

October 12, 2016

Tennessee Valley Authority
1101 Market Street
Chattanooga, Tennessee 37402

**Existing Liner Assessment
Slag Ponds 2A and 2B, Slag Stilling Pond 2C
EPA Final CCR Rule
TVA Paradise Fossil Plant
Drakesborow, Kentucky**

1.0 PURPOSE

This letter documents AECOM's certification of the existing liner assessment for the TVA Paradise Fossil Plant's Slag Ponds 2A and 2B, and Slag Stilling Pond 2C.

2.0 EXISTING LINER ASSESSMENT

As required in 40 CFR 257.71, an existing surface impoundment must be evaluated as to whether or not it was constructed with a liner as described in 40 CFR 257.71(a)(1)(i)-(iii).

3.0 SUMMARY OF FINDINGS


The attached report presents the analysis for the existing liner assessment. Based on the assessment, there is insufficient data to support the Slag Ponds 2A and 2B and Slag Stilling Pond 2C being constructed with a liner that meets the requirements in the Final CCR Rule 40 CFR 257.71(a)(1). Following the review of historical subsurface information on the Slag Ponds 2A and 2B, and Slag Stilling Pond 2C impoundments, it was determined that any underlying clayey soil layers do not meet EPA's interpretation of a mechanically placed soil liner. Additional information regarding these soils is described in the attached report.

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4.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Nicholas S Golden PE, being a Professional Engineer in good standing in the State of Kentucky, 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
3. that the TVA Paradise Fossil Plant's Slag Ponds 2A and 2B, and Slag Stilling Pond 2C were not constructed with a liner system as described in 40 CFR 257.71(a)(1).

SIGNATURE  DATE 10/12/16
ADDRESS: AECOM
564 White Pond Drive
Akron, OH 44320
TELEPHONE: (330) 836-9111
ATTACHMENTS: Liner Design Demonstration 40 CFR for §257.71 for Coal Combustion Residuals (CCR)



COAL COMBUSTION PRODUCT DISPOSAL PROGRAM

**TENNESSEE VALLEY AUTHORITY – SLAG PONDS 2A AND 2B, AND SLAG STILLING
POND 2C
DRAKESBORO, KENTUCKY**

**LINER DESIGN DEMONSTRATION
(40 CFR §257.71)
FOR COAL COMBUSTION RESIDUALS (CCR)
EXISTING SURFACE IMPOUNDMENTS - PARADISE FOSSIL PLANT**

Prepared for



Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402-2801

October 12, 2016

Prepared by



Nicholas Golden
10/12/16



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1.0 BACKGROUND

1.1 INTRODUCTION

On April 17, 2015 the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities (EPA Final CCR Rule) was published in the Federal Register. AECOM was contracted by the Tennessee Valley Authority (TVA) to demonstrate liner design criteria for the Paradise Fossil Plant (PAF) Slag Pond 2A and 2B, and Slag Stilling Pond 2C, which are existing CCR surface impoundments, and evaluate compliance relative to §257.71 of the EPA Final CCR Rule.

The PAF facility is located at 13246 Kentucky 176 in Muhlenberg County, Kentucky on the west bank of the Green River, approximately five miles northeast of the center of the City of Drakesboro. The property occupies approximately 3,400 acres of land. Slag Pond 2A and 2B and Slag Stilling Pond 2C, which are existing CCR surface impoundments, manage bottom ash (slag) and wastewater flows from the plant.

1.2 OBJECTIVE

The objective of this demonstration is to evaluate compliance related to §257.71, specifically whether Slag Pond 2A and 2B, and Slag Stilling Pond 2C were constructed with one of the following:

- A liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no greater than 1×10^{-7} cm/sec;
- A composite liner that meets the requirements of § 257.70(b); or
- An alternative composite liner that meets the requirements of § 257.70(c).

The Rule was clarified by the EPA during a presentation on April 15, 2015 titled, "Top 20 Questions on EPA's CCR Final Rule". First, an existing natural clay layer, regardless of its hydraulic conductivity, does not meet the Rule as an acceptable clay liner. Second, "compacted soil" means soil that is mechanically compacted in lifts.

1.3 SUMMARY OF HISTORICAL INFORMATION

TVA built Paradise Fossil Plant between 1959 and 1970 with two units beginning operation in 1963. Four ash disposal areas were built during original site construction, Ash Disposal Area No. 1 through 4. When PAF began operating in 1963, sluicing started with Areas 1 and 3. Both impoundments were filled by 1967. As a result of Areas 1 and 3 reaching their capacity, Area 2 needed to be utilized. Prior to opening, splitter dikes were built within Area 2 creating Ash Disposal Area 2A, Ash Disposal Area 2B, and Slag Stilling Pond 2C. Construction drawing 10N209 shows the original Ash Disposal Areas in **Appendix A**.



In 1970, most of the perimeter and the interior dikes were raised and/or relocated. The Ash Disposal Area No. 2 became Slag Ponds 2A and 2B. Sheet piles were added to the interior dike that separates Slag Ponds 2A and 2B. A new dike was constructed in the Slag Stilling Pond 2C, closing the northern half of the pond and leaving the southern half in operation. See historical drawing 10N3203 in **Appendix A** for information on construction performed at this time.

2.0 FIELD INVESTIGATION

There have been no additional field explorations at this facility. Historical geotechnical explorations have revealed select areas indicating clayey soil/minespoil material beneath the impoundments. This clayey minespoil has variable thickness, rock fragment content, and permeability. New field explorations of the Slag Pond 2A and 2B, and Slag Stilling Pond 2C at Paradise Fossil Plant were not undertaken.

3.0 CONCLUSION

Historical construction documents were reviewed in order to evaluate status relative to the EPA Final CCR Rule criteria. Based on our review we were not able to confirm that, Slag Pond 2A and 2B, and Slag Stilling Pond 2C at Paradise Fossil Plant was constructed with a liner that complies with the requirements of §257.71 of the EPA Final CCR Rule. This unit is therefore an unlined surface impoundment in accordance to the EPA Final CCR Rule and is allowed to remain in operation in compliance with the requirements of §257.101(a).

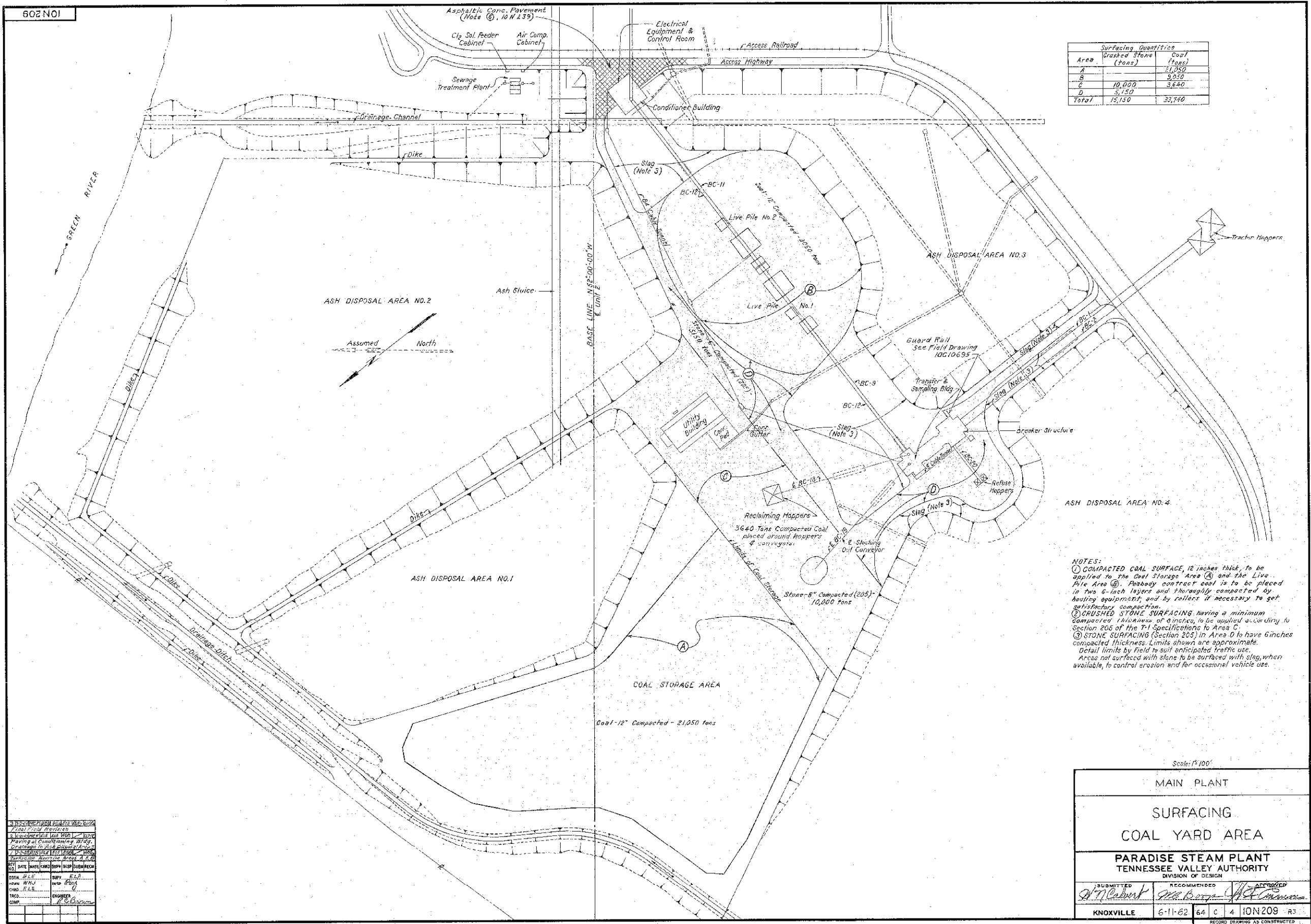
4.0 REFERENCES

AECOM, Slag Ponds 2A and 2B, Slag Stilling Pond 2C, Safety Factor Assessment §257.73 prepared for CCR Certification, 2016.

APPENDIX A – HISTORICAL DRAWINGS

602 NOI

Area	Surfacing Quantities	
	Crushed Stone (tons)	Coal (tons)
A		21,050
B		9,050
C	10,000	3,640
D	5,150	
Total	15,150	33,740



NOTES:
 ① COMPACTED COAL SURFACE, 12 inches thick, to be applied to the Coal Storage Area (A) and the Live Pile Area (B). Ready contract coal is to be placed in two 6-inch layers and thoroughly compacted by hauling equipment, and by rollers if necessary to get satisfactory compaction.
 ② CRUSHED STONE SURFACING having a minimum compacted thickness of 8 inches, to be applied according to Section 206 of the T-1 Specifications to Area C.
 ③ STONE SURFACING (Section 205) in Area D to have 6 inches compacted thickness. Limits shown are approximate. Detail limits by field to suit anticipated traffic use. Areas not surfaced with stone to be surfaced with slag, when available, to control erosion and for occasional vehicle use.

DESIGNED BY	DATE	SCALE
CHECKED BY		
APPROVED BY		
DATE	SCALE	
DESIGNER	ENGINEER	
COMP.		

Scale: 1" = 100'

MAIN PLANT

SURFACING

COAL YARD AREA

PARADISE STEAM PLANT

TENNESSEE VALLEY AUTHORITY

DIVISION OF DESIGN

SUBMITTED	RECOMMENDED	APPROVED
<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
KNOXVILLE	6-11-62	64 C 4 10N209 R3

RECORD DRAWING AS CONSTRUCTED

P.F. Revised drawing, Ash Disposal Areas #3, 4, 5

