TVA 64 (OS-9-65)

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

CDB 791101 004

: H. S. Fox, Director of Power Production, 716 EB-C (2)

FROM : Roy H. Dunham, Manager of Engineering Design, W11A9 C-K

DATE : November 1, 1979

SUBJECT: KINGSTON STEAM PLANT - ANNUAL ASH DISPOSAL AREA INSPECTION

HRR Kingston - Ash Disposal

Attached is a report from Ronald D. Powell to Frank D. Stansberry dated October 31, 1979 (CDB 791101 003), on the joint inspection of the ash disposal areas at Kingston Steam Plant which includes recommendations for corrective work. I concur in these recommendations.

Original Signed By
F. P. Lacy
Roy H. Dunham

GLB:RDP:TLT
Attachment
cc: D. B. Bowen, 6204 MTB-K
G. L. Buchanan, W3C126 C-K
R. G. Domer, W9D224 C-K
MEDS, E4B37 C-K
E. F. Thomas, 550 CST2-C (Attachment)

RECEIVED
11:25
NOV 2 '79
CIVIL ENG. & DES. BRANCH

IN				OUT	
	Date	Time		Date	Time
✓			GLB	2	11
			DLG		
			TJA		
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✓	2	1	FDS	2	31
✓	2	4	RJB	2	1P
			JRF		
			RAD		
			OHR		
			RSB		
			JHC		
			SDS		
			RWA		

✓ 5 11:30 RDP 5 11:45
✓ 5 11 KWB 5 11

TVA 64 (OS-9-65)

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

CDB '79 11 01 003

TO : Frank D. Stansberry, Head Civil Engineer (Site Development, Highway, Railroad, and Bridge Design), W3A52 C-K

FROM : Ronald D. Powell, Civil Engineer (Site Development, Highway, and Railroad Design), W3B69 C-K

DATE : October 31, 1979

Kingston - Ash Disposal

SUBJECT: KINGSTON STEAM PLANT - ANNUAL ASH DISPOSAL AREA INSPECTION

On September 13, 1979, Meigs Brewer of P PROD and I inspected the ash disposal areas at Kingston Steam Plant. We were accompanied on the inspection by Coy Wood, Yard Operations Supervisor. Findings were discussed with Ford Clayton, Assistant Plant Superintendent.

The last annual inspection was made on August 16, 1978 (CDB 781005 007).

On the attached print of drawing 10N420, the different areas are designated.

Change in Dikes Since Last Inspection

There has been no significant change in the dikes since last year's annual inspection.

A small area of surface wetness was observed at the toe of the exterior slope of the south end of dike C (picture 1). It could not be determined whether this condition was due to seepage or a concentration of surface runoff (recommendation 1).

Some areas of the dike slopes, both interior and exterior, have an excellent vegetative cover (pictures 2 and 3); while other areas have a very sparse vegetative cover or are completely bare (pictures 6, 7, and 9 and recommendation 2). Small erosion gullies have developed in parts of the bare areas.

Placement of a bottom ash berm along the interior dike slopes of the ash disposal area is in progress (picture 6).

A finger dike of bottom ash is under construction parallel to and 200± feet north of the east end of the divider dike. This finger dike should provide some relief from the effects of wave action and wind load on the buoyant skimmer in the divider dike flow-through spillway.

The tops of all dikes are smooth and sloped to the inside with a good crushed stone surface.

Change in Pond Operation Since Last Inspection

There has been no change in pond operation since last year's annual inspection.

Frank D. Stansberry
October 31, 1979

KINGSTON STEAM PLANT - ANNUAL ASH DISPOSAL AREA INSPECTION

Condition of Spillways, Skimmers, and Outlets

The standard spillways and skimmers in the stilling pool area appear to be in good condition and functioning properly. The spillway outlets are discharging equally, and the concrete end wall is in good condition. The riprap outfall to the intake channel appears to be in good condition with no sign of erosion. There was no sign of loss of ash into the intake channel. The weep holes in the concrete end wall of the spillway outlet pipes were seeping; however, the dike slope behind the end wall appeared to be dry and well compacted.

The two buoyant skimmers in the divider dike flow-through spillway appear to be functioning properly with minimal loss of ash into the stilling pool area (picture 4). However, a fly ash slurry was observed covering at least 50 percent or more of the stilling pool area surface (picture 8).

The plant-constructed spillways of the initial ash disposal area in the east end of the north dike were submerged; however, they appeared to be functioning adequately.

The outlets of the plugged and abandoned spillways in the northern portion of dike C were submerged by Watts Bar Lake and could not be inspected for leakage.

Action on Recommendations of Last Inspection

1. All badly eroded areas of the dike slopes have been repaired; however, small erosion gullies are beginning to develop in parts of the bare areas.

2. Placement of a heavy ash berm along the interior dike slopes of the ash disposal area is in progress (picture 6). This berm should prevent further erosion of the dike slopes due to wave action.

3. Some areas of the dike slopes have an excellent vegetative cover (pictures 2 and 3), while other areas are completely bare (pictures 6, 7, and 9).

4. The spillway access area has been regraded and appears to be draining adequately.

5. Crushed stone surfacing has been placed on top of the ash disposal area dikes and the spillway access.

6. Some areas of the divider dike slopes are badly eroded and do not appear to have had any maintenance work.

7. The channel bottom has been lowered and two longer buoyant skimmers have been placed in the flow-through spillway (picture 4). These skimmers appear to be functioning properly.

Frank D. Stansberry
October 31, 1979

KINGSTON STEAM PLANT - ANNUAL ASH DISPOSAL AREA INSPECTION

8. Riprap placement on the divider dike flow-through spillway slopes has deteriorated badly and does not appear to have had any maintenance work (picture 5).

9. A private contractor is presently removing some of the fly ash slurry covering the stilling pool area surface.

10. The weep holes in the concrete end wall of the spillway outlet pipes were seeping; however, not excessively. The dike slope behind the end wall appears dry and well compacted.

Recommendations

1. Plant personnel should regrade the area of surface wetness at the south end of dike C (picture 1) so that surface runoff is not concentrated at the toe of the dike slope and will flow into Watts Bar Reservoir. This area should then be observed for a period of time to determine if a seepage problem exists.

2. Fertilize and reseed all areas of the dike slopes where an adequate vegetative cover has not been established with type 6, mixture E, in accordance with sections 180 and 182 of the T-1 Specifications.

3. Repair any earthfill dike slope erosion that may occur prior to the establishment of an adequate vegetative cover.

4. Repair badly eroded areas of the divider dike slopes.

Ronald D. Powell
Ronald D. Powell

RDP:TLT
Attachments

Concur: Frank D. Stansberry
Frank D. Stansberry

G. L. Buchanan
G. L. Buchanan

10/31/79 - GLB:TLT
cc: D. B. Bowen, 6204 MIB-K (Attachments)
R. G. Domer, W9D224 C-K (Attachments)
Roy H. Dunham, W11A9 C-K
MEDS, E4B37 C-K (Attachments)

10/31/79 - FDS:TLT
cc: G. L. Buchanan, W3C126 C-K (Attachments)

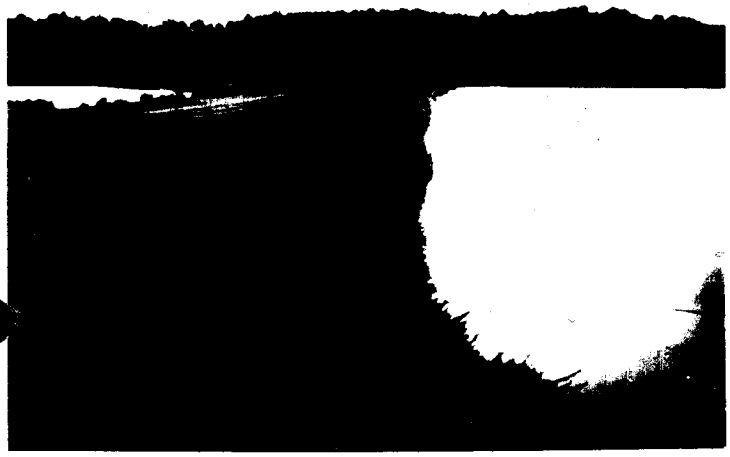
KINGSTO[illegible]

(1.)

Wet area at toe of slope of East dike adjacent to stilling pool.

(2.)

Exterior slope of East Dike. Note excellent vegetative cover.



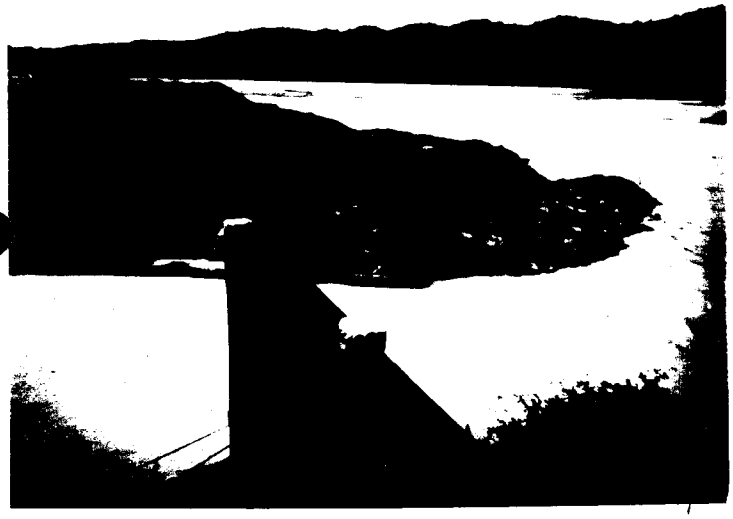
(3.)

Interior slope of East dike inside stilling pool area. Note excellent vegetative cover.

KINGSTON STEAM PLANT
1979

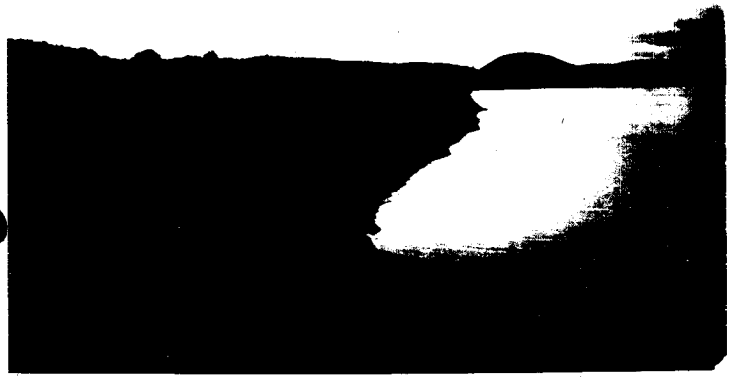
(4.)

Looking into stilling pool area from divider dike. Note fly ash slurry on water surface in front of floating skimmer.



(5.)

Looking into divider dike flow-through spillway. Note sparse riprap cover on divider dike slope.



(6.)

Looking southward along interior slope of east dike from location of abandoned spillway. Note bottom ash berm adjacent to dike slope and lack of vegetative cover on top

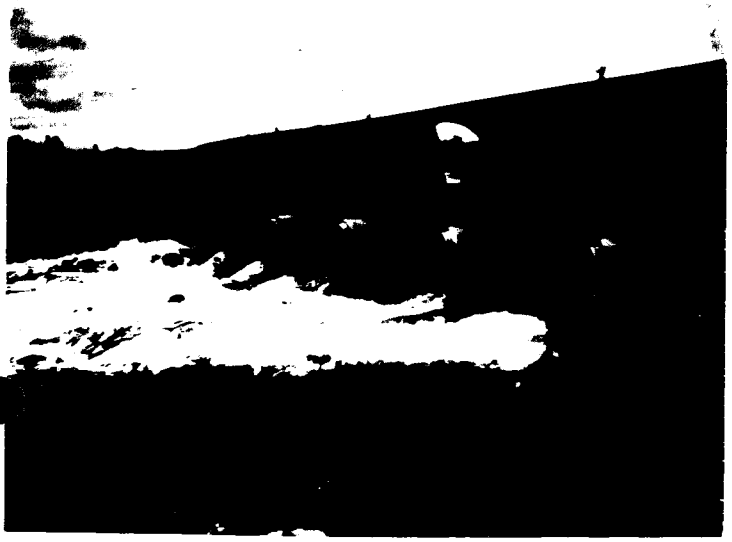
KINGSTON STEAM PLANT
1979

7.

Looking Northwest along interior slope of East dike from location of abandoned spillways. Note lack of vegetative cover on dike slope in this area.

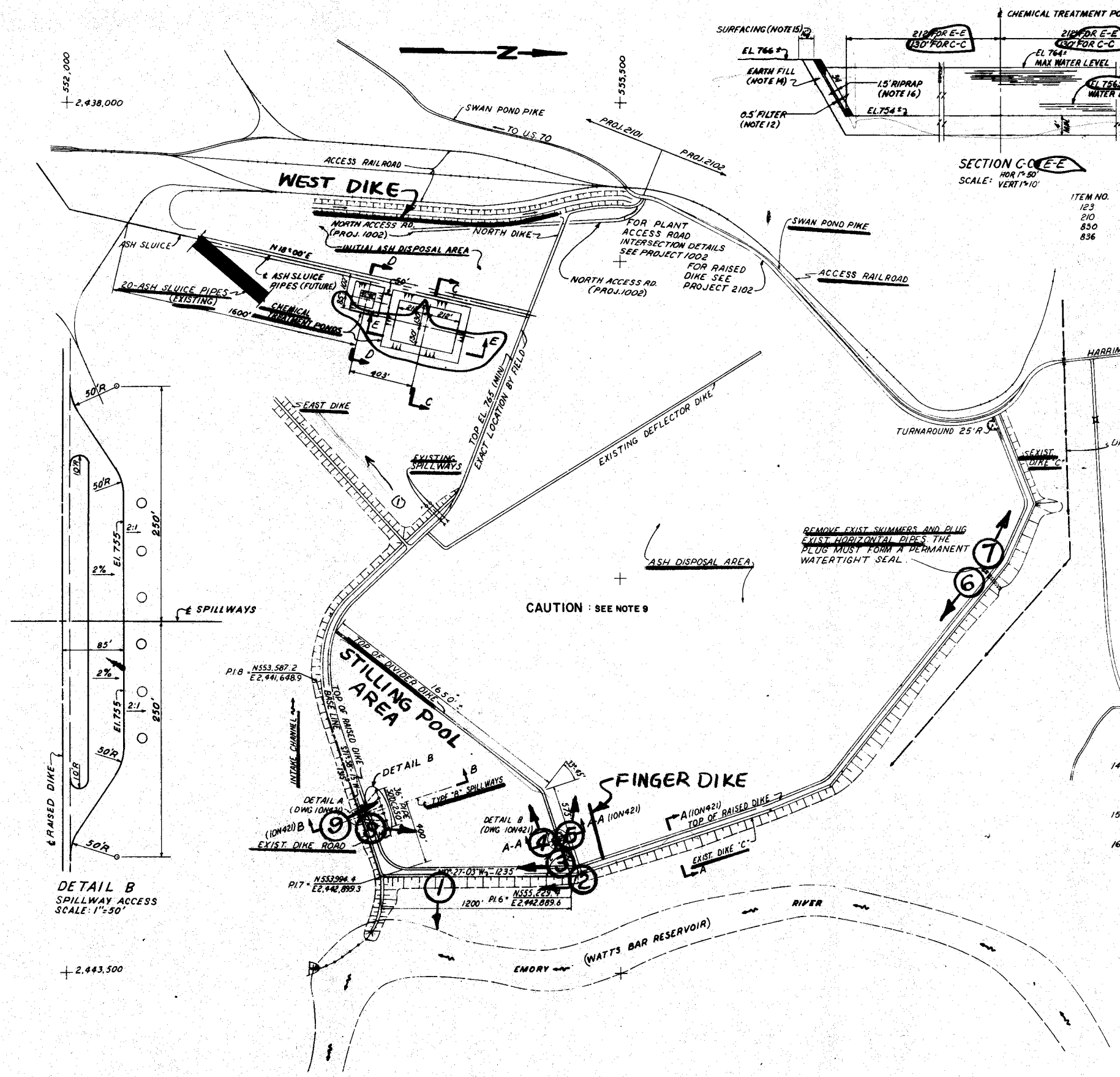
8.

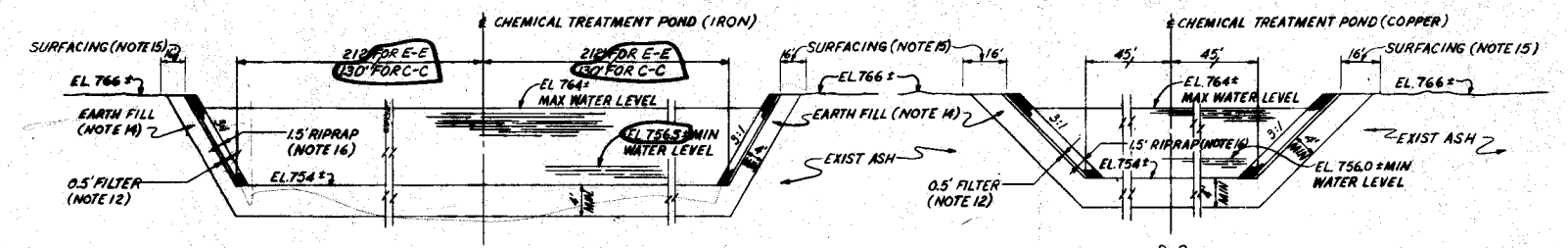
Looking North across stilling pool from South dike. Note fly ash slurry on water surface around standard spillways.



9.

Looking into standard spillway outlets. Note absence of vegetative cover on dike slope above spillway outlets.





SECTION C-C E-E
SCALE: HOR 1"=50' VERT 1"=10'

D-D
SCALE: HOR 1"=30' VERT 1"=10'

CHEMICAL TREATMENT POND
SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY
123	EARTH BORROW	32,000 C.Y.
210	CRUSHED STONE	800 TONS
850	RIPRAP	4,200 C.Y.
836	FILTER BLANKET	2,400 TONS
	ASH EXCAVATION	100,000 C.Y.

NOTES:

1. SOIL EXPLORATION AND LABORATORY TESTING IS RECORDED IN MEMORANDUM REPORT FROM GENE FARMER TO G.L. BUCHANAN, DATED NOVEMBER 3, 1975.
2. CIRCULAR-ARC STABILITY ANALYSIS SAFETY FACTORS FOR THE NEW DIKES BASED UPON AN EVALUATION OF THE SOILS INVESTIGATION REPORT ARE AS FOLLOWS:
   A. INITIAL CONSTRUCTION, EXTERIOR SLOPE: SAFETY FACTOR = 2.6
   B. INITIAL CONSTRUCTION, INTERIOR SLOPE: SAFETY FACTOR = 1.9
   C. OPERATING CONDITION WITH ASH AND WATER TO EL. 761, EXTERIOR SLOPE: SAFETY FACTOR = 2.7
   D. OPERATING CONDITION WITH ASH AND WATER TO EL. 761, INTERIOR SLOPE: SAFETY FACTOR = 1.6
3. ALL WORK TO BE IN ACCORDANCE WITH T-1 SPECIFICATIONS UNLESS NOTED.
4. ALL DIKE CONSTRUCTION SHALL BE IN ACCORDANCE WITH GENERAL CONSTRUCTION SPECIFICATION NO. G-9 FOR ROLLED EARTHFILL FOR DAMS AND POWER PLANTS. FILL COMPACTION SHALL BE AT LEAST 95% OF STANDARD MAXIMUM DENSITY AND FILL MOISTURE CONTENT SHALL BE WITHIN ±3% OF OPTIMUM MOISTURE CONTENT, AS DETERMINED BY THE CENTRAL SOILS LABORATORY.
5. FOUNDATION PREPARATION FOR EARTH EMBANKMENTS SHALL CONSIST OF REMOVING ORGANIC TOPSOIL, TO A DEPTH THAT WILL REMOVE ALL ROOTS, AND ALL PERVIOUS MATERIAL, (RIPRAP, GRAVEL, CRUSHED STONE, COARSE ASH, ETC.), AND EXCAVATION SHALL CONTINUE TO A DEPTH THAT WILL SUPPORT HEAVY EARTH MOVING EQUIPMENT WITHOUT RUTTING INTO THE GROUND AND WITHOUT HEAVING THE GROUND SO AS TO REDUCE ITS STABILITY.
6. PIPE BACKFILL SHALL CONSIST OF IMPERVIOUS SOIL, FREE OF DEBRIS, WITH NO HARD LUMPS OR CLODS LARGER THAN 3" IN DIAMETER. COMPACTION SHALL BE BY HAND-HELD COMPACTORS TO A MINIMUM OF 1' ABOVE THE TOP OF THE PIPE. THE SOIL SHALL BE PLACED IN 6" LAYERS AND COMPACTED TO AT LEAST 95% OF STANDARD MAXIMUM DENSITY AS ESTABLISHED BY THE CENTRAL SOILS LABORATORY. BACKFILL MOISTURE SHALL BE CONTROLLED TO OBTAIN THE MAXIMUM PRACTICABLE DENSITY. THE BACKFILL SHALL BE PLACED SO AS TO MAINTAIN THE SAME ELEVATION ON BOTH SIDES OF THE PIPE.
7. THE DIVIDER DIKE SHALL BE CONSTRUCTED OF 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 OVERLAYING ASH FILL. BOTTOM ASH FOR THAT PORTION OF THE DIVIDER DIKE ABOVE WATER SHALL BE PLACED IN NOT MORE THAN 9-INCH LAYERS AND SHALL BE WELL COMPACTED WITH RUBBER TIRED HAULING EQUIPMENT.
8. CUT SLOPES ADJACENT TO EXISTING OR PROPOSED DIKES SHALL NOT BE EXCAVATED STEEPER THAN 3:1 AND TOP OF CUT SHALL BE A MINIMUM OF 20' FROM THE TOE OF ANY DIKE.
9. WHEN CONNECTING THE NEW DIKE TO THE OLD DIKE, EXTREME CARE SHALL BE USED TO INSURE AN IMPERVIOUS AND STABLE CONNECTION. THE EXISTING DIKES SHALL BE STRIPPED OF ALL VEGETATION, RIPRAP, GRAVEL, CRUSHED STONE, COARSE ASH AND OTHER PERVIOUS MATERIAL, BENCHED, AND SCARIFIED TO A MINIMUM DEPTH OF 6" AND COMPACTED SO AS TO FORM A BOND WITH THE NEW FILL. THE UTMOST CAUTION SHALL BE USED IN BENCHING THE EXISTING DIKE SLOPES SO AS NOT TO CREATE AN UNSTABLE CONDITION. SMALL BENCHES OF MINIMUM DEPTH SHALL BE USED.
10. GRASSING: CUT AND FILL SLOPES, AND DISTURBED AREAS SHALL BE SEEDED WITH TYPE 6E MIXTURE (SPRING SEEDING) OR TYPE 6 (FALL SEEDING). IF COVER IS NEEDED PRIOR TO SEEDING DATES USE TYPE 9 FOR WINTER SEEDING AND TYPE 10A FOR SUMMER SEEDING. ALL AREAS ARE TO BE SEEDED, FERTILIZED, AND MULCHED IN ACCORDANCE WITH SECTIONS 180 AND 182.
11. RIPRAP IS TO BE PLACED AT THE LOCATIONS AS SHOWN. AT LEAST 50% OF THE RIPRAP SHALL CONSIST OF STONE OF A WEIGHT EQUAL TO OR GREATER THAN 150 LBS., AND IN ACCORDANCE WITH SECTION 830.
12. FILTER BLANKET SHALL BE 6" THICK AND IN ACCORDANCE WITH SECTION 836.
13. SUMMARY OF QUANTITIES - SEE DWG. 2102H101
14. EARTH FILL COMPACTION IN CHEMICAL PONDS SHALL BE DONE WITH SHEEPSFOOT ROLLERS AND SHALL BE AT LEAST 95% OF STANDARD PROCTOR MAXIMUM DENSITY. FILL MOISTURE SHALL BE CONTROLLED TO ACHIEVE OPTIMUM COMPACTION.
15. SURFACING FOR THE EARTH FILL AROUND CHEMICAL PONDS SHALL BE 4" OF CRUSHED STONE, PER SECTION 210 OF THE T-1 SPECS.
16. RIPRAP IN CHEMICAL PONDS SHALL BE 18" THICK, WITH A MINIMUM OF 50% BY WEIGHT, CONSISTING OF STONES AT LEAST 100 POUNDS EACH. RIPRAP SHALL CONFORM TO SECTION 830 OF THE T-1 SPECS.

1. → Photograph taken at this point in this direction.

SCALE: 1" = 300'

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECD	APPR
2		5-6-77	KWS	KWS	JLG	JLG	KWB		RJB	JBS	GAB
	Rev iron chem pond & summary of quantities. PA 3076.										
1		2-16-77	GRO	GRO	AWS	JLG	KWB		RJB	JBS	GAB
	Added chemical treatment ponds, detail B PA 3076. Add Proj 1002.										

DSGN D.R. GALLOWAY
DRWN J.R.L. & D.R.G.
CHKD D.R. GALLOWAY
SUPV J.P.H. STIVERS
INSP R.D. STONE J.P. FOX
ENGINEER E.B. Bogan

ASH POND DIKE

PLAN-RAISING ASH DISPOSAL AREA DIKE

KINGSTON STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED Robert J. Bowman | RECOMMENDED | APPROVED

KNOXVILLE 5-20-76 38 C 10N420 R2

COMPANION DRAWING: 10N421, N422, N423
HWY PROJECT 2102

INSPECTED AND APPROVED FOR ISSUE

PRINTS READ-R2 DS or PROJ

	DWG	SIZE F	SIZE H
ME			
EE			
CE			
AD			
CD		3	
ED			
MD			
DF			
SW			
DL			
PA			