

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

CDB '79 11 01 004

*HRB
Kingston -
Ash Disposal*

TO : 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

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 MIB-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
✓	GLB 2:14
	DLG
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✓ 11	FDS 2:31
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✓ 5 11:30 RDP 5 11:45
 ✓ 5 11 LWB 5 11



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

SUBJECT: KINGSTON STEAM PLANT - ANNUAL ASH DISPOSAL AREA INSPECTION

*Kingston
Ash Disposal*

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.

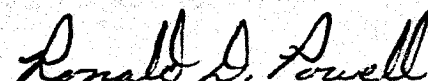
Frank D. Stansberry
October 31, 1979

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.

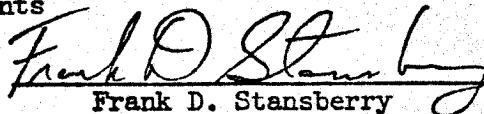
Recommendations

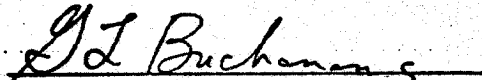
1. Plant personnel should regrade the area of surface wetness at the south end of dike C (picture 1) so that surface runoff is not concentrated at the toe of the dike slope and will flow into Watts Bar Reservoir. This area should then be observed for a period of time to determine if a seepage problem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

RDP:TLT
Attachments

Concur:


Frank D. Stansberry


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)

KINGSTON STILLING POOL
1970



①

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



②

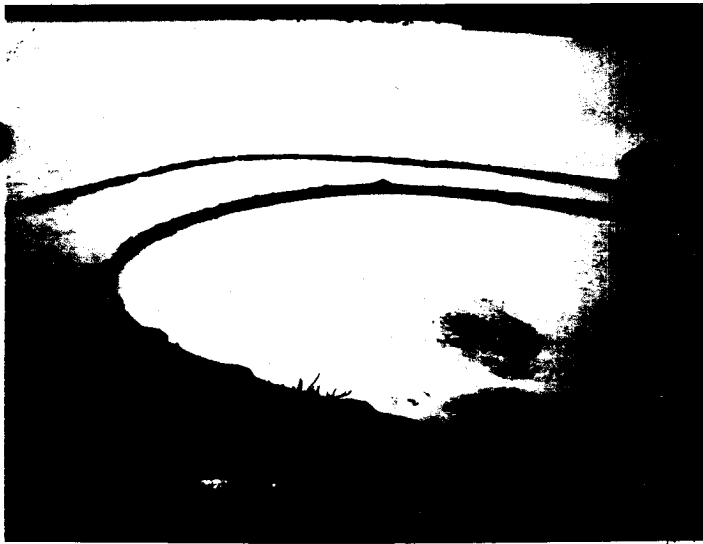
Exterior slope of East Dike.
Note excellent vegetative cover.



③

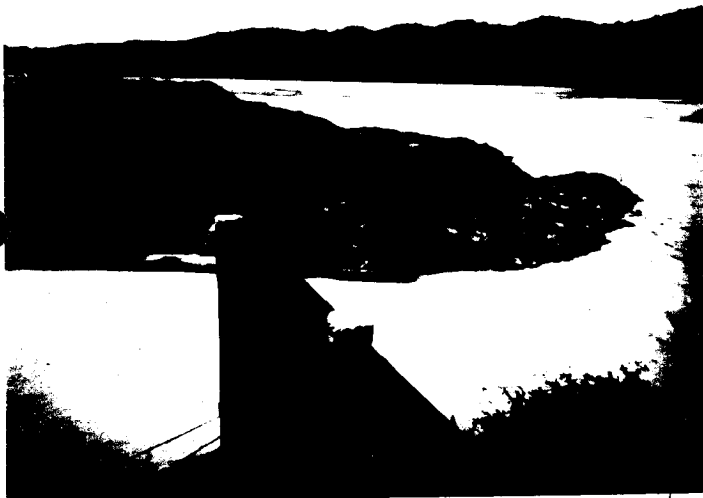
Interior slope of East dike inside
stilling pool area. Note excellent
vegetative cover.

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 coarse riprap cover on divider dike slope.



⑥

Looking southeast along interior slope of main dike from location of abandoned spillway. Note bitter sch berm adjacent to dike slope and lack of vegetation cover on slope.

KINGSTON STEAM PLANT
1979



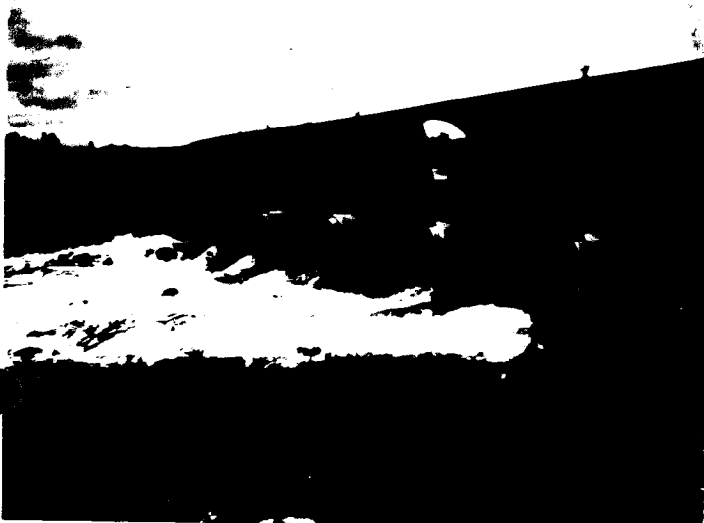
⑦

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



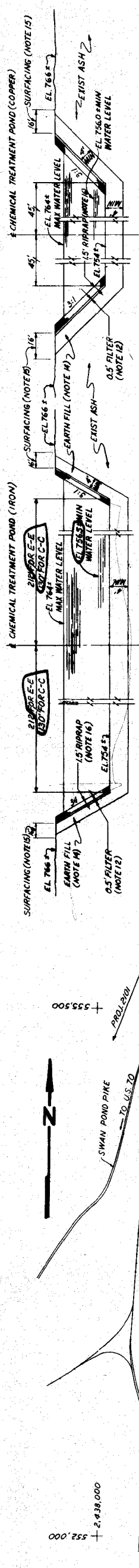
⑧

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



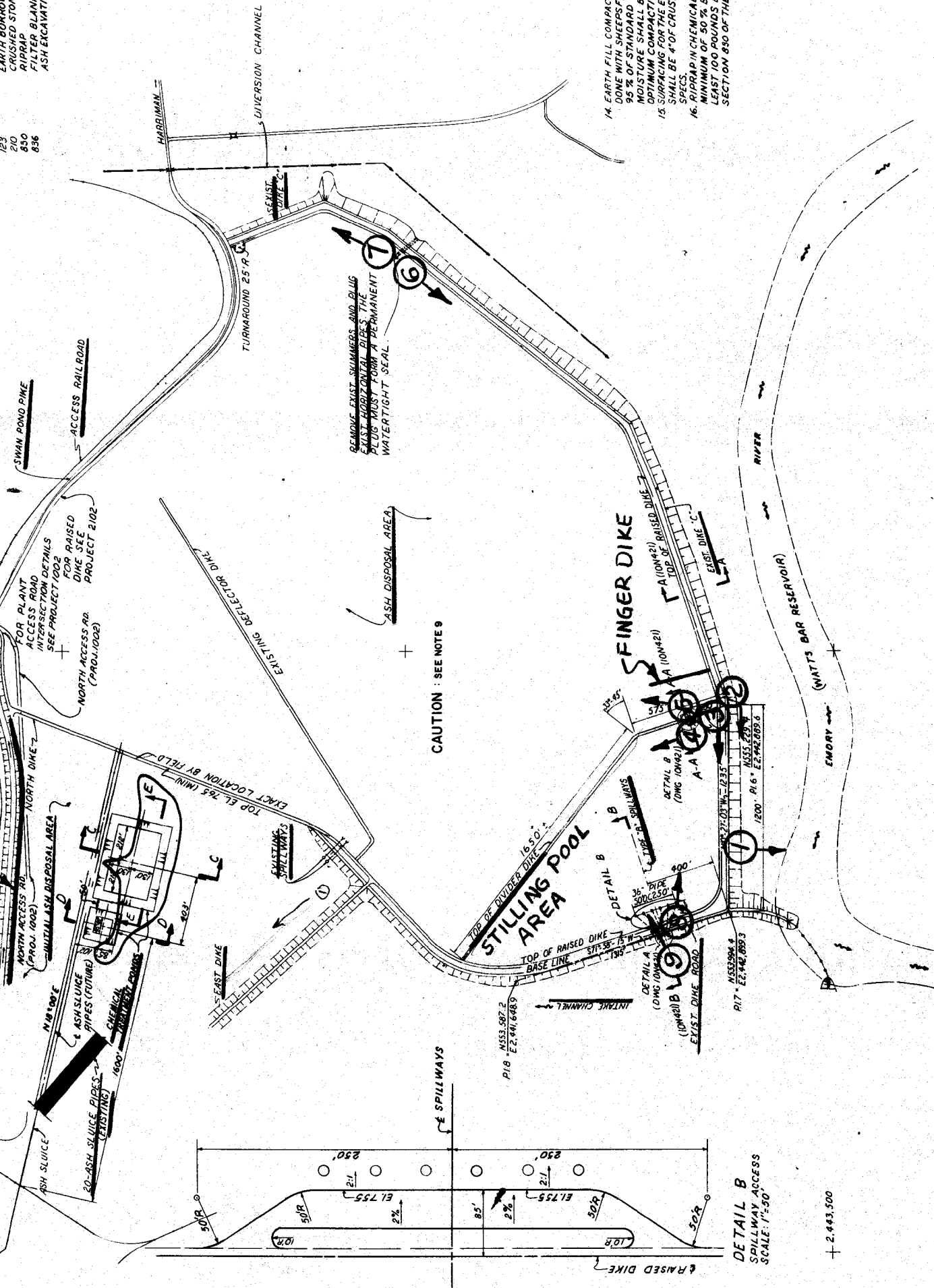
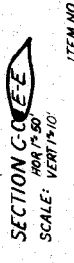
⑨

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



CHEMICAL TREATMENT POND SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY
833	EARTH BORROW	34,000 CY
834	CRUSHED STONE	4,200 CY
835	RIPRAP	2,400 TONS
836	FILTER BLANKET	100,000 CY
837	ASH EXCAVATION	



- NOTES:
- SOIL EXPLORATION AND LABORATORY TESTING IS RECORDED IN MEMORANDUM REPORT FROM GENE FARMER TO G.L. BUCHANAN, DATED NOVEMBER 3, 1975. BASED UPON AN EVALUATION OF THE SOILS INVESTIGATION REPORT ARE AS FOLLOWS:
 - INITIAL CONSTRUCTION, EXTERIOR SLOPE: SAFETY FACTOR = 2.6
 - OPERATING CONDITION WITH ASH AND WATER TO EL. 761, EXTERIOR SLOPE: SAFETY FACTOR = 2.7
 - OPERATING CONDITION WITH ASH AND WATER TO EL. 761, INTERIOR SLOPE: SAFETY FACTOR = 2.8
 - ALL DIKE CONSTRUCTION SHALL BE IN ACCORDANCE WITH GENERAL NOTES AND SPECIFICATION NO. 8-3 FOR ROLLED EARTH FILL FOR DAMS AND POWER PLANTS. FILL COMPACTION SHALL BE AT LEAST 95% OF STANDARD MAXIMUM DRY DENSITY AS DETERMINED BY THE CENTRAL SOILS LABORATORY. MOISTURE CONTENT AS DETERMINED BY THE CENTRAL SOILS LABORATORY.
 - FOUNDATION PREPARATION FOR EARTH EMBANKMENTS SHALL CONSIST OF REMOVING ORGANIC TOPSOIL TO A DEPTH THAT WILL REMOVE ALL ROOTS AND DEBRIS. EXCAVATION SHALL CONTINUE TO A DEPTH THAT WILL SUPPORT HEAVY EARTH MOVING EQUIPMENT WITHOUT SETTLING INTO THE GROUND AND WITHOUT HEAVING THE GROUND SO AS TO REDUCE ITS STABILITY. WITH NO HARD LAMPS OR CLOSURES LARGER THAN 3" IN DIAMETER. COMPACTION SHALL BE BY HAND-HELD COMPACTORS TO A MINIMUM OF 1" ABOVE THE TOP OF THE EMBANKMENT. BACKFILL MOISTURE SHALL BE CONTROLLED TO CENTRAL SOILS LABORATORY. BACKFILL MAXIMUM DENSITY AS ESTABLISHED BY THE CENTRAL SOILS LABORATORY. BACKFILL SHALL BE PLACED SO AS TO MAINTAIN THE SAME ELEVATION ON BOTH SIDES OF THE PIPE.
 - THE DIVIDER DIKE SHALL BE CONSTRUCTED OF BOTTOM ASH. PLACEMENT OF THE UNDERWATER ASH FILL SHALL BE BY 800 BUMPING ALONG THE LENGTH OF THE DIVIDER DIKE. THE DIVIDER DIKE SHALL BE CONSTRUCTED OF BOTTOM ASH. PLACEMENT OF THE UNDERWATER ASH FILL SHALL BE BY 800 BUMPING ALONG THE LENGTH OF THE DIVIDER DIKE. THE DIVIDER DIKE SHALL BE CONSTRUCTED OF BOTTOM ASH. PLACEMENT OF THE UNDERWATER ASH FILL SHALL BE BY 800 BUMPING ALONG THE LENGTH OF THE DIVIDER DIKE.
 - 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.
 - TO MAINTAIN THE STABILITY OF THE DIKE, EXISTING VEGETATION SHALL BE STRIPPED FROM ALL VEGETATION, RIPRAP, GRAVEL, CRUSHED STONE, AND OTHER MATERIALS. ALL MATERIALS SHALL BE REMOVED TO A MINIMUM DEPTH OF 4" AND COMPACTION SHALL BE WITH THE NEW FILL. THE UNDERWATER ASH FILL SHALL BE PLACED IN A SINGLE LAYER WITH A MINIMUM OF 3" TO 4" OF ASH. THE UNDERWATER ASH FILL SHALL BE PLACED IN A SINGLE LAYER WITH A MINIMUM OF 3" TO 4" OF ASH.
 - GRASSING: CUT AND FILL SLOPES, AND DISTURBED AREAS SHALL BE SEEDED WITH TYPE 6E MIXTURE (SPRING SEEDING) OR TYPE 8 (FALL SEEDING). SEEDING SHALL BE DONE IN ACCORDANCE WITH SECTION 100 AND 102. FERTILIZER, AND MULCH IN ACCORDANCE WITH SECTION 100 AND 102.
 - RIPRAP IS TO BE PLACED AT THE LOCATIONS AS SHOWN. AT LEAST 90% OF RIPRAP SHALL BE 4" TO 6" IN SIZE. THE REMAINING 10% SHALL BE 1.5" TO 3" IN SIZE. RIPRAP SHALL BE PLACED IN ACCORDANCE WITH SECTION 100 AND 102.
 - FILTER BLANKET SHALL BE 6" THICK AND IN ACCORDANCE WITH SECTION 836.
 - SUMMARY OF QUANTITIES - (SEE DWG. 2102H10)

① Photograph taken at this point in this direction.

- 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.
- SURFACING FOR THE EARTH FILL AROUND CHEMICAL PONDS SHALL BE 4" OF CRUSHED STONE, PER SECTION 200 OF THE F-1 SPECS.
- RIPRAP IN CHEMICAL PONDS SHALL BE 18" THICK WITH A MINIMUM OF 90% OF RIPRAP SHALL BE 4" TO 6" IN SIZE. THE REMAINING 10% SHALL BE 1.5" TO 3" IN SIZE. RIPRAP SHALL CONFORM TO SECTION 830 OF THE F-1 SPECS.

SCALE: 1"=300'

NO.	DATE	BY	CHKD.	APP'D.	REVISION
1	12/15/75	J.L.B.			AS SHOWN
2	1/15/76	J.L.B.			AS SHOWN
3	2/15/76	J.L.B.			AS SHOWN
4	3/15/76	J.L.B.			AS SHOWN
5	4/15/76	J.L.B.			AS SHOWN
6	5/15/76	J.L.B.			AS SHOWN
7	6/15/76	J.L.B.			AS SHOWN
8	7/15/76	J.L.B.			AS SHOWN
9	8/15/76	J.L.B.			AS SHOWN
10	9/15/76	J.L.B.			AS SHOWN
11	10/15/76	J.L.B.			AS SHOWN
12	11/15/76	J.L.B.			AS SHOWN
13	12/15/76	J.L.B.			AS SHOWN
14	1/15/77	J.L.B.			AS SHOWN
15	2/15/77	J.L.B.			AS SHOWN
16	3/15/77	J.L.B.			AS SHOWN
17	4/15/77	J.L.B.			AS SHOWN
18	5/15/77	J.L.B.			AS SHOWN
19	6/15/77	J.L.B.			AS SHOWN
20	7/15/77	J.L.B.			AS SHOWN
21	8/15/77	J.L.B.			AS SHOWN
22	9/15/77	J.L.B.			AS SHOWN
23	10/15/77	J.L.B.			AS SHOWN
24	11/15/77	J.L.B.			AS SHOWN
25	12/15/77	J.L.B.			AS SHOWN

ASH POND DIKE

PLAN-RAISING ASH DISPOSAL AREA DIKE

KINGSTON STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED: [Signature]
RECOMMENDED: [Signature]
APPROVED: [Signature]
KNOXVILLE 5-20-76 36 C 10N480 RE

COMPANION DRAWING: 10N421, 10N23, 10N23 HWY PROJECT 2102

INSPECTED AND APPROVED FOR ISSUE
[Signature]