfill material is performed in accordance with the testing schedule.

4.5.2. In Footprint and Outboard of Perimeter Stabilization

Maximum 12-inch compacted lifts shall be compacted by a minimum of three passes of a D-6 or larger dozer.

Ash Backfill Specifications are provided in Section 02300 of the Technical Specifications. During placement of Ash Backfill material, the QC Manager or a qualified QC Team Representative shall:

- 1. Inspect fill placement and compaction operations to:
 - a. Document compacted lift thickness does not exceed 12-inches.

- b. Verify that a minimum of three passes with a D-6 or larger dozer has been performed.

4.6. Embankment QC Requirements

Submittal and conformance testing frequencies for the respective materials are presented on the Testing Schedule. Representative sampling and testing shall be performed sufficiently ahead of the borrow operations to identify any significant change in material prior to placement and compaction. Conformance density testing of all embankment, including Embankment Platform materials and Ash Backfill, shall consist of either standard Proctor testing or the determination of minimum/maximum densities depending on the nature of the material.

5. Rock Berm Construction

5.1. General

The term Rock Berm references the armored surface between the Earthen Berm and Watts Bar Lake. The Rock Berm construction extends below normal pool of the lake and is accomplished by excavation and embankment. Embankment consists of Class B Machined Riprap and TDOT No.2 aggregate placed on the shaped surface. The Rock Berm construction shall meet the lines and grades shown in the Drawings.

5.2. Excavation

Existing surfaces shall be excavated to the lines and grades shown in the Drawings. The CONTRACTOR shall establish grade stakes for use in excavation and embankment activities.

5.3. Rock

1. Material requirements for TDOT Class B Machined Riprap are outlined in Section 8 of the QC Plan.

TDOT No. 57 and No. 2 coarse aggregate shall meet the gradations specified and fall within the ranges noted in Table 1 of Section 903.22 of the TDOT Standard Specifications for Road and Bridge Construction. This material shall be tested at the last stockpile prior to incorporation.

2. Inspect fill placement and compaction operations to:
 - a. Evaluate the suitability of the compacted material,
 - b. Document that rock fill of riprap and aggregate is carefully placed to not disturb underlying material,
 - c. Verify that rock placement results in uniform fill with large spaces filled with smaller rock as described in Section 02350 of the Specifications,

- d. Verify that elevations and grades are consistent with the approved construction plan.
3. Confirm that conformance testing of the Rock Berm material is performed in accordance with the Testing Schedule.

6. Erosion Control

Erosion Control shall conform to the site wide Storm Water Management Plan (SWMP). Erosion and sediment control measures shall be provided as field conditions dictate and approved by the Construction Manager, or as directed by the appropriate Regulatory Agency.

The Construction Manager shall periodically monitor these structures as well as overall site drainage conditions. Appropriate adjustments to site drainage and related sediment control structures shall be made as necessary based on current site conditions during the project.

7. As-built Documentation

7.1. General

The CONTRACTOR will grade stake the existing configuration and provide cut/fill stakes on an appropriate interval as needed for construction. The location (northing and easting) and elevation of the existing surface shall be recorded and provided to the QC Manager. Other surveys shall include:

- Monthly progress survey of embankment;
- As-needed to provide support to QC activities;
- Top of Perimeter Wall Stabilization, subgrade, top of Embankment Platform and Earthen Berm final grade;
- Location of ditches, limits of flowable fill and drainage structures; and
- Cross sections on 100-foot centers along project baseline of each work item noted above with maximum survey point incremental distance of 50 feet.

7.2. Quality Control Requirements

1. All survey activities shall be performed under the direction of a Tennessee licensed Land Surveyor or Professional Engineer.
2. Survey data shall be provided to the QC Manager within 10 days of survey completion in survey point files with a description for each of the points. Survey shots shall be performed along cross sections and along breaks in slopes.
3. The QC Manager will develop as-built Drawings from the provided data.

8. TDOT Class A-3 and Class B Machined Riprap

Riprap utilized for rock check dams (Class A-3) as needed, shall conform to the requirements in Section 709.03 of the TDOT "Standard Specifications for Road and Bridge Construction." Riprap used as buttress stone shall consist of quarry stone meeting the requirements for TDOT Class B Machined Riprap as stated in Section 709 of the Tennessee Department of Transportation "Standard Specifications for Road and Bridge Construction" latest edition.

9. Precast Concrete Structures

9.1. General

Precast concrete structures and related components shall meet all requirements of applicable TDOT standard specifications and the project Drawings. Modifications to these standards as required on the project shall be included within shop drawings submitted to the QC Manager for review and approval.

9.2. Quality Control Requirements

Submittals shall be reviewed and approved by the QC Manager. The QC Team shall observe all precast structures upon delivery. Any structures showing signs of shipment damage or non-conformance to design or project specifications shall be replaced by the CONTRACTOR. The QC Team shall observe the subgrade and structural backfill construction methods for all pre-cast concrete drainage structures.

10. Reinforced Concrete Pipe

10.1. General

Reinforced Concrete Pipe (RCP) shall conform to the requirements established in Section 02310 of the Technical Specifications. RCP pipe drainage applications on the project include storm water drainage through the perimeter stabilization.

10.2. Quality Control Requirements

Pipe suppliers shall submit certified material specifications, delivery tickets and all other available documentation to show that the supplied material meets the project specifications.

Inspection and acceptance of pipe to structure penetration seals, pipe joints and lines/grades of pipe work shall be documented by the QC Team. The condition of the pipe upon arrival, installation and during use shall also be documented by the QC Team. In particular, review of the pipe for cracking, holes or defects will be documented.

11. Flowable Fill

11.1. General

Flowable fill shall conform to the requirements established in Section 02310 of the Technical Specifications.

11.2. Quality Control Requirements

Submittals shall be submitted to the TVA and reviewed and approved by the QC Manager. The QC Team shall observe all flowable fill placement and obtain samples for testing at the designated intervals as shown on the testing schedule. Depth of placement of bedding and pipe cover shall be documented by the QC Team.

12. Instrumentation

12.1. General

Instrumentation has been installed in the North Dredge Cell to monitor the embankment slopes and the underlying foundation materials. This instrumentation shall be removed by the CONTRACTOR within the area of the Deep Mixing footprint and shall be protected elsewhere. Instrumentation for geotechnical monitoring shall be removed, protected, or extended according to the attached Plan and Detail Sheets. The instrumentation program for the "North and Central Dredge Cells (Cells 2 and 3) Ash Stacking" prescribed the use of the instrumentation and the specific monitoring of these devices. Protective barriers shall be installed by the CONTRACTOR around the instrumentation outside of the Deep Mixing footprint. Instrumentation designated for protection that is damaged or destroyed by the CONTRACTOR shall be replaced by the CONTRACTOR as noted in Section 02150 of the Specifications. Extensions and maintenance of instrumentation are the responsibility of the QC Team.

12.2. Types

1. Piezometers have been installed and are monitored to characterize the increase and dissipation of pore pressures within the existing ash and native foundation soils-layers due to embankment loading.
2. Slope inclinometers are used to measure lateral displacements within the embankment and foundation materials due to loading. The inclinometers are anchored a minimum of 10 feet into bedrock.
3. Settlement plates are utilized to measure the vertical deformation of the foundation soils due to embankment loading.

If any instruments designated for protection are damaged during construction by the CONTRACTOR's activities, they shall be repaired/replaced as directed by the QC Manager at no additional cost to the Owner.

13. Project Documentation

Documentation shall be collected and maintained by the QC Manager (copied to the Owner) during the project. This documentation shall include but not be limited to the following:

- Daily construction field reports;
- Observation reports;

- CONTRACTOR submittals;
- Material conformance data;
- Photographic documentation (per Kingston photo data base Standard Operating Procedure);
- Survey data;
- As-Built Drawings;
- Construction issue and solution reports;
- Weekly summary reports (for regulatory submittal);
- Plan modifications; and
- Meeting minutes.

**Perimeter Containment
North Dredge Cell (Dike C)
Segment Sta. A161+50 to Sta A179+50
Kingston Fossil Plant
Harriman, Roane County, Tennessee
Quality Control Task Summary⁽¹⁾ - Earthwork**

A. General Site and Construction Tasks

Task	Responsible Personnel ⁽⁴⁾	Task Description/Itemization
QC Testing	QC Manager	-Designate appropriate test standards and methods to maintain quality standards outlined in the project requirements -Review all QC data for conformance with project standards and requirements -Collection and maintenance of all QC documentation -Generation of all QC related reports
Project Meetings	QC Manager / Construction Manager	-Organize meetings as necessary to ensure construction related personnel are familiar with design, construction procedures, and QA/QC requirements.
Contractor Submittals	QC Manager (QC Team)	-Approval of contractor submittals a minimum of 10 days before materials arrive on site -Verify materials utilized in site construction meet or exceed project requirements
Scheduling	Construction Manager	-Develop and maintain construction schedule and verify construction progress
Site Inspections	Construction Manager	-Site observations for indications of trench or slope failure and/or instability
Surveying	Construction Manager	-Schedule surveying
As-built	QC Manager	-As-built Drawings
Site Construction Issues	TCM	-Approval of Contractor requests for access locations and stockpiles

B. Embankment

Task	Responsible Personnel	Task Description/Itemization
Earthen Berm, Embankment Platform, and Ash Backfill Placement and Compaction	QC Manager	-Verify and document fill placement and compaction per project requirements -Verify fill meets or exceeds project requirements -Confirm proper lift thickness -Verify proper lift surface preparation and scarification techniques -Establish and record elevations
Submittals		-Certification Statement -Collection, organization and maintenance of delivery tickets and all available documentation that supplied materials meet or exceed project requirements -Verification of minimum conformance tests
Density Meter Calibration	QC Manager	-Random Drive Tube Sampling, Density and Moisture Testing

C. TDOT Class A-3 and B Machined Riprap and Coarse Aggregates		
Task	Responsible Personnel	Task Description/Itemization
Submittals	QC Manager	-Approval of documentation regarding conformance to Technical Specifications of proposed riprap and coarse aggregate supplier a minimum of 10 days prior to material arrival on site
Conformance Testing	QC Manager	-Verify minimum conformance testing per current QC Plan
D. Pre-cast Structures		
Task	Responsible Personnel	Task Description/Itemization
Submittals	QC Manager	-Approval of certified material specifications a minimum of 10 days prior to product arrival on site
Conformance Testing	QC Manager	-Collection, organization and maintenance of delivery tickets and all available documentation that supplied materials meet or exceed project requirements -Verification of minimum conformance tests
Installation	QC Team	-Monitor deployment and backfill operations -Documentation that operations are performed per project requirements, manufacturer recommendations, and industry practice
E. Pipes		
Task	Responsible Personnel	Task Description/Itemization
Submittals	QC Manager	-Approval of certified material specifications a minimum of 10 days prior to product arrival on site
Conformance Testing	QC Manager	-Collection, organization and maintenance of delivery tickets and all available documentation that supplied materials meet or exceed project requirements -Verification of minimum conformance tests
Installation	QC Team	-Monitor deployment and backfill operations -Documentation that operations are performed per project requirements, manufacturer recommendations, and industry practice
F. Flowable Fill		
Task	Responsible Personnel	Task Description/Itemization
Submittals	QC Manager	-Approval of certified material specifications a minimum of 10 days prior to product arrival on site
Conformance Testing	QC Manager	-Collection, organization and maintenance of delivery tickets and all available documentation that supplied materials meet or exceed project requirements -Verification of minimum conformance tests
Installation	QC Team	-Monitor deployment and backfill operations -Documentation that operations are performed per project requirements, manufacturer recommendations, and industry practice
Mix Design	Contractor	-Provide mix design for flowable fill that meets project requirements

Compressive Strength Tests	QC Team	-Sample and Test flowable fill per testing schedule. Collect delivery tickets.
Elevations	QC Team/Contractor	- Contractor provides survey shot - checked by QC Team
G. Instrumentation		
Task	Responsible Personnel	Task Description/Itemization
Extensions	QC Manager	-Extend existing instrumentation and arrange for any new instrumentation.
Protection	Construction Manager/ Contractor	-Arrange and coordinate installation of t-posts and safety fence around instrumentation. Protect existing instrumentation.
Removal	TVA	-Arrange removal of Instrumentation within Deep Mixing Footprint
H. Erosion and Sediment Control		
Task	Responsible Personnel	Task Description/Itemization
Site Inspections and Evaluations	Construction Manager	-Periodic erosion and sediment control structure inspections and overall site drainage evaluations -Adjustments to site drainage and structures as necessary, based upon prevalent site conditions -Documentation of sediment control observations and modifications
I. QA/QC Documentation		
Task	Responsible Personnel	Task Description/Itemization
Documentation	QC Manager AND Construction Manager	-Overall organization and maintenance of QA/QC documentation of items outlined above as well as those designated in the QA/QC Plan
Protection	Contractor	-Document any damage and concur with QC Manager.
Notes:		
<p>¹⁾ The task summary is an itemized list of the general responsibilities to be administrated by the Construction Manger and the QC Manger/QC Team per the current Quality Control Plan and the associated testing schedule.</p> <p>²⁾ All materials testing and site observations are to be conducted in accordance with the current Quality Control Plan and the associated testing schedule to assure that minimum project requirements are maintained on the site during the construction of the special waste disposal facility. Frequency stated when applicable. Many manager or team tasks, such as subgrade inspection, have no quantifiable testing frequency but are required during work progress.</p> <p>³⁾ TDOT- "Tennessee Department of Transportation"</p> <p>⁴⁾ Responsible Personnel Definitions:</p> <p><u>Construction Manager</u> - A TVA employee or consultant designated to be the Owner representative on the construction site. Responsibilities involve overall management of site operations including construction administration tasks, waste disposal, contracting and retaining the services of all necessary personnel (including a qualified engineer) for the life of the facility. The Construction Manager is also a liaison for the Owner to the QC Manager and Contractors.</p> <p><u>QC Manager</u> - Registered Professional Engineer in the State of Tennessee that becomes the Engineer of Record for construction. Responsibilities generally include the management of the QC Team as well as determining conformance of submittals and test results with project requirements, review of data, construction monitoring and/or testing, and construction document preparation.</p> <p><u>QC Team</u> - Personnel qualified in construction quality assurance/quality control (QA/QC) testing procedures pertinent to the Kingston Fossil Plant facility working under the direct supervision of the QC Manager.</p> <p><u>TCM</u> - Designated TVA representative responsible for the administration and oversight of the Work, including but not limited to the duties outlined in the QC Plan and other project documents.</p>		

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Quality Control Plan - Material Testing and Product Certification Schedule

Material	Property	Test Method	Value	Minimum Conformance Test Frequency
Earth Berm Earth Berm	Nuclear Density and Moisture	ASTM	Minimum 95% standard Proctor and -2% to +2% optimum moisture	5 tests / acre / lift
	Classification and Proctor	ASTM	Varies to be approved by QC Manager	1 / 10,000 CY
Embankment Platform No. 10 Screenings Product No. 57 Coarse Aggregate	3 Passes by Roller	Visual	Visually Firm	Daily
	Gradation	ASTM	Less than 12% passing No. 200 sieve	1 / 5,000 tons stockpiled
	3 Passes by Roller	Visual	Visually Firm	Daily
	Gradation	ASTM	TDOT Ranges	1 / 30,000 tons stockpiled
Pre-cast Structures	Certification Statement		Project Requirements	1 / manufacturer / year visual
	Visual Review	Visual	Project Requirements	Daily

Material	Property	Test Method	Value	Minimum Conformance Test Frequency
Ash Backfill	Nuclear Density	ASTM	Minimum 90% Compaction -4% to +2% Optimum Moisture Content	5 tests / acre / lift 1 / 10,000 CY
	Class and Proctor	ASTM	Varies, to be approved by QC Manager	1 / manufacturer / year
Class A-3 & B Machined Riprap	QC Manager Certification Statement		Project Requirements	1 / manufacturer / year
Reinforced Concrete Pipe	Certification Statement		Project Requirements	1 / manufacturer / year
	Visual Review	Visual	Project Requirements	Per Segment
Instrumentation Extensions	TVA Protocols		Manufacturer's Recommendations	
Flowable Fill	Compressive Strength	ASTM	200 psi at 28-days	1 / 50 / CY or Min. Daily
	Flowability	Visual	Workable	Daily
QA/QC Documentation	Project Requirements		Project Requirements	On-going
TDOT No. 57 and No. 2 Coarse Aggregate	Gradation	ASTM	Project Requirements	1/30,000 tons