E. F. Vaden, Director of Power Production, 100C HB-C (4)

J. A. Scalsi, Director of Engineering Design, 290 WB-K

February 3, 1970

[redacted] - ANNUAL SITE VISIT INSPECTION

Attached is a memorandum report from J. F. B. Oliver to H. E. Oliver of the October 15, 1969, joint field inspection at Kingston which includes recommendations for corrective work. I concur in these recommendations.

J. L. Harlan

JFBO:HEH
Attachment
cc: Rivel Chambers, 522 FSB-K
J. E. Lacy, 405 HB-K (3) - w/3 attachments
Power Manager's Files, 932 FSB-C

W. E. Stewart, Asst Civil Engineer (Highway and Railroad), 401 AB-K

J. F. E. Stivers, Civil Engineer (Highway and Railroad), 309 AB-K

February 2, 1970

KINGSTON STEAM PLANT - ANNUAL ASH DIKE INSPECTION

On October 13, 1969, J. L. Hall of DPP; A. G. Spencer, Plant Superintendent; L. E. Kennedy, Assistant Plant Superintendent; E. J. Hunt, Operating Supervisor; and H. G. Beattie and I of ENB inspected the ash dikes at Kingston Steam Plant.

Plant personnel have completed raising the dikes around the initial ash area with heavy ash to approximately elevation 768. The outside slope of the east dike is approximately 6:1 and is in very good condition. The outside slopes of the north and west dikes are approximately 2:1 with the outside slope of the west dike developing some erosion gullies (picture 1). The top width of the dikes is approximately 30 feet. The north dike is having ash deposited against it. The outside slope of the west dike will be flattened. The dikes are named on the attached print of drawing 102W00.

The initial ash area has been filled to approximately elevation 769. Sluice water flows from the ash pipe outfalls to the spillway in a trench it maintains through the initial ash area. This spillway discharges into the main pond. The velocity of the sluice water is great enough so very little ash is deposited in the initial area.

Plant personnel were in the process of widening the road dike to the inside prior to raising (picture 5). See attached print of drawing 102W00 for location of pictures.

Plant personnel report that the drainage between the west dike and the railroad is acidic. This drainage was routed in a ditch north of and parallel to the north and road dikes, mixing with the sluice water, thus allowing more water contact time as well as some dilution of the drainage. The contact time and dilution reduced the acidity of the effluent through the main spillways to the river.

No raising has been done on dike C. The plant personnel have attempted to establish vegetation on the outside earth slope of dike C, with type 7 mixture as recommended; but at the time of our inspection, very little growth could be seen. Several logs and other trash were seen on the outside slope of dike C (picture 3). The top portion of the outside slope of dike C is too steep for wave protection of high fined and should be flattened (picture 2). Picture 4 shows the inside slope of dike C which has eroded vertically. This has occurred in several places along the inside slope. At the present time, the

W. E. Calvert
February 4, 1970

KINGSTON STEAM PLANT - ASHPOND AREA DIKE INSPECTION

erosion does not constitute a hazard if the present widening construction continues. The widening of the dikes is advancing along the road dike toward dike C.

The spillway and skimmer are allowing a small amount of fly ash to escape into the river due to the lack of sufficient height between the bottom of the skimmer and top of ash.

Mr. Spencer informed us that water was leaking around the outside of the spillway pipes. Since our inspection, further investigations have been completed. These investigations showed the flow to be from broken pipes. For a full report on these investigations, see memorandum, H. G. Beattie to W. E. Calvert, dated October 30, 1969.

Our recommendations are as follows:

1. Brace up the outside slope of the west dike and slope to 3:1, maintaining a top width of at least 16 feet.

2. On the outside slopes of the east and west dikes of the initial area, establish two experimental plots, on each slope, about 30 feet long. One plot shall be covered with 6+ inches of soil fertilized and seeded; the other plot shall be limed to neutralize the ash, then fertilized and seeded. We recommend type 7 grass mixture for seeding. Seeding and fertilizing shall be in accordance with section 150 of the T-1 Specifications. Design shall be notified of the results of these experiments.

3. Add a 2-foot section of pipe to the spillways and install standard skimmers. This must be done to avoid fly ash entering the reservoir, even if it means raising the dikes as recommended to maintain a 4-foot freeboard.

4. Continue widening the existing dikes before raising. The toe of the original dikes shall be left as a berm and the dikes raised with slopes of 2:1 on the inside and 3:1 on the outside with 16-foot top width. The maximum height of each lift shall not exceed 10 feet before providing a berm.

5. Reseed, with type 7 mixture, the outside earth slopes of dike C, where necessary.

6. Flatten the upper portion of the outside slope of dike C (picture 2) to 3:1 or flatter, being sure to leave a top width of at least 16 feet.

T. K. Oliver
February 2, 1970

[redacted]

7. Secure logs and trash from the outside slopes of dike C; and as other logs are deposited, they shall be removed immediately.

J. F. K. Oliver

JFKO:MCR
Attachment:

Concur:
T. K. Oliver

F. F. Lacy

MCR:MCR--2/2/70
CC (Attachments):
F. F. Lacy, 401 UB-K

JFK:MR--2/2/70
CC (Attachments):
J. R. Parrish, 505 UB-K

[redacted]

[redacted]

[redacted]

H. H. Calvert, Head Civil Engineer (Rigsby and Hollroyd), NR 2K6

E. E. Herrin, Senior Civil Design Engineer (Rigsby and Hollroyd), NR 2K-2

October 30, 1969

KINGSTON FOSSIL PLANT - INVESTIGATION OF DIKE SEEPAGE AREA RESIDENT FILE KINGSTON

During our recent annual safe dike inspection A. S. Spencer, Plant Superintendent, at Kingston informed us that a small flow of water had been observed parallel to the northern spilling pipe. We were unable to observe this flow during our inspection due to the high elevation of the reservoir. Mr. Spencer agreed to dig down to the pipe on the reservoir side of the dike road and to notify Design when this was done so we could make an inspection. The purpose of this excavation was to establish whether the parallel flow was due to the end section of pipe being undermined by the blowhole or whether the flow was traveling an appreciable distance through the fill.

On October 29, 1969, these excavations were inspected by the following persons:

Ralph Brewer	-	NFP
L. B. Kennedy	-	Assistant Plant Superintendent
W. J. Hurt	-	Yard Supervisor
J. L. Glover	-	NRB
M. C. Bettis	-	NRB

There was considerable flow parallel to the pipe as observed from the previously described observation hole (see attached sketch). This eliminated undermining at the outlet end as a possible cause. In order to learn whether the flow was from water within the pipe or from a parallel channel extending the full length of the pipe, an additional hole was excavated at the edge of the dike road on the pond side. Water which entered this hole was not from a channel parallel to the pipe but seeped slowly from the soil in the bottom of the hole.

Water in the hole nearest the reservoir was at the same level as the reservoir. The water level in the hole on the pond side of the dike road was 0.4 foot higher than the reservoir and 4 feet lower than the pond.

When dye was placed in the spillway, it appeared in the hole nearest the reservoir, but not in the one nearest the pond. This proved

[illegible]
October 25, 1949

[illegible] - [illegible] AND [illegible]

satisfactorily that some, if not all, of the flow in this hole was from pipe water escaping through joint cracks. Dye was then placed in the hole adjacent the joint and about 6-foot depth of water was pumped into the hole. Within about 15 minutes the water elevation in this hole had returned to the original level. Some of the dye was evident in the hole adjacent the reservoir. This verified the theory that water in the pond also had the ground water and that a solution channel did exist parallel to the pipe between the two holes. This would also indicate that the flow in the reservoir hole is entirely due to water escaping from pipe joints between the two holes.

After discussing several possible solutions, the following course of action was agreed upon:

1. You put all water from the inlet and outlet ends of the pipe and keep dry. Then pump the hole nearest the reservoir and see if the flow is virtually eliminated (very small seepage of ground water may remain).

2. If the pumping out of water (1) eliminates all but minor ground water seepage, the following will be done:

   a. Inspect inside of pipe and attempt to locate bad joints.

   b. Excavate fill around pipe from the reservoir hole toward the centerline of dike until the bad joint (or joints) is exposed. (We specified that the ditch should extend no further than the centerline of the dike road without further inspection by design but shall be a minimum of 10 feet in length.) Excavation will be made by the backhoe until the top half of the pipe is exposed. Additional hand excavation will then be done to expose as much of the lower portion of pipe as practicable so that the excavation can be backfilled with well compacted impervious material. Hand excavation will be done in small longitudinal segments with each segment being backfilled prior to the excavation of the adjacent segment. This will minimize the possibility of the pipe settling due to reduced support during the excavation.

   c. Backfill with selected impervious clay material placed in 6-inch layers and extensively compacted with pneumatic tamper.

   d. Grout pipe from the inside at all bad joints.

[illegible]
[illegible], 1969

[illegible] STEAM PLANT - [illegible] OF [illegible] PIPE [illegible]

3. If elimination of water in the pipe fails to result in the elimination of flow in the reservoir hole, Design and [illegible] will be notified, and an alternate solution will be proposed.

Mr. Spencer said he would defer this work for one or two weeks because the reservoir level will be reduced during this period making the dewatering operation easier. He agreed to notify Design when the trench excavation had been completed so we can observe the pipe prior to backfilling.

[illegible]

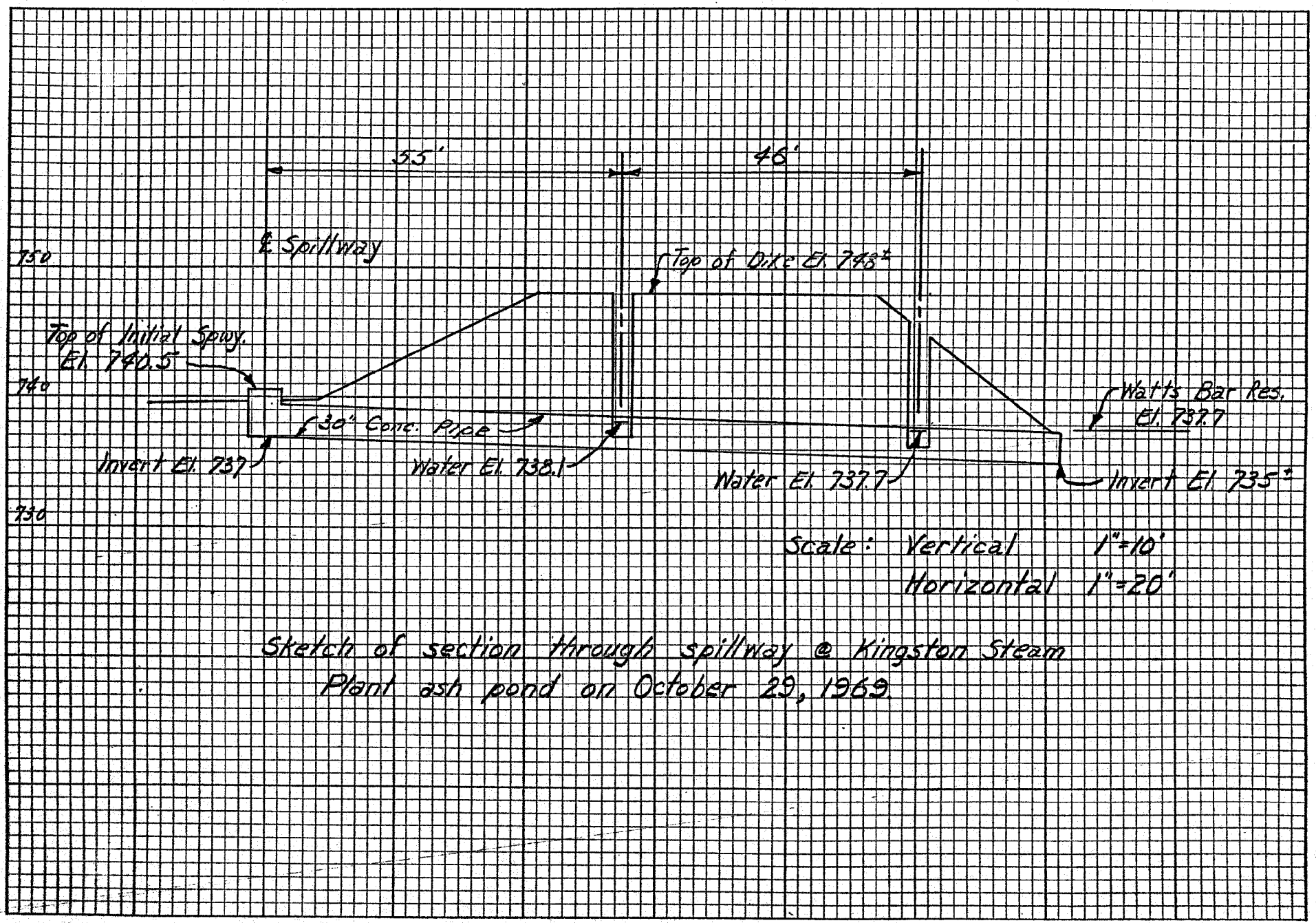
MCB:[illegible]
Attachment

[illegible]:MCB--10/30/69
CC (Attachment):
F. P. Lacy, 405 UB-K

Concur: ______________________
[illegible]

____
F. P. Lacy

FPL:[illegible]--11/10/69
CC (Attachment):
J. E. [illegible], 305 UB-K

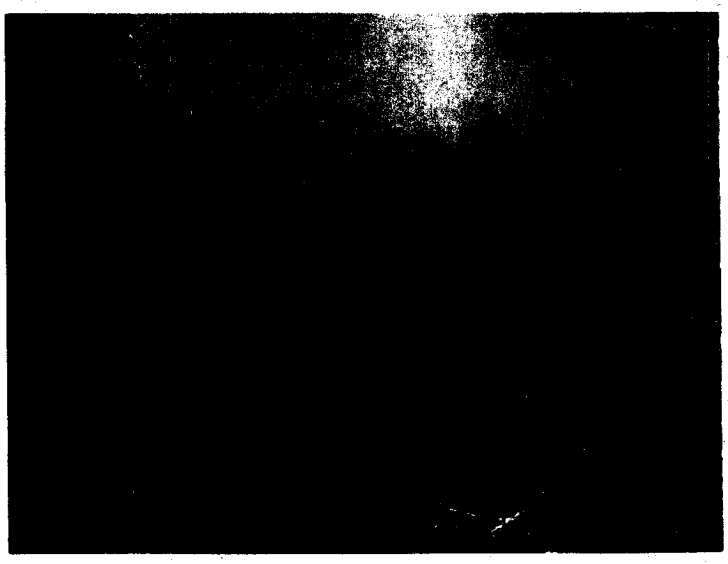


Sketch of section through spillway @ Kingston Steam Plant ash pond on October 29, 1969.

KINGSTON STEAM PLANT

(1)
Slope of Dike parallel to R.R. built by plant. Note steep slope.

(2)
Dike along Emory River: Arrow points to mulch where an attempt has been made to establish grass. Not certain why seed has not sprouted.

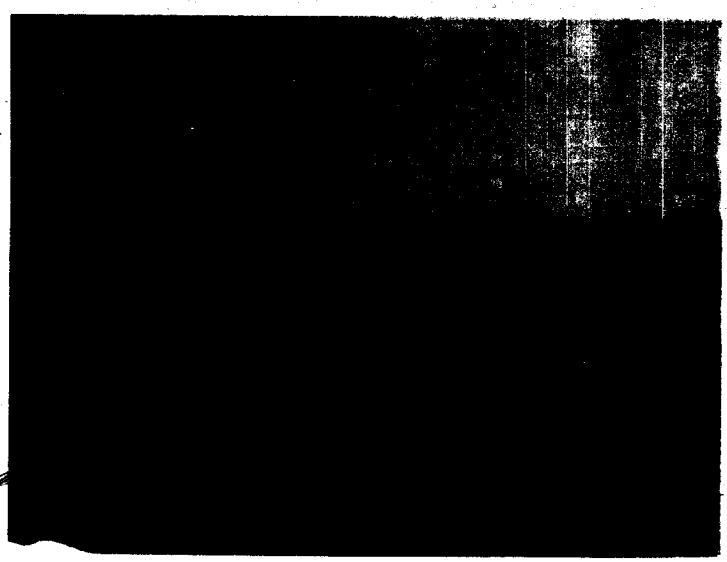


(3)
Logs on outside slope.

KINGSTON STEAM PLANT

④

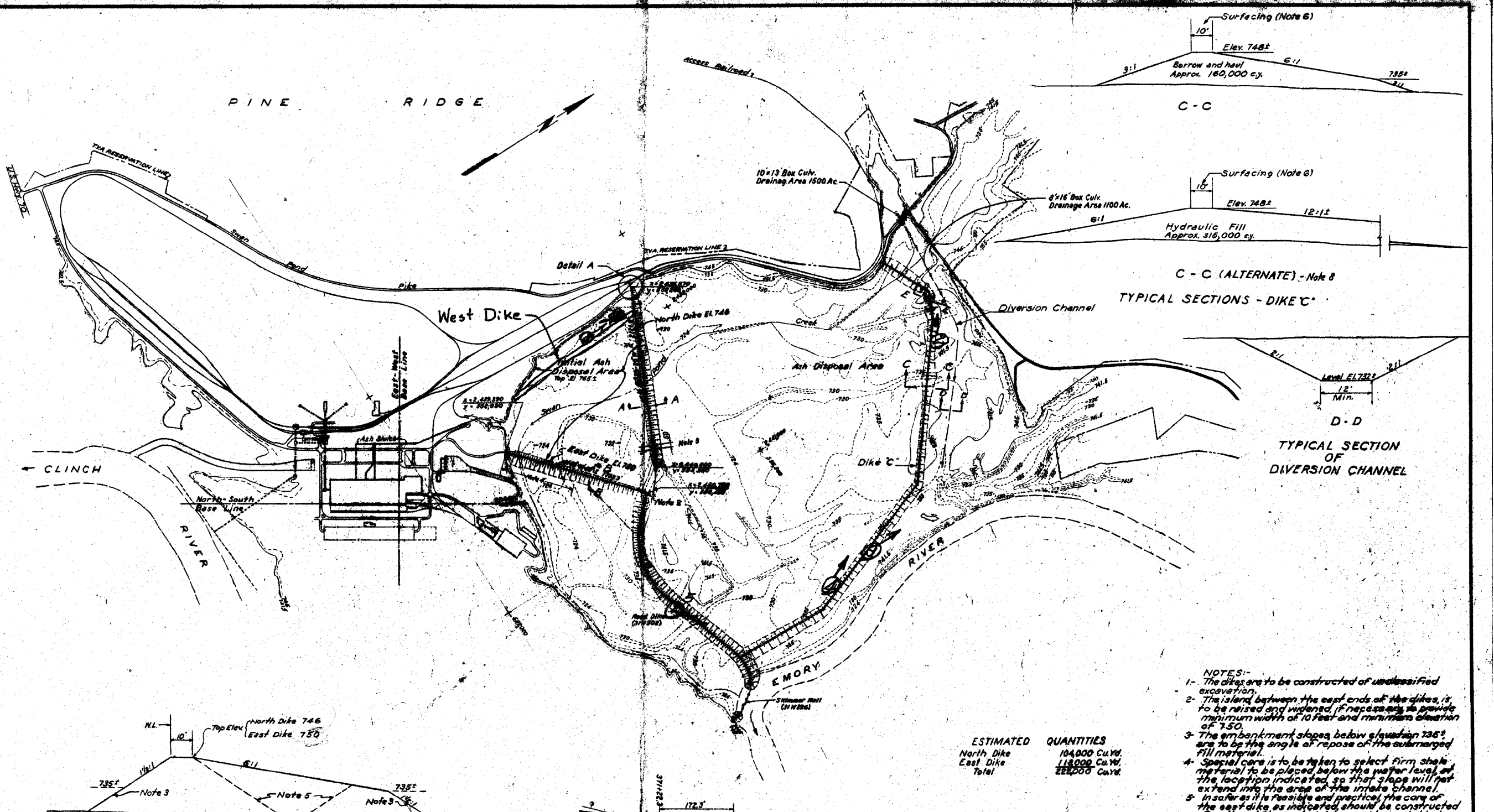
Inside slope of Dike along Emory River. Note vertical slope caused by wave erosion inside pond.



⑤

Building of base prior to raising outside dike. Line divides old and new dike.

10N400



C - C

C - C (ALTERNATE) - Note 8

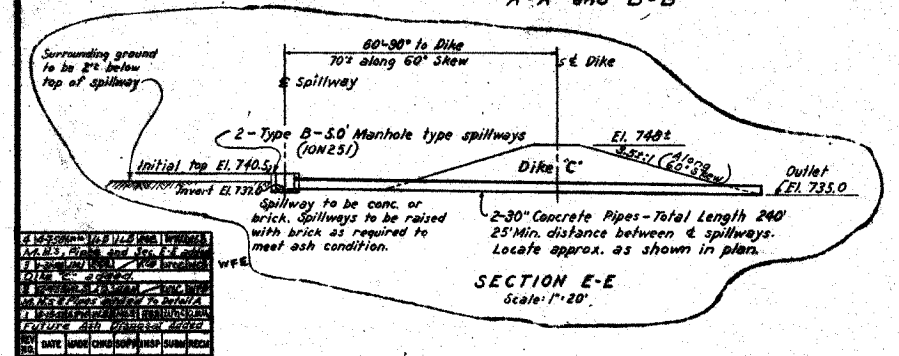
TYPICAL SECTIONS - DIKE "C"

D - D

TYPICAL SECTION OF DIVERSION CHANNEL

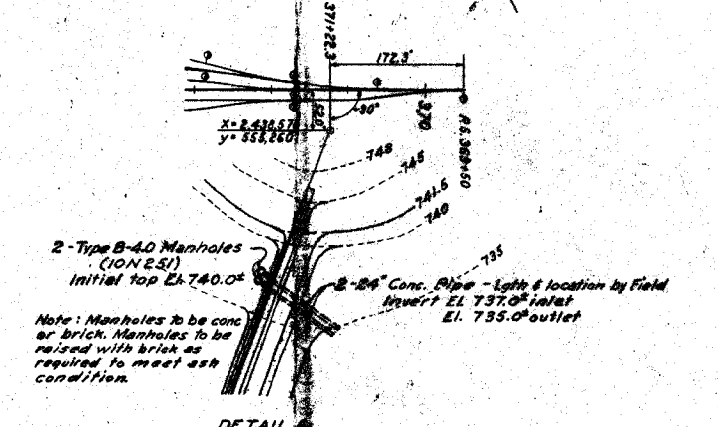
TYPICAL DIKE SECTION

A-A and B-B



SECTION E-E

Scale: 1"=20'.



Note: Manholes to be conc or brick. Manholes to be raised with brick as required to meet ash condition.

DETAIL A

Scale: 1"=40'

ESTIMATED QUANTITIES

North Dike	104,000 Cu.Yd.
East Dike	118000 Cu.Yd.
Total	222,000 Cu.Yd.

NOTES:-

1- The dikes are to be constructed of unclassified excavation.
2- The island between the east ends of the dikes is to be raised and widened, if necessary, to provide minimum width of 10 feet and minimum elevation of 750.
3- The embankment slopes below elevation 735± are to be the angle of repose of the submerged fill material.
4- Special care is to be taken to select firm shale material to be placed below the water level at the location indicated, so that slope will not extend into the area of the intake channel.
5- Insofar as it is feasible and practical, the core of the east dike, as indicated, should be constructed of earth and fine material to provide a relatively impervious dam.
6- Top of Dike "C" to be surfaced with slag and ashes, 6" compacted thickness.
7- Quantities shown for Dike C are net fill for section shown and do not include shrinkage etc.
8- Section C-C is the minimum section to be used. The slopes shown for the hydraulic fill section are assumed and may be steeper if material can be placed on steeper slopes.
9- Remove existing dike for minimum width of 30 ft. and to elevation 742 or lower after Dike C has been completed to at least elevation 746.

Scale: 1"=800' except as noted

GENERAL

ASH DISPOSAL AREA

KINGSTON STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF DESIGN

SUBMITTED	RECOMMENDED	APPROVED
W. N. Palmer Jr.	O. O. Meyers	R. A. Morrow
KNOXVILLE	8-8-51	36 C 4 10N400 R4

RECORD DRAWING AS CONSTRUCTED

TVA-00005734