

DRG Copy
✓ WMM

| | | | | |
|----------------------|---------|---------------|--|---|
| FOR | NAME | RON CLEVENGER | DATE | 3-25-86 |
| | ADDRESS | 11-158 SB-K | <input type="checkbox"/> Chatto <input type="checkbox"/> Knox | <input type="checkbox"/> M. S. <input type="checkbox"/> Nor. |
| Fold here for return | | | | |
| FROM | NAME | JOHN BRANCH | EXTENSION | |
| | ADDRESS | W3 D 213 C-K | <input type="checkbox"/> Chatto <input type="checkbox"/> Knox | <input type="checkbox"/> M. S. <input type="checkbox"/> Nor. |

Attached is a copy of the info I called you about today to get CSB on board.

I assume that in the very near future we will be requesting an official construction estimate from OC. FEP is already preparing material estimates for that purpose.

cc: L.D. Chapman, 10-111 SB-K w/Att.

Larry please review the concept of what we intend to do for any problems in constructability. Let me know or R.E. Harris if you foresee any problems. - J.B. Bramba
6387

R.E. Harris, W2 D220 C-K w/Att.

TVA ASD/OC/ARD INTEROFFICE MAILING SLIP

KWB

KINGSTON STEAM PLANT
SPILLWAY RELOCATION & DIKE "C" SEEPAGE REPAIRS

SCOPE OF WORK

The following scope of work describes the general requirements for design and construction to effect the subject modifications.

1. SPILLWAY RELOCATION (See attached sketches)

A. COLLECTION BOX

Design and construct concrete collection/spillway box with weir and skimmer. Construction will require placement of unclassified earth coffer dike to minimum elevation of 755 feet and removal of same dike to elevation 750 feet. Pumping during construction will be required and the impacting of stone may be required if an unsuitable foundation is determined by the engineer. Lowering of the stilling pool water elevation to 753 feet (+/-) will be done by removing one (1) 2 foot riser from the 5 discharging spillway pipes. The removed section will be replaced and one additional section (2 foot riser) will be added.

B. DISCHARGE PIPES

The existing exterior dike will be excavated approximately 8 feet (to elevation 757) by pan & dozer in this local area, with structural excavation continuing below this point for the pipe installation (approximately 7 feet). The excavation will be in two phases. The first will consist of work from the centerline of the dike toward the inside of the pond. The second phase begins after the discharge pipes are in place. The inside area will be back-filled and the outer half of the dike will be excavated for pipe installation. The pipes will have concrete seepage collars and a concrete/riprapped discharge pad. The backfill of the existing exterior dike will be placed and compacted to the normal standards set forth for all ash pond dikes. The excavated material from the exterior dike will be used for the backfill and the dike surfaced with crushed stone. *and the material stored for use in backfill*
(Borrow Material?)

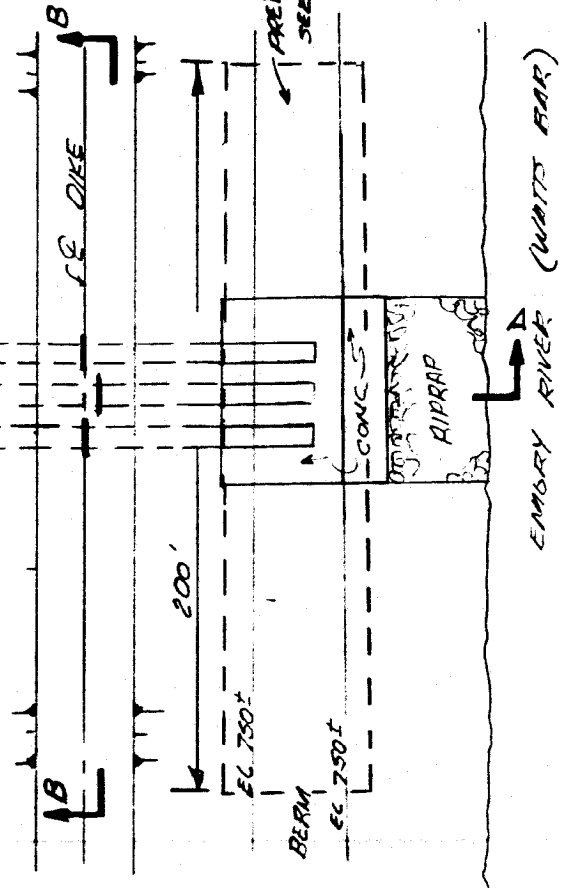
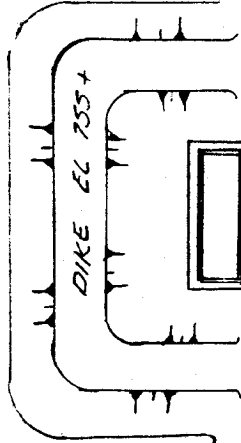
2. DIKE "C" (EXTERIOR SLOPE)-SEEPAGE REPAIRS

- A. Seepage repairs as noted in memorandum B64 85 0416 004 will also be implemented during this period since the stilling pool water elevation will be sufficiently low enough to accomplish the previously planned repair work.
- B. Preventative seepage repairs will also be implemented (utilizing the same method as referenced in the memorandum above) at the new installed discharge pipes for a distance of approximately 200 linear feet along the dike.

3. DEFLECTOR DIKE

- A. A deflector dike will be constructed of heavy (bottom) ash within the stilling pool approximately 800 feet in length to elevation 758 +/-.

EL 753±
(STILLING POOL)

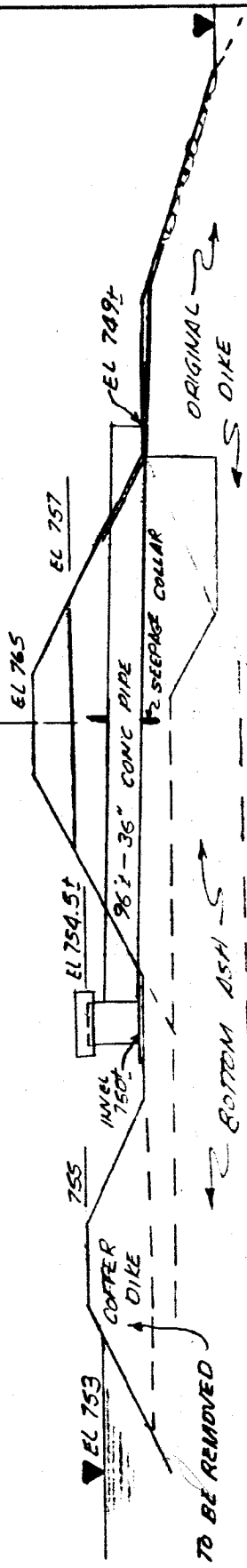


PLAN

TVA 11030 (WM-7-75)

NOTE: SPHY FOUNDATION TO BE OVER EXCAVATED,
 RECOMPACTED WITH CLAY. IF FOUNDATION IS DEEMED
 UNSUITABLE BY THE ENGR. THEN AREA IS TO BE IMPROVED
 UNTIL SOLID BASE IS OBTAINED.

DIKE



TO BE REMOVED

BOTTOM ASH

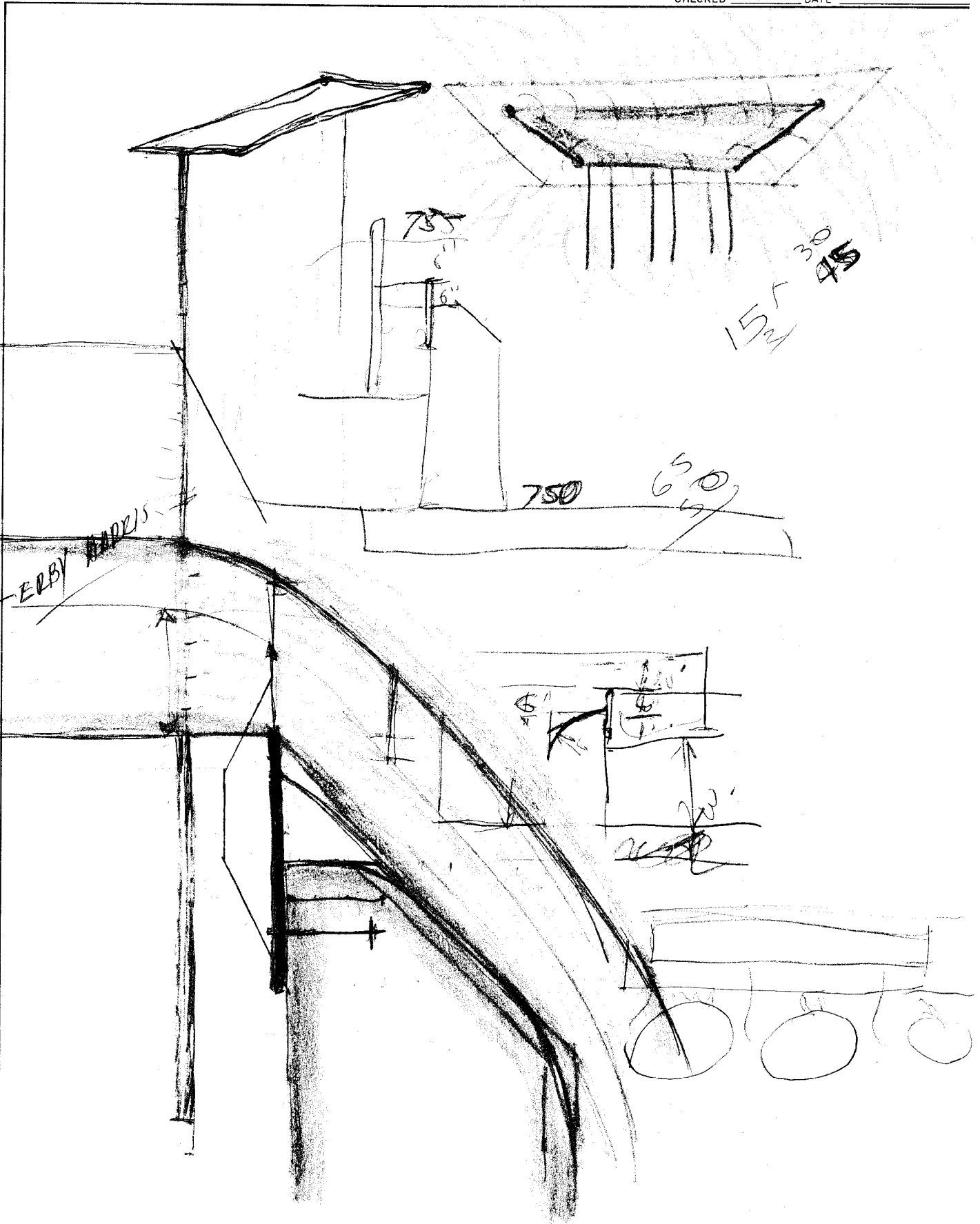
A-A

T/DIKE EL 765

EL 757



B-B



TVA 11030 (WM-7-75)

KINGSBURY

SCOPE:

1.) SPILLWAY RELOCATION:

A) COLLECTION BOX:

DESIGN & CONSTRUCT CONCRETE COLLECTION/SPRAY BOX WITH WEIR AND SKIMMER. CONSTRUCTION WILL REQUIRE REMOVAL OF UNCLASSIFIED EARTH COFFER DIKE TO MIN EL 755 AND REMOVAL OF SOME DIKE TO EL 750. PUMPING OVERSIS CONSTRUCTION WILL BE REQUIRED AND THE INSTALLING OF STONE MAY BE REQ'D IF AN UNSUITABLE FOUNDATION IS

EXISTING H₂O LEVEL TO EL?

ONE ~~REMOVED~~ BY THE LANDSLIDE. LOWERING OF THE STILLING POOL ~~WILL BE DONE~~

BY REMOVING THE RISE OF THE EXISTING SPILLWAYS. AN ADDITIONAL SECTION WILL BE REQ'D ON SPILLS AT THE CONCLUSION OF CONSTRUCTION.

B) DISCHARGE PIPES:

EACH OF THE 5 EXISTING

THE EXISTING EXPOSED DIKE WILL BE EXCAVATED APPROX. 8' (EL 757) BY PAN & TIEER IN THIS LOCAL AREA, WITH STRUCTURAL EXCAV. CONTAINING BELOW THIS POINT FOR THE PIPE INSTALLATION (APPROX 7')

INSERT 1

THE PIPES WILL HAVE CONCRETE SECTICE COLLARS AND A CONCRETE DISCHARGE END.

THE FACE OF THE EXISTING EXPOSED WILL BE FENCED AND COMPACTED TO THE NORMAL STILLING POOL SET FORTH FOR ALL RUN AND DICES. THE EXCAVATED MATERIAL FROM THE EXPOSED DIKE WILL BE USED AND SURFACED WITH CRUSHED STONE.

2.) DIKE C (EXTERIOR SCOPE)

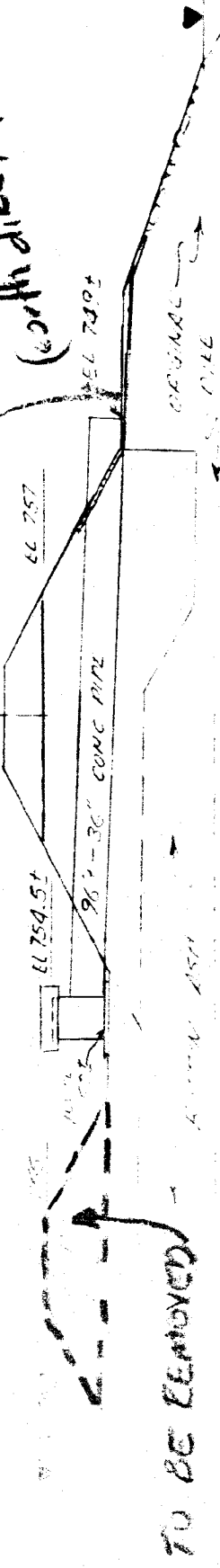
A) SEEPAGE REPAIRS AS NOTED IN MEMO 1364 BS 0416 004 WILL BE EFFECTED DURING THE PERIOD OF LOWERED STILLING POOL ~~W~~ WATER ELEVATION

B) ~~PREVENTATIVE SEEPAGE REPAIRS WILL BE MADE AT THE NEW INSTALLED DISCHARGE PIPES FOR A DISTANCE OF 200'±.~~

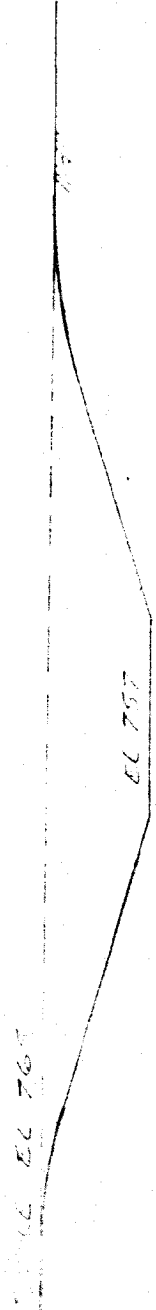
PREVENTATIVE SEEPAGE REPAIRS WILL BE MADE AT THE NEW INSTALLED DISCHARGE PIPES FOR A DISTANCE OF 200'±.

*we are going to need
 something to confine
 the water. (wall?)
 (with dike, riprap?)*

*TO BE REMOVED - EXISTING DIKE
 96" - 36" CONC PIPE
 EL 754.51
 EL 765
 EL 757
 DIKE*



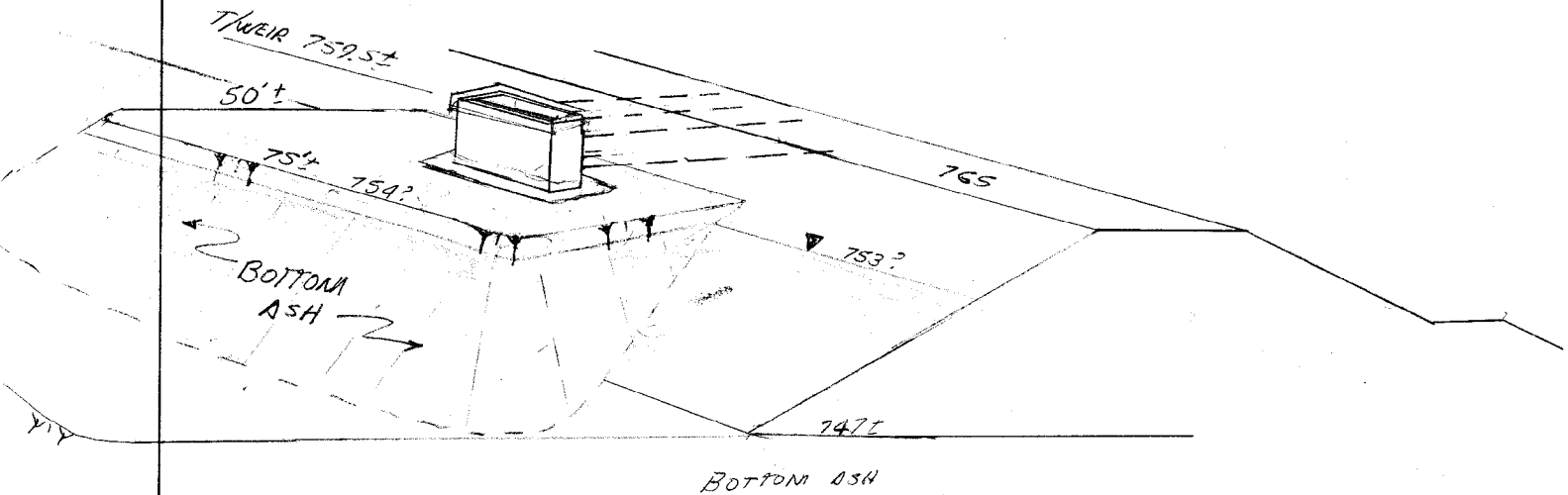
A - A



B - B

*NOTE: NUMBER OF PILE DRIVES
 ABOVE NOW BEEN DETERMINED
 AT THIS TIME 5-17-86*



SCHEME IEXISTING

SPWY EL = 746 + 6 (WITHOUT WEIR)

$$\nabla = 752 + 1' = 753'$$

PROPOSED

$$754 + 5 (\text{BOX}) + 0.5 (\text{WEIR})$$

$$= \text{EL } 759.5$$

USING 0.5' FLOW (52 cfs) OVER WEIR = NORMAL POOL EL 760.0 ±

A) THIS CONDITION IS THE ABSOLUTE BEST WE COULD HOPE FOR -

1. ASSUMING WE CAN DROP THE ∇ TO EL 753

B) IN THE EVENT THE ∇ CANNOT BE DRAWN DOWN TO MEET THIS CONDITION

OR PLANT CANNOT ACCEPT OPERATING OF EL 760. SEE NEXT PAGE.

SECTION ESTIMATE SUMMARY SHEET

*Kingston steam plant -
Ash pond discharge relocation.*

Date 3-26-86

DCR/ECN No. _____ Acct. No. _____ Project Code _____

Section Supervisor R. W. Burnett Branch or Project _____

Cost Estimate Request No. _____ WBS Item No. _____

| | | | |
|---|-----------------------------|------------|----|
| Drawings, Bills of Material, etc. | | | |
| Engineering | | <u>300</u> | MH |
| Procurement Request (Attach bills of material, form TVA 5198.) | | _____ | MH |
| Squadcheck Review and Coordination | | | |
| TVA Drawings/Data | | <u>20</u> | MH |
| Vendor Drawings/Data | | _____ | MH |
| Lead Engineer (Include SC-4 and M-5 review time) | | _____ | MH |
| Procurement Activity: Contract Administration | | _____ | MH |
| Requisition | | _____ | MH |
| Award | | _____ | MH |
| Source inspection hours | <i>ON SITE</i> | _____ | MH |
| Hours required to make estimate | <i>DURING CONST.</i> | _____ | MH |
| Clerk/Secretarial hours | <i>NOT INCL.</i> | _____ | MH |
| Analysis: Type _____ | <i>(I SUGGEST 1MO. MIN)</i> | _____ | MH |
| _____ | <i>00N</i> | _____ | MH |
| Constructibility Walkdown | | _____ | MH |
| Total Drafting Hours | | <u>200</u> | MH |
| Other: <u>M.H. Miller (Conc. Box + Weir Design 120, Drafting 160)</u> | | <u>280</u> | MH |
| Computer Costs | | \$ _____ | |
| Contracts for Engineering _____ | | \$ _____ | |
| Travel Costs | | \$ _____ | |
| Other | | \$ _____ | |

SCOPE OF WORK

Design Duration _____ Procurement Duration _____

Contracts for Engineering Duration _____

[SECTION ESTIMATE SUMMARY SHEET

*Kingsford Steam Plant -
Ash Pond Discharge Relocation*

Date 3-26-86

DCR/ECN No. _____ Acct. No. _____ Project Code _____

Section Supervisor K.W. Burnett Branch or Project _____

Cost Estimate Request No. _____ WBS Item No. _____

Drawings, Bills of Material, etc. 300 *HA*

Engineering

Procurement Request (Attach bills of material, form TVA 5198.) _____ *HA*

Squadcheck Review and Coordination _____ *HA*
TVA Drawings/Data 20 *HA*
Vendor Drawings/Data _____ *HA*

Lead Engineer (Include SC-4 and M-5 review time) _____ *HA*

Procurement Activity: Contract Administration _____ *HA*
Requisition _____ *HA*
Award _____ *HA*

Source inspection hours _____ *HA*

Hours required to make estimate _____ *HA*

Clerk/Secretarial hours _____ *HA*

Analysis: Type GGEG FROM CAP/TOLKSTEIN 4-7-86 80 *HA*

CONSTR COORD & INSPECTION 250 *HA*

Constructibility Walkdown _____ *HA*

Total Drafting Hours 200 *HA*

Other: M.H. Miller (Conc. Box-Weir Design 120, Drafting 160) 280 *HA*

CIVIL P.E. REH 100 *HA*

Computer Costs \$ _____

Contracts for Engineering \$ _____

Travel Costs \$ _____

Other \$ _____

SCOPE OF WORK

Design Duration _____ Procurement Duration _____

Contracts for Engineering Duration _____

PROJECT KINGSTON S.P.
 DESCRIPTION DISCH. RELOC.
 ACCOUNT NO. _____
 SHEET No. 1 of 2
 DATE 3-26-86

ESTIMATE NO. _____
 APPROVED _____

QUANTITIES BY PEG CHECKED BY JPHS PRICED BY _____

| Item | Description | Quantity | Unit | Rate | Material | Labor | Total Amounts |
|----------|---|----------|------|------|----------|-------|---------------|
| A | DISCHARGE PIPES RELOCATION | | | | | | |
| 1. | UNCLASSIFIED EARTH FILL (1.3 MI. ROUND TRIP) | 5000 | C.Y. | | | | |
| 2. | EXCAVATION (EARTH - PAN/DIGGER) | 4150 | C.Y. | | | | |
| 3. | EXCAVATION (EARTH - DRAGLINE) | 1800 | C.Y. | | | | |
| 4. | CLASSIFIED FILL (3200 C.Y. BORROW, 1.3 MI. R.T.) (2000 C.Y. FROM EXCAV. OF DIKE) | 5200 | C.Y. | | | | |
| 5. | STRUCTURAL EXCAV | 450 | C.Y. | | | | |
| 6. | IMPACT ROCK (FOUNDATION) | 225 | C.Y. | | | | |
| 7. | CONC. BOX | 14 | C.Y. | | | | |
| 8. | CONC. SEEPAGE COLLARS (3) | 8 | C.Y. | | | | |
| 9. | CONC. TROUGH (130 S.Y. OF FINISH SURE) | 21 | C.Y. | | | | |
| 10. | SKIMMER & WEIR | 1000 | L.B. | | | | |
| 11. | CRUSHED STONE (SURFACING) | 95 | TONS | | | | |
| 12. | FILTER STONE | 190 | TONS | | | | |
| 13. | RIPRAP (RIVER BANK DISCH. POINT) | 45 | C.Y. | | | | |
| 14. | PIPES (3-90'-36" CLASS III 6" RING) | 870 | L.F. | | | | |
| 15. | SEEDING & MULCHING | 8700 | S.Y. | | | | |
| 16. | 6" PERFORMED DRAIN - ADS TYPE | 250 | L.F. | | | | |

ESTIMATE NO.

PROJECT KINGSTON S.P.

SHEET NO. / of

DESCRIPTION DISCH. RELOC.

DATE 3-26-86

ACCOUNT NO.

APPROVED

PRICED BY

QUANTITIES BY DEG CHECKED BY JPHS

| Item | Description | Quantity | Unit | Rate | Material | Labor | Total Amounts |
|----------|---|----------|------|------|----------|-------|---------------|
| A | DISCHARGE PIPES RELOCATION | | | | | | |
| 1. | UNCLASSIFIED EARTH FILL (1.3 MI. ROUND TRIP) | 5000 | C.Y. | | | | |
| 2. | EXCAVATION (EARTH - PAN/DREER) | 4150 | C.Y. | | | | |
| 3. | EXCAVATION (EARTH - DRAGLINE) | 1800 | C.Y. | | | | |
| 4. | CLASSIFIED FILL (3200 C.Y. BORROW, 1.3 MI. R.T. (2000 C.Y. FROM EXCAV. OF DIKE) | 5200 | C.Y. | | | | |
| 5. | STRUCTURAL EXCAV | 450 | C.Y. | | | | |
| 6. | IMPACT ROCK (FOUNDATION) | 225 | C.Y. | | | | |
| 7. | CONC. BOX | 14 | C.Y. | | | | |
| 8. | CONC. SEEPAGE COLLARS (3) | 8 | C.Y. | | | | |
| 9. | CONC. TROUGH (130 S.Y. OF FINISH SURE) | 21 | C.Y. | | | | |
| 10. | SKIMMER & WEIR | 1000 | L.B. | | | | |
| 11. | CRUSHED STONE (SURFACING) | 95 | TONS | | | | |
| 12. | FILTER STONE | 190 | TONS | | | | |
| 13. | RIPRAP (RIVER BANK DISCH. POINT) | 45 | C.Y. | | | | |
| 14. | PIPES (3-90'-36" CLASS III 6" RING) | 270 | L.F. | | | | |
| 15. | BEDDING & MULCHING | 2700 | S.Y. | | | | |
| 16. | 6" PERFORMED DRAIN - ADS TYPE | 250 | L.F. | | | | |

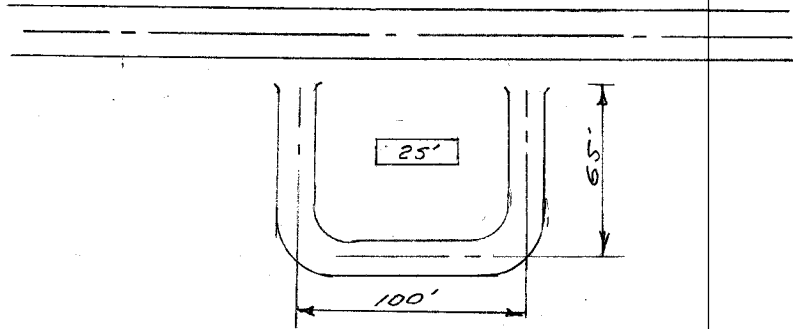
KINGSTON - DISCH. RELOC.
 SUMMARY OF QUANTITIES

COMPUTED _____ DATE _____

CHECKED _____ DATE _____

COFFER DIKE

UNCLASSIFIED EARTH FILL



X-SEC WORK SH:

$$= 410 \text{ s.f.} \times \frac{[(65)(2) + 100]}{27 \times 0.7} \approx 5000 \text{ c.y.}$$

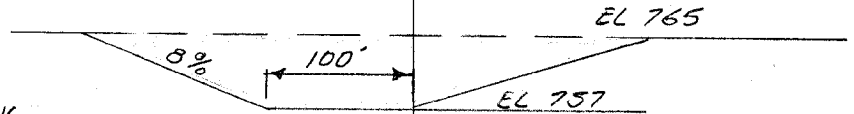
EXCAV TO EL 750'

$$210 \text{ s.f.} \times \frac{230'}{27} \approx 1800 \text{ c.y.}$$

EXTERIOR DIKE

EXCAV.

$$200' \times \frac{288}{27} \times \frac{2150}{27} \approx 2000 \text{ c.y.}$$



CLASSIFIED FILL

$$2000 \text{ c.y.} \times \frac{2700}{0.8} = 2500 \text{ c.y.}$$

CRUSHED STONE

$$350 \times \frac{4'}{12} \times 16' \times 100' \times \frac{\text{TON}}{2000 \#} \approx 95 \text{ TONS}$$

SEEDING & MULCHING

$$300' \times \frac{60'}{9} = 1500 \text{ s.y.}$$

KINGSTON - DISCH. RELOC

COMPUTED _____ DATE _____

CHECKED *JLB* DATE 3-25-86

SPILLWAY

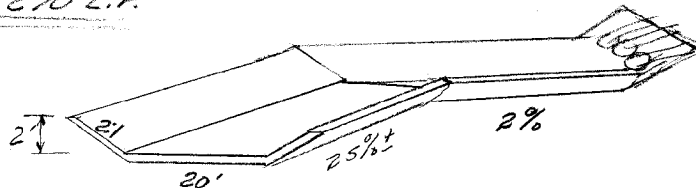
✓ CONG. BOX. = 14 c.y. (SEE ATTACH. SH 4)

✓ SKIMMER & WEIR = 1000 #

✓ ROCK FOUNDATION: $50' \times 20' \times \frac{6'}{27} = 225 \text{ c.y.}$

✓ PIPES: STR. EXCAV = $20' \times 60' \times \frac{6'}{27} = 300 \text{ c.y.}$ 266

✓ PIPES: $90 \times 3 = 270 \text{ L.F.}$ 27



CONC. TROUGH:

(2%)

$$D = \frac{K' b^{2/3} S^{1/2}}{n}$$

$$K' = \frac{(75)(0.012)}{(20)^{2.667} (0.02)^{0.5}} = 0.0022$$

$$\frac{D}{b} = 0.02$$

$$\therefore D = (0.02)(20) = 0.4'$$

(25%) $K' = \frac{(75)(0.012)}{(20)^{2.667} (0.25)^{0.5}} = 0.0006$

$$\frac{D}{b} = 0.01$$

$$D = (0.01)(20) = 0.2'$$

$$V = \frac{1.49 (R)^{2/3} (S)^{1/2}}{0.012}$$

$$R = \frac{A}{W} = \frac{4.08}{20.9} \quad S = 0.25$$

$V = 21 \text{ f.s. (NEED ENERGY DISSIPATOR)}$

CONC.

✓ $40' \times 29' \times \frac{0.5'}{27} = 21 \text{ c.y.}$ OR 130 S.Y. (FINISH)

✓ CONC. SEEPAGE COLLARS

$$3 \left(\frac{9 \times 9 \times 1 - \pi (1)^2}{4} \right) \frac{1}{27} \approx 8 \text{ c.y.}$$

✓ FILTER BLANKET

$$20 \times 30 \times \frac{6''}{12} \times \frac{100}{2000} = 15 \text{ TONS}$$

KINGSTON - DISCH RECD

COMPUTED _____ DATE _____

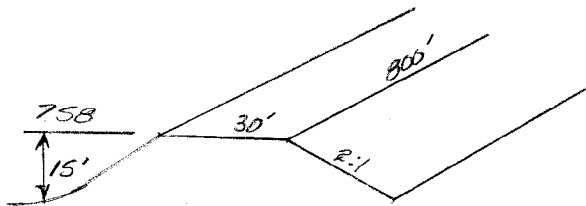
CHECKED _____ DATE _____

RIDRAP

$20' \times 30' \times \frac{2'}{27} = 45 \text{ C.Y.}$

DEFLECTOR DIKE

60x15x300,
0.8 (DISH SETTLE) x 27
= 35,000 C.Y.



DIKE "C" SEEPAGE REPAIRS

PER MEMO B64 - 85 0416 004

DISCHARGE AREA

- EXCAV : 1500 C.Y.
- FILL (BORROW) = 7000 C.Y.
- SEEDING & MULCHING = 2500 S.Y.
- STR EXCAV = 225 C.Y.
- CR. STONE = 350 T
- 6" DRAIN = 500 L.F.
- FILTER STONE = 350 T

- EXCAV: $270' \times 200' / 27 = 2000 \text{ C.Y.}$
- FILL $\frac{2000}{0.8} = 2500 \text{ C.Y.}$
- SEEDING : = $200' \times 50' / 9 = 1200 \text{ S.Y.}$
- STR. EXCAV : = $7 \times 2 \times 250' / 27 = 150 \text{ C.Y.}$ 130
- FILTER STONE = $7 \times 2 \times 100' / 2000 \times 250 = 175 \text{ TONS}$
- 6" DRAIN = 250 L.F.

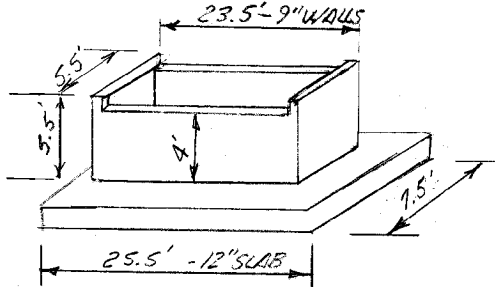
NOTE: I ASSUME THE PLANT HAS THE 5 - 2' RISERS REQ'D.

KINGSTON - DISCH RELOC.

COMPUTED _____ DATE _____

CHECKED *JLR* DATE 4-25-86

CONC. BOX BUOYANT FORCES



UPLIFT @ H=4' END OF CONST = $62.4 \times 4 = 250 \frac{\#}{s.f.}$

WT BOX = $(2(22)(4) + 2(5.5)(5.5)) \frac{9}{2} + (25.5)(7.5)(1)$

= $368 c.f. \times 150 \frac{\#}{c.f.}$

= $55,295 \#$

SLAB UPLIFT: $55,295 \frac{\#}{25.5 \times 7.5 s.f.} = 289 > 250 \frac{\#}{s.f.}$

VOLUME OF WATER DISPLACED = $(25.5)(7.5)(1) + (23.5)(4.5)(5.5)$

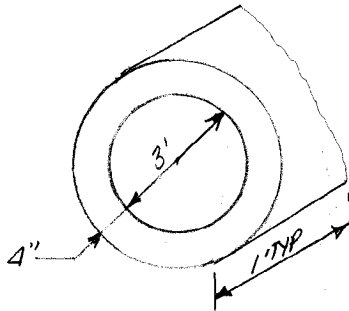
TO EL 754.5 (T/WEIR) = $773 c.f. \times 62.4 \frac{\#}{c.f.}$

= $48,230 \#$

$\therefore 55,295 \# > 48,230 \#$

(NOTE: DOES NOT CONSIDER WT OF STEEL @ $490 \frac{\#}{c.f.}$
(I.E. WEIR, REINF, SKIMMER)

CHECK PIPE BUOYANCY:



$C_1 = \pi 3$

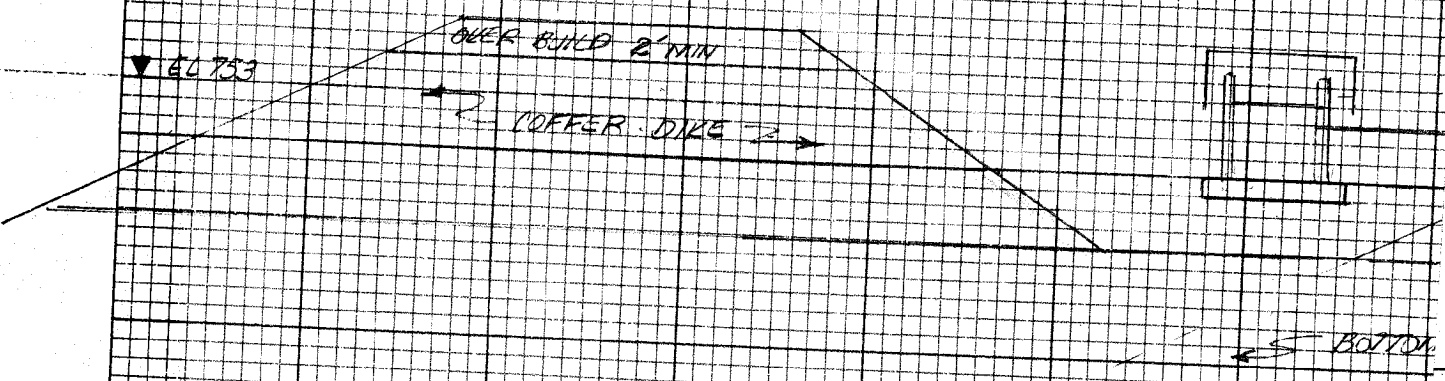
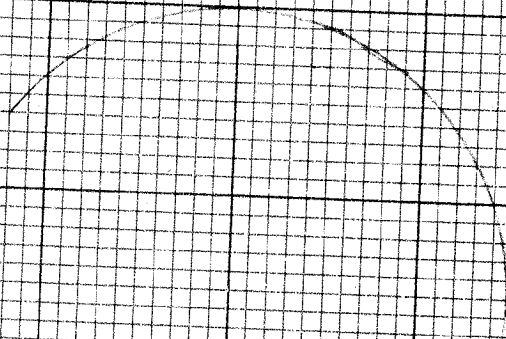
$C_2 = \pi 3.667$

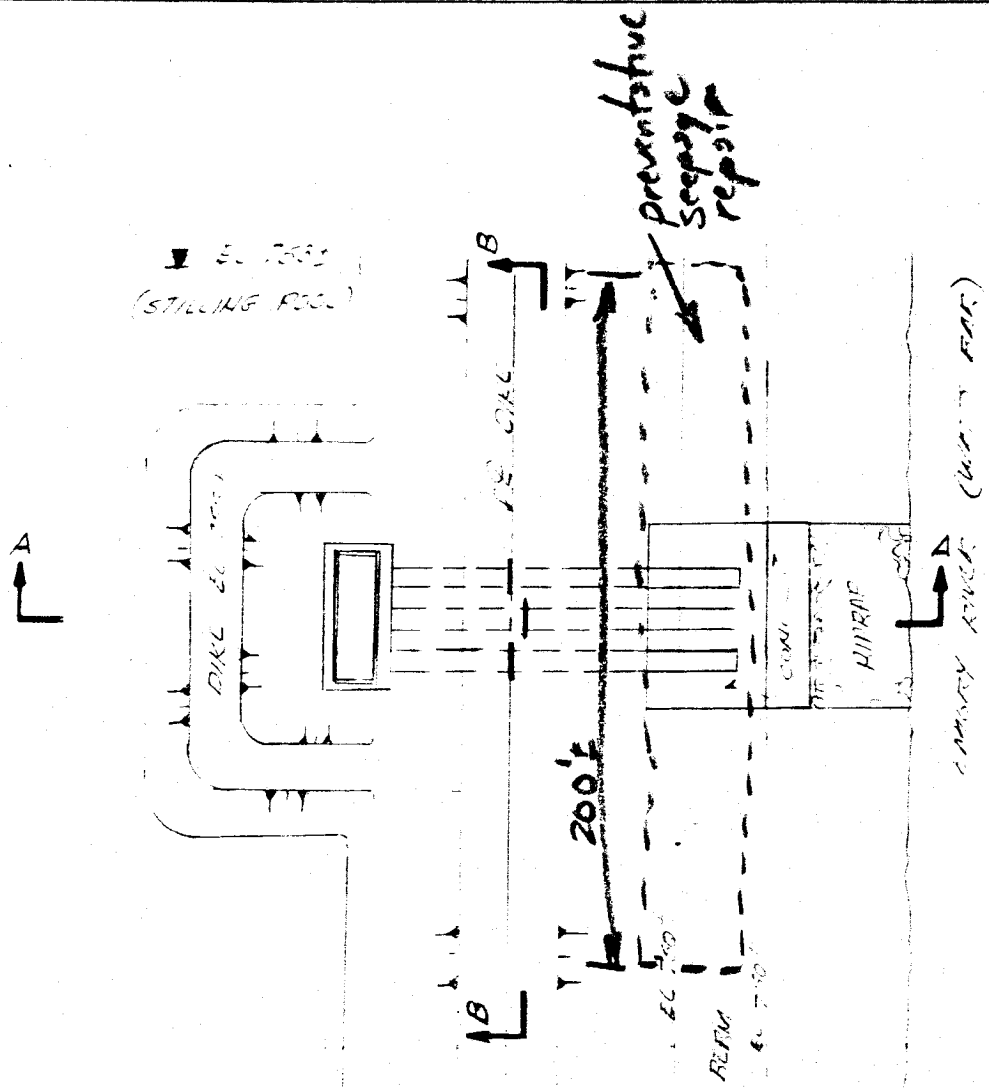
WT = $\frac{9.42' + 11.5'(4)}{2} \frac{1}{12} \times 150 \frac{\#}{c.f.} = 523 \frac{\#}{1'}$

VOL. OF WATER DISPLACED:

$\pi (3.667)(1) 62.4 \frac{\#}{c.f.} = 719 \frac{\#}{1'}$

$719 \frac{\#}{1'} < 523 \frac{\#}{1'}$





PLAN

| | | | | |
|------|---------|---------|--|---|
| FORM | NAME | DRG/MHM | DATE | MAR 5, 1985 |
| | ADDRESS | W2D199 | <input type="checkbox"/> Chatta <input type="checkbox"/> M. S. | <input type="checkbox"/> Knox <input type="checkbox"/> Nor. |

Fold here for return

| | | | | |
|------|---------|---------|--|---|
| FORM | NAME | JMH/CDT | EXTENSION | |
| | ADDRESS | | <input type="checkbox"/> Chatta <input type="checkbox"/> M. S. | <input type="checkbox"/> Knox <input type="checkbox"/> Nor. |

KINGSTON DIKE "C"

COMMENTS ON PROPOSED FIX

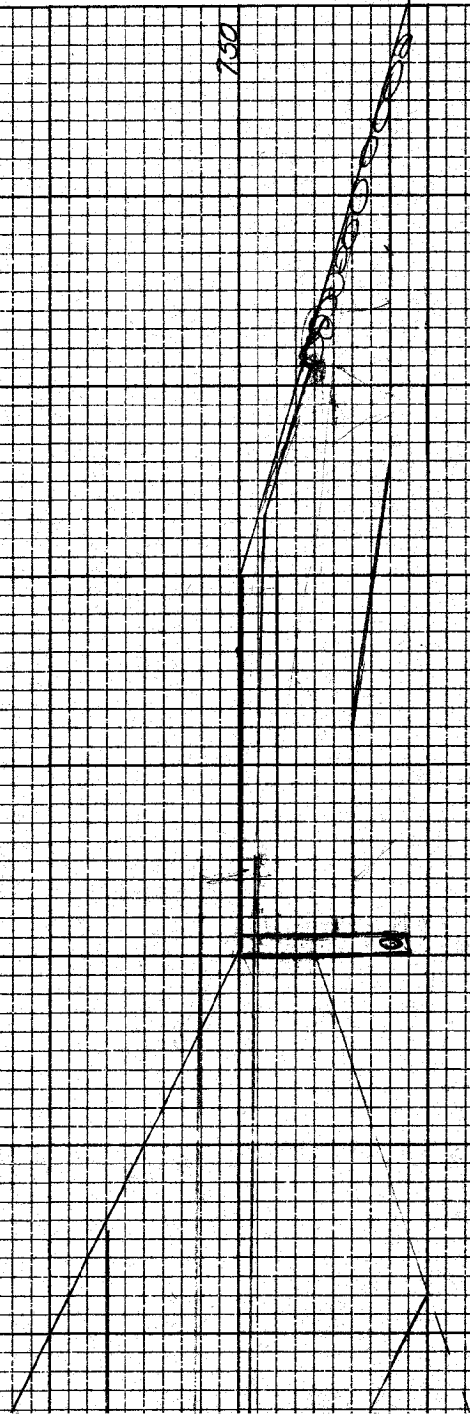
①. MAKE SURE THE TRENCH FOR THE 6" ϕ PERF. PIPE IS NOT LEFT OPEN FOR MORE THAN $\frac{1}{2}$ HOUR. THE MOVEMENT OF THE WATER MAY CAUSE A COLLAPSE AND UNKNOWN STABILITY.

②. AT STAGE ④ OF THE FIX, THE COMPACTION OF THE SOIL SHOULD BE BY SOIL RAMMER OR BACKFILL TAMPER NOT BY BACKHOE.

We agree in principle with your Concept. Pls let us review your final plans + notes. cmt

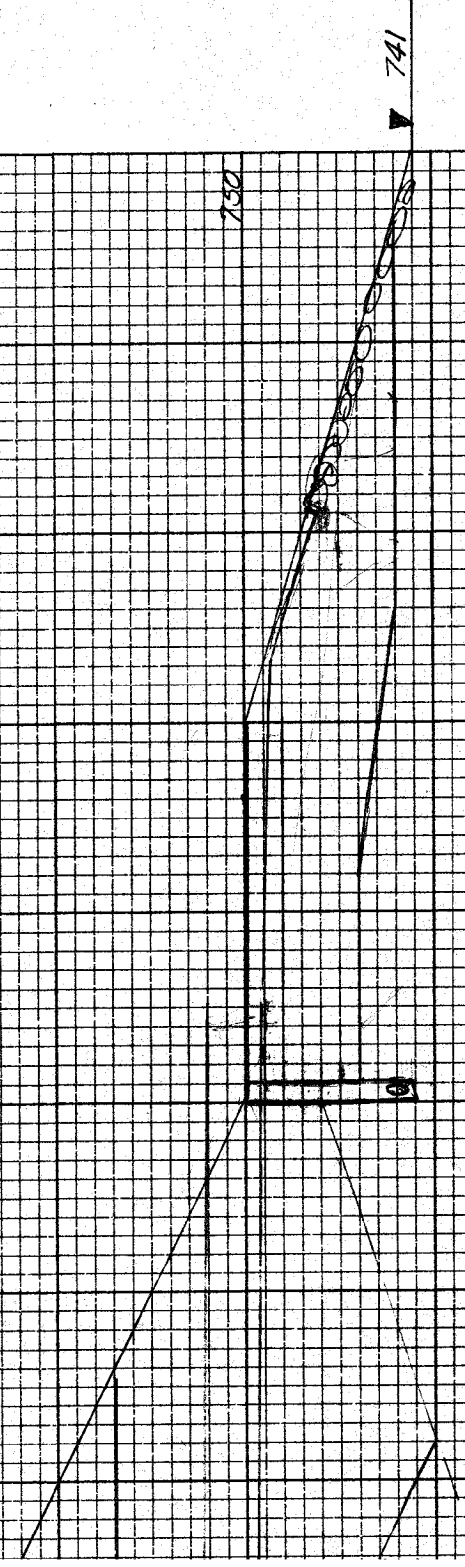
741

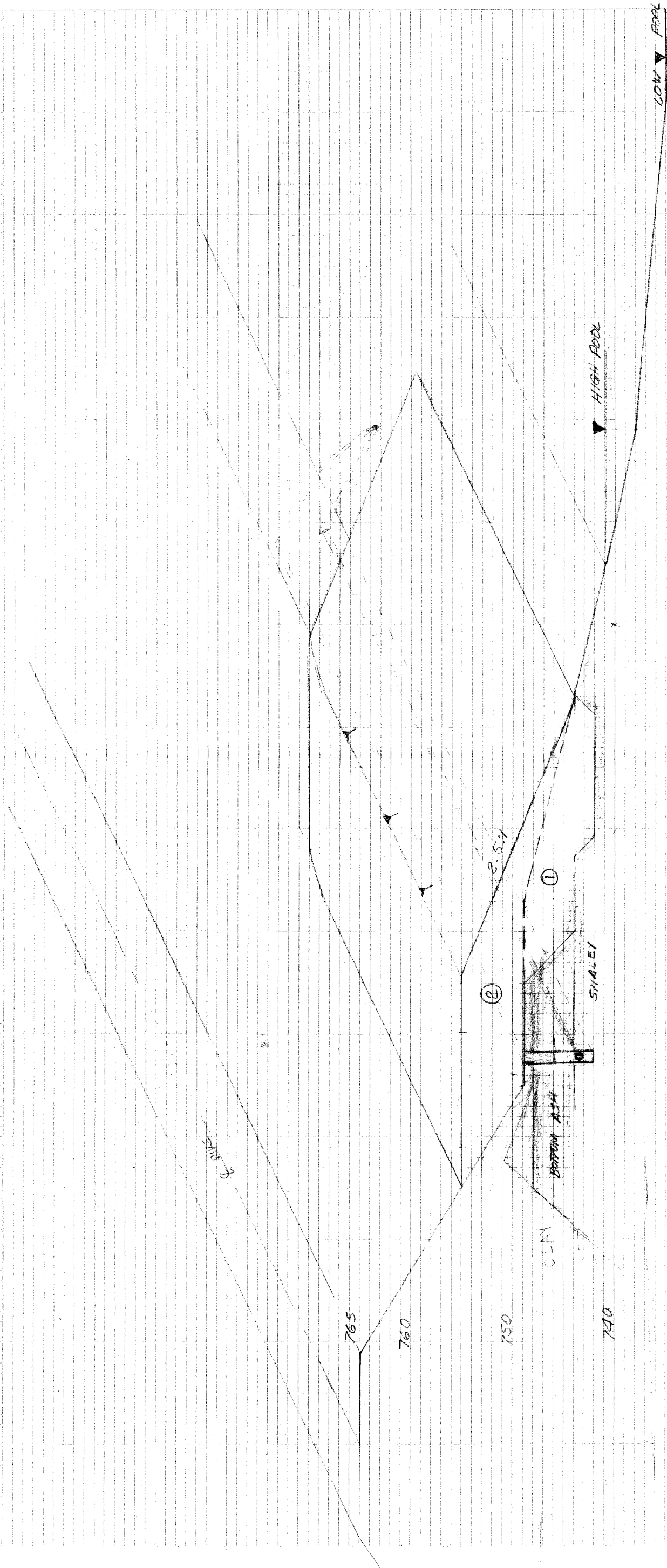
750



741

750

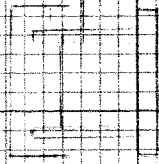




EXCAV @ 100' = 375 CY/100'
 FILL ① + ② = $\frac{2700'}{18} = 150 \text{ CY}/100'$ (1375 CY/100')
 TRENCH: 7' x 2' x 100' = 50 CY (EXCAV)
 CR STN: $\frac{7' \times 2' \times 100' \times 1.5}{5000} = 70 \text{ CY}/100'$ @ 100'/100'
 SEEDING & MULCH = 1.5 CY
 10' x 10' x 1' = 10 CY

KINGSTON S.F. DIKE '00"

EXHAUST LIMIT EL 277



ANTIM 151.5

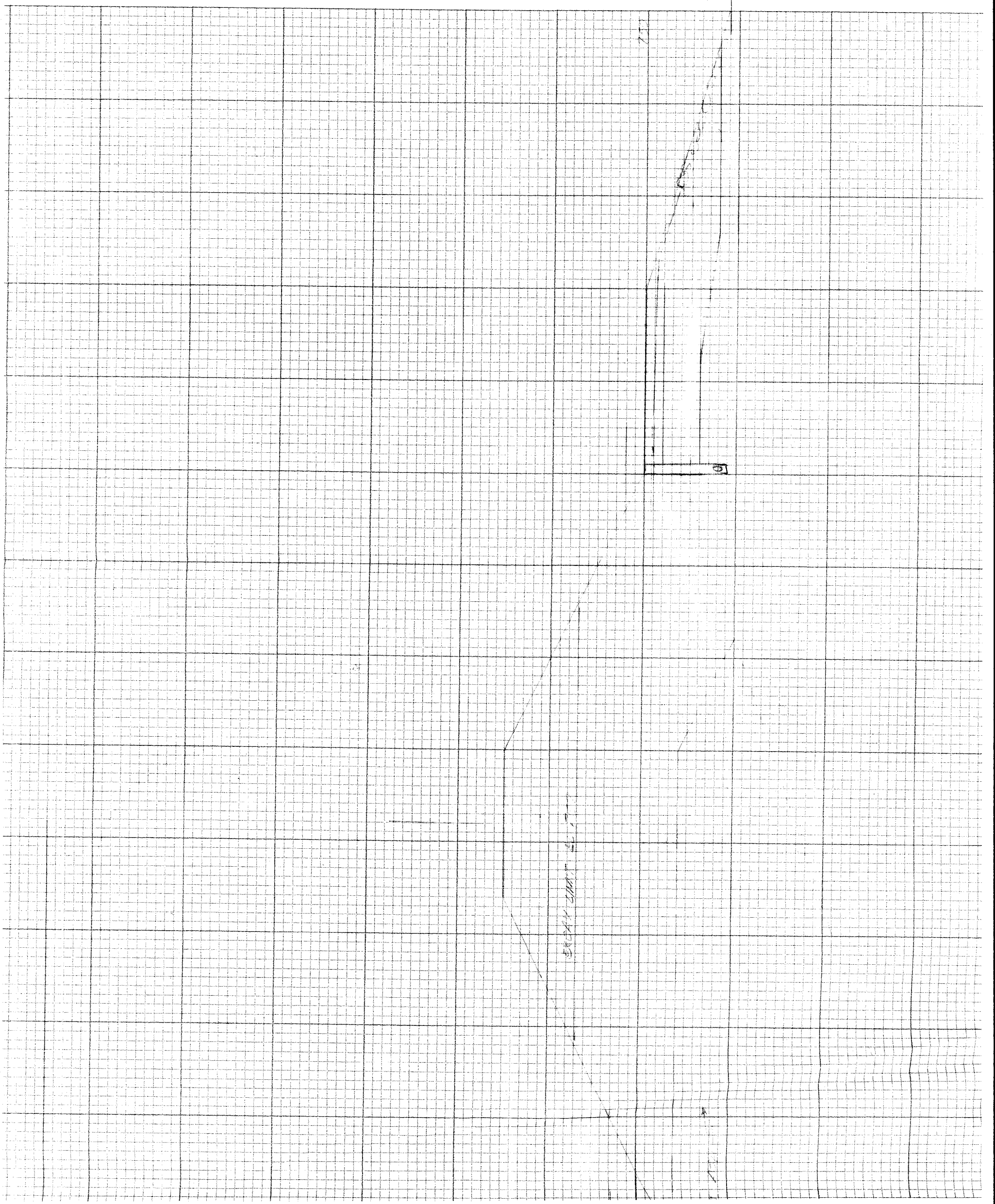
OVER FUEL EL 277

OUTLET DMS

EL 277

PRINTED IN U.S.A.

174 A



EXHAUST SYSTEM

KIF
Ash Disposal Area
Repair Leak Area on Dike C

The proposed work outlined here to repair and strengthen a leaky zone along the elevation 750(±) berm

on dike C is risky in that this is a perimeter dike on an active pond.

Precautions must be planned into the design and carried out during the construction operations to minimize the risk involved.

The following are some of the construction restraints and pre construction conditions needed to safely carry out the construction repair work.

②
KIF
Dike C
11-1-85
WMA

- ① Water level of ash pond should be lowered as much as possible.
- ② Construction must be on site with ^{the} proper equipment, personnel and material to re-seal ^{the} dike immediately if deemed necessary and an alternate method of repair be commenced without delay.
- ③ OE must approve what ② is ready before any work is begun and be on the site during the construction operations.

KIF
Dike C Seepage Repair
Ash Disposal Area

Minimized Engineering Services

2601

1.) Provide the final engineering design and associated construction drawings, specifications, constraints and procedures necessary to repair the seepage through dike C. Drawings will detail by views and notes the different stages and construction ^{restraints} necessary to carry out a safe repair job on an active pond dike.

90

2.) ^{OE will} Provide inspection, ^{and geology and soils} review support during the preconstruction and construction period and a final inspection of completed work.

(#2200) 3.) OE will provide a ^(SME) materials inspector for 6 (±) days during construct period to perform the necessary test and inspections.

Note: An alternate repair scheme should be designed and detailed on the the plans so that if it is determined in the early stages of construction, that the above scheme cannot be completed as planned, then construction of the alternate scheme can proceed immediately.

SUMMARY

RECOMMENDED SOIL PROPERTIES
FOR
STABILITY ANALYSIS

| SOIL IDENTIFICATION | UNIT WEIGHT (PCF) | | R- TRIAXIAL TEST | | | |
|---|-------------------|-----------------------|------------------|---------------|--------------|---------------------|
| | γ_{DRAST} | $\gamma_{SAT.}$ | APPARENT | | EFFECTIVE | |
| | | | C (PCF) | ϕ (deg) | C (PCF) | ϕ (deg) |
| BOTTOM ASH | 129 | 133 | 500 | 25 | 0 | 31 |
| FLY ASH | 90 | 95 | 100 | 15 | 0 | 24 |
| RAISED DIKE EARTH-FILL | 116 | 111 122 | 400 | 15 | 200 | 24 |
| INITIAL DIKE EARTH-FILL | 130 | 132 | 300 | 16 | 0 | 28 30 |
| FOUNDATION (EL/ML) | 131 | 132 | 300 | 18 | 0 | 28 |
| FOUNDATION (SM) | 126 | 128 | 800 | 22 | 0 | 28 |
| FOUNDATION EL @ 725.0 | 127 | 129 | 800 | 18 | 0 | 28 |
| → COMPACTED ASH (50% BOTTOM ASH + 50% FLY ASH) | 110 | 114 | 300 | 20 | 0 | 27 |
| ? STACK MATERIAL (FROM SHANNEE ASSUMED PROPERTIES) | 118 | 123 | 400 | 18 | 0 | 30 |

JMH 12-12-84

JMH 12-18-84

JMH 12-19-84

ROCK @ EL 700.0

TENNESSEE VALLEY AUTHORITY
OFFICE OF ENGINEERING
DIVISION OF ENGINEERING PROJECTS

B64 '85 0416 004

ENGINEERING ESTIMATE OF FACILITY COST

Date April 16, 1985

PROJECT: Kingston Steam Plant

FEATURE: Dike "C" Seepage Repairs

PURPOSE AND SCOPE: Estimate the total project cost to make seepage repairs to the existing dike by excavating and replacing the existing porous material along approximately 400 LF of the dike and installing a compacted clay cap.

ESTIMATE REQUESTED BY O. P. Thornton DATE _____

REFERENCE MEMO (IF ANY) O. P. Thornton to W. D. Hall, April 9, 1985 (B65 850409 002)

Cost Estimate Request (if any) _____

CLASSIFICATION OF ESTIMATE

- 1. Order of Magnitude--Variable accuracy usually based on previous similar cost information.
- 2. Preliminary Estimate--Accuracy insufficient for budgeting, but a guide to further interest.
- 3. Budget or Authorization Estimate--Suitable for budgeting.
- 4. Detailed Estimate--Prepared from complete engineering specifications, drawings, and site surveys.
- 5. Contract Bid Estimate - For purchase requisition or bid award evaluation.
- 6. Other -

ESTIMATED COST: \$ 70,000

COMMENTS: Total project cost based on three weeks construction in FY 1985.

Attachment:

- cc: RIMS, SL26 C-K
- C. Bonine, Jr., 12-108 SB-K
- D. J. Cowser, 12-111 SB-K
- R. G. Domer, W12A5 C-K
- W. D. Hall, W12C62 C-K
- R. A. Painter, W5D181 C-K
- O. P. Thornton, W3D224 C-K

Submitted: D. C. Ritchey
D. C. Ritchey

Reviewed: W. David Hue
W. D. Hall

Approved: _____
O. P. Thornton

KINGSTON STEAM PLANT

DIKE "C" SEEPAGE REPAIR

Estimate of Cost^a

| | <u>Material</u> | <u>Labor</u> | | <u>Equip. Oper. & Other</u> | <u>Total</u> |
|--|-------------------------|--------------|-----------------|---------------------------------|------------------|
| | | <u>MH</u> | <u>Amount</u> | | |
| 1500 CY Unclassified Excavation ^{#1.30/CY} \$ | -- | 45 | \$ 700 | \$ 2,000 | \$ 2,700 |
| 2000 CY Fill-Earth Borrow ^{3.71/CY} | -- | 448 | 7,400 | 18,600 | 26,000 |
| 2560 SY Seeding and Mulching ^{50/100} | 300 | 72 | 800 | 200 | 1,300 |
| 225 CY Structure Excavation ^{0.44/CY} | -- | 60 | 800 | 1,100 | 1,900 |
| 350 T Crushed Stone Surfacing ^{8.06/T} | 2,500 (Haul Rd) | 24 | 300 | 300 | 3,100 |
| 500 LF 6" PVC Perforated Underdrain Pipe With ^{1.8/LF} Filter Fabric Wrapping | 400 | 48 | 500 | -- | 900 |
| 350 T Crushed Stone Filter Backfill | 2,500 ^{7.14/T} | 64 | 800 | 900 | 4,200 |
| Power Stores Overhead | 1,000 | -- | -- | -- | 1,000 |
| Power Direct Field Expense | -- | -- | -- | -- | N/C ^b |
| Power Central Service Expense | -- | -- | -- | 500 | 500 |
| Contingency | -- | -- | -- | 6,200 | 6,200 |
| Total Construction | \$6,700 | 761 | \$11,300 | \$29,800 | \$47,800 |
| Engineering * | | | | | 17,200 |
| General Engineering and Construction Expense | | | | | 2,600 |
| Other TVA Offices and Organizations (Listed) | | | | | -- |
| Central Services | | | | | 700 |
| Corporate Management Expense | | | | | 1,400 |
| Total Excluding AFUDC | | | | | \$69,700 |
| AFUDC | | | | | 300 |
| Total Project Cost^a | | | | | \$70,000 |

^aTotal project cost based on three weeks construction in FY 1985.

^bExcludes temporary construction facilities, transportation of tools and equipment, field supervision and office expense, etc. These are assumed to be available at the plant at no charge to this work.

D/S Principally prepared by C. L. Toney, extension 7134.

DEP - Division Services Staff
 April 16, 1985
 J65106.5

DIVISION OF ENGINEERING DESIGN COST ESTIMATE

FEP - Civil

BRANCH/PROJECT

Civil No 2 SECTION

PROJECT Kingston Steam Plant

ESTIMATE NO. _____

DESCRIPTION Dike C seepage repair @ stilling pool

SHEET No. 1 of 1

ACCOUNT NO. 544-68-20604-J0622

DATE 3-28-85

QUANTITIES BY C.D. Stikera

CHECKED BY WMM 3-28-85 PRICED BY _____

APPROVED _____

| Item / UNID / Sys. No. | Description | Quantity | Unit | Rate | Material | Labor | Total Amounts |
|------------------------|--|-------------|-----------------------|------|----------|-------|---------------|
| | <u>Dike C - see cross section attached use 400' length</u> | | | | | | |
| <u>120</u> | <u>Excavation - Unclassified - 0.5 mi. round trip hauling distance</u> | <u>1500</u> | <u>CY</u> | | | | |
| <u>123</u> | <u>Fill - Borrow - 1.5 mi round trip hauling distance, pit measurement</u> | <u>7000</u> | <u>CY</u> | | | | |
| <u>580, 582</u> | <u>Seeding - Mulch</u> | <u>2500</u> | <u>yd²</u> | | | | |
| <u>125</u> | <u>Structure Excavation</u> | <u>225</u> | <u>CY</u> | | | | |
| <u>305</u> | <u>Crushed Stone Surfacing Haul Road (800' x 20' x 4")</u> | <u>350</u> | <u>T</u> | | | | |
| <u>500</u> | <u>Underdrains, 6" PVC perforated pipe with filter fabric wrapping</u> | <u>500</u> | <u>LF</u> | | | | |
| <u>500</u> | <u>Crushed Stone (125 pcf) filter</u> | <u>350</u> | <u>T</u> | | | | |
| | <u>Construction by Plant Personnel</u> | | | | | | |

WMM - file

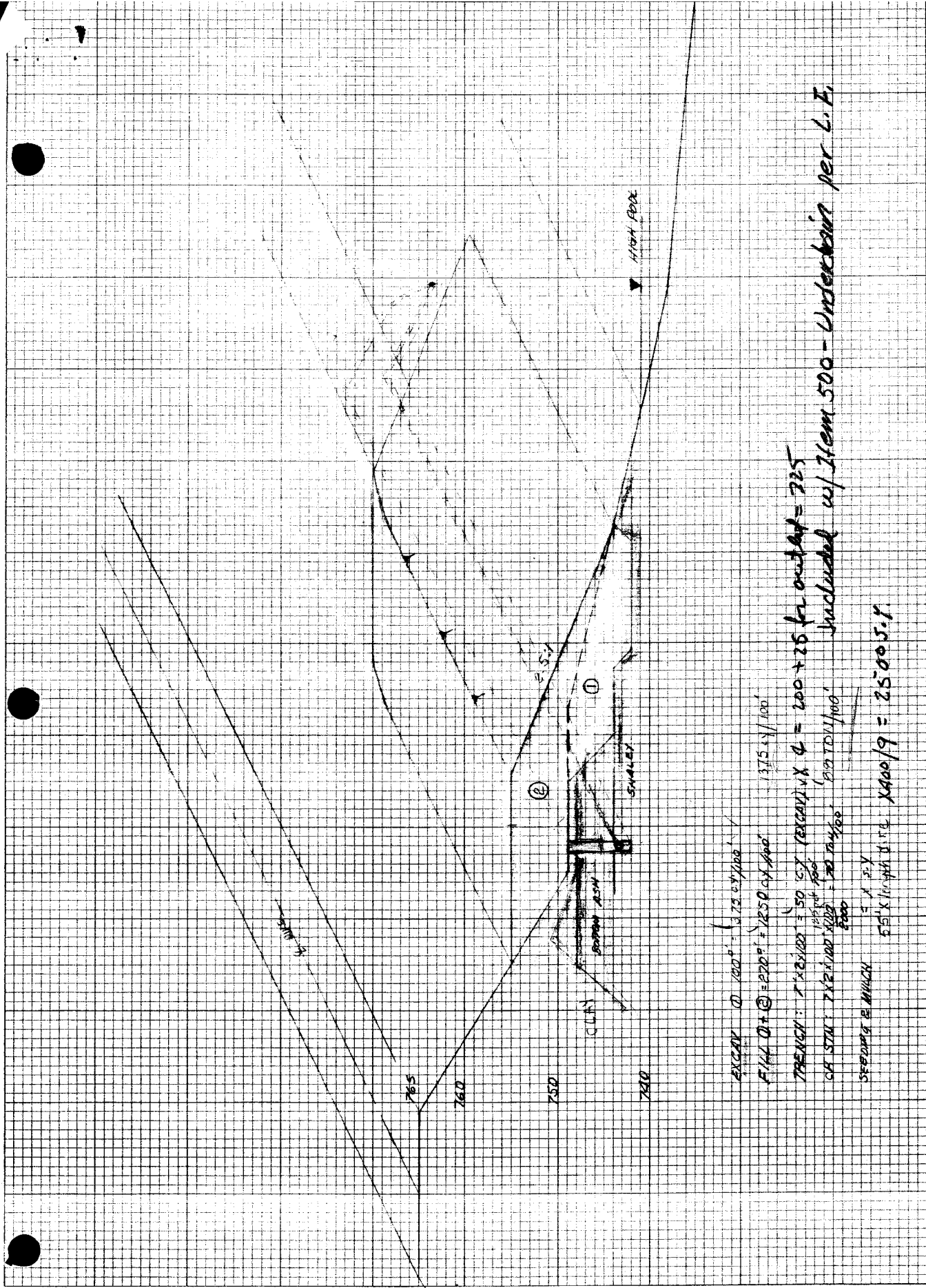
ACTIVITY LEVEL ESTIMATE WORKSHEET

Project Kingston Steam Plant Feature Dike C Seep Repair CER Number 36J
 Branch/Project FEP Section Supervisor M. Miller Project Code 36J
 Prepared By CDS Date 3-28-85
CKD WMM
 (KWB)

A. Design Items

| WBS Item No. | Activity Number | Drawing Number | M N | P Q R | Start Date | Finish Date | Man-hours by Task | | | | Detailed Description of Activity |
|--------------|-----------------|----------------|--------|-------------|------------|-------------|-------------------|----|----|----|--|
| | | | | | | | AD | EN | DF | DR | |
| | | 10N424 | ✓ | | FY 85 | | 90 | 60 | | | New drawing - Dike C Repair Sections & Details |
| | | 10N420 | | ✓ | " | | 10 | 10 | | | Section Overhead |
| | | | | | | | 30 | 60 | | | Field visits during construction |
| | | | | | | | | 30 | | | Geology, Soils Review (CEB) & Field visits |
| | | | | | | | | 64 | | | Materials Inspector - 8 days \$275/day SME =\$2200 |

Note: No permits or NEPA review will be required, per Dave Mayfield 3-29-85



EXCAV @ 200' = 375 CY/100'
 FILL @ 200' = 225 CY/100'
 TRENCH: 1' x 50' x 200' = 100 CY (EXCAV) x 4 = 200 + 25 for outlet = 225
 OF STA. 762 TO 765 = 30' x 4' x 100' = 1200 CY (DISTON) / 100'
 SPREADING MILLING = 1' x 3' x 50' x 100' = 1500 CY x 1000/9 = 25000 S.F.

KINGSTON S.P.

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

FDP '84 0625 004

TO : C. C. Schonhoff, Director of Fossil and Hydro Power (Acting), 720 EB-C

FROM : R. W. Cantrell, Manager of Engineering Design (Acting), W11A9 C-K

DATE : JUN 25 1984

SUBJECT: KINGSTON STEAM PLANT - DIKE "C" SOILS INVESTIGATION AND ENGINEERING STUDY - FUNDING REQUIREMENTS

The soils investigation requested by Tom Williams of your division is presently being performed by Singleton Materials Engineering Laboratory (SME). The field portion of the work has been completed, and the laboratory analysis and written report is nearing completion. The cost for work being performed by SME is estimated to be approximately \$15,000.

EN DES will require another \$5,500 to cover costs already incurred and an additional \$14,000 in order to evaluate the test results and do preliminary engineering.

The total funding requirements for the soils investigation, test report, evaluation of test report, and preliminary engineering as outlined in the attached scope, is approximately \$34,500.

Please provide us with a work order to cover these expenditures as soon as possible. EN DES will make recommendations to your division approximately four weeks after the work order is received.

Original Signed By
R. G. Domer

R. W. Cantrell

SDS-T
REV
JEB

OPT:RSH:FS

Attachment

cc (Attachment):

- R. O. Barnett, W9D224 C-K
- C. Bonine, E7B24 C-K
- C. A. Chandley, W7C126 C-K
- MEDS, W5B63 C-K
- R. A. Painter, W5D181 C-K
- O. P. Thornton, 102 SPT-K
- F. Van Meter, 500 SPT-K (3)

Principally Prepared By: R. S. Harris, Extension 3875

S74170.02

BC/PM: CPJ

MO: _____

| FOSSIL DESIGN PROJECTS | | |
|------------------------|------|--------|
| REC'D. JUN 28 84 | | |
| IN | OUT | |
| Date | Time | |
| ✓ 128 | 1230 | SP |
| | | FAB |
| | | ISC |
| ✓ J.R. Barnett | | RGJ 29 |
| | | RAB |
| | | JAF |
| | | DAK |
| | | RENY |
| | | RDB |
| | | WAR |
| | | BNR |
| | | RES |
| ✓ | | REN |
| | | RWB |
| | | AM/MA |



ATTACHMENT A

KINGSTON STEAM PLANT ASH POND
DIKE "C" REPAIR

Scope For Conceptual Study

I. Stilling Pool Compartment

- A. Develop a design scheme that would ensure structural integrity and stop the seepage from the stilling pool.
- B. Road Dike - Evaluate integrity of "road dike". If this dike is likely to leak, develop a design scheme that would stop the seepage.

II. Active Pond Compartment

Assuming seepage occurs, develop a design scheme that would stop seepage and ensure structural integrity.

III. Dredge Pond Compartment

Same as II. Design for future loads from high interior dikes.

S74170.02
FDP 6/18/84

Domes

March, 1985

COMPUTED

DATE

KINGSTON STEAM PLANT - DIKE C SOILS

CHECKED

DATE

INVESTIGATION AND ENGINEERING STUDY RESULTS ✓

LRT
3-19-85

We have completed the soils investigation and engineering analysis for Dike C. As you are aware the dike was not built according to design drawings. A layer of ash extends to within a few feet of the exterior of the dike slope (see Attachment A).

P The minimum "as built" factor of safety against a dike slide failure is $1.2 \pm$ (see Attachment B). Since a factor of safety of 1.5 ^{is} ~~is~~ ^{the} desirable ^{min. industry standard}, we recommend daily inspections of this dike by plant personnel.

continued P Construction of an engineered dredge pond dike adjacent to Dike C will not increase the probability of a slide failure of the exterior dike; however, the dredge pond would increase the risk of seepage thru Dike C ^{due to increased head}. The new dredge dike must be constructed in accordance with Attachment C.

At one zone in the stilling pool compartment (see Attachment D), the ash layer transports ash pond water to the exterior surface of the dike. OE will recommend a repair scheme and submit an order of magnitude cost estimate to you by April 19, 1985.

OPT: MHM

cc: R.O. Barnett
C.A. Chandley
RIMS
~~OR~~ Thornton

Principally prepared by M. H. Miller, X-3806

SUBJECT ATTACHMENT A

PROJECT _____

COMPUTED BY JMH

DATE 3-18-85

COMPUTED BY

DATE

CHECKED BY

DATE

KINGSTON S.P.
DIKE "C"

SCALE 1" = 20'

TYPICAL SECTION NEAR WET AREA

| |
|------------|
| <u>800</u> |
| <u>790</u> |
| <u>780</u> |
| <u>770</u> |
| <u>760</u> |
| <u>750</u> |
| <u>740</u> |
| <u>730</u> |
| <u>720</u> |
| <u>710</u> |
| <u>700</u> |

800

700

GRAVEL

EL. VARIES

EARTHFILL

GRASS COVER

RIP RAP

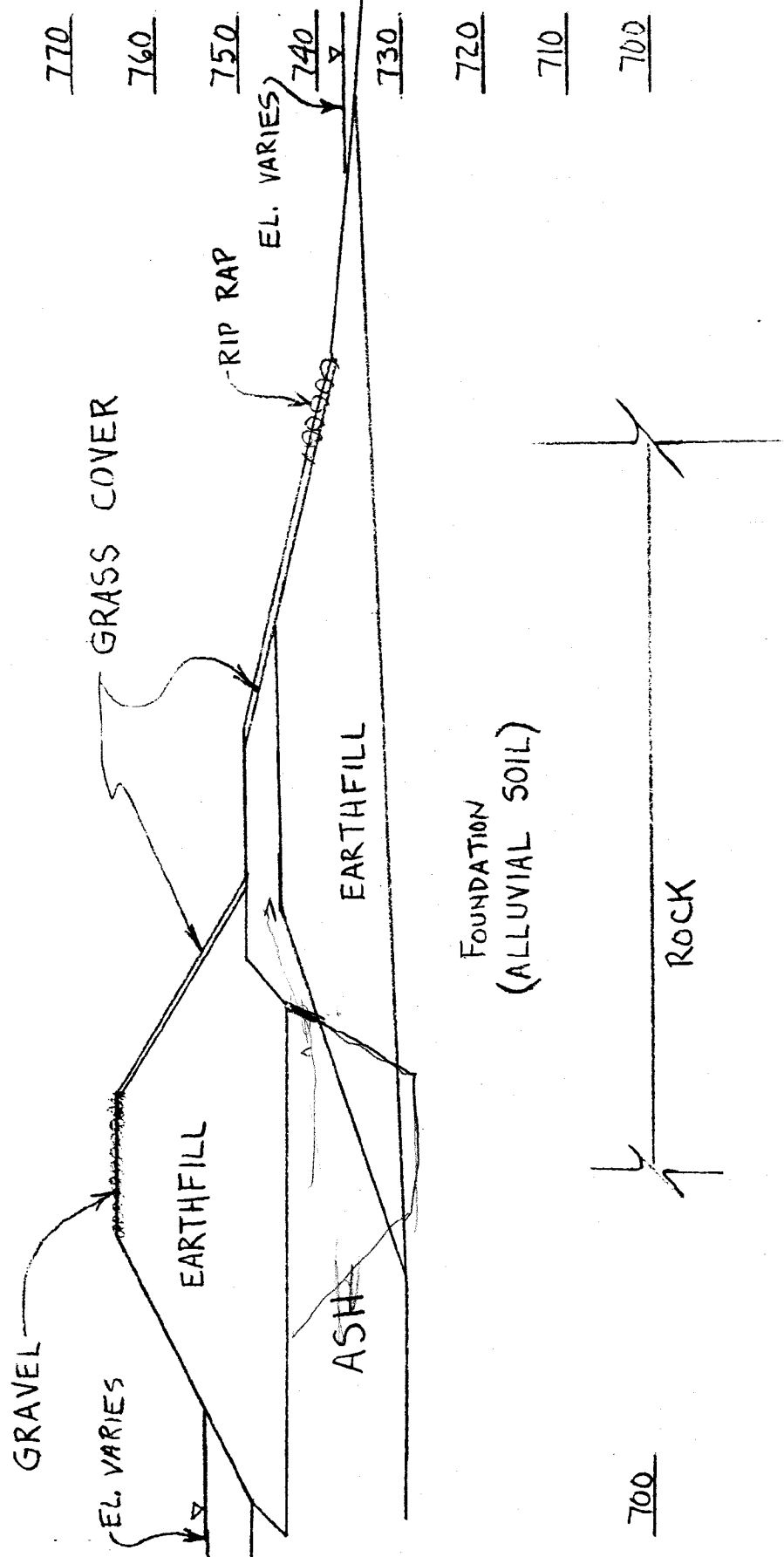
EL. VARIES

ASH

EARTHFILL

FOUNDATION
(ALLUVIAL SOIL)

ROCK



SUBJECT ATTACHMENT B

PROJECT _____

JMH

3-18-85

COMPUTED BY
(1-23-85)

DATE

CHECKED BY

DATE

KINGSTON S.P.
DIKE "C"

SCALE 1" = 20'

TYPICAL SECTION NEAR WET AREA

| |
|------------|
| <u>800</u> |
| <u>790</u> |
| <u>780</u> |
| <u>770</u> |
| <u>760</u> |
| <u>750</u> |
| <u>740</u> |
| <u>730</u> |
| <u>720</u> |
| <u>710</u> |
| <u>700</u> |

800

700

F.S. = 1.2

GRAVEL

EL. VARIES

EARTHFILL

GRASS COVER

RIP RAP

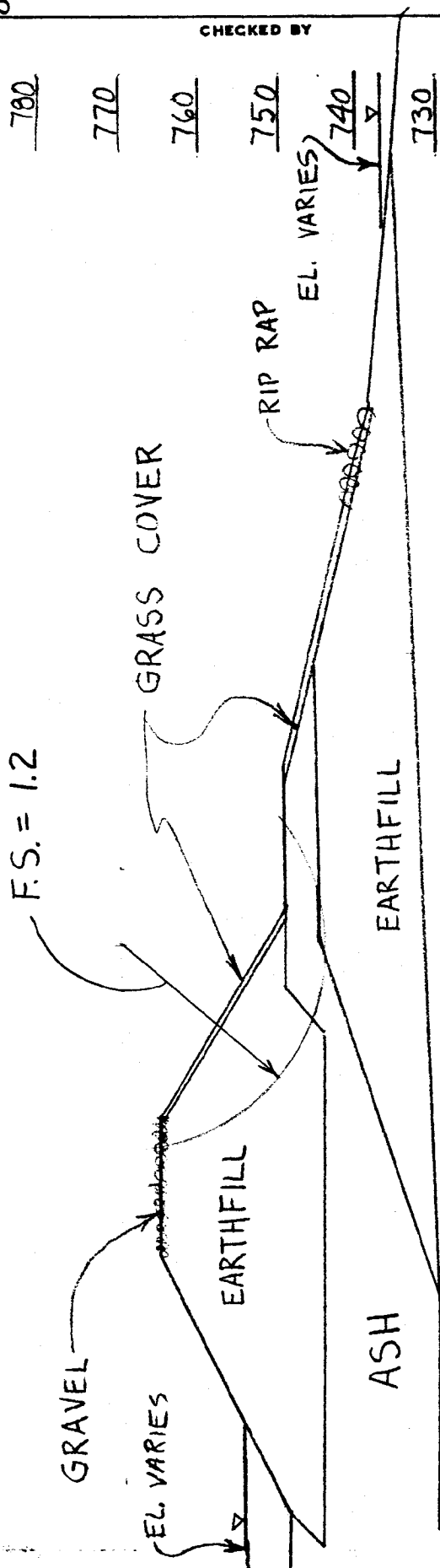
EL. VARIES

ASH

EARTHFILL

FOUNDATION
(ALLUVIAL SOIL)

ROCK



SUBJECT ATTACHMENT C

PROJECT _____

COMPUTED BY _____

DATE _____

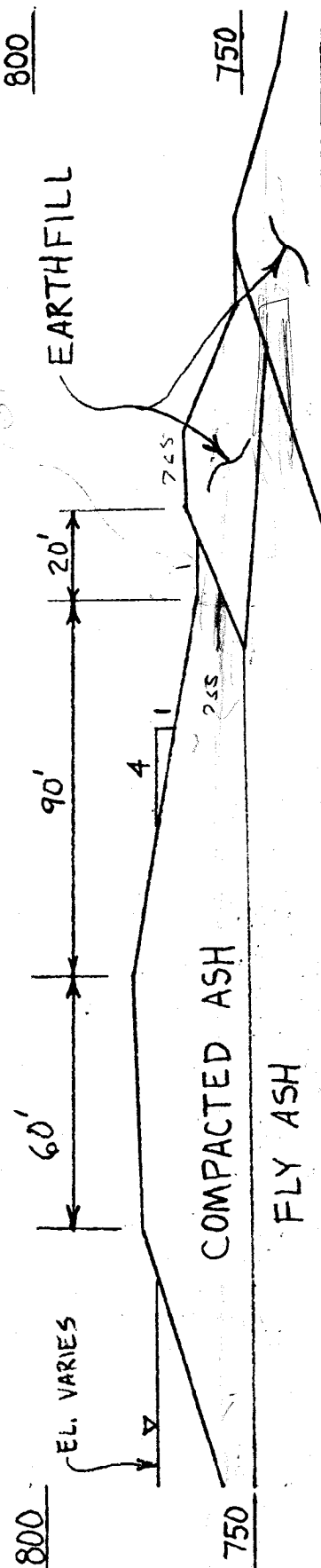
CHECKED BY _____

DATE _____

KINGSTON S.P.
DIKE "C"

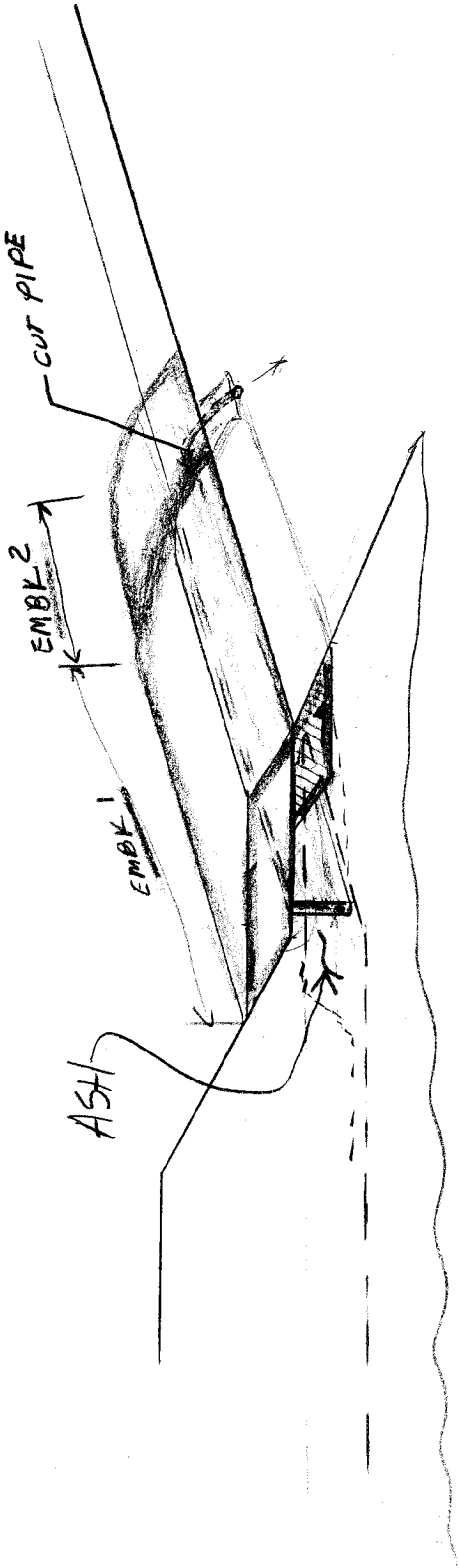
SCALE 1" = 40'

COMPACTED ASH DIKE
MAX. EL. 778



beginning @ what elevation?

KINGSTON Dike "C"



1. INSERT 6" Ø PERF PIPE (AFTER ACTUAL DETERMINATION IS MADE FOR NECESSITY) FILL WITH COARSE BOTTOM ASH, EXCEPT TOP 18" WITH EARTH



2. REMOVE

3. PLACE EARTH EMBANK 1

4. WITH BACKNOE, CUT 6" PIPE AS SHOWN - FILL HOLE IMMEDIATELY WITH EARTH AND COMPACT WITH BACKNOE

- REMOVE REMAINDER OF 4" PIPE AND COMPACT EARTH.

5. EXTEND TO EMBANK 2

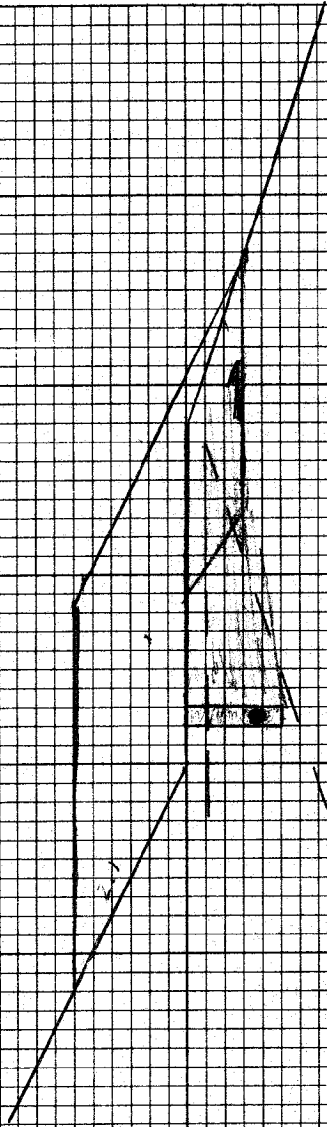
NEED

1. CONTROL FILL FOR THE SPECIAL FIX
2. NEED CONTROL CURVES FOR DENSITY AND MOISTURE CONTROL
3. FILL SHOULD BE ON THE WET SIDE OF OPTIMUM MOISTURE CONTENT (-1% TO +3%)
4. NEED 1 AND CONE TEST PER EVERY 500 CYD. AND A MINIMUM OF 1 TEST PER DAY
5. MINIMUM DENSITY SHALL BE 95% OF MAXIMUM DRY DENSITY

241 NORMAL HIGH POOL

7410

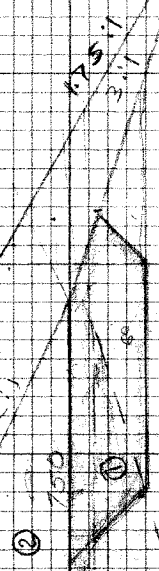
7 NORMAL LOW POOL



(PAGE)

AM

255.5



7 741 NORMAL HIGH POOL

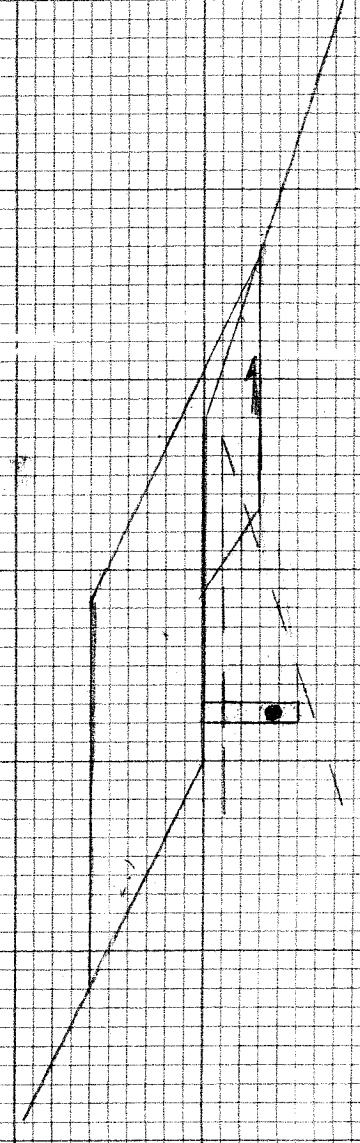
7 741 NORMAL LOW POOL

740

203 241/65

250.4
1.5

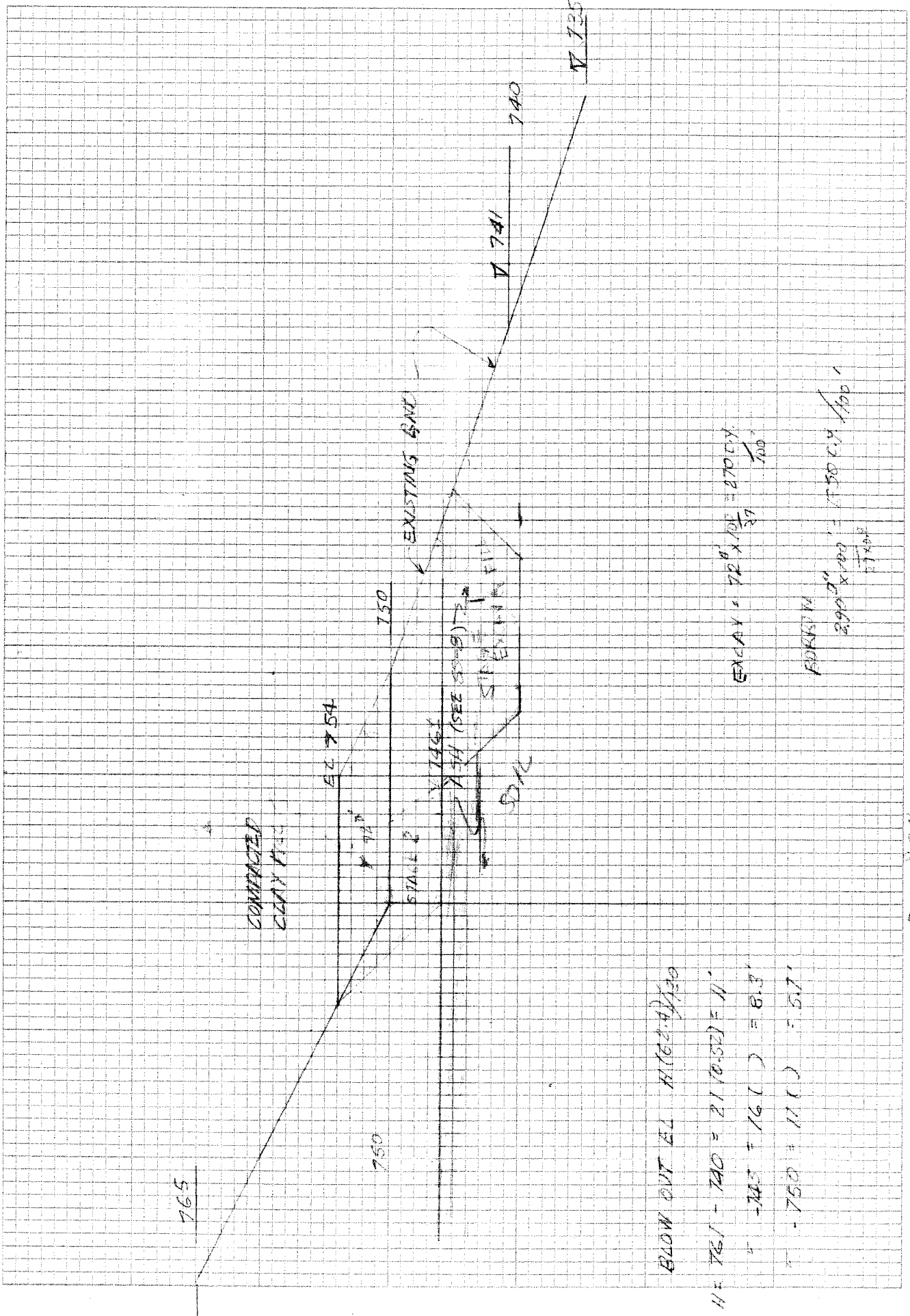
RAM



X-SEC BY HAND LEVEL

NEED

1. CONTROL FILL FOR THE SPECIAL FIX
2. NEED CONTROL CURVES FOR DENSITY AND MOISTURE CONTROL
3. FILL SHOULD BE ON THE WET SIDE OF OPTIMUM MOISTURE CONTENT (-1% TO +3%)
4. NEED 1 SAND CONE TEST PER EVERY 500 CYD. AND A MINIMUM OF 1 TEST PER DAY
5. MINIMUM DENSITY SHALL BE 95% OF MAXIMUM DRY DENSITY



BLOW OUT EL. $H(62.4)/130$
 $H = 761 - 740 = 21 (0.52) = 11'$
 $- 745 = 16 () = 8.3'$
 $- 750 = 11 () = 5.7'$

EXCAV. $= 72' \times \frac{70'}{2} = 2520 \text{ CY}$

FORREST M
 $290' \times 100' = 29000 \text{ CY}$

DIAKE 0'

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO : Frank Van Meter, Chief, Construction Services Branch, 500 SPT-K (3)

FROM : O. P. Thornton, Project Manager, Fossil Design Projects, 102 SPT-K

DATE :

SUBJECT: KINGSTON STEAM PLANT - DIKE "C" - SOILS INVESTIGATION - EN DES SOIL SCHEDULE 82.3

Reference: My memorandum to you dated April 25, 1984 (FDP 840425 012)

We request that you arrange for Singleton Materials Engineering Laboratory (SME) to perform an additional soil investigation for Dike "C". The proposed boring locations and depths are shown on the attached sketch.

The purpose of the additional soils investigation is to define the conditions at the wet spot in Dike "C" for possible future repair of the dike.

Field Exploration

The number of standard penetration test split-spoon borings will be determined during the drilling and inspection process. Six potential borings have been tentatively located. Continuous split-spoon sampling is required.

A bag sample of representative ash, if encountered, and two water samples are to be collected from each split-spoon boring. Groundwater observations are to be made 1 hour and 24 hours after completion of each split-spoon boring. All borings are to be backfilled with the same material removed from the hole after the drilling is completed.

Laboratory Testing

Laboratory testing is to include moisture content for all split-spoon samples. Specific gravity, Atterberg limits, and grain size distribution tests are to be conducted on representative split-spoon samples. Each soil type is to be classified in accordance with ASTM D 2487. Chemical analyses are to be made on the ash and water samples as previously described in the reference memo.

Report

The report is to contain the field and laboratory test results and all boring logs. Generalized soil profiles with boundaries defined for each layer with groundwater elevations are to be developed. The usual tabulation of test results of split-spoon samples is to be included in the report.



2

Frank Van Meter

Preliminary cost estimates supplied by SME indicate the cost of five additional split-spoon borings (three borings 35 feet deep and two borings 15 feet deep) should cost approximately \$12,000. Any additional borings at a depth of 35 feet should cost \$2,800 each as indicated by SME. All work is to be charged to account No. 544-30-20674.

One copy of the final report is to be submitted to me and one copy to R. O. Barnett, Chief, CEB, no later than June 22, 1984.

We understand that the required survey for the borings will be made by CSB as coordinated with EN DES.

O. P. Thornton

ROB:JMH:BSH

Attachment

cc: R. O. Barnett, W9D224 C-K (2)
R. W. Cantrell, W11A9 C-K
R. A. Painter, W5D181 C-K

RWC:BSH -

cc: C. Bonine, E7B24 C-K
H. S. Fox, 716 EB-C
MEDS, W5B63 C-K

Principally Prepared By: J. M. Hoskins, Extension 6905

074122.01

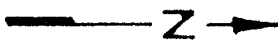
TVA-00010773

N553.587.2
E2,441,648.9

INTAKE CHANNEL
TOP OF RAISED DIKE
BASE LINE
S71°38'15"W
1315'

APPROX LOCATION
FIELD SPILLWAYS/SKIMMERS

36" PIPES
DIVIDER DIKE



TYPE "B" SPILLWAYS

EXIST. DIKE ROAD

N553.994.4
E2,442,899.3
PI 7

N0°27'03"W 1235'

1200' PI 6
N555.229.4
E2,442,889.6

WET AREA

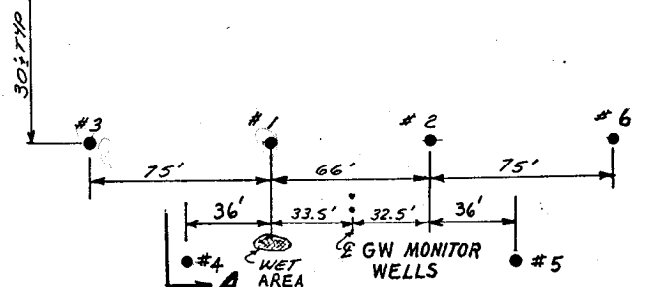
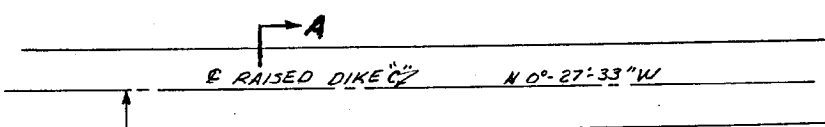
DIKE

TOP OF RAISED DIKE
EXIST. DIKE "C"

KEY

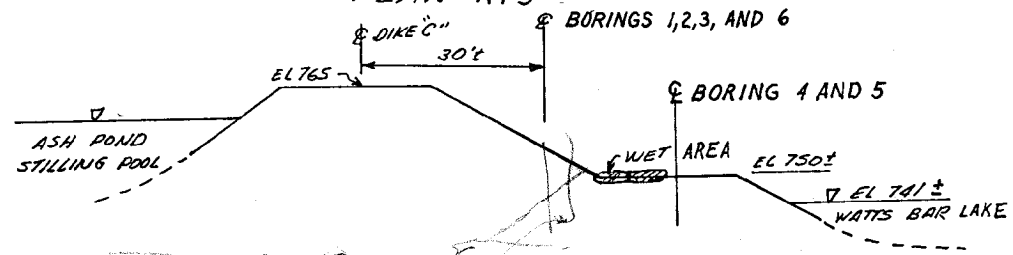
EMORY

(WATTS BAR RESERVOIR)



- NOTE: 1. FINAL FIELD LOCATION WILL BE SURVEYED BY CSB.
2. BORING 1 IS TO BE DRILLED FIRST AND 35' DEEP. OTHER BORINGS WILL BE DRILLED TO VARIOUS DEPTHS TO BE DETERMINED AFTER BORING 1 IS DRILLED.

PLAN NTS



TYPICAL - A-A
NTS

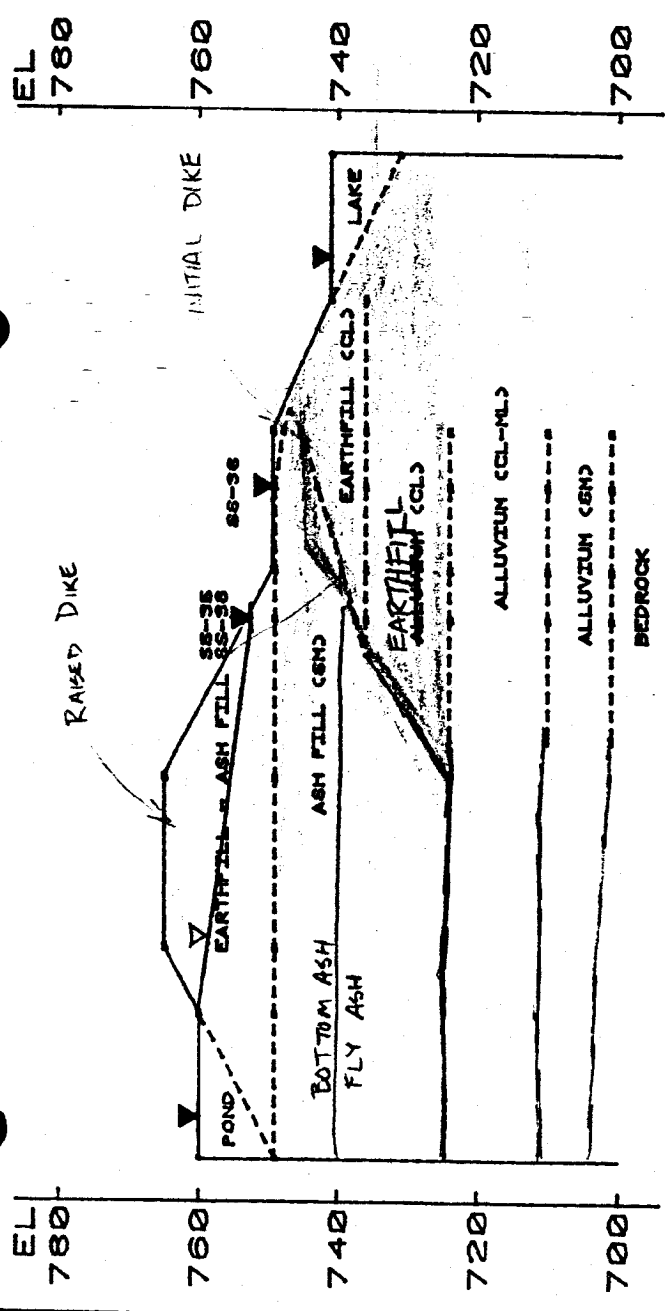
DIKE "C"
KINGSTON S.P.
BORING LOCATIONS

BA/71

SCALE, VERT. 1" = 20'
HORIZ. 1" = 20'

| | | | |
|----------------------------------|-------------|----------|-------|
| KINGSTON STEAM PLANT | | | |
| DIKE C | | | |
| GENERALIZED | | | |
| CROSS SECTION #1 | | | |
| TENNESSEE VALLEY AUTHORITY | | | |
| MATERIALS ENGINEERING LABORATORY | | | |
| SUBMITTED | RECOMMENDED | APPROVED | |
| MD | HPM | S.P.S. | |
| KNOXVILLE | 002084 | 30 CS 3 | 00492 |

- SOIL PROPERTIES
- ① EARTH FILL ② INITIAL ③ RAISED
 - ② ASH FILL ③ BOTTOM ④ FLY
 - ③ ALLUVIUM (CL-ML)
 - ④ ALLUVIUM (SM)



LEGEND

- ▽ 1 h WATER TABLE
- ▾ 24 h WATER TABLE

NOTE: STRATA CONTINUITY BETWEEN BORINGS ASSUMED

SUMMARY

RECOMMENDED SOIL PROPERTIES
FOR
STABILITY ANALYSIS

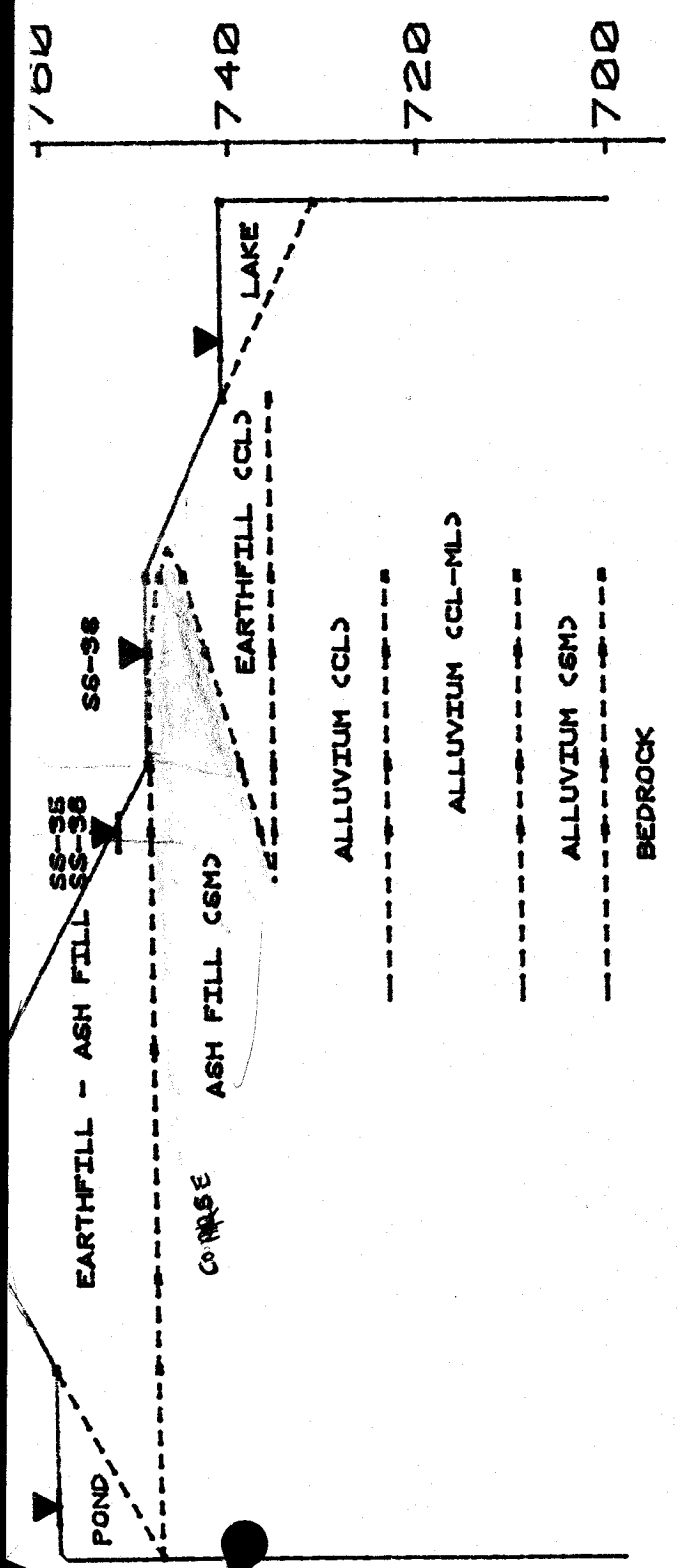
| SOIL IDENTIFICATION | UNIT WEIGHT (PCF) | | R- TRIAXIAL TEST | | | |
|---|-------------------|-----------------------|------------------|---------------|--------------|---------------------|
| | γ_{DRIEST} | $\gamma_{SAT.}$ | C (pcf) | ϕ (deg) | C (pcf) | ϕ (deg) |
| BOTTOM ASH | 129 | 133 | 500 | 25 | 0 | 31 |
| FLY ASH | 90 | 95 | 100 | 15 | 0 | 24 |
| RAISED DIKE EARTH-FILL | 116 | 112 122 | 400 | 15 | 200 | 24 |
| INITIAL DIKE EARTH-FILL | 130 | 132 | 300 | 16 | 0 | 28 30 |
| FOUNDATION (CL ML) | 131 | 132 | 300 | 18 | 0 | 28 |
| FOUNDATION (SM) | 126 | 128 | 800 | 22 | 0 | 28 |
| FOUNDATION EL @ 725.0 | 127 | 129 | 800 | 18 | 0 | 28 |
| → COMPACTED ASH (50% BOTTOM ASH + 50% FLY ASH) | 110 | 114 | 300 | 20 | 0 | 27 |
| ? STACK MATERIAL (FROM SHAWNEE ASSUMED PROPERTIES) | 118 | 123 | 400 | 18 | 0 | 30 |

JMH 12-12-84

JMH 12-18-84

JMH-12-19-84

ROCK @ EL 700.0 =



$$Q = VA$$

$$\frac{300}{7.5} = V$$

$$12.622V$$

$$\frac{1.33}{4} \left(\frac{5.5}{4} \right) \left(\frac{10}{4} \right)$$

$$-8.2 - 5.10 = V$$

$$12.627 = 2.5 - 3.5$$

$$\left[\frac{A}{WP} \right]^{1.33} (120) (20) (1 + Ke + 20) (0.12) + 2K + 1$$

$$1.33 + 5.10 + 1.7$$

SCALE: VERT. 1" = 20'
HORIZ. 1" = 20'

| | |
|----------------------------------|-------------|
| KINGSTON STEAM PLANT | |
| DIKE C | |
| GENERALIZED | |
| CROSS SECTION #1 | |
| TENNESSEE VALLEY AUTHORITY | |
| MATERIALS ENGINEERING LABORATORY | |
| SUBMITTED | RECOMMENDED |
| MP | HPM |
| | APPROVED |
| | EC |

$$700 + 3.5$$

$$696.5$$

INTRODUCED:

$$(1.3)(5.5) = 9.975$$

$$404.9$$

12.28

LEGEND

- 1 h WATER TABLE
- 24 h WATER TABLE

NOTE: STRATA CONTINUITY BETWEEN BORINGS ASSUMED

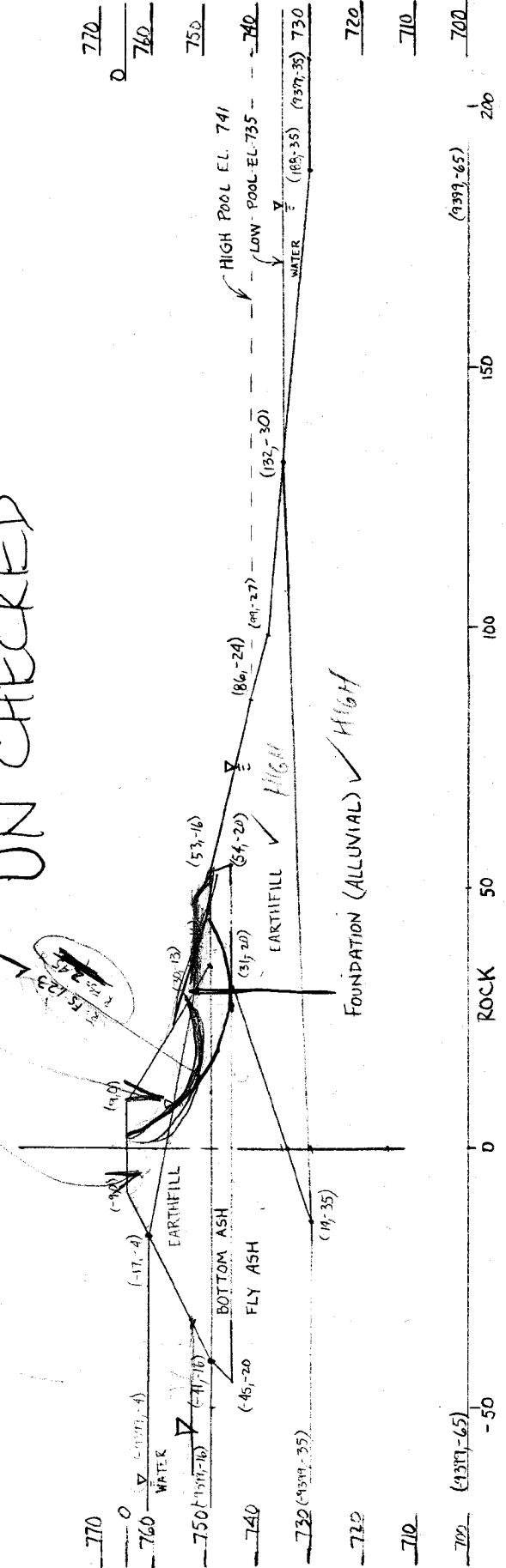
COMPUTED BY JMH 12-12-84 CHECKED BY DATE



FOR DON GALLOWAY

5 { 75% dry ← low
75% wet

TEST PRELIMINARY INFORMATION
UN CHECKED



770
760
750
740
732
722
710
700

0
50
100
150
200

WATER
EARTH FILL
BOTTOM ASH
FLY ASH
FOUNDATION (ALLUVIAL) ✓ HIGH

HIGH POOL EL. 741
LOW POOL EL. 735

(14,0)
(-9,0)
(-17,-4)
(-41,-16)
(-45,-20)
(19,-35)

(130,13)
(53,-16)
(31,-20)
(86,-24)
(187,-27)
(132,-30)
(189-35) (137-35) 730

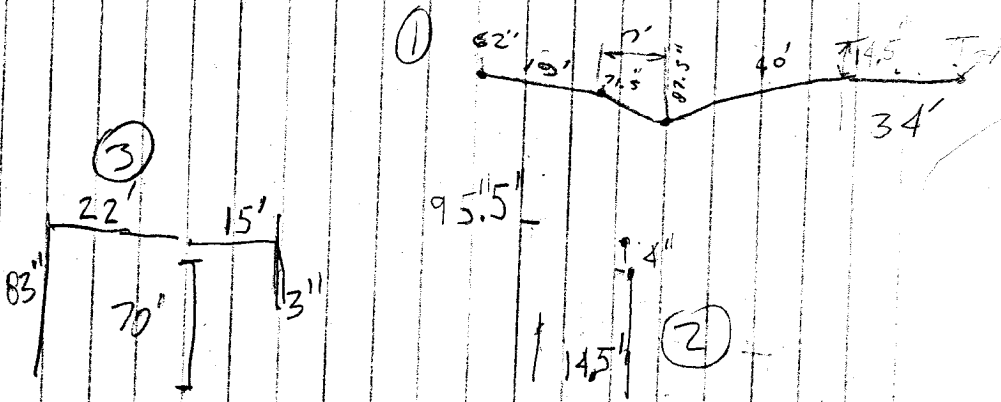
1.23
1.25

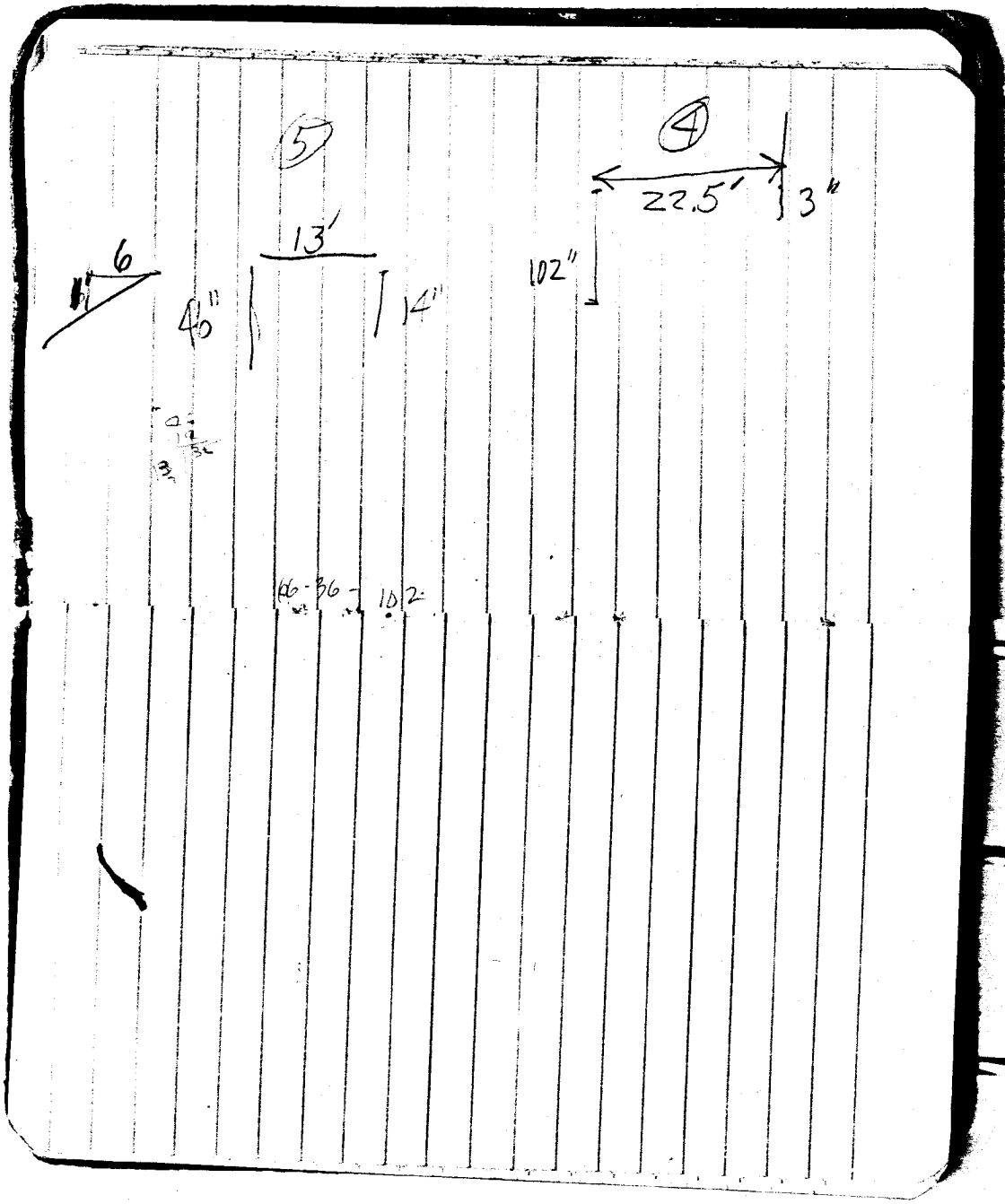
50
100
150
200

(137,-65)

31 A 62' 19' 9.15"
 B 71.5' 71.15"
 A
 H D
 A
 A

59
~~24~~
 83





SUBJECT _____

PROJECT _____

①

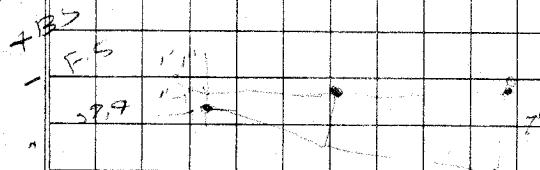
COMPUTED BY _____

DATE _____

CHECKED BY _____

DATE _____

| | B.S. | HI | F.I.S. | EL |
|---|----------|-------|--------|-----------------|
| | | | | 745 |
| ① | 770'-2" | 5'-2" | 6' | 764'-2" |
| | | | 7'-3" | 762'-11" |
| | | | 1'-2" | 769'-0" |
| | | | 2' | 768'-2" |
| ② | 765'-4" | 4" | | 765 INST GR. TP |
| | | | 8' | 757'-4" |
| ③ | 757'-7" | 3" | | |
| | | | 5'-10" | 751'-9" |
| | | | 7' | 750'-7" |
| ④ | 750'-10" | 3" | | |
| | | | 8'-6" | 742'-4" |
| ⑤ | 743'-6" | 1'-2" | | |
| | | | 3'-10" | 739'-8" |



SUBJECT _____

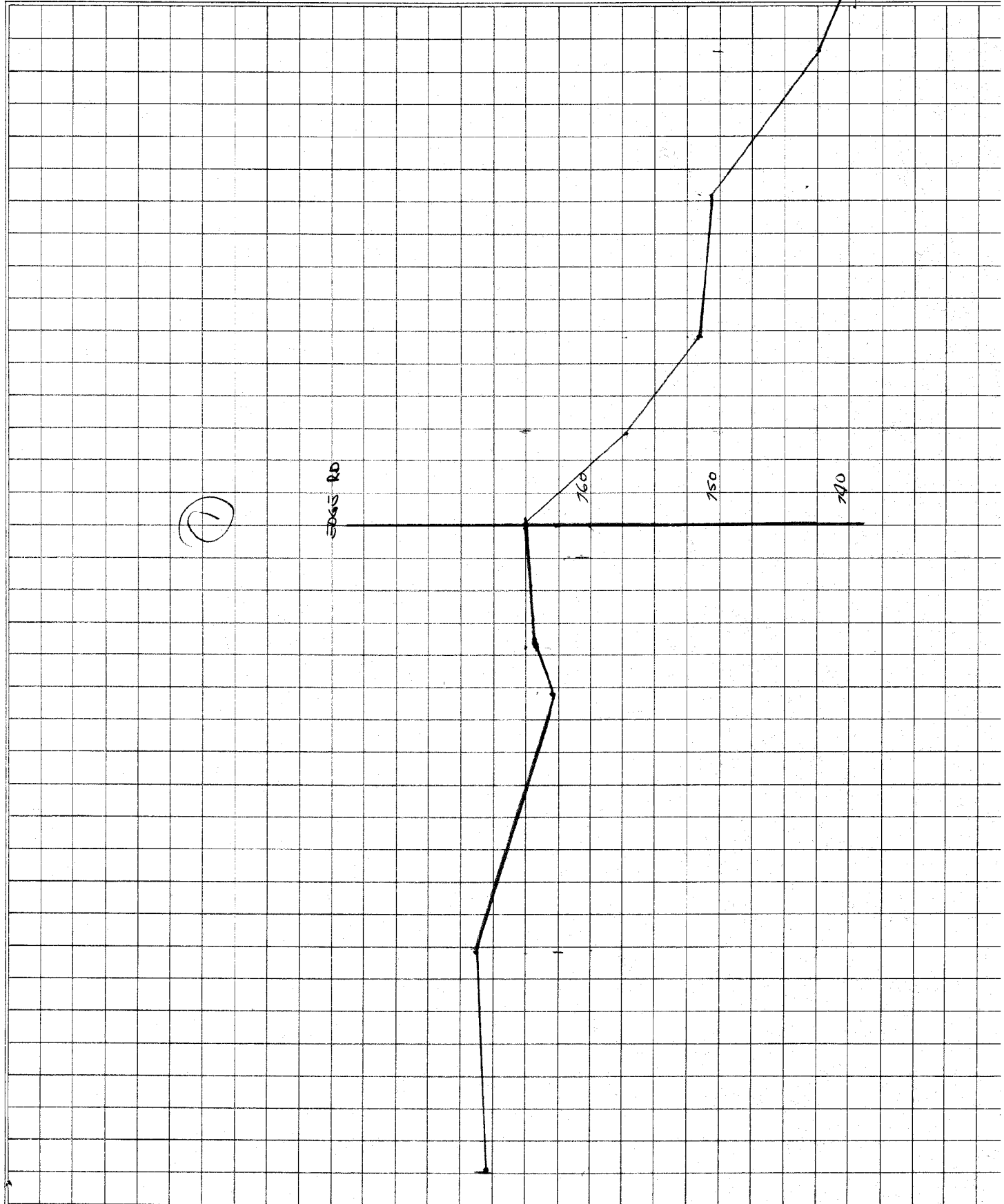
PROJECT _____

COMPUTED BY _____

DATE _____

CHECKED BY _____

DATE _____



SUBJECT

2

PROJECT

COMPUTED BY

DATE

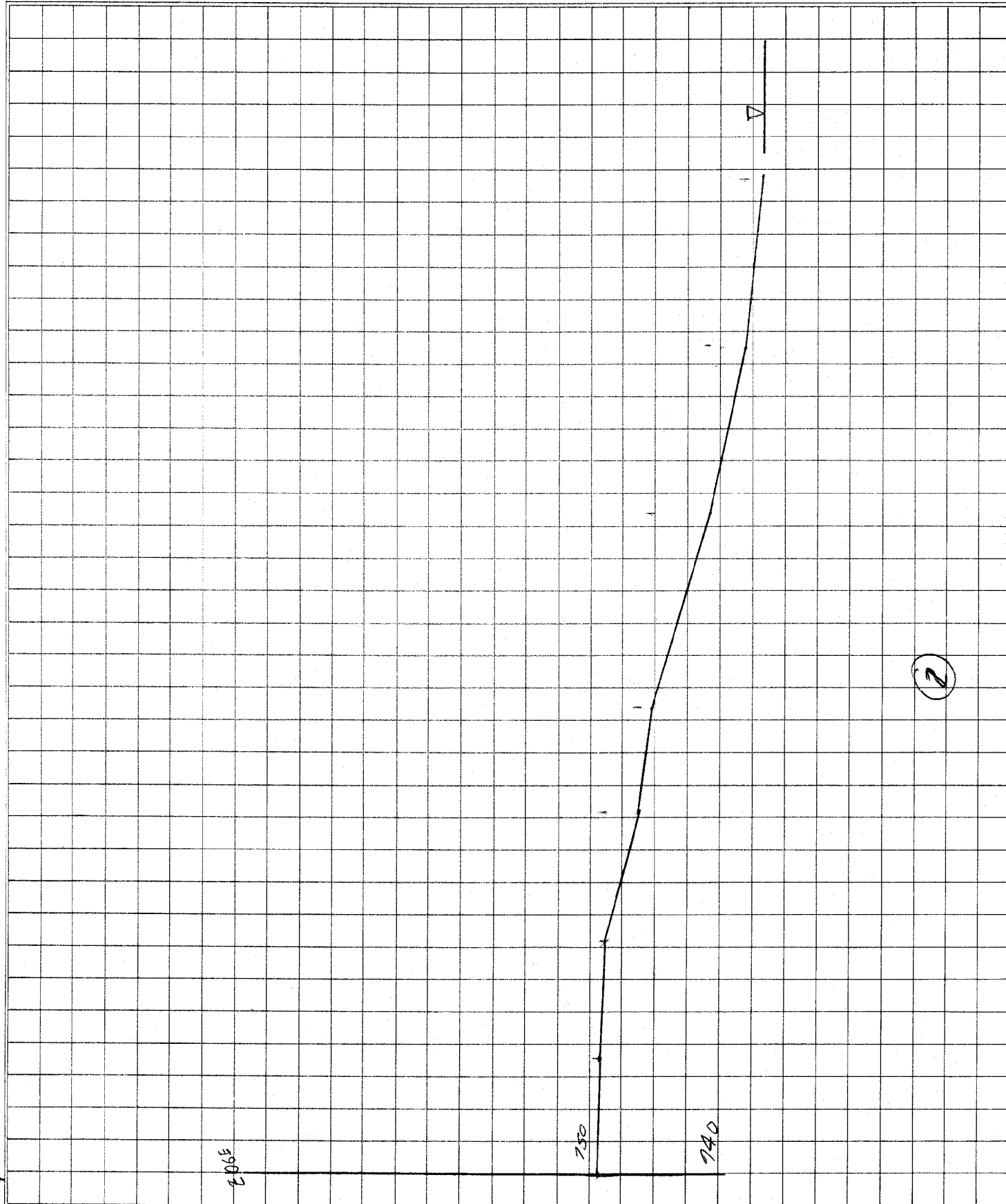
CHECKED BY

DATE

| | Ø S. | H.I. | F.S. | ELEV | |
|----------------|----------------------------|-------|--------|-----------|-------------------|
| EDGE RD | 752-10 | 3' 6" | | 749-4" | EDGE RD |
| 9' RD | | | 3'-8" | 749-2" ✓ | RD |
| EDGE RD & LAKE | | | 4' | 748-10" ✓ | EDGE RD |
| 10' SLOPE | | | 6'-8" | 746'-2" ✓ | SLOPE |
| 8' SLOPE | | | 7'-8" | 745'-2" ✓ | SLOPE |
| 15' TP | + 8" + 745'-2" = 745-10" ✓ | | 5' | 740-10" ✓ | (TOP ROCKS) SLOPE |
| 13' 13' | | | 7'-10" | 738-0" ✓ | TOE SLOPE |
| 9 | | | 9 | 736-10" ✓ | RIVER |

SUBJECT _____ PROJECT _____

COMPUTED BY _____ DATE _____ CHECKED BY _____ DATE _____



| | | | | |
|-----------|--------------|--------------------|---|---|
| FOR | NAME | | DATE | 11-21-84 |
| | ADDRESS | MHM 333 SPT-K | <input type="checkbox"/> Chatta <input checked="" type="checkbox"/> Knox | <input type="checkbox"/> M. S. <input type="checkbox"/> Nor. |
| FROM | NAME | JMH | Fold here for return | |
| | ADDRESS | 157 LB-K | EXTENSION | 6905 |
| TEL. CALL | CALL NUMBER: | | <input type="checkbox"/> Chatta <input checked="" type="checkbox"/> Knox | <input type="checkbox"/> M. S. <input type="checkbox"/> Nor. |
| | | TIME CALL RECEIVED | <input type="checkbox"/> Returned Your Call | |

KIF DIKE "C"

enclosed are TABLE 1 and
SPT logs not found in your
Investigation Report 823.

| | | | | |
|--|--|--|------------------------------------|----------------------------------|
| <input checked="" type="checkbox"/> Per Your Request | <input type="checkbox"/> Comment | <input type="checkbox"/> Note and Return | <input type="checkbox"/> Approval | <input type="checkbox"/> Call Me |
| <input type="checkbox"/> Information | <input type="checkbox"/> Handle | <input type="checkbox"/> Distribute | <input type="checkbox"/> Signature | <input type="checkbox"/> See Me |
| <input type="checkbox"/> Per Conversation | <input type="checkbox"/> Prepare Reply | <input type="checkbox"/> Circulate | <input type="checkbox"/> Destroy | <input type="checkbox"/> File |

45 (OS-9-80) INTEROFFICE MAILING SLIP-TELEPHONE CALL SLIP

Table 1
KINGSTON STEAM PLANT
DIKE C
BORING COORDINATES

| <u>Boring</u> | <u>Coordinates</u> | |
|---------------|--------------------|--------------|
| | <u>East</u> | <u>North</u> |
| SS-35 | 2,442,873 | 554,375 |
| 36 | 2,442,871 | 554,516 |
| 37 | 2,442,874 | 554,271 |
| 38 | 2,442,892 | 554,439 |
| AH-1 | 2,442,869 | 554,084 |
| 2 | 2,442,873 | 554,714 |
| 3 | 2,442,874 | 554,917 |
| 4 | 2,442,875 | 555,118 |
| 5 | 2,442,862 | 555,226 |
| 6 | 2,442,732 | 555,606 |
| 7 | 2,442,599 | 555,985 |
| 8 | 2,442,464 | 556,364 |
| 9 | 2,442,326 | 556,743 |
| 10 | 2,441,965 | 557,082 |
| 11 | 2,441,532 | 557,335 |
| 12 | 2,440,750 | 557,808 |
| 13 | 2,442,640 | 553,906 |
| 14 | 2,441,862 | 553,673 |

A34173.2

3965

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY SOIL PROFILE (SPLIT SPOON BORING)

SHEET 1 OF 1

PROJECT: KINGSTON S.P.
BORING: SS-35 STATION:
DATE DRILLED: 5/11/84 TO

FEATURE: DIKE C
RANGE: SURFACE EL: 752.4
PREPARED BY: MHD CHECKED BY: *EA*

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|----------|------|----|----|---|
| 5 | 750 | 14 | CL | 20.2 | 43 | 24 | STRAT: CRS SD CL 50%, GV CL 50%, R-BRN, MST, FL |
| | | 17 | SI | 20.4 | 30 | 8 | STRAT: GV CL 50%, FT CL 40%, MED SD(FLY ASH)10%, BRN-R-GY, MST, FL |
| 10 | 745 | 37 | SI | 16.4 | NP | NP | GV CRS SD, DK GY, V MST, BOT ASH FL |
| | | 36 | SI | 14.0 | NP | NP | GV CRS SD, GY, W, BOT ASH FL |
| | | 7 | SI | 17.2 | NP | NP | GV CRS SD, BLK, W, BOT ASH FL |
| 15 | 740 | 6 | SI | 13.4 | NP | NP | GV CRS SD, BLK, W, BOT ASH FL |
| | | 4 | SI | 11.4 | NP | NP | GV CRS SD, BLK, W, BOT ASH FL |
| | | 3 | SI | 15.4 | NP | NP | IR; STRAT: GV CRS SD 50%, SD SI 50%, BLK-BRN, W, BOT ASH FL |
| | | 3 | CL | 20.7 | 28 | 11 | CL SI, BRN, MST, FL |
| 20 | 735 | 2 | CL | 22.5 | 28 | 11 | CL SI, R BRN, W, FL |
| | | 1 | CL | 23.0 | 28 | 11 | CL SI, R BRN, W, FL |
| 25 | 730 | 2 | CL | 22.3 | 28 | 11 | CL SI, R BRN-BRN, W, FLCTR WTH SH |
| | | 1 | CL | 22.7 | 28 | 11 | CL SI, R BRN-BRN, W, FL |
| 30 | 725 | 1 | SI | 24.7 | 24 | 4 | SD SI, GY, W, ALL |
| | | 1 | SI | 25.5 | 24 | 4 | SD SI, GY, W, ALL |
| 35 | 720 | | | | | | DISCONTINUED. EL ±722.5 |

* Lab. Classif.

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON BORING)

SHEET 1 OF 2

PROJECT: KINGSTON S.P.
BORING: SS-36 STATION:
DATE DRILLED: 5/14/84 TO

FEATURE: DIKE C
RANGE: SURFACE EL: 753.0
PREPARED BY: MHD CHECKED BY: BA

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|--------------------|------|----|----|--|
| 5 | 750 | 18 | CL | 22.4 | 43 | 24 | CRS SD, FT CL(TR GV), R, MST, FL |
| | | 17 | Σ S S | 15.6 | 30 | 8 | CL SICWTH SH), BRN, D, FL |
| 10 | 745 | 1 | Σ S S | 18.2 | NP | NP | IR; STRAT: CL SICWTH SH)50%, GV CRS SD(BOT ASH)50%, BRN-GY, W, FL |
| | | 40 | Σ S S | 13.9 | NP | NP | GV CRS SD, DK GY, V MST, BOT ASH FL |
| | | 21 | Σ S S | 16.0 | NP | NP | GV CRS SD, DK GY, V MST, BOT ASH FL |
| 15 | 740 | 4 | Σ S S | 21.2 | 30 | 8 | STRAT SI CRS SD, BRN-R BRN, W, ALL |
| | | 2 | Σ S | 15.6 | NP | NP | STRAT: GV CRS SD 70%, SI CL 30%, BLK-R BRN, V MST, BOT ASH FL |
| 20 | 735 | 2 | CL | 19.5 | 28 | 11 | FN SD CL, BRN, V MST, FL |
| | | 2 | | | | | IR; CLN FN SD, BRN, W, FL |
| 25 | 730 | 4 | CL SI Σ | 24.5 | 24 | 4 | CL SI, DK GY, V MST, FL |
| 30 | 725 | 5 | CL | 22.9 | 43 | 24 | SD SI, GY-BRN, V MST, FL |
| 35 | 720 | 1 | CL SI Σ | 23.6 | 24 | 4 | SD SI, GY, W, ALL |
| 1''=5' | | | * Lab. Classif. | | | | |

TENNESSEE VALLEY AUTHORITY
 SINGLETON MATERIALS ENGINEERING LABORATORY
 SOIL PROFILE (SPLIT SPOON BORING)

SHEET 2 OF 2

PROJECT: KINGSTON S.P.
 BORING: SS-36 STATION:
 DATE DRILLED: 5/14/84 TO

FEATURE: DIKE C
 RANGE: SURFACE EL: 753.0
 PREPARED BY: MHD CHECKED BY: *AF*

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|--------------------------------|------|----|----|---------------------------|
| 40 | 715 | 1 | $\frac{1}{0} \frac{1}{\Sigma}$ | 25.1 | 24 | 4 | SI FN SD, GY, W, ALL |
| 45 | 710 | 5 | $\frac{\Sigma}{0}$ | 29.9 | NP | NP | LAM SI FN SD, GY, W, ALL |
| 50 | 705 | 50+ | $\frac{\Sigma}{0} \frac{0}{0}$ | 13.7 | 30 | 8 | IR; GV CRS SD, GY, W, ALL |
| 55 | 700 | | | | | | REFUSAL. |
| 60 | 695 | | | | | | |
| 65 | 690 | | | | | | |
| 70 | 685 | | | | | | |

1"=5'

* Lab. Classif.

TENNESSEE VALLEY AUTHORITY
 SINGLETON MATERIALS ENGINEERING LABORATORY
 SOIL PROFILE (SPLIT SPOON BORING)

SHEET 1 OF 1

PROJECT: KINGSTON S.P.
 BORING: SS-37 STATION:
 DATE DRILLED: 5/14/84 TO

FEATURE: DIKE C
 RANGE: SURFACE EL: 752.9
 PREPARED BY: MHD CHECKED BY: *BA*

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|-------------|------|----|----|---|
| 5 | 750 | 6 | ┌ └ | 29.7 | 43 | 24 | FT CL(CTR GV), R, MST, FL |
| | | 5 | ┌ └ | 31.5 | 43 | 24 | FT CL(CTR GV), R, MST, FL |
| 10 | 745 | 2 | Σ ┌ └ | 23.9 | 30 | 8 | IR; FT CL(CTR GV)50%, CRS SD GV 50%, R-GY, BOT ASH FL |
| | | 25 | Σ ┌ └ | 18.5 | NP | NP | GV CRS SD, GY, V MST, BOT ASH FL |
| | | 23 | Σ ┌ └ | 12.1 | NP | NP | GV MED SD, GY, V MST, BOT ASH FL |
| 15 | 740 | 7 | Σ ┌ └ | 19.5 | NP | NP | STRAT: GV CRS SD 50%, CL SI 50%, DK GY-LT GY, V MST, ALL |
| | | 2 | ┌ └ | 28.5 | 24 | 4 | CL SI, DK GY-BRN, V MST, ALL |
| 20 | 735 | 3 | ┌ └ | 22.0 | 28 | 11 | SD CL, R BRN, MST, ALL |
| | | | | | | | DISCONTINUED. |
| 25 | 730 | | | | | | |
| 30 | 725 | | | | | | |
| 35 | 720 | | | | | | |

* Lab. Classif.

1"=5'

TENNESSEE VALLEY AUTHORITY
 SINGLETON MATERIALS ENGINEERING LABORATORY
 SOIL PROFILE (SPLIT SPOON BORING)

SHEET 1 OF 1

PROJECT: KINGSTON S.P.
 BORING: SS-38 STATION:
 DATE DRILLED: 5/15/84 TO

FEATURE: DIKE C
 RANGE: SURFACE EL: 749.3
 PREPARED BY: MHD CHECKED BY: BA

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|----------|------|----|---------------|---|
| 5 | 745 | 42 | Σ S | 14.1 | NP | NP | GV CRS SD, DK GY, MST, BOT ASH FL |
| | | 25 | Σ S | 16.1 | NP | NP | GV CRS SD, DK GY-YEL BRN, V MST, BOT ASH FL |
| | | 17 | Σ S | 9.2 | NP | NP | STRAT: GV CRS SD(BOT ASH)80%, SI CL(WTH SH)20%, BLK-BRN, MST, FL |
| | | 8 | Σ S | 16.7 | 30 | 8 | SI CL(WTH SH), BRN, MST, FL |
| 10 | 740 | 7 | | | | NO RECOVERY | |
| 15 | 735 | 8 | CL | 18.6 | 28 | 11 | FN SD SI, R BRN, MST, ALLCTR RTS |
| | | 7 | CL | 20.1 | 28 | 11 | LAM FN SD SI, R BRN-GY, MST, ALLCTR GV, RTS) |
| | | 6 | CL | 21.0 | 28 | 11 | STRAT FN SD SI, R BRN-BRN, MST, ALLCTR RTS) |
| 20 | 730 | | | | | DISCONTINUED. | |
| 25 | 725 | | | | | | |
| 30 | 720 | | | | | | |
| 35 | 715 | | | | | | |

1"=5'
 * Lab. Classif.

UNITED STATES GOVERNMENT

CSB '840709 301
TENNESSEE VALLEY AUTHORITY

Memorandum

TO : O. P. Thornton, Project Manager, Fossil Design Projects, 102 SPT-K

FROM : Frank Van Meter, Chief, Construction Services Branch, 500 SPT-K

DATE : July 9, 1984

SUBJECT: KINGSTON STEAM PLANT - DIKE C - SOILS INVESTIGATION - EN DES SOIL
SCHEDULE 82.3

As referenced in the previously submitted report, CSB 840622 301, chemical analyses of water samples from split-spoon borings have been completed and are summarized in table 3. Also attached are tables 1 and 2 and individual soil profiles of the split-spoon borings, which were inadvertently omitted from the initial report.

Original signed by
Frank Van Meter

Frank Van Meter

BJA:BCJ

Attachments

cc (Attachments):

R. O. Barnett, W9D224 C-K

W. H. Childres, SME-K

MEDS, W5B63 C-K

Principally prepared by Barbara J. Adkins, extension 2771.

A34191.1

| FOSSIL DESIGN PROJECTS | | | | | |
|------------------------|------|------|------|------|-----|
| IN | | | OUT | | |
| N | Date | Time | Date | Time | |
| ✓ | 11 | 11 | | | |
| | | | | | CPT |
| | | | | | SBJ |
| | | | | | JAB |
| | | | | | SC |
| | | | | | RGJ |
| | | | | | RAB |
| | | | | | JAF |
| | | | | | DAK |
| | | | | | RHH |
| | | | | | RDB |
| | | | | | WAR |
| | | | | | RNR |
| | | | | | RFS |
| | | | | | REM |
| | | | | | RWJ |
| | | | | | MHM |

REC'D. JUL 11 '84

Adkins 13/8



Table 1

KINGSTON STEAM PLANT

DIKE C

BORING COORDINATES

| <u>Boring</u> | <u>Coordinates</u> | |
|---------------|--------------------|--------------|
| | <u>East</u> | <u>North</u> |
| SS-35 | 2,442,873 | 554,375 |
| 36 | 2,442,871 | 554,516 |
| 37 | 2,442,874 | 554,271 |
| 38 | 2,442,892 | 554,439 |
| AH-1 | 2,442,869 | 554,084 |
| 2 | 2,442,873 | 554,714 |
| 3 | 2,442,874 | 554,917 |
| 4 | 2,442,875 | 555,118 |
| 5 | 2,442,862 | 555,226 |
| 6 | 2,442,732 | 555,606 |
| 7 | 2,442,599 | 555,985 |
| 8 | 2,442,464 | 556,364 |
| 9 | 2,442,326 | 556,743 |
| 10 | 2,441,965 | 557,082 |
| 11 | 2,441,532 | 557,335 |
| 12 | 2,440,750 | 557,808 |
| 13 | 2,442,640 | 553,906 |
| 14 | 2,441,862 | 553,673 |

A34173.2

Table 2

KINGSTON STEAM PLANT

DIKE C

CHEMICAL ANALYSIS OF ASH

| | <u>Fly Ash,</u> <u>Bottom Ash</u> |
|--|--------------------------------------|
| pH | 4.40 |
| Loss-on-Ignition, % | 12.69 |
| Silicon dioxide, SiO ₂ , % | 31.12 |
| Calcium oxide, CaO, % | 0.92 |
| Ferric oxide, Fe ₂ O ₃ , % | 38.61 |
| Aluminum oxide, Al ₂ O ₃ , % | 13.13 |
| Magnesium oxide, MgO, % | 0.55 |
| Sulfur trioxide, SO ₃ , % | 0.97 |
| Chlorides, Cl ⁻ , ppm | 138 |
| Nitrate, NO ₃ ⁻ , ppm | 3 |

A34173.3

Table 3

KINGSTON STEAM PLANT

DIKE C

CHEMICAL ANALYSIS OF WATER SAMPLES FROM BORINGS

| <u>Analysis</u> | <u>Result, mg/L</u> | |
|--|---------------------|--------------|
| | <u>SS-35</u> | <u>SS-37</u> |
| Total suspended solids | 6600 | 5400 |
| Fluorides | <0.1 | 0.34 |
| NO ₃ - NO ₂ (As N) | 0.09 | 0.17 |
| Sulfates ² | 2300 | 2600 |
| Aluminum | 31 | 490 |
| Boron | 2.0 | 2.1 |
| Iron | 560 | 600 |
| Magnesium | 74 | 81 |
| Calcium | 550 | 490 |
| pH | 4.2 | 4.1 |
| Organic N | 1.1 | 0.1 |
| Ammonia (As N) | 1.9 | 1.1 |

A34191.4

TENNESSEE VALLEY AUTHORITY
 SINGLETON MATERIALS ENGINEERING LABORATORY
 SOIL PROFILE (SPLIT SPOON BORING)

SHEET 1 OF 1

PROJECT: KINGSTON S.P.
 BORING: SS-35 STATION:
 DATE DRILLED: 5/11/84 TO

FEATURE: DIKE C
 RANGE: SURFACE EL: 752.4
 PREPARED BY: MHD CHECKED BY: BA

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|----------|------|----|----|--|
| 5 | 750 | 14 | CL | 20.2 | 43 | 24 | STRAT: CRS SD CL 50%, GV CL 50%, R-BRN, MST, FL |
| | | 17 | SI | 20.4 | 30 | 8 | STRAT: GV CL 50%, FT CL 40%, MED SD(FLY ASH)10%, BRN-R-GY, MST, FL |
| | | 37 | SM | 16.4 | NP | NP | GV CRS SD, DK GY, V MST, BOT ASH FL |
| 10 | 745 | 36 | SM | 14.0 | NP | NP | GV CRS SD, GY, W, BOT ASH FL |
| | | 7 | SM | 17.2 | NP | NP | GV CRS SD, BLK, W, BOT ASH FL |
| | | 6 | SM | 13.4 | NP | NP | GV CRS SD, BLK, W, BOT ASH FL |
| 15 | 740 | 4 | SM | 11.4 | NP | NP | GV CRS SD, BLK, W, BOT ASH FL |
| | | 3 | SM | 15.4 | NP | NP | IR; STRAT: GV CRS SD 50%, SD SI 50%, BLK-BRN, W, BOT ASH FL |
| | | 3 | CL | 20.7 | 28 | 11 | CL SI, BRN, MST, FL |
| 20 | 735 | 2 | CL | 22.5 | 28 | 11 | CL SI, R BRN, W, FL |
| | | 1 | CL | 23.0 | 28 | 11 | CL SI, R BRN, W, FL |
| | | 2 | CL | 22.3 | 28 | 11 | CL SI, R BRN-BRN, W, FLCTR WTH SHY |
| 25 | 730 | 1 | CL | 22.7 | 28 | 11 | CL SI, R BRN-BRN, W, FL |
| | | 1 | SI | 24.7 | 24 | 4 | SD SI, GY, W, ALL |
| | | 1 | SI | 25.5 | 24 | 4 | SD SI, GY, W, ALL |
| 35 | 720 | | | | | | DISCONTINUED. EL ±722.5 |

* Lab. Classif.

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON BORING)

SHEET 1 OF 2

PROJECT: KINGSTON S.P.
BORING: SS-36 STATION:
DATE DRILLED: 5/14/84 TO

FEATURE: DIKE C
RANGE: SURFACE EL: 753.0
PREPARED BY: MHD CHECKED BY: BA

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|------------|------|----|----|-----------------------------------|
| 5 | 750 | 18 | U | 22.4 | 43 | 24 | CRS SD, FT CL(CTR GV), R, MST, FL |
| | | 17 | Σ U 0 0 | 15.6 | 30 | 8 | CL SI(WTH SH), BRN, D, FL |
| 10 | 745 | 1 | Σ 0 | 18.2 | NP | NP | IR; STRAT: CL SI(WTH SH)50%, GV |
| | | 40 | Σ 0 | 13.9 | NP | NP | CRS SD(BOT ASH)50%, BRN-GY, W, FL |
| | | 21 | Σ 0 | 16.0 | NP | NP | GV CRS SD, DK GY, V MST, BOT |
| | | 4 | Σ U 0 0 | 21.2 | 30 | 8 | ASH FL |
| 15 | 740 | 2 | Σ 0 | 15.6 | NP | NP | GV CRS SD, DK GY, V MST, BOT |
| | | 2 | U | 19.5 | 28 | 11 | ASH FL |
| 20 | 735 | 2 | | | | | IR; CLN FN SD, BRN, W, FL |
| 25 | 730 | 4 | U U 0 Σ | 24.5 | 24 | 4 | CL SI, DK GY, V MST, FL |
| 30 | 725 | 5 | U 0 | 22.9 | 43 | 24 | SD SI, GY-BRN, V MST, FL |
| 35 | 720 | 1 | U U 0 Σ | 23.6 | 24 | 4 | SD SI, GY, W, ALL |

1"=5'

* Lab. Classif.

TENNESSEE VALLEY AUTHORITY
 SINGLETON MATERIALS ENGINEERING LABORATORY
 SOIL PROFILE (SPLIT SPOON BORING)

SHEET 2 OF 2

PROJECT: KINGSTON S.P.
 BORING: SS-36 STATION:
 DATE DRILLED: 5/14/84 TO

FEATURE: DIKE C
 RANGE: SURFACE EL: 753.0
 PREPARED BY: MHD CHECKED BY: BA

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|--------------------------------|------|----|----|---------------------------|
| 40 | 715 | 1 | $\frac{1}{0} \frac{1}{\Sigma}$ | 25.1 | 24 | 4 | SI FN SD, GY, W, ALL |
| 45 | 710 | 5 | $\frac{\Sigma}{0}$ | 29.9 | NP | NP | LAM SI FN SD, GY, W, ALL |
| 50 | 705 | 50+ | $\frac{\Sigma}{0} \frac{0}{0}$ | 13.7 | 30 | 8 | IR; GV CRS SD, GY, W, ALL |
| 55 | 700 | | | | | | REFUSAL. |
| 60 | 695 | | | | | | |
| 65 | 690 | | | | | | |
| 70 | 685 | | | | | | |

1''=5'

* Lab. Classif.

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON BORING)

SHEET 1 OF 1

PROJECT: KINGSTON S.P.
 BORING: SS-37 STATION:
 DATE DRILLED: 5/14/84 TO

FEATURE: DIKE C
 RANGE: SURFACE EL: 752.9
 PREPARED BY: MHD CHECKED BY: BA

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|----------|------|----|---------------|---|
| 5 | 750 | 6 | CL | 29.7 | 43 | 24 | FT CL(CTR GV), R, MST, FL |
| | | 5 | CL | 31.5 | 43 | 24 | FT CL(CTR GV), R, MST, FL |
| 10 | 745 | 2 | SI SI | 23.9 | 30 | 8 | IR; FT CL(CTR GV)50%, CRS SD GV 50%, R-GY, BOT ASH FL |
| | | 25 | MS | 18.5 | NP | NP | GV CRS SD, GY, V MST, BOT ASH FL |
| | | 23 | MS | 12.1 | NP | NP | GV MED SD, GY, V MST, BOT ASH FL |
| 15 | 740 | 7 | MS | 19.5 | NP | NP | STRAT: GV CRS SD 50%, CL SI 50%, DK GY-LT GY, V MST, ALL |
| | | 2 | CL SI | 28.5 | 24 | 4 | CL SI, DK GY-BRN, V MST, ALL |
| | | 3 | CL | 22.0 | 28 | 11 | SD CL, R BRN, MST, ALL |
| 20 | 735 | | | | | DISCONTINUED. | |
| 25 | 730 | | | | | | |
| 30 | 725 | | | | | | |
| 35 | 720 | | | | | | |

* Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY SOIL PROFILE (SPLIT SPOON BORING)

SHEET 1 OF 1

PROJECT: KINGSTON S.P.
BORING: SS-38 STATION:
DATE DRILLED: 5/15/84 TO

FEATURE: DIKE C
RANGE: SURFACE EL: 749.3
PREPARED BY: MHD CHECKED BY: BA

| DEPTH ft. | EL | SPT (N) | * LOG | W | LL | PI | FIELD DESCRIPTION |
|--------------|-----|------------|----------|------|----|---------------|--|
| 5 | 745 | 42 | Σ S | 14.1 | NP | NP | GV CRS SD, DK GY, MST, BOT ASH FL |
| | | 25 | Σ S | 16.1 | NP | NP | GV CRS SD, DK GY-YEL BRN, V MST, BOT ASH FL |
| | | 17 | Σ S | 9.2 | NP | NP | STRAT: GV CRS SD(BOT ASH)80%, SI CLC(WTH SH)20%, BLK-BRN, MST, FL |
| | | 8 | Σ S | 16.7 | 30 | 8 | SI CLC(WTH SH), BRN, MST, FL |
| 10 | 740 | 7 | | | | NO RECOVERY | |
| 15 | 735 | 8 | CL | 18.6 | 28 | 11 | FN SD SI, R BRN, MST, ALLCTR RTS |
| | | 7 | CL | 20.1 | 28 | 11 | LAM FN SD SI, R BRN-GY, MST, ALLCTR GV, RTS) |
| | | 6 | CL | 21.0 | 28 | 11 | STRAT FN SD SI, R BRN-BRN, MST, ALLCTR RTS) |
| 20 | 730 | | | | | DISCONTINUED. | |
| 25 | 725 | | | | | | |
| 30 | 720 | | | | | | |
| 35 | 715 | | | | | | |

1''=5'

* Lab. Classif.