



April 13, 2018

Tennessee Valley Authority
1101 Market Street
Chattanooga, Tennessee 37402

Existing Liner Assessment
Main Ash Pond
EPA Final CCR Rule
TVA Bull Run Fossil Plant
Clinton, Tennessee

AECOM
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1.0 PURPOSE

This letter documents AECOM's certification of the existing liner assessment for the TVA Bull Run Fossil Plant's inactive Main Ash Pond.

2.0 EXISTING LINER ASSESSMENT

As required by 40 CFR 257.71, an inactive 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 Conclusion

The attached report presents the analysis for the existing liner assessment. The Main Ash Pond at Bull Run Fossil Plant was evaluated relative to the CCR Rule requirements for liner certification for existing inactive CCR surface impoundments (40 CFR §257.71(a)(1)). Based on the evaluation of design drawings and available construction records, the Main Ash Pond was not constructed with a liner and therefore does not meet the design criteria specified in 40 CFR §257.71(a)(1).

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4.0 Qualified Professional Engineer Certification

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

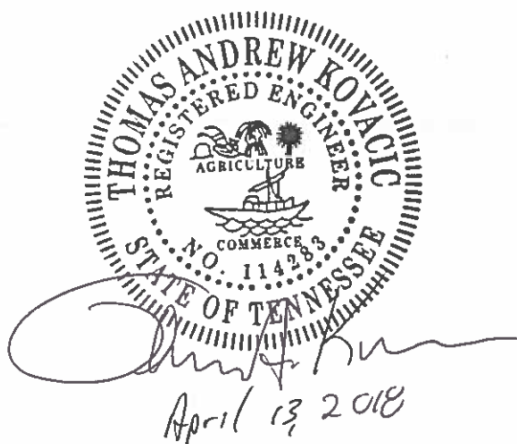
1. That the information contained in this certification is prepared in accordance with the accepted practice of engineering;
2. That the information contained herein is accurate as of the date of my signature below; and
3. That the TVA Bull Run Fossil Plant's Main Ash Pond is considered an unlined inactive CCR surface impoundment as described in 40 CFR §257.71(a)(3).

SIGNATURE  _____ DATE 4-13-2018

ADDRESS: AECOM
1300 E. 9th Street, Suite 500
Cleveland, OH 44114

TELEPHONE: (216)-622-2400

ATTACHMENTS: Liner Design Demonstration (40 CFR §257.71) for Coal Combustion Residuals (CCR)



COAL COMBUSTION PRODUCT DISPOSAL PROGRAM

**TENNESSEE VALLEY AUTHORITY – MAIN ASH POND
CLINTON, TENNESSEE**

**LINER DESIGN DEMONSTRATION
(40 CFR § 257.71)
FOR COAL COMBUSTION RESIDUALS (CCR)
INACTIVE SURFACE IMPOUNDMENTS – BULL RUN FOSSIL PLANT**

Prepared for



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

April 13, 2018

Prepared by

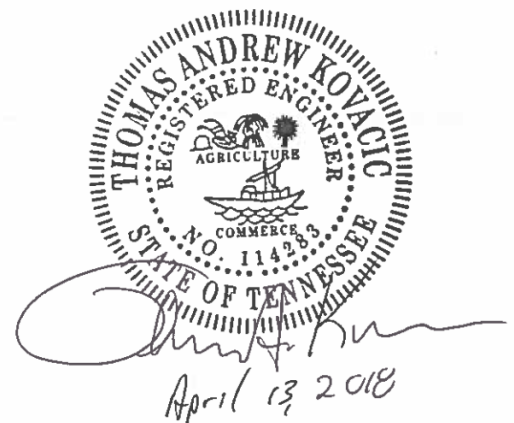




TABLE OF CONTENTS

1.0	BACKGROUND.....	1
1.1	Introduction	1
1.2	Objective	1
1.3	Summary of Historical Information	1
2.0	FIELD INVESTIGATION	2
3.0	CONCLUSION	2
4.0	REFERENCES	2

APPENDICES

Appendix A Historical Drawings



1.0 BACKGROUND

1.1 INTRODUCTION

On April 17, 2015, EPA published the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities final rule (CCR Rule or the Rule) in the Federal Register. The Tennessee Valley Authority (TVA) contracted AECOM to evaluate compliance relative to § 257.71—the Rule’s liner design criteria—at the Bull Run Fossil Plant (BRF) Main Ash Pond, which is an existing but inactive CCR surface impoundment.

The BRF facility is located in Anderson County, situated along the banks of the Clinch River (Melton Hill Reservoir) and Bull Run Creek in Clinton, Tennessee, approximately 20 miles west of Knoxville, Tennessee. The Main Ash Pond is an inactive CCR surface impoundment.

1.2 OBJECTIVE

The objective of this demonstration is to evaluate compliance related to § 257.71, specifically whether Main Ash Pond was 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

The wet CCR disposal area, referred to as Ash Disposal Area #2, which includes the Main Ash Pond, was initially constructed and operated for the disposal of wet sluiced bottom ash, gypsum and fly ash materials when BRF was constructed in the 1960s. The Main Ash Pond was constructed in the 1960’s by building dikes in the floodplains adjacent to the Clinch River and Bull Run Creek. The dikes were constructed approximately 15 feet tall to a crest elevation of 800 feet. In the mid-1970’s the dikes were raised to 810 feet. In 1976, an internal dike was constructed within Ash Disposal Area #2 to form Stilling Pond 2C, in the western portion of the impoundment. Since the construction of this internal dike, also known as the splitter dike, water enters Stilling Pond 2C through a rock weir near the south end of the splitter dike and effluent from Stilling Pond 2C discharges into the Clinch River. In 1981, an internal dike was constructed within Ash Disposal Area #2 that effectively reduced the area into the current Main Ash Pond. A Location Map, shown in **Figure 1** displays the boundary of the Main Ash Pond.



Figure 1. Location Map

2.0 FIELD INVESTIGATION

AECOM reviewed available historical information, which included a subsurface investigation performed by Stantec in 2010. The subsurface data collected from the Stantec investigation indicates the dikes are composed of embankment fill consisting of lean clay with depths extending from 13 to 27 feet below the ground surface. The underlying layer beneath the embankment fill consists of alluvium which overlies bedrock consisting of shale interbedded with limestone.

Historical drawings do not show a presence of a liner constructed within the footprint of the impoundment. Historical drawings can be found in Appendix A.

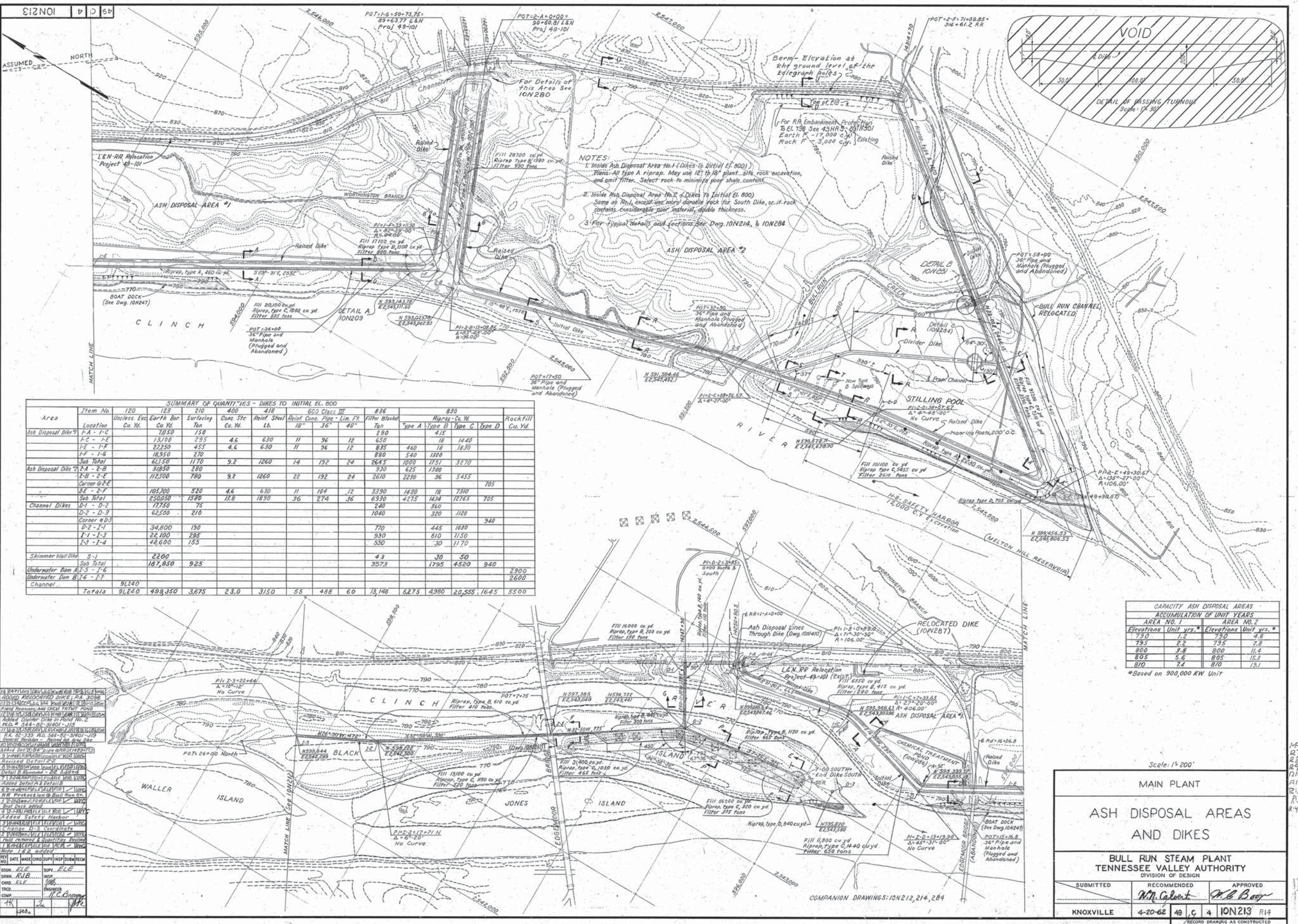
3.0 CONCLUSION

Historical construction documents were reviewed to evaluate status relative to the EPA Final CCR Rule criteria. Based on historical drawings and construction information, no evidence can be found that suggest the Main Ash Pond at Bull Run Fossil Plant was constructed with a liner that complies with the requirements of 40 CFR § 257.71 of the EPA Final CCR Rule. Therefore, the TVA Bull Run Fossil Plant's Main Ash Pond is considered an unlined inactive CCR surface impoundment as described in 40 CFR § 257.71(a)(3).

4.0 REFERENCES

- AECOM, Geotechnical Fly Ash Pond Closure Evaluation, 2016.
- Stantec, Report of Geotechnical Exploration, 2010.

APPENDIX A – HISTORICAL DRAWINGS



NOTES:
 1. Inside Ash Disposal Area No. 1 (Dikes to Initial El. 800)
 Plans: All Type A riprap. May use 12" 1/8" plant site rock excavation, and omit filter. Select rock to minimize poor shale content.
 2. Inside Ash Disposal Area No. 2 (Dikes to Initial El. 800)
 Same as No. 1, except use more durable rock for South Dike, or if rock contains considerable poor material, double thickness.
 3. For typical details and sections see Dwg. ION214, & ION204

SUMMARY OF QUANTITIES - DIKES TO INITIAL EL. 800

Area	Item No.	120		210		400		418		600 Class III		836		830		Rock/Fill Cu. Yd.
		Unclass. Etc. Cu. Yd.	Earth Sur. Cu. Yd.	Surfacing Ton	Coars. Jtc. Cu. Yd.	Reinf. Steel Lb.	Reinf. Conc. Pipe - Lin. Ft.	Filter Blanket Ton	Type A Riprap Cu. Yd.	Type B Riprap Cu. Yd.	Type C Riprap Cu. Yd.	Type D Riprap Cu. Yd.				
Ash Disposal Dike #1	F-A - I-C	70,500	1,510	2,935	4.6	630	11	36	12	650	18	1440				
	F-E - I-F	22,250	455	4.6	630	11	36	12	835	460	18	1830				
	F-F - I-G	18,350	270						880	540		1380				
	Sub Total	111,100	1170	9.2	1260	14	192	24	2665	1000	1751	3270				
Ash Disposal Dike #2	F-A - I-B	31,850	280						930	625		1380				
	F-B - I-E	112,500	780	9.2	1260	22	192	24	2670	2290	36	3435				
Channel Dikes	D-1 - D-2	17,750	75						240			360				
	D-2 - D-3	62,500	210						1040			1120				
Skimmer Wall Dike	S-1	2200							43			50				
	Sub Total	187,950	925						3573			1795				
Underwater Dam	A-1 - F-6															2300
Underwater Dam	B-1 - F-7															2600
Channel		91,140														
Totals		91,240	499,350	3,675	23.0	3150	55	488	60	13,146	6,275	4,980	20,555	16,45	5500	

CAPACITY ASH DISPOSAL AREAS - ACCUMULATION OF UNIT YEARS

Elevations	AREA NO. 1		AREA NO. 2	
	Unit yrs.	Elevations	Unit yrs.	Elevations
750	1.2	750	4.8	
795	2.2	795	7.8	
800	2.8	800	11.4	
805	5.6	805	16.3	
810	7.4	810	19.1	

*Based on 300,000 KW Unit

REVISIONS:
 1. 10/21/62 - Initial Issue
 2. 11/15/62 - Add Detail A (ION209)
 3. 12/10/62 - Add Detail B (ION204)
 4. 1/10/63 - Add Detail C (ION204)
 5. 2/10/63 - Add Detail D (ION204)
 6. 3/10/63 - Add Detail E (ION204)
 7. 4/10/63 - Add Detail F (ION204)
 8. 5/10/63 - Add Detail G (ION204)
 9. 6/10/63 - Add Detail H (ION204)
 10. 7/10/63 - Add Detail I (ION204)
 11. 8/10/63 - Add Detail J (ION204)
 12. 9/10/63 - Add Detail K (ION204)
 13. 10/10/63 - Add Detail L (ION204)
 14. 11/10/63 - Add Detail M (ION204)
 15. 12/10/63 - Add Detail N (ION204)
 16. 1/10/64 - Add Detail O (ION204)
 17. 2/10/64 - Add Detail P (ION204)
 18. 3/10/64 - Add Detail Q (ION204)
 19. 4/10/64 - Add Detail R (ION204)
 20. 5/10/64 - Add Detail S (ION204)
 21. 6/10/64 - Add Detail T (ION204)
 22. 7/10/64 - Add Detail U (ION204)
 23. 8/10/64 - Add Detail V (ION204)
 24. 9/10/64 - Add Detail W (ION204)
 25. 10/10/64 - Add Detail X (ION204)
 26. 11/10/64 - Add Detail Y (ION204)
 27. 12/10/64 - Add Detail Z (ION204)

Scale: 1" = 200'

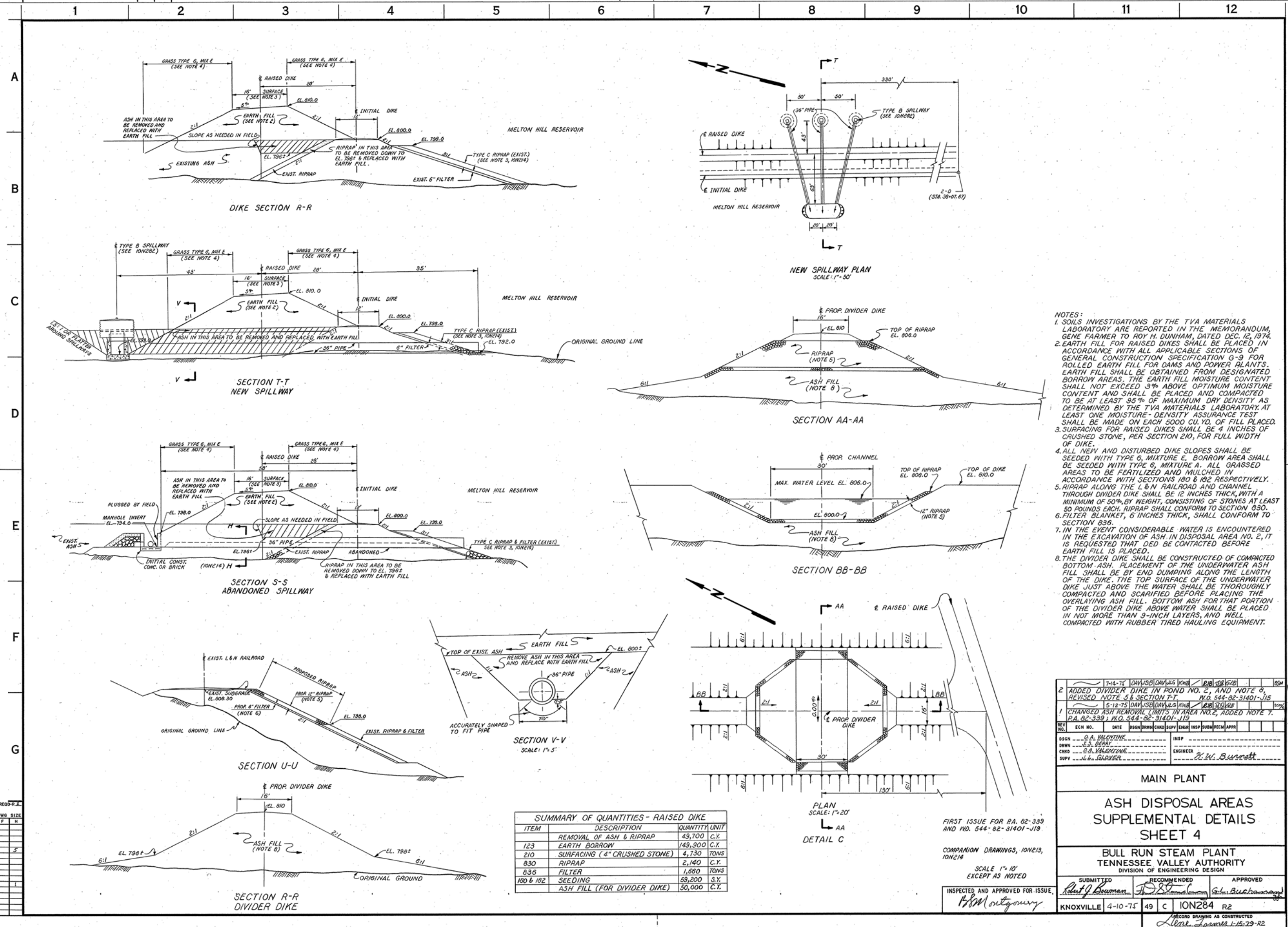
MAIN PLANT

ASH DISPOSAL AREAS AND DIKES

BULL RUN STEAM PLANT
 TENNESSEE VALLEY AUTHORITY
 DIVISION OF DESIGN

SUBMITTED	RECOMMENDED	APPROVED
	<i>W. C. Calvert</i>	<i>W. B. Beer</i>
KNOXVILLE	4-20-62 49 C 4	ION213 R14

RECORD DRAWING AS CONSTRUCTED
 1-16-79 ERM



- NOTES:
- SOILS INVESTIGATIONS BY THE TVA MATERIALS LABORATORY ARE REPORTED IN THE MEMORANDUM, GENE FARMER TO ROY H. DUNHAM, DATED DEC. 12, 1974.
 - EARTH FILL FOR RAISED DIKES SHALL BE PLACED IN ACCORDANCE WITH ALL APPLICABLE SECTIONS OF GENERAL CONSTRUCTION SPECIFICATION G-9 FOR ROLLED EARTH FILL FOR DAMS AND POWER PLANTS. EARTH FILL SHALL BE OBTAINED FROM DESIGNATED BORROW AREAS. THE EARTH FILL MOISTURE CONTENT SHALL NOT EXCEED 3% ABOVE OPTIMUM MOISTURE CONTENT AND SHALL BE PLACED AND COMPACTED TO BE AT LEAST 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY THE TVA MATERIALS LABORATORY. AT LEAST ONE MOISTURE-DENSITY ASSURANCE TEST SHALL BE MADE ON EACH 5000 CU. YD. OF FILL PLACED.
 - SURFACING FOR RAISED DIKES SHALL BE 4 INCHES OF CRUSHED STONE, PER SECTION 210, FOR FULL WIDTH OF DIKE.
 - ALL NEW AND DISTURBED DIKE SLOPES SHALL BE SEEDED WITH TYPE G, MIXTURE E. BORROW AREA SHALL BE SEEDED WITH TYPE G, MIXTURE A. ALL GRASSED AREAS TO BE FERTILIZED AND MULCHED IN ACCORDANCE WITH SECTIONS 180 & 182 RESPECTIVELY.
 - RIPRAP ALONG THE L & N RAILROAD AND CHANNEL THROUGH DIVIDER DIKE SHALL BE 12 INCHES THICK, WITH A MINIMUM OF 50% BY WEIGHT, CONSISTING OF STONES AT LEAST 50 POUNDS EACH. RIPRAP SHALL CONFORM TO SECTION 830.
 - FILTER BLANKET, 6 INCHES THICK, SHALL CONFORM TO SECTION 836.
 - IN THE EVENT CONSIDERABLE WATER IS ENCOUNTERED IN THE EXCAVATION OF ASH IN DISPOSAL AREA NO. 2, IT IS REQUESTED THAT DED BE CONTACTED BEFORE EARTH FILL IS PLACED.
 - THE DIVIDER DIKE SHALL BE CONSTRUCTED OF COMPACTED BOTTOM ASH. PLACEMENT OF THE UNDERWATER ASH FILL SHALL BE BY END DUMPING ALONG THE LENGTH OF THE DIKE. THE TOP SURFACE OF THE UNDERWATER DIKE JUST ABOVE THE WATER SHALL BE THOROUGHLY COMPACTED AND SCARIFIED BEFORE PLACING THE OVERLYING ASH FILL. BOTTOM ASH FOR THAT PORTION OF THE DIVIDER DIKE ABOVE WATER SHALL BE PLACED IN NOT MORE THAN 9-INCH LAYERS, AND WELL COMPACTED WITH RUBBER Tired HAULING EQUIPMENT.

SUMMARY OF QUANTITIES - RAISED DIKE

ITEM	DESCRIPTION	QUANTITY	UNIT
	REMOVAL OF ASH & RIPRAP	49,700	C.Y.
123	EARTH BORROW	149,900	C.Y.
210	SURFACING (4" CRUSHED STONE)	4,730	TONS
830	RIPRAP	2,140	C.Y.
836	FILTER	1,680	TONS
180 & 182	SEEDING	59,200	S.Y.
	ASH FILL (FOR DIVIDER DIKE)	50,000	C.Y.

REV	NO.	DATE	BY	CHKD	APPV	DESC
2		7-4-75	DAV	WLG	KMG	ADDED DIVIDER DIKE IN POND NO. 2, AND NOTE 8, REVISED NOTE 5 & SECTION T-T. NO. 544-82-31401-J15
1		5-12-75	DAV	WLG	KMG	CHANGED ASH REMOVAL LIMITS IN AREA NO. 2, ADDED NOTE 7. P.A. 82-339, NO. 544-82-31401-J12

DESIGN	D. A. VALENTINE
DRAWN	E. J. BERRY
CHECKED	D. A. VALENTINE
SUPV	J. W. GLOVER
INSPECTOR	R. W. BURNETT

MAIN PLANT
ASH DISPOSAL AREAS
SUPPLEMENTAL DETAILS
SHEET 4
BULL RUN STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED: *Robert J. Bowman*
RECOMMENDED: *R. W. Burnett*
APPROVED: *G. L. Buchanan*

INSPECTED AND APPROVED FOR ISSUE: *B. M. Outgony*

KNOXVILLE 4-10-75 49 C ION284 R2

SCALE 1" = 10' EXCEPT AS NOTED

FIRST ISSUE FOR P.A. 82-339 AND NO. 544-82-31401-J19

COMPANION DRAWINGS, 10N213, 10N214

RECORD DRAWING AS CONSTRUCTED
Gene Farmer 1-15-79-R2

PRINTS READ-TO
OR OF
PROJ. DWG. SIZE

F	H
ME	
EE	
CE	
AD	
CD	
ED	
MD	
BF	
SW	
BL	
PA	