TVA 64 (OS-9-65)

WMS

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

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

FROM : R. O. Barnett, Chief, Civil Engineering Support Branch, W9D224 C-K

DATE : JAN 11 1983

SUBJECT: WIDOWS CREEK STEAM PLANT - BORROW AREA FOR SCRUBBER SLUDGE POND DIKE RAISING - TOP-OF-ROCK CONTOUR MAP

Reference: Memorandum from H. S. Fox to M. N. Sprouse dated September 20, 1982 (DES 820921 007)

On December 22, 1982, W. M. Seay of CEB hand carried the contour map requested in the reference memorandum to M. H. Miller of FDP for incorporation into a construction drawing to be issued by FDP. The map was at a scale of 1" = 100', contour interval of 2 feet, had 6 feet added to all contours and data points, and was contoured from both the soil boring and seismic refraction data.

During a meeting on December 20, 1982, between M. H. Miller and J.P.H. Stivers of FHP; R. J. Hunt, H. K. McLean, and W. M. Seay of CEB; and C. D. Loflin of CSB, caution was urged in utilizing the map to achieve an excavation with a final bottom configuration very much like the contour map but with some set soil thickness remaining. Due to the fairly broad (200$\pm$ feet) data centers and the saw-toothed character of the top-of-rock surface, there is some likelihood that rock between data points will occasionally be encountered higher than that indicated by the contour map. As such, the map should be used as only a guide to excavation, and the 6-foot elevation addition to the contours should provide sufficient buffer, thereby significantly reducing the likelihood of encountering rock.

As was also discussed, if we can assist CSB during excavation by providing additional seismic refraction, please contact us.

R. Joe Hunt

for R. O. Barnett

ROB:WMS:DDM

cc: MEDS, W5B63 C-K

M. N. Sprouse, W11A9 C-K

Principally Prepared By: W. M. Seay, Extension 4775

072008.06

Attend
Date
Other

UNITED STATES GOVERNMENT

Memorandum

DES '820921 007

TENNESSEE VALLEY AUTHORITY

M53 8209

SEP 21 '82

ENGINEERING DESIGN MANAGER'S OFFICE

Note	962	Noted
	Sprouse	
	Bowen	
	Burroughs	
	Cantrell	
	Dorrer	
	MEDS	

TO : M. N. Sprouse, Manager of Engineering Design, W11A9 C-K

FROM : H. S. Fox, Director of Fossil and Hydro Power, 716 EB-C

DATE : SEP 20 1982

SUBJECT: WIDOWS CREEK STEAM PLANT - BORROW AREA FOR THE SCRUBBER SLUDGE POND DIKE RAISING

We have been informed by representatives of the Construction Services Branch (CSB) that rock has been encountered in the borrow area to the south of the transmission lines. As agreed in the meeting of June 17, 1982 between the Offices of Power and Natural Resources and the Division of Engineering Design, we will complete the top of rock map prior to removing any borrow from the site of the new scrubber sludge wet stacking area.

Because of the problems encountered by the construction forces, it may become necessary to begin borrow activities in the area north of the powerlines in a short period of time. Therefore, we request that the top of rock map for phase I of the disposal area be prepared and provided to CSB as soon as possible to avoid potential project delays.

This work should be charged to the existing accounts for preliminary studies for the new wet stacking area (Job Order No. 31401-J83). Any questions regarding this matter should be directed to T. F. Manseill at extension 3505 in Chattanooga.

By copy of this memorandum, we request the Land Branch to obtain the required permits for access to any private tracts. Further information will be forwarded to Wade Cowan informally to expedite the project.

for H. S. Fox

CIVIL ENGINEERING BRANCH
SEP 29 1982

Received
SEP 23 '82
ENVIRONMENTAL DESIGN PROJECT

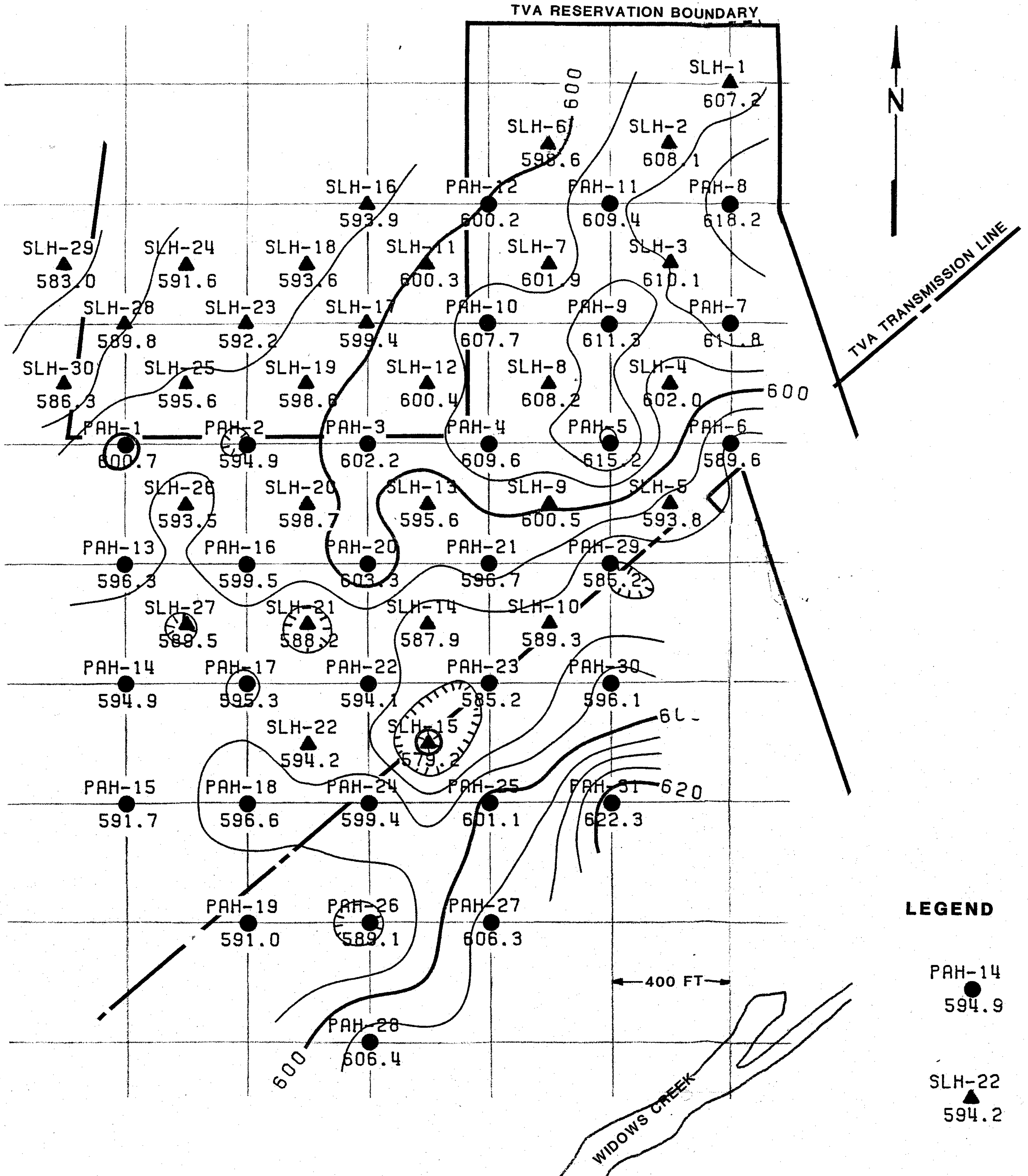
N	Supv	Date	N	Supv	Date
2	SBJ			WAG	
				WAB	
3	JAB			RNK	
2A	REH			RFS	
1	JAK	23			
	RWJ			LJC	
				KLS	
	RED				
	JAF			BLH	
	DAK				
				FPSR	

CCS:JTT:TFM:MLD
cc: ARMS, 810 EB-C
D. R. Gengozian, 115 LSB-K
H. H. Mull, E7B24 C-K
Conro L. Olive, Jr., 464 LB-C
Power Plant Superintendent, Widows Creek

9/21/82 - RGD:JL
cc: MEDS, W5B63 C-K
O. P. Thornton, 102 SPT-K - Please handle.--MNS

FDP '82 0928 005

9/28/82 - OPT:DKP
cc: R. O. Barnett, W9D224 C-K - Please provide top of rock map as soon as possible. --OPT
J. E. Holladay, W2D224 C-K - Information only.
xc: MEDS, W5B63 C-K



LEGEND

PAH-14 ● 594.9 — SOIL BORING TOP-OF-ROCK ELEVATION

SLH-22 ▲ 594.2 — SEISMIC REFRACTION STATION TOP-OF-ROCK ELEVATION

SCALE

0 200 400 FEET

CONTOUR INTERVAL IS 5 FEET

BORROW AREA FOR SCRUBBER SLUDGE POND DIKE RAISING

TOP-OF-ROCK CONTOUR MAP

WIDOWS CREEK STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED

KNOXVILLE | 12-17-82 | 34 GE

TVA 64 (OS-9-65)
UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

CEB '82 1206 012

TO : R. O. Barnett, Chief, Civil Engineering Support Branch, W9D224 C-K

FROM : W. M. McMaster, Chief, Data Services Branch, 350 EB-K

DATE : December 2, 1982

SUBJECT: WIDOWS CREEK STEAM PLANT - BORROW AREA FOR THE SCRUBBER SLUDGE POND DIKE RAISING

In reference to your memorandum to me dated October 21, 1982, attached is a tabulation listing the plant grid coordinates and elevations of thirty seismic stations at Widows Creek.

W. M. McMaster

KWK:KYR
Attachment
cc: H. S. Fox, 716 EB-C
S. E. Griffith, 6411 EBR-C (Attachment)
C. L. Olive, Jr., 464 LB-C
R. A. Painter, E5C80 C-K
M. D. Ramsey, FOR B-N
M. N. Sprouse, W11A9 C-K
O. P. Thornton, 102 SPT-K
DSB-TR, 335 EB-K (Attachment)

Prepared by Kary W. Kaley

ROB:KMP --12/6/82
cc: MEDS, W5B63 C-K (Attachment)

CIVIL ENGINEERING BRANCH
DEC 6 1982

IN N	IN Date	IN Time		OUT Date	OUT Time
✓			ROB	✓	
			KLW		
			JWM		
			TCC		
			WAE		
✓	8	11	RWA	8	12
✓	8	1	WMS	8	1
✓	7		RJH	8	8
Cy			KWK		
			ROH		
			TAR		

1 December 1982

TENNESSEE VALLEY AUTHORITY
DATA SERVICES BRANCH
AND MAPPING SERVICES BRANCH

WIDOWS CREEK STEAM PLANT
SEISMIC LOCATIONS
4TH ORDER

(Field Books: ESS-3064 Pages 1-7
ES-815 Pages 13-14)

Hole	Plant Grid Coordinates	Elevation (Feet)
SLH-1	E 95+62.0 N 19+43.6	624.1
SLH-2	E 92+79.1 N 19+43.1	621.8
SLH-3	E 89+96.8 N 16+59.7	625.9
SLH-4	E 87+14.5 N 13+76.3	615.1
SLH-5	E 84+32.2 N 10+92.9	607.0
SLH-6	E 89+95.7 N 22+25.4	613.4
SLH-7	E 87+13.4 N 19+42.0	617.8
SLH-8	E 84+31.1 N 16+58.6	622.5
SLH-9	E 81+48.8 N 13+75.2	621.3
SLH-10	E 78+66.6 N 10+91.8	610.1
SLH-11	E 84+30.1 N 22+24.3	612.2

Hole	Plant Grid Coordinates	Elevation (Feet)
SLH-12	E 81+47.8 N 19+40.9	611.4
SLH-13	E 78+65.5 N 16+57.5	613.9
SLH-14	E 75+83.2 N 13+74.2	608.6
SLH-15	E 73+00.9 N 10+90.8	608.6
SLH-16	E 84+29.5 N 25+07.2	609.1
SLH-17	E 81+47.2 N 22+23.8	608.4
SLH-18	E 81+46.7 N 25+06.6	606.6
SLH-19	E 78+64.4 N 22+23.2	610.3
SLH-20	E 75+82.1 N 19+39.8	609.9
SLH-21	E 72+99.8 N 16+56.4	608.4
SLH-22	E 70+17.5 N 13+73.1	605.6
SLH-23	E 78+63.8 N 25+06.1	607.6
SLH-24	E 78+63.3 N 27+88.9	602.6
SLH-25	E 75+81.0 N 25+05.5	610.7
SLH-26	E 72+98.7 N 22+22.1	607.9
SLH-27	E 70+16.4 N 19+38.8	606.6
SLH-28	E 75+80.4 N 27+88.4	606.2

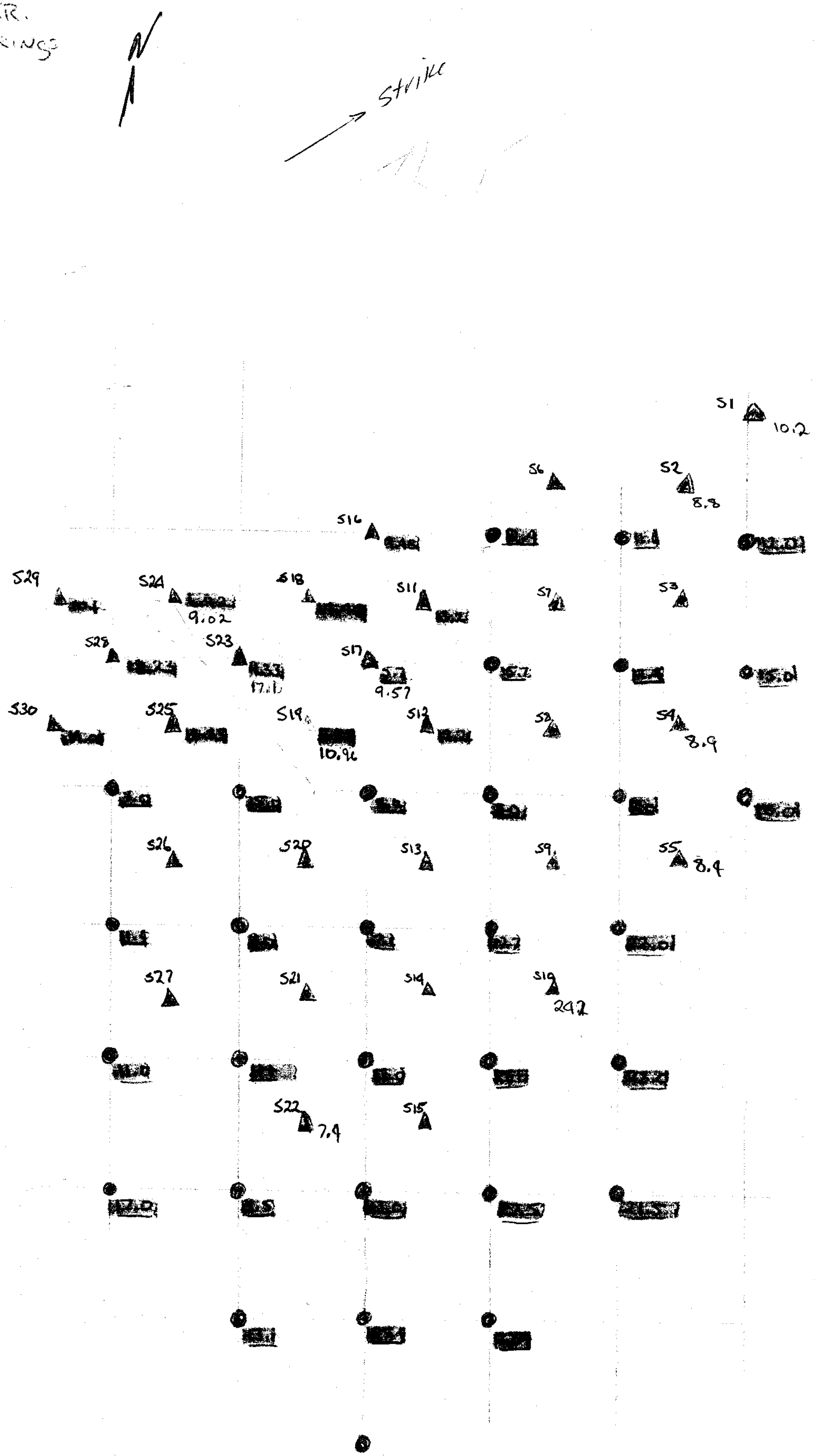
Hole	Plant Grid Coordinates	Elevation (Feet)
SLH-29	E 75+79.9 N 30+71.2	601.2
SLH-30	E 72+97.6 N 27+87.8	603.4

SHEET ______ OF ______

Widows Creek
Ash Dike Raising plan Borrow Invest.
Top of Rock
Seismic & Auger Boring

COMPUTED JAO DATE 16 Nov 82
CHECKED ______ DATE ______

▲ Seismic T.R.
● Auger Borings



Widows Creek

III Research / Setup

A. - Previous work on site or nearby

1. Soil auger holes

a) refusal depths

b) soil column

2. Seismic data

a. Rock Velocity = 16,000'/sec

b. Intermediate layers -

respective velocities -

3. Site Geology

B. Field parameters

1. Scope - accurately define rock ∴ 3+ phones @ 16K

2. 5' centers to define intersections - then 10-20'

3. Review procedures for data reduction

a) Program

b) total time (f = n)

4. Equipment to be used (data desired)

II Field data requisition

A. Site conditions

1. Topography - lines ‖ topography not ⊥

2. Lines long enough to satisfy B1

3. Rain etc -

4. Record anything that might influence data (signatures)

5. Keep settings same

B. Data acquisition

1. Label all records

2. Try to maintain continuity - signatures and/or picks

3. Occupy drill locations

III. Data reduction

A. What to input.

V_1 1200

V_2 3000-4000 - closer to 4000 due to wet conditions

V_3 16000 rock

B. Reduce drill locations first.

1. Compare results - if adj. necessary - try to get constant correction factor

C. Reduce remaining data in similar fashion trying as with acquisition keeping consistent (however if site conditions are expected to change allow for this)

Keep in Widows Ck File

INFORMATION PERTAINING TO

THE WIDOWS CREEK PROPOSED SCRUBBER

SLUDGE DISPOSAL PROJECT

Hal, This is the info packet I talked to you about Monday, if you need any other info contact me.

D. Allen

General Information

The proposed wet stacking of the oxidized scrubber sludge is expected to commence operation sometime in December 1984. The disposal project will encompass approximately 200 acres and will proceed in two phases, that is, there will be two identical stacks.

This information package includes design schematics, maps, soils reports, and other pertinent information to the project. In order the attachments are:

1. Schematic of wet stack contruction.

2. A map depicting the location of the disposal facility, private wells, waterways of concern, etc.

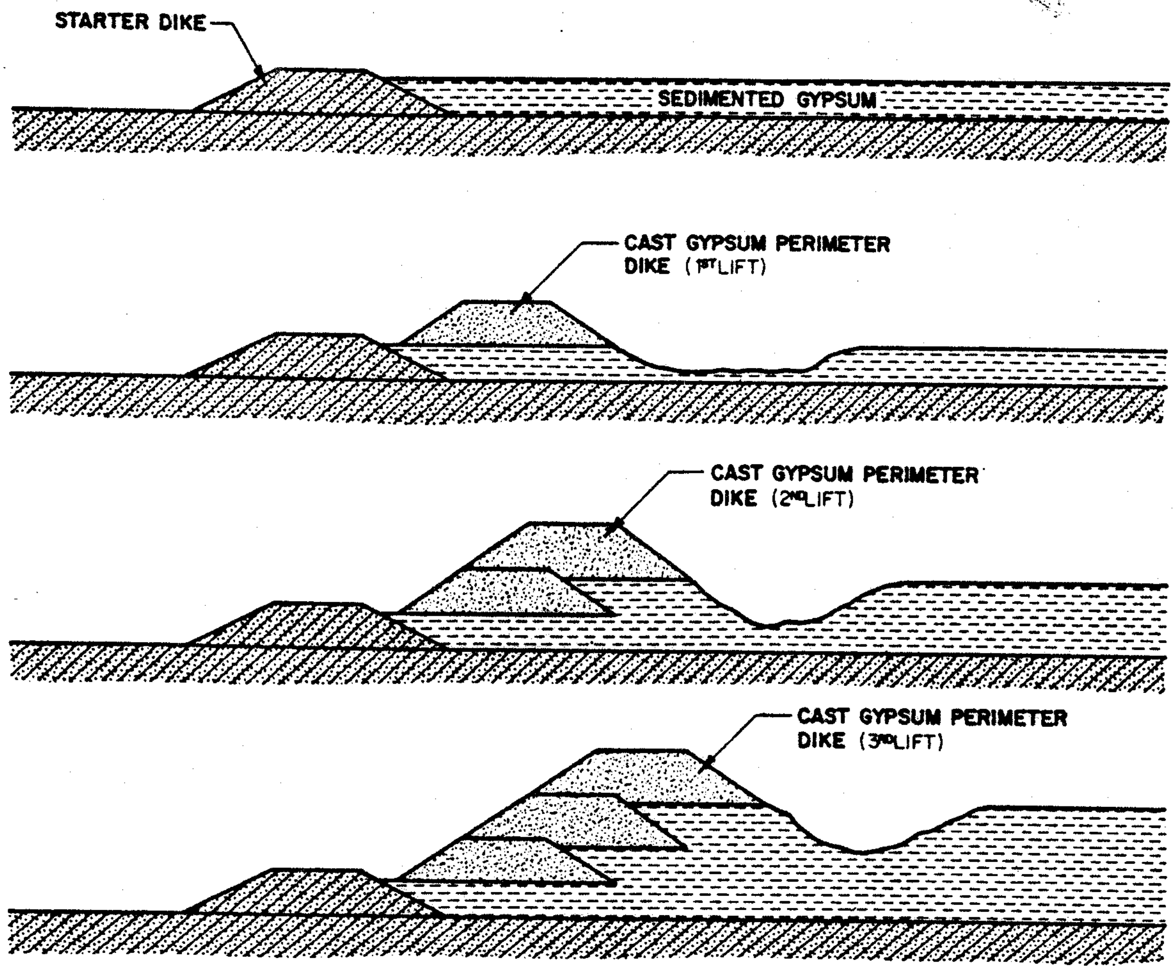
3. A map showing the expected land acquistion needed to complete the project.

4. A map showing the location of recent TVA core borings in the area of concern.

5. A soils report prepared by Ardaman and Associates, Inc., on the area where the wet stacking pilot study has been proposed. (Approximately 3/4 miles to the west of the proposed large scale disposal facility.)

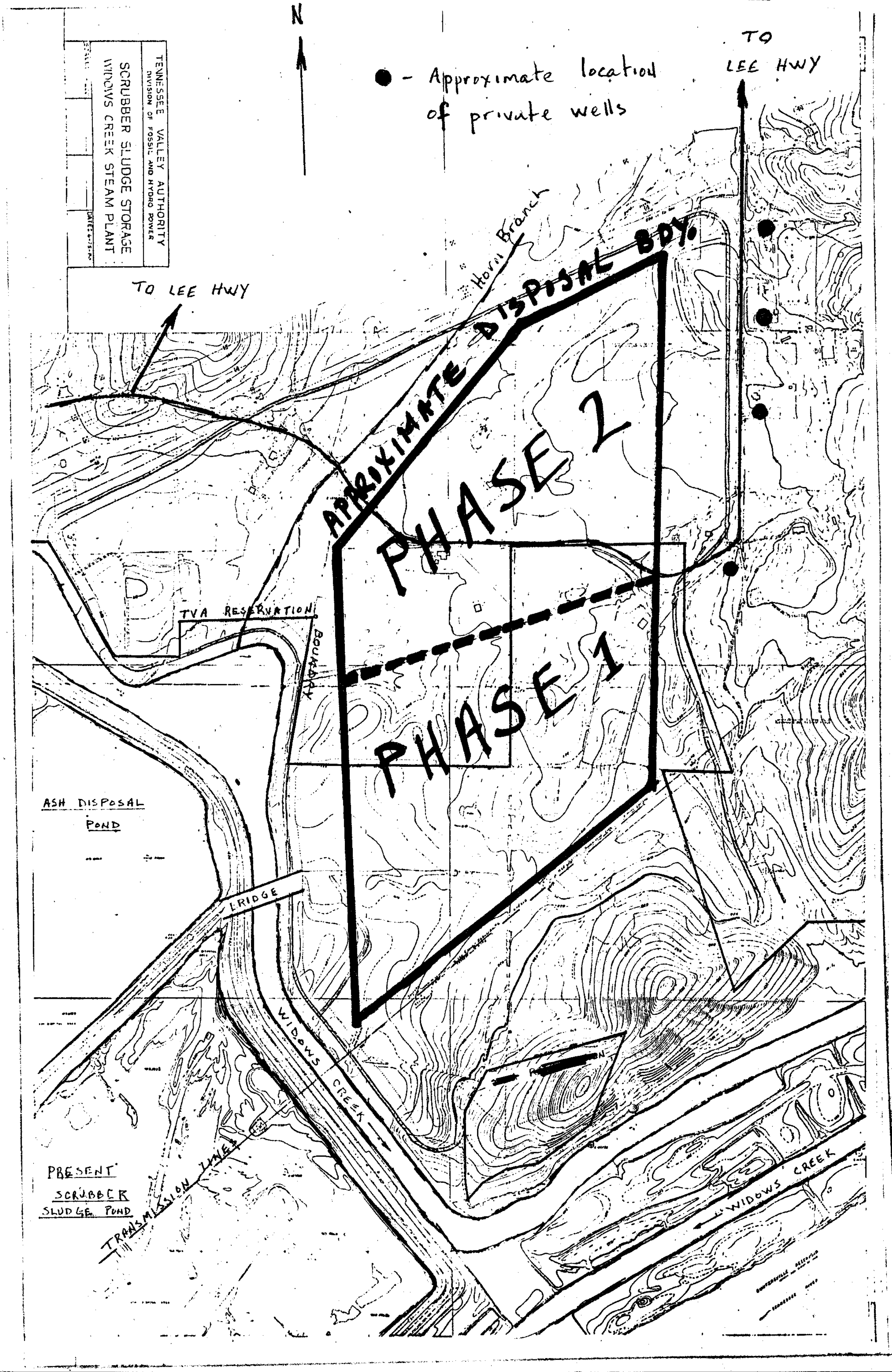
6. Seepage patterns to be expected with various soil conditions. Figure 16-7 best represents what we expect at Widows Creek Steam Plant.

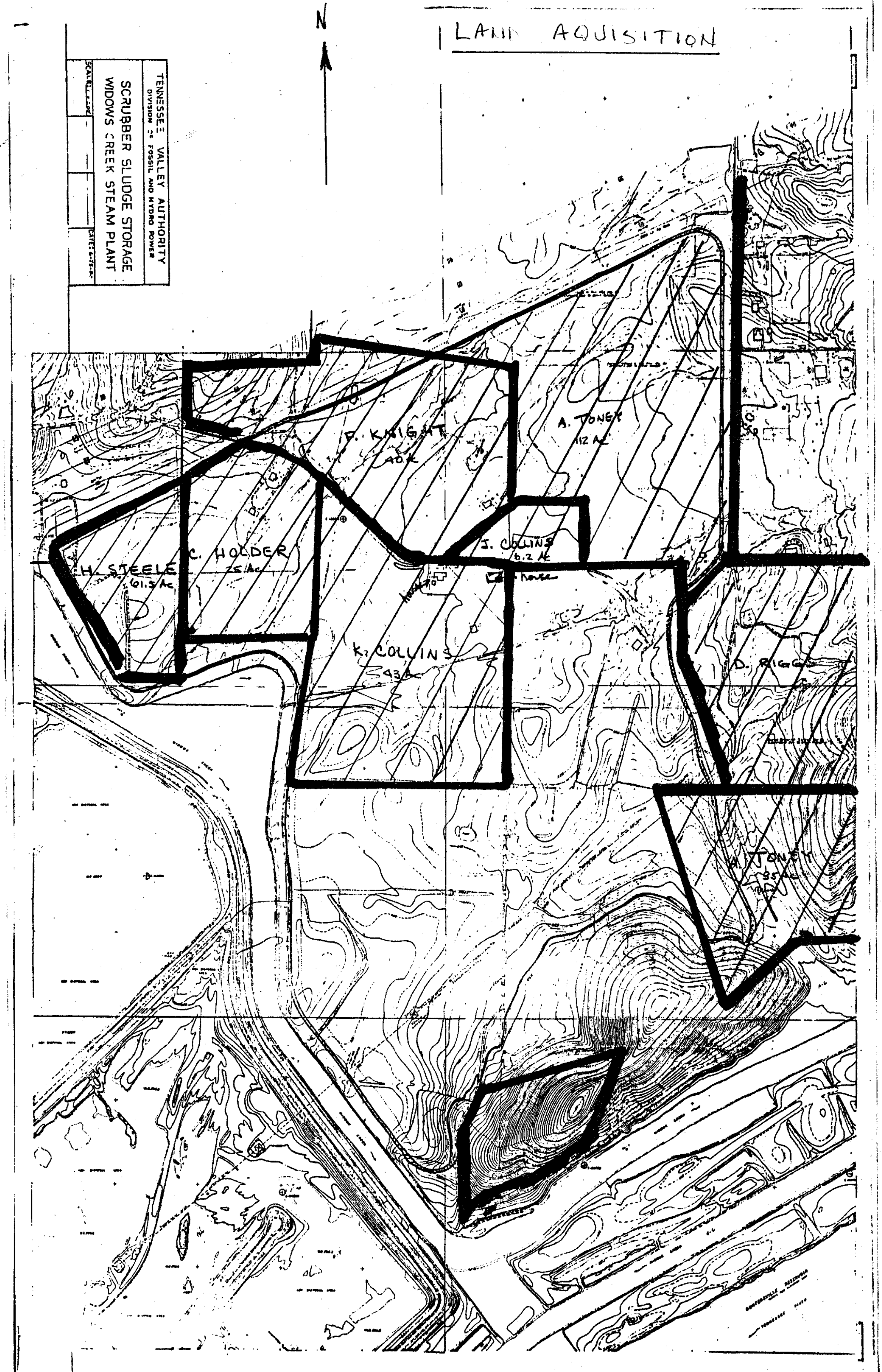
7. RCRA extraction studies performed on scrubber sludge from the existing scrubber pond.

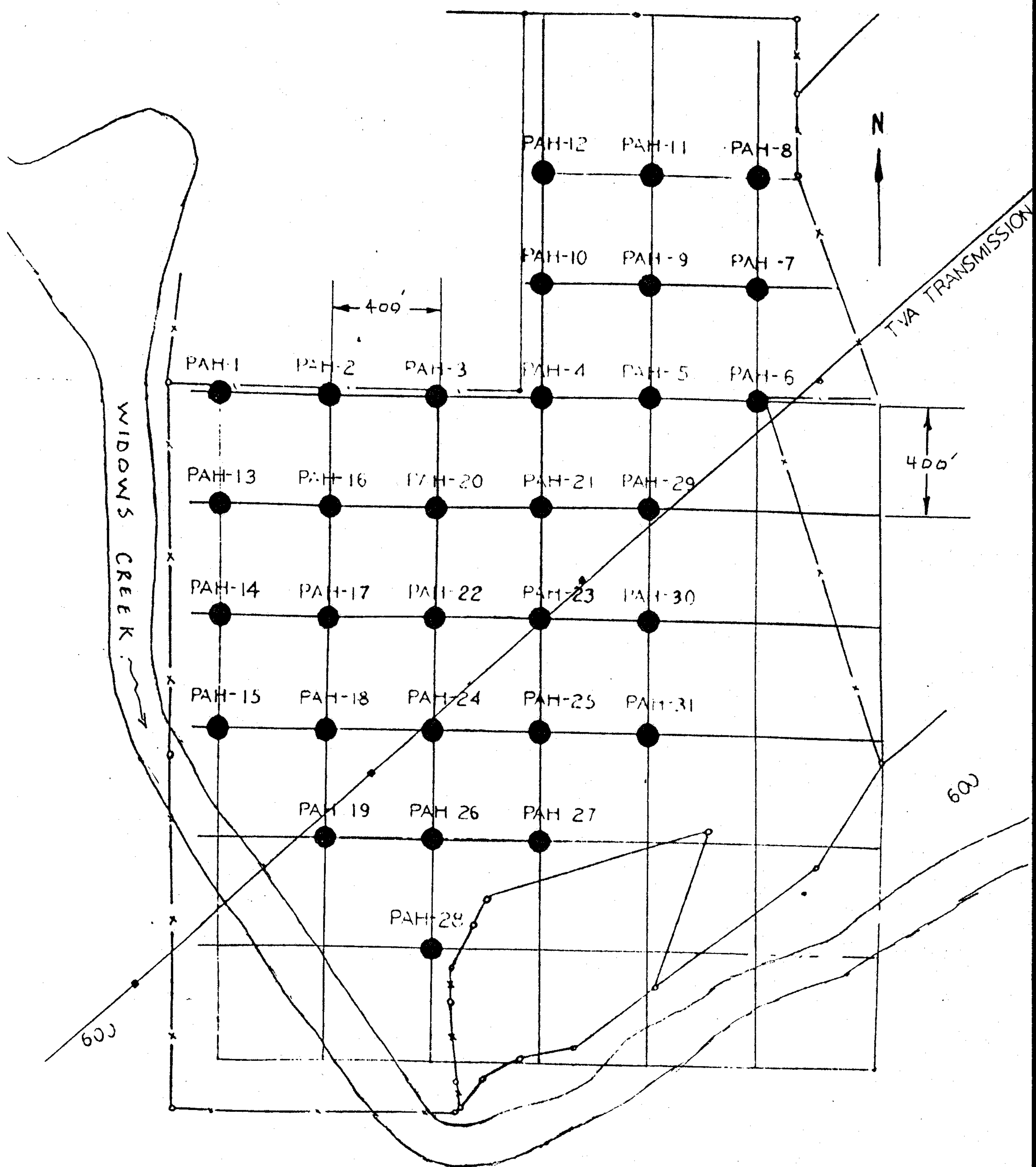


Upstream Method of Gypsum Stack Construction

OPERATION OVERVIEW




LAND AQUISITION
N
TENNESSEE VALLEY AUTHORITY
DIVISION OF FOSSIL AND HYDRO POWER
SCRUBBER SLUDGE STORAGE
WIDOWS CREEK STEAM PLANT
H. STEELE
61.5 Ac
C. HOLDER
25 Ac
P. KNIGHT
A. TONEY
112 Ac
J. COLLINS
6.2 Ac
house
K. COLLINS
A. TONEY



These ~~core~~ Auger borings indicate depths to refusal in the range of 6-28 ft., AVE = 15 ft. Soils WERE predominantly highly plastic clay And silt (70%) AND lean clay (30%). Based ON index properties soil permeabilities were estimated at 10^{-6} - 10^{-8} cm/sec. This SECTION ~~represts~~ represents about 75% of phase I.

SITE CONDITIONS

The proposed site of the disposal area is currently adjoined on two sides by existing dikes which are built 3 to 5 feet above adjacent ground, and on one side by an existing road. The proposed site is currently used as an equipment and materials storage area and is covered with gravel from an off-site borrow area.

A soils investigation consisting of two hollow-stem auger borings was performed in the disposal area on December 9 and 10, 1981 by the Tennessee Valley Authority (TVA). Based on this investigation, the site is characterized by approximately 5 feet of uncontrolled fill composed of rubble mixed with a slightly sandy lean clay, overlying 15 to 20 feet of fill composed of slightly sandy lean to fat clay. One undisturbed sample and one disturbed sample from the upper 5 feet of the profile indicated that the clay is characterized by: a natural moisture content of 31%; an in-place dry density of 86 lb/ft^3; a fines content (i.e., percent silt and clay size material by dry weight) of 85 to 90%; liquid limits of 31 to 44%; and plasticity indices of 11 to 20%. One laboratory permeability test on an undisturbed sample from these soils indicated a relatively low coefficient of permeability, k, of $8.4x10^{-8}$ cm/sec.

Underlying the upper 5 feet of uncontrolled fill is 15 to 20 feet of relatively soft, slightly sandy lean to fat clays which are also reported as fill. These soils are characterized by a natural moisture content of 26%; an in-place dry density of 98 lb/ft^3; a fines content of 75 to 95%; liquid limits of 32 to 52%; and plasticity indices of 13 to 26%. Two laboratory permeability tests on undisturbed samples yielded relatively low coefficients of permeability of $8.4x10^{-8}$ and $7.8x10^{-9}$ cm/sec. Underlying these soils is bedrock or an approximately 5-foot thick layer of residual sandy silt overlying bedrock.

At the time of the soils investigation, the groundwater level was reported at 1-foot below ground surface.

Overall, the results reported by the TVA soils investigation indicate that the disposal area is underlain by fill largely composed of slightly sandy lean to fat clays with rubble within the upper 5 feet. Laboratory permeability tests indicate relatively impervious foundation conditions ($k < 10^{-7}$ cm/sec), although the *in situ* coefficient of permeability may be greater since the fills were apparently randomly placed and also contain rubble. Borrow material used to construct the starter dike for the disposal area is scheduled to be obtained from within the disposal area. The high natural moisture content of the clays, the presence of rubble, and the high water table, however may make excavation and subsequent fill placement and compaction difficult.

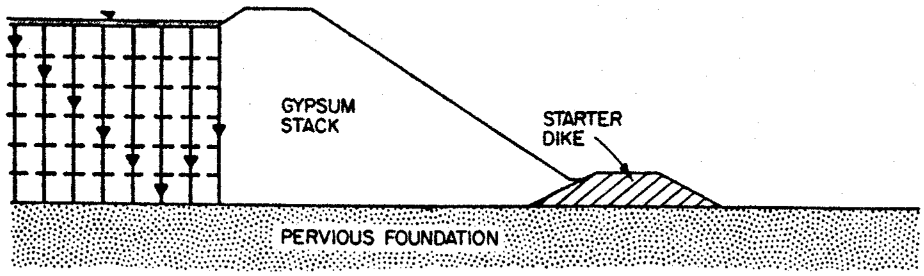


Figure 16-6. Seepage Pattern through a
Gypsum Stack on a Pervious Foundation

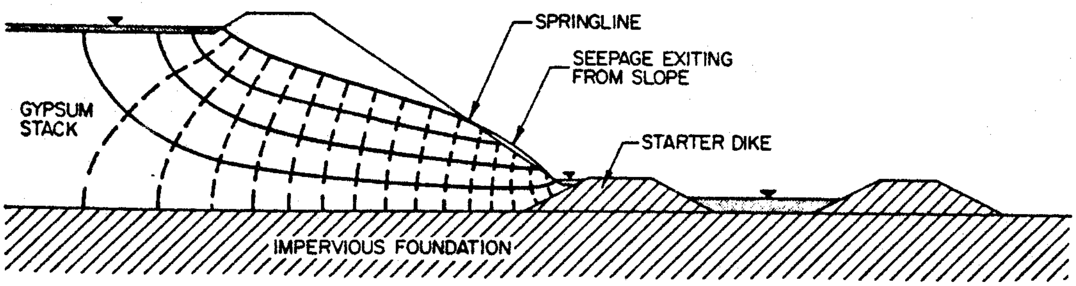
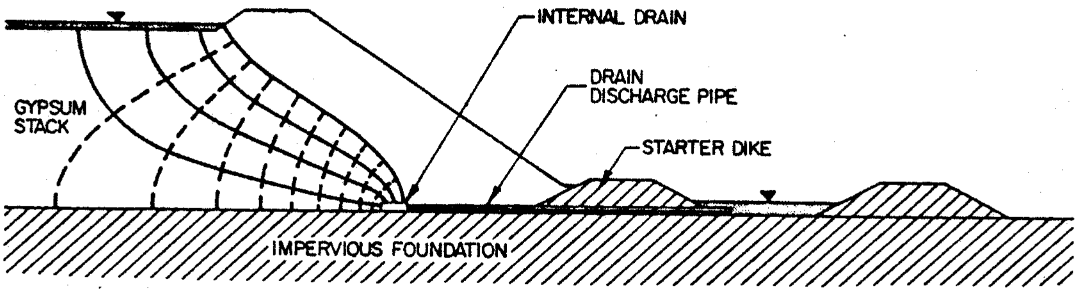


Figure 16-7. Seepage Pattern through a
Gypsum Stack on an Impervious Foundation



Effect of Internal Drain on
Seepage Pattern through a
Gypsum Stack on an Impervious Foundation

CHEMICAL ANALYSES OF FGD SLUDGE EXTRACTS AND INTERSTITIAL WATER FROM EXISTING SCRUBBER POND

	Concentration, mg/L	
	Pond core sludge extract[a]	Pond core sludge interstitial water[b]
Arsenic	0.004	0.090
Barium	2.7	0.64
Beryllium	<0.010	<0.010
Boron	15	20
Calcium	2,100	130
Cadmium	<0.001	0.001
Chromium	<0.005	<0.005
Copper	0.050	0.030
Iron	0.150	0.230
Lead	<0.010	0.015
Magnesium	19	2.8
Manganese	0.620	0.040
Mercury	<0.0002	<0.0002
Nickel	0.220	0.100
Selenium	0.014	0.034
Silver	0.040	0.030
Thallium	0.430	0.250
Zinc	0.030	0.020
Chloride	90	700
Sulfate	480	1,500

a. EPA extraction procedure extract of sludge from a layer of pond sediment between 10 and 50 cm below the solid-liquid interface.
b. Interstitial water physically extracted from the same sludge sample.

WMB

TVA 64 (OS-9-65)

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO : William M. McMaster, Chief, Data Services Branch, 350 EB-K

FROM : R. O. Barnett, Chief, Civil Engineering Support Branch, W9D224 C-K

DATE : OCT 14 1982

SUBJECT: WIDOWS CREEK STEAM PLANT - BORROW AREA FOR THE SCRUBBER SLUDGE POND DIKE RAISING

References: 1. Memorandum from H. S. Fox to M. N. Sprouse dated September 20, 1982 (DES 820921 007)

2. Memorandum from G. L. Buchanan to Frank Van Meter dated August 6, 1979 (CDB 790806 015)

In response to a request for a top-of-rock map for the borrow area for the scrubber sludge pond at Widows Creek Steam Plant (reference 1), we request that the grid system previously utilized during a Widows Creek Steam Plant soils investigation in this area (reference 2) be reestablished. Thirty additional stations for a seismic refraction survey need to be located as shown on the attachment. These locations should be given an appropriate alpha-numeric designation. Additionally, we request that four random original soil borings be relocated. All location stakes should be marked with the appropriate grid coordinates and elevations. A table with all pertinent data should be transmitted to us upon completion of your work.

The attachment to this memorandum identifies the survey site so the Land Branch of the Division of Property and Services can obtain the required permits for access to private land tracts as requested in reference 1. The Land Branch should be aware that seismic survey activities will include the use of a 4-wheel-drive vehicle and small subsurface blasts that will create minimal noise and, depending on soil conditions, possibly a crater 2 feet deep and 3 feet in diameter. All craters will be backfilled.

By copy of this memorandum, we request that the Cultural Resources Program of the Division of Land and Forestry Resources assess the potential impact of the seismic survey operations, described above, upon the site (attachment).

Any questions regarding budgetary matters related to operations should be directed to T. F. Manseill of the Division of Fossil and Hydro Power at extension 3505 in Chattanooga.

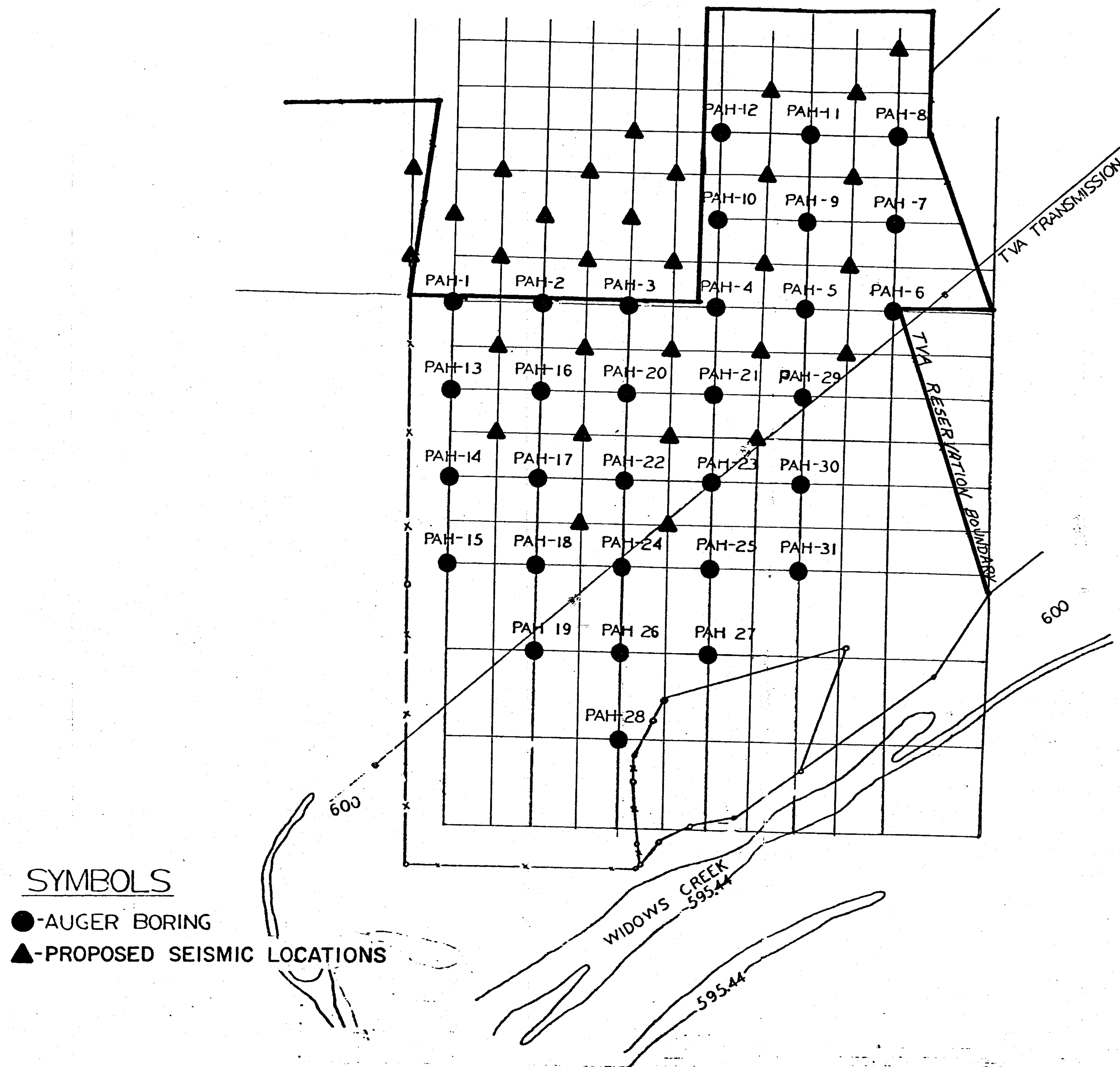
If you have any questions concerning these requests, please contact Bill Seay at extension 4775.

R. Joe Hunt
for R. O. Barnett

WCW
ROB:WCW:DDM
WMS
Attachment
cc (Attachment):
C. L. Olive, Jr., 464 LB-C
R. A. Painter, E5C80 C-K
M. D. Ramsey, FOR B-N
M. N. Sprouse, W11A9 C-K
J. T. Thompson, 705 EB-C
O. P. Thornton, 102 SPT-K

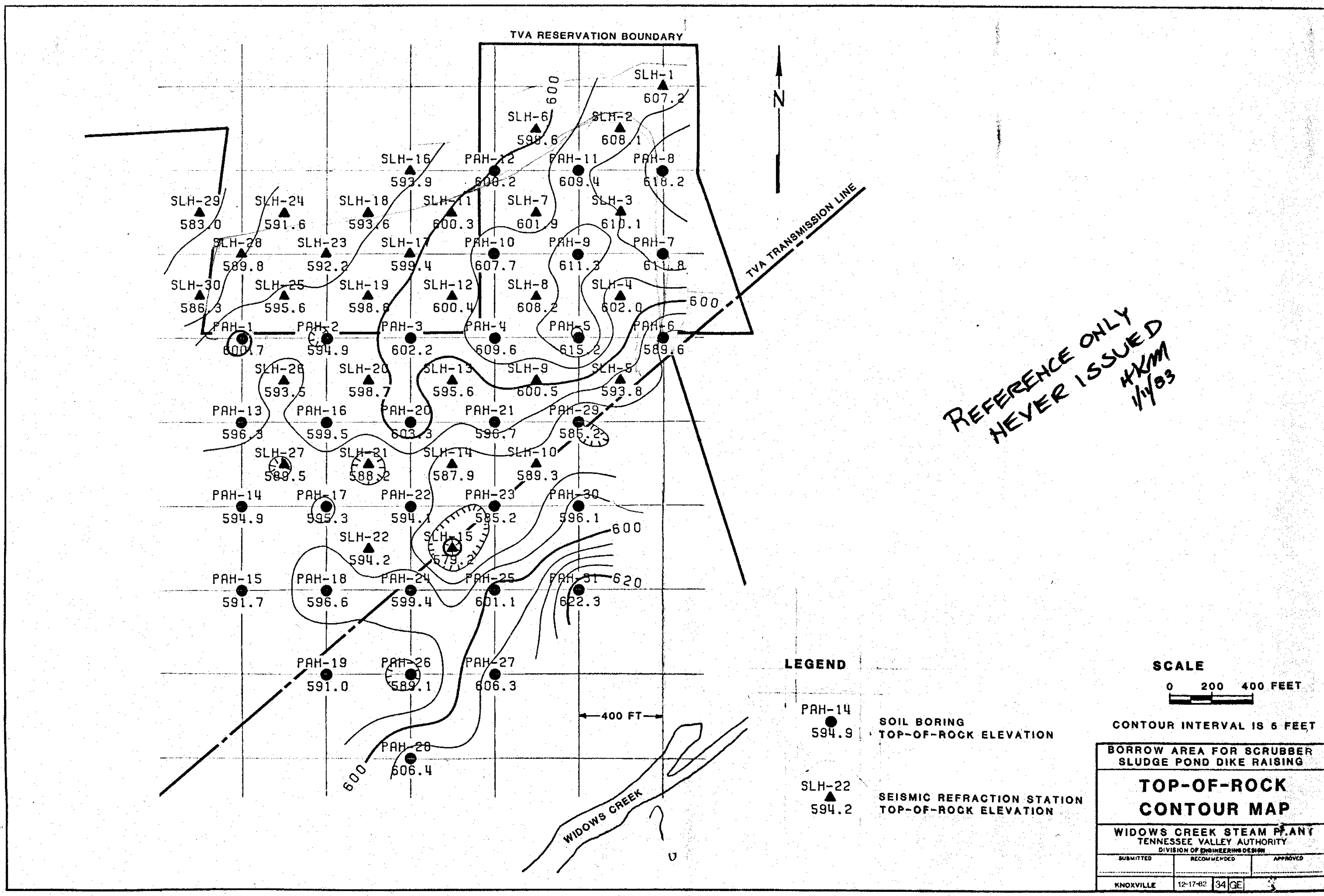
MNS:DDM -
cc (Attachment):
MEDS, W5B63 C-K
M. G. Msarsa, 268 401B-C

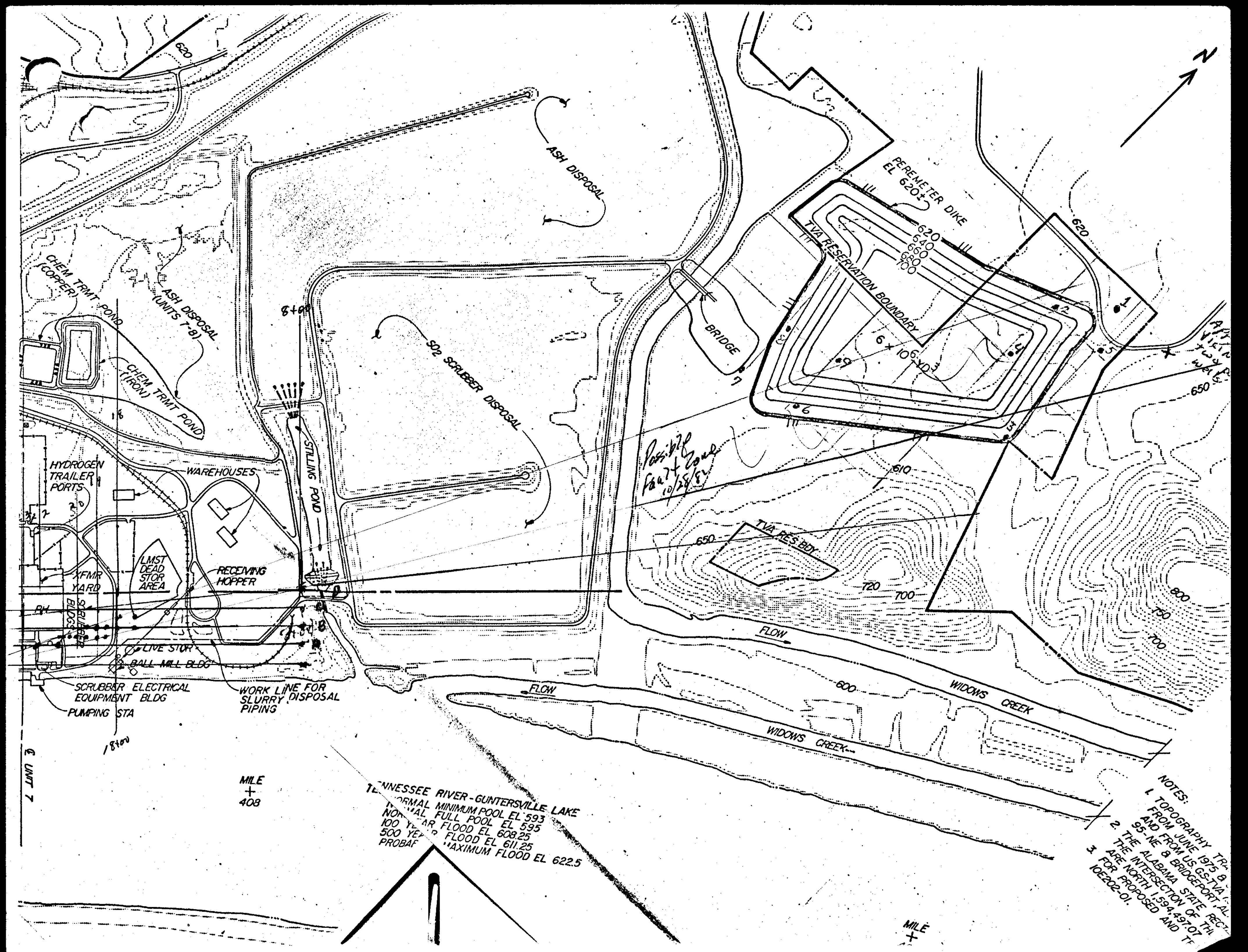
Principally Prepared By: Wade C. Whitaker, extension 4779



SCALE: 1" = 500'

WIDOWS CREEK STEAM PLANT				
ASH DIKE RAISING PLAN OF BORROW INVESTIGATION				
TENNESSEE VALLEY AUTHORITY MATERIALS ENGINEERING LABORATORY				
SUBMITTED WPM	RECOMMENDED	APPROVED		
KNOXVILLE	1-9-81	34	CS	3 604B1062R0


TVA RESERVATION BOUNDARY
TVA TRANSMISSION LINE
N
WIDOWS CREEK
400 FT
600
620
SLH-1 607.2
SLH-6 598.6
SLH-2 608.1
SLH-16 593.9
PAH-12 600.2
PAH-11 609.4
PAH-8 618.2
SLH-29 583.0
SLH-24 591.6
SLH-18 593.6
SLH-11 600.3
SLH-7 601.9
SLH-3 610.1
SLH-28 589.8
SLH-23 592.2
SLH-17 599.4
PAH-10 607.7
PAH-9 611.3
PAH-7 611.8
SLH-30 586.3
SLH-25 595.6
SLH-19 598.8
SLH-12 600.4
SLH-8 608.2
SLH-4 602.0
PAH-1 600.7
PAH-2 594.9
PAH-3 602.2
PAH-4 609.6
PAH-5 615.2
PAH-6 589.6
SLH-26 593.5
SLH-20 598.7
SLH-13 595.6
SLH-9 600.5
SLH-5 593.8
PAH-13 596.3
PAH-16 599.5
PAH-20 603.3
PAH-21 596.7
PAH-29 585.2
SLH-27 589.5
SLH-21 588.2
SLH-14 587.9
SLH-10 589.3
PAH-14 594.9
PAH-17 595.3
PAH-22 594.1
PAH-23 585.2
PAH-30 596.1
SLH-22 594.2
SLH-15 579.2
PAH-15 591.7
PAH-18 596.6
PAH-24 599.4
PAH-25 601.1
PAH-31 622.3
PAH-19 591.0
PAH-26 589.1
PAH-27 606.3
PAH-28 606.4
LEGEND
PAH-14 594.9 SOIL BORING TOP-OF-ROCK ELEVATION
SLH-22 594.2 SEISMIC REFRACTION STATION TOP-OF-ROCK ELEVATION
SCALE
0 200 400 FEET
CONTOUR INTERVAL IS 5 FEET
BORROW AREA FOR SCRUBBER SLUDGE POND DIKE RAISING
TOP-OF-ROCK CONTOUR MAP
WIDOWS CREEK STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN
SUBMITTED
RECOMMENDED
APPROVED
KNOXVILLE
12-17-82
34
GE
REFERENCE ONLY
NEVER ISSUED
1/1/83


ASH DISPOSAL
PEREMETER DIKE
EL 620±
620
640
660
680
700
TVA RESERVATION BOUNDARY
BRIDGE
6 × 106 YD
650
610
Possible Fault Zone 10/28/81
TVA RES BDY
720
700
800
750
FLOW
600
WIDOWS CREEK
WIDOWS CREEK
CHEM TRMT POND (COPPER)
ASH DISPOSAL (UNITS 7-8)
CHEM TRMT POND (IRON)
8+00
SO2 SCRUBBER DISPOSAL
STILLING POND
HYDROGEN TRAILER PORTS
WAREHOUSES
LMST DEAD STOR AREA
XFMR YARD
RECEIVING HOPPER
PH
SCRUBBER BLDGS
LIVE STOR
BALL MILL BLDG
SCRUBBER ELECTRICAL EQUIPMENT BLDG
PUMPING STA
WORK LINE FOR SLURRY DISPOSAL PIPING
18+00
℄ UNIT 7
MILE 408
TENNESSEE RIVER - GUNTERSVILLE LAKE
NORMAL MINIMUM POOL EL 593
NORMAL FULL POOL EL 595
100 YEAR FLOOD EL 608.25
500 YEAR FLOOD EL 611.25
PROBABLE MAXIMUM FLOOD EL 622.5
MILE
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NOTES:
1. TOPOGRAPHY TR... FROM JUNE 1975 8... AND FROM US GS-TVA ... 95-NE 8 BRIDGEPORT, AL...
2. THE ALABAMA STATE RECT... THE INTERSECTION OF TH... ARE NORTH 1,594,497.07
3. FOR PROPOSED AND ... 10E202-01.

from MHM, 3-8-85

Memorandum

TENNESSEE VALLEY AUTHORITY
B65 '85 0307 006

TO : C. C. Schonhoff, Director of Fossil and Hydro Power, 716 EB-C

FROM : R. G. Domer, Director of Engineering Projects, W11A6 C-K

DATE : MAR 7 1985

SUBJECT: WIDOWS CREEK STEAM PLANT - SCRUBBER SLUDGE OXIDATION FACILITIES - SCOPE MODIFICATIONS

We have evaluated our status of work on the gypsum stack area and recommend the following scope modifications. These modifications will improve the reliability of the finished product and document construction quantities.

Following is a brief description of the scope modifications along with schedule and budget information.

Scope

1. Provide additional engineering services beyond those for previous projects (reference Colbert ash pond 5 and John Sevier ash pond J) to monitor and document the integrity of the clay liner. These services will reduce the probability of recurrence of problems as we are currently experiencing at Colbert Steam Plant. Under part 1, OE and OC would:

   a. Review the engineering report and final design drawings to determine if any changes or additional investigations are necessary.

   b. Survey, plot, and compare the final excavated pond bottom contours with the excavation contours specified on the borrow drawing. Use ground truth techniques to obtain supplemental information on lining thickness. Establish a foundation inspection team to perform visual inspections of the stack foundation and clay liner. Identify problems and specify corrective action.

   c. Perform weekly site inspections to assist OC in satisfying final design requirements.

2. Provide additional initial controls to assist OC during borrow excavation within the pond to help assure an adequate pond liner remains to satisfy environmental requirements. Under part 2, OE and OC would:

   a. Provide a more accurate borrow excavation drawing by revising the original drawing (made in 1983) to reflect rock elevations obtained from borings made after the original issue. Borrow will be limited to approximately 5 feet above known rock elevations. By revising the drawing and using the conservative 5-foot cover, we will reduce the risks of infringing on the 3-foot clay liner that must be maintained over the rock.

C. C. Schonhoff
MAR 7 1985

WIDOWS CREEK STEAM PLANT - SCRUBBER SLUDGE OXIDATION FACILITIES - SCOPE MODIFICATIONS

b. Find additional borrow source. The amount of borrow available within the ponds dikes has been reduced due to the following.

- increase of bottom liner thickness from 3 to 5 feet
- relocation of internal dike
- later soils investigation reveal rock elevations are higher

3. Document "actual" fill and foundation excavation quantities and compare with "estimated" quantities. Final cost for actual quantities would be compared with estimated costs.

   a. Survey and plot initial x-sections of the dike foundation.

   b. Survey and plot x-sections of the dikes after the foundation excavation.

   c. Calculate actual fill and foundation excavation quantities based on the initial x-sections and the dike template specified by design drawings.

Schedule

Final recommendations for corrective action (if required) can be made within 4 weeks after borrow excavation in the stack area is completed.

Budget

The estimated engineering and surveying costs for these items are as follows:

1 a	$4,500 engineering		
1 b	$7,400 engineering	and	$6,000 surveying and field support)
1 c	$8,600 engineering		
2 a	$7,500 engineering	and	$1,700 surveying

C. Schonhoff
MAR 7 1985

WIDOWS CREEK STEAM PLANT - SCRUBBER SLUDGE OXIDATION FACILITIES - SCOPE MODIFICATIONS

2 b	$10,000	engineering (including field investigation)	and	$1,900 surveying
3 a,b,c	$8,000	engineering	and	$4,000 surveying

As a minimum, Items 1a, 1b, 2a, and 2b should be performed to reduce risks of future problems with the pond liner. Items 1c, 3a, 3b, and 3c are recommended to help monitor construction progress and prevent possible cost overruns. To avoid construction delays, please notify us by March 15 if you wish us to proceed with any or all of the items described. Additional funding authorization for each approved item will be required.

Please contact B. C. Morris, extension 6389, if you have questions or require additional information.

R. G. Domer

OPT:MHM:TB
cc: RIMS, SL26 C-K
R. O. Barnett, W9D224 C-K
C. Bonine, 12-108 SB-K
W. D. Hall, W12C62 C-K
O. P. Thornton, W3D224 C-K
F. Van Meter, 10-103 SB-K (3)

Principally Prepared By: M. H. Miller, Extension 3806 and
B. Clark Morris, Extension 6389

S65046.02

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WIDOWS CREEK STEAM PLANT

SCRUBBER WASTE DISPOSAL AREA
ENGINEERING REPORT, REVISION 1
MAY 1984

Widows Creek Steam Plant, located in the northeast portion of the State of Alabama, has eight operating units. Units 7 and 8 operate with limestone scrubbers with the raw waste ponded northwest of the plant. In 1981 TVA made the decision to utilize the forced oxidation process on scrubber waste from units 7 and 8. The disposal of the oxidized scrubber waste will be in an area located approximately 1.5 miles northeast of the plant just east of Widows Creek. The specific location is shown on drawing 34C10E231-01, RO.

General

The scrubber waste primarily consists of gypsum and fly ash. The waste will be transported from the plant area by pumping after it has undergone a forced oxidation process. Sluice water for the oxidized scrubber waste will be composed of 75-percent recycle from the ash pond and 25-percent raw water from the plant intake. The scrubber waste slurry lines will cross Widows Creek on a bridge and discharge the waste into the disposal area.

change The disposal area will be constructed in two phases designed to handle the wastes for approximately 20 years. The initial phase will be sufficient for approximately 5 years of disposal. During the first 5 years the only activity considered for phase 2 is excavation (borrow of overburden soils) and possibly the construction of the initial spillway. The same disposal method will be used in both phases.

An initial containment dike will be constructed of relatively impermeable soils excavated from the interior of the disposal area. Oxidized scrubber waste will be sluiced to the interior pond, where the solid scrubber waste will settle. The process water will be decanted by a gravity spillway to a sump collection pond, and the gypsum waste will be air dried. Interior ditches, slopes, and berms will be constructed using air dried gypsum. A perimeter runoff ditch will be maintained between the gypsum pile exterior slopes and the initial containment dike. This runoff will also be routed to the sump pond, which is common to phases 1 and 2. The sump pond provides collection for runoff from the exterior slopes and decanted process water from the interior pond.

Supernatant from the sump pond will be gravity drained to Guntersville Reservoir. This gravity discharge includes an entry skimmer, 30-inch steel pipe across Widows Creek, 30-inch buried concrete pipe, and an open channel flow to the reservoir. A weir constructed at the discharge from the concrete pipe into the open channel discharge ditch will provide for flow monitoring. The location and profiles of the discharge route are shown on drawings 34C10H232-1 and 34C10H232-2. Details of the discharge design are shown on drawings 34C10H232, sheets 01 through 09 (attached).

The disposal area is protected from the 100-year frequency flood (approximate elevation 608.5) by the containment dike. The dike will be grassed to protect against erosion and minimize washout during the 100-year flood.

changed ?

Data

The phase 1 disposal area includes approximately 59 acres inside the containment dike; the phase 2 contains 76 acres. The anticipated disposal volumes available are 3700 and 9900 acre-feet, respectively. The higher disposal volume of phase 2, with the relatively same base area as for phase 1, is due to the usage of the north face of the phase 1 stack as a retaining structure for phase 2. The volume of impermeable soils necessary to build the containment dike for phase I is estimated to be 225,000 cubic yards, and 238,000 cubic yards for phase II. The expected rate of waste generation is approximately 5000 gallons per minute at 13 percent solids.

Approximately 75 percent of the scrubber waste sluice water (4600 gal/m to 5100 gal/m) will be taken from the ash pond. The remainder will be provided by the plant raw water intake pumps. The expected rate of discharge from the scrubber disposal area sump pond to Guntersville Reservoir is approximately 6000 gal/m based on normal rainfall and 30-percent water retention by the waste material. This discharge will mix with discharge from the ash pond (between 15,500 gal/m and 16,100 gal/m) and flow into the Guntersville Reservoir. (Discharge occurs from the ash pond approximately 50 percent of the time (based on pH) and is recycled to the plant intake the remainder of the time.)

TVA performed a pilot study at WCF to identify stacking characteristics of the solid waste and to characterize the expected discharge wastewater quality from the new disposal area. A small quantity of sludge was oxidized to obtain gypsum, and the oxidized sludge was sluiced to an onsite pond.

Stacking characteristics of the waste as determined in the pilot study will be used in designing the interior slopes, ditches, and berms. The slopes of the containment dike and gypsum stack as well as the in situ foundation will be designed to provide a minimum safety factor of 1.5 at full hydrostatic head inside the disposal area. The compaction of the soils in the dikes results in a low permeability material which experience has demonstrated will result in little or no loss of water through the dikes.

Settling characteristics of the waste were studied in the test program. The gypsum settles relatively quickly with velocities ranging from 2.0 to 3.0 cm/min. To allow for settling of finer particles within the waste, a value of 0.5 cm/min can be used to determine a minimum required detention area. The interior pond depth may vary from two to fifteen feet during stacking operations. An averge depth of five feet will be assumed. For this depth, a settling time of approximately 5 hours will be required. For the projected flow rate of 5000 gal/m, a treatment volume of approximately 200,000 ft^3 would, therefore, be required, corresponding to an area slightly less than one acre. The projected final area in phase I will be greater than 20 acres. The interior pond will, therefore, provide adequate detention for settling of the waste prior to discharge of the process water into the sump pond.

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In the pilot study, samples of process water were collected at the exit from the stacking area (pond) into a sump pond from which process water was recycled. The chemical composition of the process water samples is given in Table 1. This composition is expected to be generally representative of the discharge water, but conservative in the following regards:

1. The pilot study was operated in a continuously closed loop which could result in a buildup of metals concentrations in the process water to an equilibrium with concentrations in the oxidized scrubber sludge. The actual system will discharge rather than recycle, and

2. The samples from the pilot test facility were taken upstream of a sump pond. Settling in the sump pond may further reduce levels of settleable solids and metals.

The perimeter runoff ditch and the sump pond, as well as the interior ponds with spillway, will be designed to control a 10-year 24-hour rainfall event.

Soils

Soil investigations were conducted in the phase I disposal area during 1980 and 1983 to identify borrow material and to define the in-situ soil properties. These reports were issued on March 9, 1981, and October 20, 1983, and entitled Division of Engineering Design's Soil Schedule Numbers 85.1, and 83.2, respectively. Copies of these reports have been provided separately.[1]

The 1980 investigation included 31 auger borings drilled at 400-foot centers and a laboratory testing program consisting of soil classification, standard compaction (ASTM D 698), and triaxial shear tests. Samples for the triaxial shear tests were remolded to 95-percent maximum standard dry density with moisture content within 3 percent of optimum.

Soil investigation performed during 1983 included 50 split-spoon borings and 8 undisturbed borings. The laboratory testing program consisted of soil classification, triaxial shear, consolidation, and permeability tests. Triaxial shear and consolidation tests were conducted on representative undisturbed samples. Permeability tests were performed on representative undisturbed and remolded samples.

Additionally, a seismic refraction survey was performed during 1982 to define top-of-rock elevations. All auger borings, split-spoon borings, undisturbed borings, and seismic refraction stations are shown on the drawing 34C10E217-01, R1.

The average soil overburden depth in the phase I borrow area (bounded by the dikes) was approximately 11 feet with a minimum depth of 2 feet and a maximum of 22 feet. Borrow from this area will be taken such that a minimum of 3 feet of soils will remain in place. Permeability of these in situ soils is in the range of 1.6×10^{-6} cm/sec to 6×10^{-8} cm/sec which indicates relatively impervious material. The borrow depth will be based

where? fill would be reqd to provide the min acceptable cover upon known top-of-rock elevations as previously determined by the auger and split-spoon borings and seismic refraction. Should borrow excavation uncover an unexpected high portion of rock, a minimum backfill of 3 feet of compacted clay will be installed. The borrow soils consist primarily of clays, classified as CH or CL (Unified Soil Classification System). The borrow soils specimens remolded to 95-percent maximum standard dry density near optimum moisture content exhibited a permeability range of 6×10^{-6} to 7×10^{-8} cm/sec which indicates that the borrow material available at the site would result in a relatively impervious soil mass when properly compacted. Therefore, the borrow soils are suitable for constructing (1) a compacted clay liner between the bottom of the gypsum/fly ash stack and top of rock (if rock is exposed during the borrow excavations or foundation preparations) and (2) a relatively impervious containment dike around the disposal area to allow very little or no seepage losses. impossible

Split-spoon borings drilled at the proposed location of the containment dike and its general vicinity indicated that thickness of soil overburden varies between 6± and 35± feet with an average of 14± feet. In general, the soil profile at the dike foundations consists of up to 1 foot of topsoil followed by a clay CL layer up to 11 feet thick. The CL layer is underlain by a CH stratum up to 19 feet in thickness. Bedrock is generally encountered below the CH stratum. The consistency of the in situ soils generally varies from stiff to very stiff. The borings did not reveal any zone of pervious material. Therefore, the possibility for any significant seepage through the dike foundations is remote. The foundation soils are adequate to support the dike.

Geology

Core drill investigations which were initiated for the foundation of Widows Creek Steam Plant adjacent to the disposal site resulted in the various stratigraphic units being identified for engineering related studies and for purposes of correlation. Since the disposal area is northeast along the strike from the steam plant, the same stratigraphic units will be present. Bedrock underlying the disposal area will be limestone, siltstone, and shale of the Chickamauga Group of Ordovician age. The limestones are generally thin to medium bedded and contain varying amounts of silt. Siltstones and shales are interbedded with the limestones. The strata dip to the southeast at an angle of 12 to 15 degrees from the horizontal.

Borings at the proposed disposal site indicated a depth to top of rock greater than within the phase I area ranging from 2 to 22 feet. Thus, an irregular or stepped top-of-rock surface similar to that encountered at the steam plant is anticipated due to the uneven rate of weathering of the various strata. Excavations in similar situations (i.e., the Widows Creek powerhouse and Bellefonte Nuclear Plant), show a top-of-rock surface consisting of alternating highs and lows. This results from the uneven rate of weathering of beds of varying resistance. The long axis of these highs and lows trends northeast along the strike of the inclined beds. These lows, produced by weathering of more susceptible beds, may contain accumulations of coarser insoluble material and act as conduits for movement of

Could this be another Colbert?

groundwater. Minor deep weathering along joints and faults can produce effective travel paths for groundwater as seen in Widows Creek unit 7 foundation drilling, where instantaneous air and water connections were observed and recorded between at least 10 drill holes which intercepted a weathered fault plane.

Groundwater

Groundwater in the vicinity of the proposed scrubber sludge disposal area occurs under unconfined water table conditions, and movement is generally toward Widows Creek and Widows Creek Steam Plant. The development of a gypsum stack will create a mound in the water table which will alter both the movement and quality of groundwater in the vicinity of the stack.

Groundwater use is limited to small withdrawals for domestic use within a 1-mile radius. Four domestic wells are located approximately 700 feet east of the proposed disposal areas. A computer simulation of the effects of the disposal area on groundwater was performed to determine impacts of the Phase I disposal area on the closest domestic well and on Widows Creek. The simulation included modeling of hydrodynamics and solute transport. A discussion of the simulation and analysis of the results are provided in Appendix A.

Based on the results of the simulation, the potential for contamination of the domestic well located 650 feet upgradient of the gypsum stack will be minimal. The simulation shows that some reversal of groundwater flow occurs due to the mounded water table. The reversal of flow, however, will be limited to a small region beneath the gypsum stack, and will not reach the nearby private well. The likely effect of the gypsum stack on the nearby wells will be to raise the water table in the area of the wells by about a foot. This occurs because the mound beneath the gypsum stack will impede the flow of water towards Widows Creek and, in response to this impedance, the upgradient hydraulic head will increase to allow the natural groundwater flow to reach Widows Creek.

Effects of the waste leachate on groundwater quality have also been simulated. The contaminants which eventually reach Widows Creek will be sufficiently diluted such that effects on water quality will be insignificant.

Groundwater monitoring wells are shown on attached drawing 34C10E214, R4. Shallow monitoring well W-15 has been installed to monitor groundwater in the overburden. Although no contamination is anticipated based on the hydrodynamic modeling, wells W-12, W-13, and W-15 will provide indication of any change in groundwater quality prior to its reaching the nearby private wells.

Closure

Upon completion of storage of scrubber waste, the area will be reclaimed by draining the remaining water from the area and allowing the waste to dry. When the waste has dried, the top of the area will be graded to provide sheet flow of precipitation across the top and down the slopes into the runoff collection ditch and into the sump pond.

The top of the scrubber waste pile will be covered with 4 to 6 inches of earth, and a good cover of vegetation will be established and maintained to prevent erosion. TVA experience is that 2 to 6 inches of cover is needed to support vegetation of sufficient quality and quantity for the production of hay or pasture. Supporting information is contained in Appendix B. The gravity drain to Guntersville Reservoir will be maintained until vegetation cover is established and then the water level inside the sump pond will be lowered by appropriate means to be determined at that time.

Footnotes

[1]Soil Schedule Number 85.1 was submitted with RO of the engineering report on May 13, 1983. Soil Schedule Number 83.2 was submitted on January 26, 1984.

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WIDOWS CREEK STEAM PLANT

SCRUBBER WASTE DISPOSAL AREA
ENGINEERING REPORT, REVISION 1
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The disposal area will be constructed in two phases designed to handle the wastes for approximately 20 years. The initial phase will be sufficient for approximately 5 years of disposal. During the first 5 years the only activity considered for phase 2 is excavation (borrow of overburden soils) and possibly the construction of the initial spillway. The same disposal method will be used in both phases.

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Footnotes

[1]Soil Schedule Number 85.1 was submitted with RO of the engineering report on May 13, 1983. Soil Schedule Number 83.2 was submitted on January 26, 1984.

~~Attachment 1~~

WIDOW CREEK STEAM PLANT

BORROW AREA FOR SCRUBBE SLUDGE POND DIKE RAISING

Soil Borings

Boring Number	Surface Elevation	Depth to Top of Rock (Feet)	Top-of-Rock Elevation
PAH-1	608.7	8	600.7
PAH-2	609.9	15	594.9
PAH-3	610.2	8	602.2
PAH-4	617.6	8	609.6
PAH-5	620.2	5	615.2
PAH-6	607.6	18	589.6
PAH-7	626.8	15	611.8
PAH-8	630.2	12	618.2
PAH-9	623.7	12.4	611.3
PAH-10	623.4	15.7	607.7
PAH-11	621.0	11.6	609.4
PAH-12	612.6	12.4	600.2
PAH-13	607.3	11	596.3
PAH-14	605.9	11	594.9
PAH-15	608.7	17	591.7
PAH-16	607.5	8	599.5
PAH-17	606.3	+11	<595.3
PAH-18	606.1	9.5	596.6
PAH-19	604.0	13	591.0
PAH-20	610.3	7	603.3
PAH-21	614.4	17.7	596.7
PAH-22	607.1	13	594.1
PAH-23	613.2	+28	<585.2
PAH-24	612.4	13	599.4
PAH-25	628.6	27.5	601.1
PAH-26	617.1	+28	<589.1
PAH-27	634.3	+28	<606.3
PAH-28	624.4	+18	<606.4
PAH-29	607.2	22	585.2

mean 15.3
s.d. 6.9

both sets
mean 15.4
s.d. 5.7

Attachment

Boring Number	Surface Elevation	Depth to Top of Rock (Feet)	Top-of-Rock Elevation
PAH-30	624.1	28	596.1
PAH-31	643.8	21.5	622.3

NOTE:

Borings PAH-17, PAH-23, PAH-26, PAH-27 and PAH-28 were ~~not used because they were~~ discontinued prior to encountering rock. The top-of-rock elevations for ~~these~~ borings represent the highest possible ~~elevations for the top-of-rock~~. elevations for the locations

Note

Seismic changes
TR values changed
after coordinating
w/ drill control

1/10/85
RAM

~~Attachment 2~~

WIDOWS CREEK STEAM PLANT

BORROW AREA FOR SCRUBBER SLUDGE POND DIKE RAISING

Seismic Refraction Stations

Station Number	Surface Elevation	Depth to Top of Rock (Feet)	Top-of-Rock Elevation		Till Plot [illegible]
SLH-1	624.1	16.9	607.2	[illegible]	620.7
SLH-2	621.8	13.7	608.1	[illegible]	618.9
SLH-3	625.9	15.8	610.1	+7.1	673.2
SLH-4	615.1	13.1	602.0	+4.2	612.2
SLH-5	607.0	13.2	593.8	+4.8	604.6
SLH-6	613.4	14.8	598.6	+5.8	610.4
SLH-7	617.8	15.9	601.9	+6.8	614.7
SLH-8	622.5	14.3	608.2	+4.2	618.4
SLH-9	621.3	20.8	600.5	+7.0	613.5
SLH-10	610.1	20.8	589.3		
SLH-11	612.2	11.9	600.3	+4.4	610.7
SLH-12	611.4	11.0	600.4	+4.6	611.0
SLH-13	613.9	18.3	595.6	+7.1	608.7
SLH-14	608.6	20.7	587.9		
SLH-15	608.6	29.4	579.2		
SLH-16	609.1	15.2	593.9	+5.8	605.7
SLH-17	608.4	9.0	599.4	+3.3	608.7
SLH-18	606.6	13.0	593.6	+5.4 mean 15.6	605.[illegible]
SLH-19	610.3	11.7	598.6	+5.1 s.d. 4.1	60[illegible]
SLH-20	609.9	11.2	598.7	+4.2	608.9
SLH-21	608.4	20.2	588.2	+7.9	602.1
SLH-22	605.6	11.4	594.2	+4.1	604.3
SLH-23	607.6	15.4	592.2	+6.1	604.3
SLH-24	602.6	11.0	591.6	+4.4	602.0
SLH-25	610.7	15.1	595.6	+6.1	607.7

(56)

~~Attachment 2~~

Station Number	Surface Elevation	Depth to Top of Rock (Feet)	Top-of-Rock Elevation	
SLH-26	607.9	14.4	593.5	+5.4 [illegible]
SLH-27	606.6	17.1	589.5	+6.3
SLH-28	606.2	16.4	589.8	+5.6
SLH-29	601.2	18.2	583.0	+8.0
SLH-30	603.4	17.1	586.3	
PAH-10*	623.4	16.1	607.3	⊥ strike
PAH-12*	612.6	13.8	598.8	∥ strike

Notes

1. Stations marked with an asterisk (*) are control stations
2. Seismic refraction depth to the top of rock are accurate within ±10%

1/10/85 RAH

CALCOMP DATA SHEET

TR TR+6'

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
SS-1	1110	2990		598.8
SS-2	1120	3385		603.5
SS-3	1140	3785		599.4
SS-4	1205	4050		592.5
SS-5	1605	4150		599.5
SS-6	2000	4275		604.3
SS-7	2270	4340		609.0
SS-8	2610	4510		608.6
SS-9	2890	4610		619.2
SS-10	3090	4395		626.3
SS-11	3120	4120		609.9
SS-12	3170	3800	Replace w/US-12 ✓	597.4
SS-13	3120	3560		600.7
SS-14	2985	3360		601.0
SS-15	2700	3160	Replace w/US-15A ✓	581.2
SS-16	2480	2950		593.1
SS-17	2760 ↔	2250	589.8 ✓ ~~590~~ →	598.8
SS-18	2560 ↔	2020		597.0
SS-19	2570 ↔	1600		601.0
SS-20	1405	3190		603.7
SS-21	1400	3990		597.5
SS-22	1005	3185		603.3
SS-23	1005	3590	599.5 ✓ ~~600.5~~ →	610.[illegible]
SS-24	1005	3985	Replace w/US-24	571.2
SS-25	1205	4385		591.8
SS-26	1605	4390		599.4
SS-27	2065	4490		602.7

CALCOMP DATA SHEET

1/10/85 pg. 2 of.

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
SS-28	2400	4720		607.5
SS-29	2790	4800		607.1
SS-30	3120	4790		620.9
SS-31	3400	4200		633.2
SS-32	5330	3730		600.8
SS-33	3210	3200		601.0
SS-34	1800	2790		603.2
SS-35	1600	2990		604.9
SS-36	2000	2990		607.6
SS-37	1800	3190		607.5
SS-38	~~1800~~ 2200	~~3425~~ 3195		605.1
SS-39	1600	3425		603.9
SS-40	2000	3390		607.8
SS-41	2400	3400		611.4
SS-42	2200	3600		609.1
SS-43	2600	3600		615.1
SS-44	2000	3800		604.0
SS-45	2800	3900		626.2
SS-46	2000	4060		600.2
SS-47	2600	4000		609.5
SS-48	2400	4195		609.5
SS-49	2810	4320		618.3
SS-50	~~[illegible]~~ 1905	2790		601.3
[illegible]				
[illegible]				
SS-53				
SS-54				

CALCOMP DATA SHEET

Mike 2272 Replace

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
US-12	3165	3795		602
~~US-15~~	~~2795~~	~~3155~~		~~586.5~~
US-15A	2695	3155		591
US-24	1000	3980		587.5

1" = 400'
CI = 5' 4th BOCO

Title: Widows Creek Scrubber Sludge Borrow

CALCOMP DATA SHEET

PAH-1
SLH-1

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
PAH-1	1200	3600	600.7	606.7
PAH-2	1600	3600	594.9	600.9
PAH-3	2000	3600	602.2	608.2
PAH-4	2400	3600	609.6	615.6
PAH-5	2800	3600	615.2	621.2
PAH-6	3200	3600	589.6	595.6
PAH-7	3200	4000	611.8	617.8
PAH-8	3200	4400	618.2	624.2
PAH-9	2800	4000	611.3	617.3
PAH-10	2400	4000	607.7	613.7
PAH-11	2800	4400	609.4	615.4
PAH-12	2400	4400	600.2	606.2
PAH-13	1200	3200	596.3	602.3
PAH-14	1200	2800	594.9	600.9
PAH-15	1200	2400	591.7	597.7
PAH-16	1600	3200	599.5	605.5
PAH-17	1600	2800	(-595.3)	601.3
PAH-18	1600	2400	596.6	602.6
PAH-19	1600	2000	591.0	597.0
PAH-20	2000	3200	603.3	609.3
PAH-21	2400	3200	596.7	602.7
PAH-22	2000	2800	594.1	600.1
PAH-23	2400	2800	(-585.2)	591.2
PAH-24	2000	2400	599.4	605.4
PAH-25	2400	2400	601.1	607.1
PAH-26	2000	2000	(-589.1)	595.1
PAH-27	2400	2000	(-606.3)	612.3

CALCOMP DATA SHEET

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35		
PAH-28	2000	1600	(-606.4)		612.4
PAH-29	2800	3200	585.2		591.2
PAH-30	2800	2800	596.1		602.1
PAH-31	2800	2400	622.3		628.3
				*	1/10/85
SLH-1	3200	4800	607.2	620.7	613.2
SLH-2	3000	4600	608.1	618.9	614.1
SLH-3	3000	4200	610.1	623.2	616.1
SLH-4	3000	3800	602.0	612.2	608.0
SLH-5	3000	3400	593.8	604.6	599.8
SLH-6	2600	4600	598.6	610.4	604.6
SLH-7	2600	4200	601.9	614.7	607.9
SLH-8	2600	3800	608.2	618.4	614.2
SLH-9	2600	3400	600.5	613.5	606.5
SLH-10	2600	3000	589.3		595.3
SLH-11	2200	4200	600.3	610.7	606.3
SLH-12	2200	3800	600.4	611.0	606.4
SLH-13	2200	3400	595.6	608.7	601.6
SLH-14	2200	3000	587.9		593.9
SLH-15	2200	2600	579.2		585.2
SLH-16	2000	4400	593.9	605.9 605.7	599.9
SLH-17	2000	4000	599.4	608.7	605.4
SLH-18	1800	4200	593.6	605.0	599.6
SLH-19	1800	3800	598.6	609.7	604.6
SLH-20	1800	3400	598.7	606.9	604.7

CALCOMP DATA SHEET

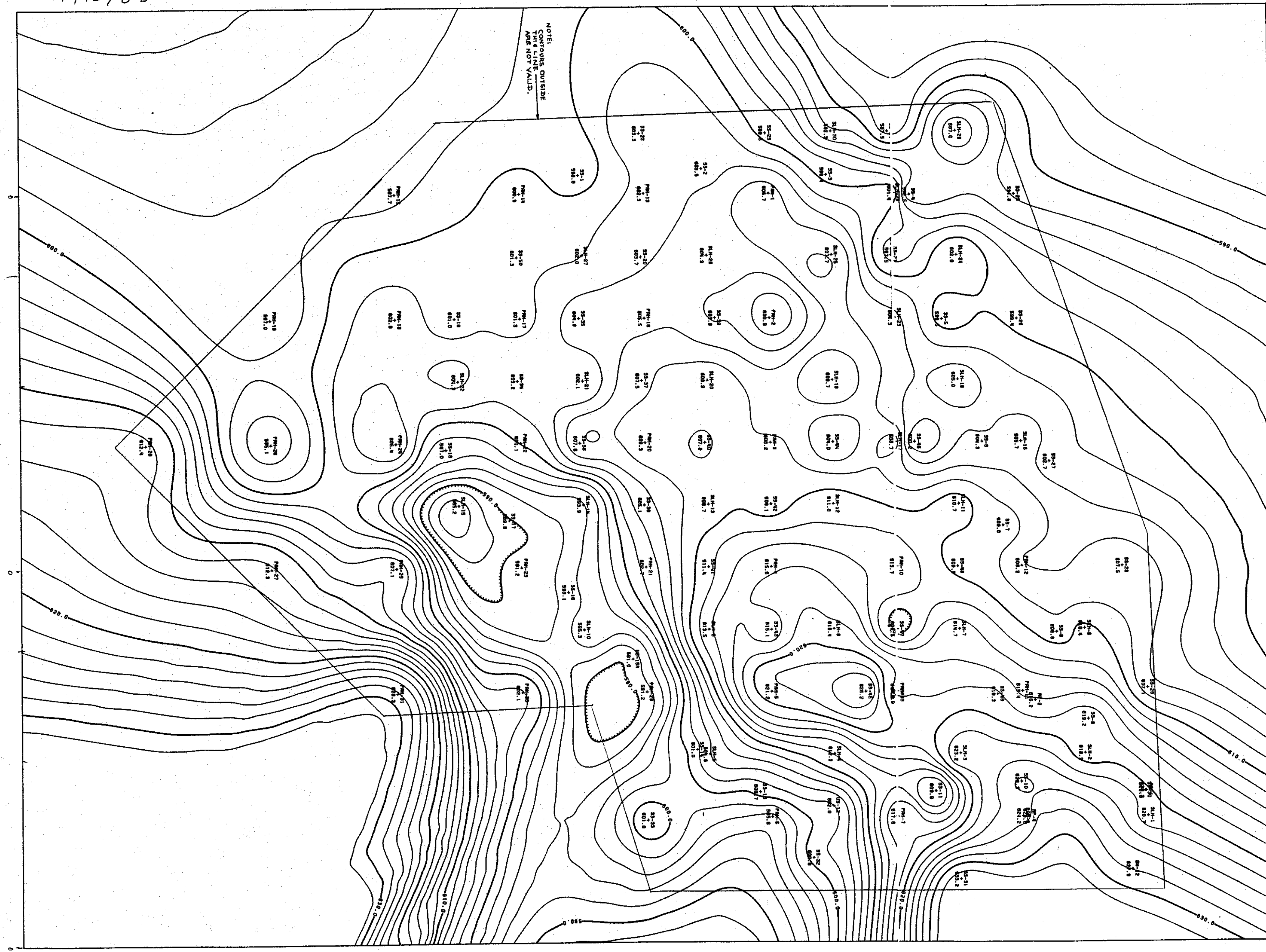
Widow Creek
Scrubber Sludge Borrow

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
SLH-21	1800	3000	588.2 602.1	594.2
SLH-22	1800	2600	594.2 604.3	600.2
SLH-23	1600	4000	592.2 604.3	598.2
SLH-24	1400	4200	591.6 602.0	597.6
SLH-25	1400	3800	595.6 607.9	601.6
SLH-26	1400	3400	593.5 604.9	599.5
SLH-27	1400	3000	589.5 602.0 602.8	595.5
SLH-28	1200	4000	589.8 601.4	595.8
SLH-29	1000	4200	583.0 597.0	589.0
SLH-30	1000	3800	586.3	592.3
GW-12	5370	4750		6[illegible].1
RP-1	3120	[illegible]		[illegible]
RP-2	[illegible]	4440		616.[illegible]
RP-3	2815	4000		618.1
RP-4	3200	4420		628.0

SCALE FACTORS - X 100.00 Y 100.00 UNITS/INCH

WIDOWS CREEK SCRUBBER SLUDGE
6' Above TOP-OF-ROCK
1/15/85

25%



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KK        KK  XX        XX  WW        WW  IIIIIIIIII  DDDDDDDDDDD   OOOOOOOOOOOO  WW        WW   SSSSSSSSSS
KK       KK    XX      XX   WW        WW  IIIIIIIIII  DDDDDDDDDDDD  OOOOOOOOOOOO  WW        WW  SSSSSSSSSSSS
KK     KK       XX    XX    WW        WW      II      DD        DD  OO        OO  WW        WW  SS        SS
KK   KK          XX  XX     WW        WW      II      DD        DD  OO        OO  WW        WW  SS
KKKKK             XX XX     WW        WW      II      DD        DD  OO        OO  WW        WW  SSS
KKKKKK             XXXX     WW        WW      II      DD        DD  OO        OO  WW        WW   SSSSSSSSS
KK  KK             XXXX     WW   WW   WW      II      DD        DD  OO        OO  WW   WW   WW    SSSSSSSSS
KK    KK          XX  XX    WW  WWWW  WW      II      DD        DD  OO        OO  WW  WWWW  WW          SSS
KK     KK        XX    XX   WW WW  WW WW      II      DD        DD  OO        OO  WW WW  WW WW           SS
KK      KK      XX      XX  WWWW    WWWW      II      DD        DD  OO        OO  WWWW    WWWW  SS        SS
KK       KK    XX        XX WWW      WWW  IIIIIIIIII  DDDDDDDDDDDD  OOOOOOOOOOOO  WWW      WWW  SSSSSSSSSSSS
KK        KK  XX        XX  WW        WW  IIIIIIIIII  DDDDDDDDDDD   OOOOOOOOOOOO  WW        WW   SSSSSSSSSS


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KXWIDOWS JOB NUMBER 6815           TVADC TVADC TVADC TVADC TVADC TVADC           KXWIDOWS JOB NUMBER 6815
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      19 CARDS READ                TVADC TVADC TVADC TVADC TVADC TVADC                 19 CARDS READ
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KDAVIS.160LBK.X4777                TVADC TVADC TVADC TVADC TVADC TVADC           KDAVIS.160LBK.X4777

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        *************************************************************************************************
        *   RJP NEWS    *                                                                               *
        ****************                                                                                *
        *                                                                                               *
        *          ****************WELCOME TO THE NEW DATA CENTER*****************                      *
        *          ----------------CURRENT MOVE INFORMATION--------------------                         *
        *          FOR THE LATEST MOVE INFORMATION, USERS MAY LIST DATA SET                              *
        *          D.US907002.WWWDD.DATA, WHERE WWW = MON, TUE, WED, THR, FRI,                           *
        *          AND DD = THE DATE.                                                                    *
        *               LATEST DATA SET IS D.US907002.MON13.DATA                                         *
        *                                                                                               *
        *          --------------------------------------------------------------                       *
        *          *********************IEHPROGM*********************************                       *
        *          WHEN USING THE CATLG STATEMENT ON IEHPROGM, SPECIFY 3350 ON                           *
        *          VOL= PARAMETER.  DO NOT SPECIFY DASD OR SYSDA.  HSM WILL NOT                          *
        *          HANDLE THIS SITUATION.                                                                *
        *          **************************************************************                       *
        *          ---------------KNOXVILLE SCHEDULED POWER OUTAGE---------------                       *
        *          THERE WILL BE A SCHEDULED OUTAGE ON SAT., DEC. 18, FROM 5.00 PM                       *
        *          UNTIL SUN., DEC. 19 @ 1.00 PM AT SL59-K.  THE FOLLOWING WILL BE                       *
        *          AFFECTED:  CONTROLLERS A000, A500, A680, A7A0, A920, ALL                              *
        *          SYSTEM 3 USERS, REMOTES 01, 11, 38, 43, 45.                                           *
        *          --------------------------------------------------------------                       *
        *          **************************************************************                       *
        *                                                                                               *
        *                                                                                               *
        *                                                                                               *
        *************************************************************************************************
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IAT6140 JOB ORIGIN FROM GROUP=RGROUP01, DSP=IR , DEVICE=INTRDR  , 000
09:19:17 IAT4401  LOCATE FOR STEP=STEP1     DD=STEPLIB  DSN=SYS4.TS922089.PLOTLOAD
09:19:17 IAT4402 UNIT=3350     ,VOL(S)=SOFT02
09:19:17 IAT4401  LOCATE FOR STEP=STEP1     DD=FT05F001 DSN=$KBDT01.CONTROL.DATA
09:19:17 IAT4402 UNIT=3350     ,VOL(S)=TS0003
09:19:17 IAT4401  LOCATE FOR STEP=STEP1     DD=FT16F001 DSN=$KBDT01.WIDOWS.DATA
09:19:17 IAT4402 UNIT=3350     ,VOL(S)=TS0003
09:19:27 IAT5220 JOB 6815 (KXWIDOWS) IS INELIGIBLE FOR SETUP ON SYSC
09:19:27 IAT5295 DD=STEPLIB  UNIT=3350      VOLUME=SOFT02 DSN=
09:19:27 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
09:19:27 IAT5295 DD=FT05F001 UNIT=3350      VOLUME=TS0003 DSN=
09:19:27 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
09:19:27 IAT5295 DD=FT09F001 UNIT=TAPE      VOLUME=PLOTKD DSN=
09:19:27 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
09:19:27 IAT5295 DD=FT16F001 UNIT=3350      VOLUME=TS0003 DSN=
09:19:27 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
09:19:28 IAT5110 JOB 6815 (KXWIDOWS) USES      D SOFT02
09:19:28 IAT5110 JOB 6815 (KXWIDOWS) USES      D TS0003
09:19:28 IAT5110 JOB 6815 (KXWIDOWS) GET       T PLOTKD ,NL
09:33:42 IAT5200 JOB 6815 (KXWIDOWS) IN SETUP ON MAIN=SYSB
09:33:42 IAT5210 STEPLIB  USING D SOFT02 ON 74E
09:33:42 IAT5210 FT05F001 USING D TS0003 ON 40D
09:33:42 IAT5210 FT09F001 RSRVD T PLOTKD ON 59F    ,NL,RING
09:34:53 IAT2000 JOB 6815 KXWIDOWS SELECTED SYSB      GRP=BATCH
09:34:54  IEF403I KXWIDOWS - STARTED - TIME=09.34.54
09:34:57 *IEC501A M 59F,PLOTKD,NL,800 BPI,KXWIDOWS,STEP1
09:43:17 PLOT IS 146*************************************************************************************************************
09:44:20  TVA002I KXWIDOWS SYSB04 2C2 BC=02048   EXCP=00224   DDN=FT14F001
09:44:25  TVA002I KXWIDOWS SYSB04 2C2 BC=02048   EXCP=00449   DDN=FT14F001
09:44:29  TVA002I KXWIDOWS SYSB04 2C2 BC=02048   EXCP=00674   DDN=FT14F001
09:44:30  TVA002I KXWIDOWS TS0003 40D BC=00256   EXCP=00002   DDN=FT05F001
09:44:30  TVA002I KXWIDOWS PLOTKD 59F BC=00125   EXCP=00125   DDN=FT09F001
09:44:30  TVA001I          PLOTKD 59F TR=000,TW=000,EG=000,CL=000,N=000,SIC=00135
09:44:30  IEC502E K 59F,PLOTKD,NL,KXWIDOWS,STEP1
09:44:30  TVA002I KXWIDOWS TS0003 40D BC=00512   EXCP=00003   DDN=FT16F001
09:44:30  TVA002I KXWIDOWS SOFT02 74E BC=00000   EXCP=00004   DDN=STEPLIB
09:44:32  IEF404I KXWIDOWS - ENDED - TIME=09.44.32
09:44:35 IAT5410 KEEP      T PLOTKD ON 59F,SYSB
09:44:37 IAT5400 JOB 6815 (KXWIDOWS) IN BREAKDOWN
```

```
//KXWIDOWS JOB 261472,KDAVIS.160LBK.X4777,CLASS=K,MSGLEVEL=1             000C0010
//*MAIN ORG=RGROUP01                                                   000CCC2C
//*OPERATOR  PLOTTING INSTRUCTIONS                                     JOB 06815
//*OPERATOR                                                            JOB C6815
//*OPERATOR  KXWIDOWS,261472,KDAVIS                                    JOB 06815
//*OPERATOR  THIS IS A CALCOMP PLOT,PLEASE TRANSMIT & PLOT IN KNOXVILLEJOB 06815
//*OPERATOR PLEASE MAIL THE PRINTOUT TO K.DAVIS AT 160 LB-K            JOB 06815
//STEP1 EXEC PGM=GPC11051,TIME=05                                      00000080
//STEPLIB DD DSN=SYS4.TS922089.PLOTLOAD,DISP=SHR                       00000090
//FT05F001 DD DSN=$KBDT01.CONTROL.DATA,DISP=SHR                        00000100
//FT06F001 DD SYSOUT=A                                                 00000110
//FT07F001 DD DUMMY                                                    00000120
//FT09F001 DD UNIT=(TAPE,,DEFER),DCB=DEN=2,VOL=SER=PLOTKD,LABEL=(,NL), 00000130
//       DISP=(,KEEP),DSN=PLOT                                         00000140
//FT10F001 DD DUMMY                                                    000C0150
//FT11F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                             00000160
//FT13F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                             000C0170
//FT14F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                             00000180
//FT16F001 DD DSN=$KBDT01.WIDOWS.DATA,DISP=SHR                         00000190
    1     //KXWIDOWS JOB 261472,KDAVIS.160LBK.X4777,CLASS=K,MSGLEVEL=1             00000010
    2     //STEP1 EXEC PGM=GPC11051,TIME=05                                        00000080
    3     //STEPLIB DD DSN=SYS4.TS922089.PLOTLOAD,DISP=SHR                         C0000090
    4     //FT05F001 DD DSN=$KBDT01.CONTROL.DATA,DISP=SHR                          00000100
    5     //FT06F001 DD SYSOUT=A                                                   00000110
    6     //FT07F001 DD DUMMY                                                      00000120
    7     //FT09F001 DD UNIT=(TAPE,,DEFER),DCB=DEN=2,VOL=SER=PLOTKD,LABEL=(,NL),   00000130
          //       DISP=(,KEEP),DSN=PLOT                                           C0000140
    8     //FT10F001 DD DUMMY                                                      00000150
    9     //FT11F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                               00000160
   10     //FT13F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                               00000170
   11     //FT14F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                               00000180

   12     //FT16F001 DD DSN=$KBDT01.WIDOWS.DATA,DISP=SHR                           00000190
```

```
IEF235I ALLOC. FOR KXWIDOWS STEP1
IEF237I 74E  ALLOCATED TO STEPLIB
IEF237I 2CF  ALLOCATED TO SYS00133
IEF237I 40D  ALLOCATED TO FT05F001
IEF237I JES3 ALLOCATED TO FT06F001
IEF237I DMY  ALLOCATED TO FT07F001
IEF237I 59F  ALLOCATED TO FT09F001
IEF237I DMY  ALLOCATED TO FT10F001
IEF237I 9AA  ALLOCATED TO FT11F001
IEF237I 24A  ALLOCATED TO FT13F001
IEF237I 2C2  ALLOCATED TO FT14F001
IEF237I 40D  ALLOCATED TO FT16F001
TVA002I KXWIDOWS SYSB04 2C2 BC=02048   EXCP=00224   DDN=FT14F001
TVA002I KXWIDOWS SYSB04 2C2 BC=02048   EXCP=00449   DDN=FT14F001
TVA002I KXWIDOWS SYSB04 2C2 BC=02048   EXCP=00674   DDN=FT14F001
TVA002I KXWIDOWS TS0003 40D BC=00256   EXCP=00002   DDN=FT05F001
TVA002I KXWIDOWS PLOTKD 59F BC=00125   EXCP=00125   DDN=FT09F001
TVA001I          PLOTKD 59F TR=000,TW=000,EG=000,CL=000,N=000,SID=00135
TVA002I KXWIDOWS TS0003 40D BC=00512   EXCP=00003   DDN=FT16F001
TVA002I KXWIDOWS SOFT02 74E BC=00000   EXCP=00004   DDN=STEPLIB
IEF142I KXWIDOWS STEP1 - STEP WAS EXECUTED - COND CODE 0016
IEF285I   SYS4.TS922089.PLOTLOAD                              KEPT
IEF285I   VOL SER NOS= SOFT02.
IEF285I   SYS1.USRCAT1                                        KEPT
IEF285I   VOL SER NOS= USCAT1.
IEF285I   $KBDT01.CONTROL.DATA                                KEPT
IEF285I   VOL SER NOS= TS0003.
IEF285I   STEP1.FT06F001                                      SYSOUT
IEF285I   PLOT                                                KEPT
IEF285I   VOL SER NOS= PLOTKD.
IEF285I   SYS82354.T091913.RA000.KXWIDOWS.R0000002            DELETED
IEF285I   VOL SER NOS= SYSB01.
IEF285I   SYS82354.T091913.RA000.KXWIDOWS.R0000003            DELETED
IEF285I   VOL SER NOS= SYSB03.
IEF285I   SYS82354.T091913.RA000.KXWIDOWS.R0000004            DELETED
IEF285I   VOL SER NOS= SYSB04.
IEF285I   $KBDT01.WIDOWS.DATA                                 KEPT
IEF285I   VOL SER NOS= TS0003.
IEF373I STEP /STEP1    / START 82354.0934
IEF374I STEP /STEP1    / STOP  82354.0944 CPU    0MIN 09.60SEC SRB    0MIN 00.40SEC VIRT   300K SYS   212K
************************************************************************************************************************
*                                                                                                                      *
*                                            KOMAND DATA ACQUISITION SYSTEM                                            *
*                                                                                                                      *
* STEP NAME     STEP1        START TIME 09.34.54.69    VIRT SYS  USED  212  K    PAGE INS            55  STEP CPU     00.00.07.29 *
* PGM NAME      GPC11051     STOP  TIME 09.44.32.70    VIRT CORE USE   300  K    PAGE OUTS           62  JOB  CPU     00.00.07.29 *
* DISPATCH PRTY 73           ELAP. TIME 00.09.38.01    SWAPS/PAGES      0/     0  SRB TIME    00.00.00.30  CONDITION CODE     0016 *
* PGN                 19     SERVICE UN      20,046    TRANS ACT TIME 00.09.33.52                                              *
*                                                                                                                      *
************************************************************************************************************************
*                                                   EXCP STATISTICS                                                    *
*                                                                                                                      *
* UNIT    EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT *
*                                                                                                                      *
*  74E            4      2CF            0      40D            2      59F          125      9AA            0      24A            0 *
*  2C2          674      40D            3                                                                                      *
* EXCP TOTAL        808       VIO PAGE INS          0        VIO PAGE OUTS          0        PAGES SWAPPED IN        0           *
************************************************************************************************************************
IEF375I  JOB /KXWIDOWS/ START 82354.0934
IEF376I  JOB /KXWIDOWS/ STOP  82354.0944 CPU    0MIN 09.60SEC SRB    0MIN 00.40SEC
************************************************************************************************************************
*                                                                                                                      *
*                                            KOMAND DATA ACQUISITION SYSTEM                                            *
```

```
*  JOB LOG NUMBER - KXWIDOWS 82354 09.19.08.71          CPU TIME     00.00.07.29           SRB TIME              00.0J.00.30   *
*  PROGRAMMER  KDAVIS.160LBK.X4777                      INIT DATE  12/20/82   82.354      INITIATION TIME       09.34.54.69   *
*  ACCTG DATA  261472                                   TERM DATE  12/20/82   82.354      TERMINATION TIME      09.44.32.74   *
*  OS-VS2 REL  03.8                                     PGN/SERVICE     19/   20,046      ELAPSED TIME          00.09.38.05   *
*  SYSTEM ID   B3                                       CLASS                K             COMPLETION STATUS           C0016   *
*********************************************************************************************************************************
```

```
JOB   WIDOWS CREEK SCRUBBER SLUDGE BORROW - TOP OF ROCK
BAS
SIZE    100.000   100.000      0.0        0.0           600.000    33.333    3600.000       1200.000    44.444    5200.000
EDIT     16     0
CNTL      0.040       0.100          1          7    0      0     0     0     0     0     0                          15          15
CNTL  (7X,F4.0,2X,F4.0, 2X,F5.1,1X,8A1,4X,I2,1X,4I1)
CNTL       1      2      3      0      0      0      0     12   4   5   6   7   8   9  10  11
CNTL          1200.0000         3600.0000        600.7000       0.0            0.0            0.0       0    0   PAH-1
CNTL          1600.0000         3600.0000        594.8999       0.0            0.0            0.0       0    0   PAH-2
CNTL          2000.0000         3600.0000        602.2000       0.0            0.0            0.0       0    0   PAH-3
CNTL          2400.0000         3600.0000        609.6001       0.0            0.0            0.0       0    0   PAH-4
CNTL          2800.0000         3600.0000        615.2000       0.0            0.0            0.0       0    0   PAH-5
CNTL          3200.0000         3600.0000        589.6001       0.0            0.0            0.0       0    0   PAH-6
CNTL          3200.0000         4000.0000        611.8000       0.0            0.0            0.0       0    0   PAH-7
CNTL          3200.0000         4400.0000        618.2000       0.0            0.0            0.0       0    0   PAH-8
CNTL          2800.0000         4000.0000        611.3000       0.0            0.0            0.0       0    0   PAH-9
CNTL          2400.0000         4000.0000        607.7000       0.0            0.0            0.0       0    0   PAH-10
CNTL          2800.0000         4400.0000        609.3999       0.0            0.0            0.0       0    0   PAH-11
CNTL          2400.0000         4400.0000        600.2000       0.0            0.0            0.0       0    0   PAH-12
CNTL          1200.0000         3200.0000        596.3000       0.0            0.0            0.0       0    0   PAH-13
CNTL          1200.0000         2800.0000        594.8999       0.0            0.0            0.0       0    0   PAH-14
CNTL          1200.0000         2400.0000        591.7000       0.0            0.0            0.0       0    0   PAH-15
CNTL          1600.0000         3200.0000        599.5000       0.0            0.0            0.0       0    0   PAH-16
CNTL          1600.0000         2800.0000        595.3000       0.0            0.0            0.0       0    0   PAH-17
CNTL          1600.0000         2400.0000        596.6001       0.0            0.0            0.0       0    0   PAH-18
CNTL          1600.0000         2000.0000        591.0000       0.0            0.0            0.0       0    0   PAH-19
CNTL          2000.0000         3200.0000        603.3000       0.0            0.0            0.0       0    0   PAH-20
CNTL          2400.0000         3200.0000        596.7000       0.0            0.0            0.0       0    0   PAH-21
CNTL          2000.0000         2800.0000        594.1001       0.0            0.0            0.0       0    0   PAH-22
CNTL          2400.0000         2800.0000        585.2000       0.0            0.0            0.0       0    0   PAH-23
CNTL          2000.0000         2400.0000        599.3999       0.0            0.0            0.0       0    0   PAH-24
CNTL          2400.0000         2400.0000        601.1001       0.0            0.0            0.0       0    0   PAH-25
CNTL          2000.0000         2000.0000        589.1001       0.0            0.0            0.0       0    0   PAH-26
CNTL          2400.0000         2000.0000        606.3000       0.0            0.0            0.0       0    0   PAH-27
CNTL          2000.0000         1600.0000        606.3999       0.0            0.0            0.0       0    0   PAH-28
CNTL          2800.0000         3200.0000        585.2000       0.0            0.0            0.0       0    0   PAH-29
CNTL          2800.0000         2800.0000        596.1001       0.0            0.0            0.0       0    0   PAH-30
CNTL          2800.0000         2400.0000        622.3000       0.0            0.0            0.0       0    0   PAH-31
CNTL          3200.0000         4800.0000        607.2000       0.0            0.0            0.0       0    0   SLH-1
CNTL          3000.0000         4600.0000        608.1001       0.0            0.0            0.0       0    0   SLH-2
CNTL          3000.0000         4200.0000        610.1001       0.0            0.0            0.0       0    0   SLH-3
CNTL          3000.0000         3800.0000        602.0000       0.0            0.0            0.0       0    0   SLH-4
CNTL          3000.0000         3400.0000        593.8000       0.0            0.0            0.0       0    0   SLH-5
CNTL          2600.0000         4600.0000        598.6001       0.0            0.0            0.0       0    0   SLH-6
CNTL          2600.0000         4200.0000        601.8999       0.0            0.0            0.0       0    0   SLH-7
CNTL          2600.0000         3800.0000        608.2000       0.0            0.0            0.0       0    0   SLH-8
CNTL          2600.0000         3400.0000        600.5000       0.0            0.0            0.0       0    0   SLH-9
CNTL          2600.0000         3000.0000        589.3000       0.0            0.0            0.0       0    0   SLH-10
CNTL          2200.0000         4200.0000        600.3000       0.0            0.0            0.0       0    0   SLH-11
CNTL          2200.0000         3800.0000        600.3999       0.0            0.0            0.0       0    0   SLH-12
CNTL          2200.0000         3400.0000        595.6001       0.0            0.0            0.0       0    0   SLH-13
CNTL          2200.0000         3000.0000        587.8999       0.0            0.0            0.0       0    0   SLH-14
CNTL          2200.0000         2600.0000        579.2000       0.0            0.0            0.0       0    0   SLH-15
CNTL          2000.0000         4400.0000        593.8999       0.0            0.0            0.0       0    0   SLH-16
CNTL          2000.0000         4000.0000        599.3999       0.0            0.0            0.0       0    0   SLH-17
CNTL          1800.0000         4200.0000        593.6001       0.0            0.0            0.0       0    0   SLH-18
CNTL          1800.0000         3800.0000        598.6001       0.0            0.0            0.0       0    0   SLH-19
CNTL          1800.0000         3400.0000        598.7000       0.0            0.0            0.0       0    0   SLH-20
CNTL          1800.0000         3000.0000        588.2000       0.0            0.0            0.0       0    0   SLH-21
CNTL          1800.0000         2600.0000        594.2000       0.0            0.0            0.0       0    0   SLH-22
CNTL          1600.0000         4000.0000        592.2000       0.0            0.0            0.0       0    0   SLH-23
CNTL          1400.0000         4200.0000        591.6001       0.0            0.0            0.0       0    0   SLH-24
CNTL          1400.0000         3800.0000        595.6001       0.0            0.0            0.0       0    0   SLH-25
CNTL          1400.0000         3400.0000        593.5000       0.0            0.0            0.0       0    0   SLH-26
```

```
CNTL    1400.0000   3400.0000   593.5000   0.0   0.0   0.0   0  0  SLH-26
CNTL    1400.0000   3000.0000   589.5000   0.0   0.0   0.0   0  0  SLH-27
CNTL    1200.0000   4000.0000   589.8000   0.0   0.0   0.0   0  0  SLH-28
CNTL    1000.0000   4200.0000   583.0000   0.0   0.0   0.0   0  0  SLH-29
CNTL    1000.0000   3800.0000   586.3000   0.0   0.0   0.0   0  0  SLH-30
BEND      61 CONTROL POINTS
DATMIN = 0.57919995E+03DATMAX = 0.62230005E+03
PHS4
SKIP     0.020
BOLD     5.000
BLEV     2.000
BRDR
END
******************  END PLOTTER TAPE BLOCK NUMBER    1  *******************
******************  END PLOTTER TAPE BLOCK NUMBER    2  *******************

IHO900I EXECUTION TERMINATING DUE TO ERROR COUNT FOR ERROR NUMBER  217

IHO217I FIOCS - END OF DATA SET ON UNIT    5

TRACEBACK ROUTINE  CALLED FROM ISN   REG. 14   REG. 15   REG.  0   REG.  1

          IBCOM                      001159A0  001292D4  00000001  00115908

          CNTCTL                     4211F91C  001154E0  C5D5C440  00000000

          MCNT                       6211D0BA  0011F6C0  0013E050  0011CEEC

          MAIN                       00025E90  0011CE78  007BC928  00114FF8

ENTRY POINT=  0011CE78
```

SUMMARY OF ERRORS FOR THIS JOB	ERROR NUMBER	NUMBER OF ERRORS
	217	1

```
KK         KK   XX          XX   WW          WW   IIIIIIIIII   DDDDDDDDDDD    00000000000   WW          WW    SSSSSSSSSS
KK       KK     XX          XX   WW          WW   IIIIIIIIII   DDDDDDDDDDDD   000000000000  WW          WW   SSSSSSSSSSSS
KK     KK        XX        XX    WW          WW       II       DD        DD   00        00  WW          WW   SS          SS
KK   KK           XX      XX     WW          WW       II       DD        DD   00        00  WW          WW   SS
KKKKK              XX    XX      WW          WW       II       DD        DD   00        00  WW          WW   SSS
KKKKKK              XXXX         WW          WW       II       DD        DD   00        00  WW          WW    SSSSSSSSS
KK   KK             XXXX         WW    WW    WW       II       DD        DD   00        00  WW    WW    WW     SSSSSSSSS
KK     KK          XX  XX        WW   WWWW   WW       II       DD        DD   00        00  WW   WWWW   WW            SSS
KK      KK        XX    XX       WW WW  WW WW         II       DD        DD   00        00  WW WW  WW WW              SS
KK       KK      XX      XX      WWWW    WWWW         II       DD        DD   00        00  WWWW    WWWW   SS          SS
KK        KK    XX        XX     WWW      WWW     IIIIIIIIII   DDDDDDDDDDDD   000000000000  WWW      WWW   SSSSSSSSSSSS
KK         KK   XX        XX     WW        WW     IIIIIIIIII   DDDDDDDDDDD    00000000000   WW        WW    SSSSSSSSSS

KXWIDOWS JOB NUMBER 6815        ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        KXWIDOWS JOB NUMBER 6815
KXWIDOWS JOB NUMBER 6815        ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        KXWIDOWS JOB NUMBER 6815
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
KDAVIS.160LBK.X4777             ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        KDAVIS.160LBK.X4777
KDAVIS.160LBK.X4777             ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        KDAVIS.160LBK.X4777
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
ORIGIN TSO $KBDT01              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        ORIGIN TSO $KBDT01
ORIGIN TSO $KBDT01              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        ORIGIN TSO $KBDT01
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
START DATE 20 DEC 82.354        ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        START DATE 20 DEC 82.354
START TIME 09.34.52             ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        START TIME 09.34.52
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
STOP  DATE 20 DEC 82.354        ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        STOP  DATE 20 DEC 82.354
STOP  TIME 09.44.33             ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        STOP  TIME 09.44.33
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
XEQ   TIME 00.09.40             ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        XEQ   TIME 00.09.40
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
PRINTER OED                     ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        PRINTER OED
ENDDC TIME 09.57.26             ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        ENDDC TIME 09.57.26
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
        19 CARDS READ           ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                19 CARDS READ
         0 CARDS PUNCHED        ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                 0 CARDS PUNCHED
        88 LINES PRINTED        ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                88 LINES PRINTED
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
KDAVIS.160LBK.X4777             ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC        KDAVIS.160LBK.X4777

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KK        KK  XX          XX  WW          WW  IIIIIIIIII  DDDDDDDDDDD   000000C00000  WW          WW  2222222222
KK      KK    XX          XX  WW          WW  IIIIIIIIII  DDDDDDDDDDDD  000000C00000  WW          WW  222222222222
KK    KK       XX        XX   WW          WW      II      DD         DD 00        00  WW          WW  22        22
KK  KK          XX      XX    WW          WW      II      DD         DD 00        00  WW          WW            22
KKKKK            XX    XX     WW          WW      II      DD         DD 00        00  WW          WW            22
KKKKKK            XXXX        WW          WW      II      DD         DD 00        00  WW          WW           22
KK   KK           XXXX        WW    WW    WW      II      DD         DD 00        00  WW    WW    WW         22
KK    KK         XX  XX       WW   WWWW   WW      II      DD         DD 00        00  WW   WWWW   WW        22
KK     KK       XX    XX      WW WW  WW WW        II      DD         DD 00        00  WW WW  WW WW       22
KK      KK     XX      XX     WWWW    WWWW        II      DD         DD 00        00  WWWW    WWWW     22
KK       KK   XX        XX    WWW      WWW    IIIIIIIIII  DDDDDDDDDDDD  000000C00000  WWW      WWW    222222222222
KK        KK  XX        XX    WW        WW    IIIIIIIIII  DDDDDDDDDDD   000000C00000  WW        WW    222222222222


KXWIDOW2 JOB NUMBER 7517                    TVADC TVADC TVADC TVADC TVADC TVADC                    KXWIDOW2 JOB NUMBER 7517
KXWIDOW2 JOB NUMBER 7517                    TVADC TVADC TVADC TVADC TVADC TVADC                    KXWIDOW2 JOB NUMBER 7517
                                            TVADC TVADC TVADC TVADC TVADC TVADC
KDAVIS.160LBK.X4777                         TVADC TVADC TVADC TVADC TVADC TVADC                    KDAVIS.160LBK.X4777
KDAVIS.160LBK.X4777                         TVADC TVADC TVADC TVADC TVADC TVADC                    KDAVIS.160LBK.X4777
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
ORIGIN TSO $KBDT01                          TVADC TVADC TVADC TVADC TVADC TVADC                    ORIGIN TSO $KBDT01
ORIGIN TSO $KBDT01                          TVADC TVADC TVADC TVADC TVADC TVADC                    ORIGIN TSO $KBDT01
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
START DATE 20 DEC 82.354                    TVADC TVADC TVADC TVADC TVADC TVADC                    START DATE 20 DEC 82.354
START TIME 11.14.39                         TVADC TVADC TVADC TVADC TVADC TVADC                    START TIME 11.14.39
                                            TVADC TVADC TVADC TVADC TVADC TVADC
STOP  DATE 20 DEC 82.354                    TVADC TVADC TVADC TVADC TVADC TVADC                    STOP  DATE 20 DEC 82.354
STOP  TIME 11.17.36                         TVADC TVADC TVADC TVADC TVADC TVADC                    STOP  TIME 11.17.36
                                            TVADC TVADC TVADC TVADC TVADC TVADC
XEQ   TIME 00.02.56                         TVADC TVADC TVADC TVADC TVADC TVADC                    XEQ   TIME 00.02.56
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
PRINTER 0E8                                 TVADC TVADC TVADC TVADC TVADC TVADC                    PRINTER 0E8
TVADC TIME 11.17.40                         TVADC TVADC TVADC TVADC TVADC TVADC                    TVADC TIME 11.17.40
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
        19 CARDS READ                       TVADC TVADC TVADC TVADC TVADC TVADC                            19 CARDS READ
         0 CARDS PUNCHED                    TVADC TVADC TVADC TVADC TVADC TVADC                             0 CARDS PUNCHED
        88 LINES PRINTED                    TVADC TVADC TVADC TVADC TVADC TVADC                            88 LINES PRINTED
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
                                            TVADC TVADC TVADC TVADC TVADC TVADC
KDAVIS.160LBK.X4777                         TVADC TVADC TVADC TVADC TVADC TVADC                    KDAVIS.160LBK.X4777


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KK        KK   XX        XX  WW        WW  IIIIIIIIII   DDDDDDDDDD    OOOOOOOOOO    WW        WW   2222222222
KK       KK     XX      XX   WW        WW  IIIIIIIIII   DDDDDDDDDDD   OOOOOOOOOOOO  WW        WW  222222222222
KK     KK        XX    XX    WW        WW      II       DD        DD  OO        OO  WW        WW  22        22
KK   KK           XX  XX     WW        WW      II       DD        DD  OO        OO  WW        WW            22
KKKKK              XXXX      WW        WW      II       DD        DD  OO        OO  WW        WW           22
KKKKKK             XXXX      WW        WW      II       DD        DD  OO        OO  WW        WW          22
KK  KK            XX  XX     WW   WW   WW      II       DD        DD  OO        OO  WW   WW   WW        22
KK    KK         XX    XX    WW  WWWW  WW      II       DD        DD  OO        OO  WW  WWWW  WW      22
KK     KK       XX      XX   WW WW  WW WW      II       DD        DD  OO        OO  WW WW  WW WW    22
KK       KK    XX        XX  WWWW    WWWW      II       DD        DD  OO        OO  WWWW    WWWW  22
KK        KK   XX        XX  WWW      WWW  IIIIIIIIII   DDDDDDDDDDD   OOOOOOOOOOOO  WWW      WWW  222222222222
KK         KK  XX        XX  WW        WW  IIIIIIIIII   DDDDDDDDDD    OOOOOOOOOO    WW        WW  222222222222


KXWIDOW2 JOB NUMBER 7517                       TVADC TVADC TVADC TVADC TVADC TVADC                      KXWIDOW2 JOB NUMBER 7517
KXWIDOW2 JOB NUMBER 7517                       TVADC TVADC TVADC TVADC TVADC TVADC                      KXWIDOW2 JOB NUMBER 7517
                                               TVADC TVADC TVADC TVADC TVADC TVADC
KDAVIS.160LBK.X4777                            TVADC TVADC TVADC TVADC TVADC TVADC                      KDAVIS.160LBK.X4777
KDAVIS.160LBK.X4777                            TVADC TVADC TVADC TVADC TVADC TVADC                      KDAVIS.160LBK.X4777
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
ORIGIN TSO $KBDT01                             TVADC TVADC TVADC TVADC TVADC TVADC                      ORIGIN TSO $KBDT01
ORIGIN TSO $KBDT01                             TVADC TVADC TVADC TVADC TVADC TVADC                      ORIGIN TSO $KBDT01
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
START DATE 20 DEC 82.354                       TVADC TVADC TVADC TVADC TVADC TVADC                      START DATE 20 DEC 82.354
START TIME 11.14.39                            TVADC TVADC TVADC TVADC TVADC TVADC                      START TIME 11.14.39
                                               TVADC TVADC TVADC TVADC TVADC TVADC
STOP  DATE 20 DEC 82.354                       TVADC TVADC TVADC TVADC TVADC TVADC                      STOP  DATE 20 DEC 82.354
STOP  TIME 11.17.36                            TVADC TVADC TVADC TVADC TVADC TVADC                      STOP  TIME 11.17.36
                                               TVADC TVADC TVADC TVADC TVADC TVADC
XEQ   TIME 00.02.56                            TVADC TVADC TVADC TVADC TVADC TVADC                      XEQ   TIME 00.02.56
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
PRINTER 0E8                                    TVADC TVADC TVADC TVADC TVADC TVADC                      PRINTER 0E8
TVADC TIME 11.17.40                            TVADC TVADC TVADC TVADC TVADC TVADC                      TVADC TIME 11.17.40
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
        19 CARDS READ                          TVADC TVADC TVADC TVADC TVADC TVADC                              19 CARDS READ
         0 CARDS PUNCHED                       TVADC TVADC TVADC TVADC TVADC TVADC                               0 CARDS PUNCHED
        88 LINES PRINTED                       TVADC TVADC TVADC TVADC TVADC TVADC                              88 LINES PRINTED
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
                                               TVADC TVADC TVADC TVADC TVADC TVADC
KDAVIS.160LBK.X4777                            TVADC TVADC TVADC TVADC TVADC TVADC                      KDAVIS.160LBK.X4777

***********************************************************************************************************************************
***********************************************************************************************************************************
***********************************************************************************************************************************
***********************************************************************************************************************************
***********************************************************************************************************************************
```

```
**********************************************************************************************
*   RJP NEWS   *                                                                             *
****************                                                                             *
*                                                                                            *
*         ****************WELCOME TO THE NEW DATA CENTER*****************                    *
*         -----------------CURRENT MOVE INFORMATION--------------------                      *
*         FOR THE LATEST MOVE INFORMATION, USERS MAY LIST DATA SET                           *
*         D.US907002.WWWDD.DATA, WHERE WWW = MON, TUE, WED, THR, FRI,                        *
*         AND DD = THE DATE.                                                                 *
*              LATEST DATA SET IS D.US907002.MON13.DATA                                      *
*                                                                                            *
*         ------------------------------------------------------------                      *
*         *********************IEHPROGM***********************************                  *
*         WHEN USING THE CATLG STATEMENT ON IEHPROGM, SPECIFY 3350 ON                        *
*         VOL= PARAMETER.  DO NOT SPECIFY DASD OR SYSDA.  FSM WILL NOT                       *
*         HANDLE THIS SITUATION.                                                             *
*         ****************************************************************                  *
*         ---------------KNOXVILLE SCHEDULED POWER OUTAGE---------------                    *
*         THERE WILL BE A SCHEDULED OUTAGE ON SAT., DEC. 18, FROM 5.00 PM                    *
*         UNTIL SUN., DEC. 19 @ 1.00 PM AT SL59-K.  THE FOLLOWING WILL BE                    *
*         AFFECTED:  CONTROLLERS A000, A500, A680, A7A0, A920, ALL                           *
*         SYSTEM 3 USERS, REMOTES 01, 11, 38, 43, 45.                                        *
*         ------------------------------------------------------------                      *
*         ****************************************************************                  *
*                                                                                            *
*                                                                                            *
*                                                                                            *
**********************************************************************************************
```

```
IAT6140 JOB ORIGIN FROM GROUP=RGROUP01, DSP=IR , DEVICE=INTRDR , 000
10:24:46 IAT4401  LOCATE FOR STEP=STEP1     DD=STEPLIB  DSN=SYS4.TS922089.PLOTLOAD
10:24:46 IAT4402 UNIT=3350     ,VOL(S)=SOFT02
10:24:46 IAT4401  LOCATE FOR STEP=STEP1     DD=FT05F001 DSN=$KBDT01.CONTROL2.DATA
10:24:46 IAT4402 UNIT=3350     ,VOL(S)=TS0005
10:24:46 IAT4401  LOCATE FOR STEP=STEP1     DD=FT16F001 DSN=$KBDT01.WIDOWS2.DATA
10:24:46 IAT4402 UNIT=3350     ,VOL(S)=TS0005
10:24:48 IAT5220 JOB 7517 (KXWIDOW2) IS INELIGIBLE FOR SETUP ON SYSC
10:24:48 IAT5295 DD=STEPLIB  UNIT=3350      VOLUME=SOFT02 DSN=
10:24:48 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
10:24:48 IAT5295 DD=FT05F001 UNIT=3350      VOLUME=TS0005 DSN=
10:24:48 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
10:24:48 IAT5295 DD=FT09F001 UNIT=TAPE      VOLUME=PLOTKX DSN=
10:24:48 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
10:24:48 IAT5295 DD=FT16F001 UNIT=3350      VOLUME=TS0005 DSN=
10:24:48 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
10:24:50 IAT5110 JOB 7517 (KXWIDOW2) USES      D SOFT02
10:24:50 IAT5110 JOB 7517 (KXWIDOW2) USES      D TS0005
10:24:50 IAT5110 JOB 7517 (KXWIDOW2) GET       T PLOTKX ,NL
11:04:00 IAT5200 JOB 7517 (KXWIDOW2) IN SETUP ON MAIN=SYSB
11:04:00 IAT5210 STEPLIB  USING D SOFT02 ON 74E
11:04:00 IAT5210 FT05F001 USING D TS0005 ON 40E
11:04:00 IAT5210 FT09F001 RSRVD T PLOTKX ON 59F    ,NL,RING
11:14:40 IAT2000 JOB 7517 KXWIDOW2 SELECTED SYSB      GRP=BATCH
11:14:46  IEF403I KXWIDOW2 - STARTED - TIME=11.14.42
11:14:52 *IEC501A M 59F,PLOTKX,NL,800 BPI,KXWIDOW2,STEP1
11:16:43 PLOT IS 182*****************************************************************************************
11:17:17  TVA002I KXWIDOW2 SYSB04 2C2 BC=00512   EXCP=00218   DDN=FT14F001
11:17:23  TVA002I KXWIDOW2 SYSB04 2C2 BC=00512   EXCP=00437   DDN=FT14F001
11:17:31  TVA002I KXWIDOW2 SYSB04 2C2 BC=00512   EXCP=00656   DDN=FT14F001
11:17:32  TVA002I KXWIDOW2 TS0005 40E BC=00256   EXCP=00002   DDN=FT05F001
11:17:32  TVA002I KXWIDOW2 PLOTKX 59F BC=00122   EXCP=00122   DDN=FT09F001
11:17:32  TVA001I           PLOTKX 59F TR=000,TW=000,EG=000,CL=000,N=000,SIO=00132
11:17:32  IEC502E K 59F,PLOTKX,NL,KXWIDOW2,STEP1
11:17:32  TVA002I KXWIDOW2 TS0005 40E BC=00512   EXCP=00003   DDN=FT16F001
11:17:32  TVA002I KXWIDOW2 SOFT02 74E BC=00000   EXCP=00006   DDN=STEPLIB
11:17:35  IEF404I KXWIDOW2 - ENDED - TIME=11.17.36
11:17:37 IAT5410 KEEP      T PLOTKX ON 59F,SYSB
11:17:37 IAT5400 JOB 7517 (KXWIDOW2) IN BREAKDOWN
```

```
//KXWIDOW2 JOB 261472,KDAVIS.160LBK.X4777,CLASS=K,MSGLEVEL=1            00000010
//*MAIN ORG=RGROUP01                                                    00000020
//*OPERATOR  PLOTTING INSTRUCTIONS                                     JOB 07517
//*OPERATOR                                                            JOB 07517
//*OPERATOR  KXWIDOW2,261472,KDAVIS                                    JOB 07517
//*OPERATOR  THIS IS A CALCOMP PLOT,PLEASE TRANSMIT & PLOT IN KNOXVILLEJOB 07517
//*OPERATOR PLEASE MAIL THE PRINTOUT TO K.DAVIS AT 160 LB-K            JOB 07517
//STEP1 EXEC PGM=GPC11051,TIME=05                                       00000080
//STEPLIB DD DSN=SYS4.TS922089.PLOTLOAD,DISP=SHR                        00000090
//FT05F001 DD DSN=$KBDT01.CONTROL2.DATA,DISP=SHR                        00000100
//FT06F001 DD SYSOUT=A                                                  00000110
//FT07F001 DD DUMMY                                                     00000120
//FT09F001 DD UNIT=(TAPE,,DEFER),DCB=DEN=2,VOL=SER=PLOTKX,LABEL=(,NL),  00000130
//       DISP=(,KEEP),DSN=PLOT                                          00000140
//FT10F001 DD DUMMY                                                     00000150
//FT11F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000160
//FT13F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000170
//FT14F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000180
//FT16F001 DD DSN=$KBDT01.WIDOWS2.DATA,DISP=SHR                         00000190
    1       //KXWIDOW2 JOB 261472,KDAVIS.160LBK.X4777,CLASS=K,MSGLEVEL=1            00000010
    2       //STEP1 EXEC PGM=GPC11051,TIME=05                                       00000080
    3       //STEPLIB DD DSN=SYS4.TS922089.PLOTLOAD,DISP=SHR                        00000090
    4       //FT05F001 DD DSN=$KBDT01.CONTROL2.DATA,DISP=SHR                        00000100
    5       //FT06F001 DD SYSOUT=A                                                  00000110
    6       //FT07F001 DD DUMMY                                                     00000120
    7       //FT09F001 DD UNIT=(TAPE,,DEFER),DCB=DEN=2,VOL=SER=PLOTKX,LABEL=(,NL),  00000130
            //       DISP=(,KEEP),DSN=PLOT                                          00000140
    8       //FT10F001 DD DUMMY                                                     00000150
    9       //FT11F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000160
   10       //FT13F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000170
   11       //FT14F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000180
   12       //FT16F001 DD DSN=$KBDT01.WIDOWS2.DATA,DISP=SHR                         00000190
```

```
IEF236I ALLOC. FOR KXWIDOW2 STEP1
IEF237I 74E  ALLOCATED TO STEPLIB
IEF237I 2CF  ALLOCATED TO SYS00368
IEF237I 40E  ALLOCATED TO FT05F001
IEF237I JES3 ALLOCATED TO FT06F001
IEF237I DMY  ALLOCATED TO FT07F001
IEF237I 59F  ALLOCATED TO FT09F001
IEF237I DMY  ALLOCATED TO FT10F001
IEF237I 24A  ALLOCATED TO FT11F001
IEF237I 242  ALLOCATED TO FT13F001
IEF237I 2C2  ALLOCATED TO FT14F001
IEF237I 40E  ALLOCATED TO FT16F001
TVA002I KXWIDOW2 SYSB04 2C2 BC=00512   EXCP=00218   DDN=FT14F001
TVA002I KXWIDOW2 SYSB04 2C2 BC=00512   EXCP=00437   DDN=FT14F001
TVA002I KXWIDOW2 SYSB04 2C2 BC=00512   EXCP=00656   DDN=FT14F001
TVA002I KXWIDOW2 TS0005 40E BC=00256   EXCP=00002   DDN=FT05F001
TVA002I KXWIDOW2 PLOTKX 59F BC=00122   EXCP=00122   DDN=FT09F001
TVA001I          PLOTKX 59F TR=000,TW=000,EG=000,CL=000,N=000,SIO=00132
TVA002I KXWIDOW2 TS0005 40E BC=00512   EXCP=00003   DDN=FT16F001
TVA002I KXWIDOW2 SOFT02 74E BC=00000   EXCP=00006   DDN=STEPLIB
IEF142I KXWIDOW2 STEP1 - STEP WAS EXECUTED - COND CODE 0016
IEF285I   SYS4.TS922089.PLOTLOAD                       KEPT
IEF285I   VOL SER NOS= SOFT02.
IEF285I   SYS1.USRCAT1                                 KEPT
IEF285I   VOL SER NOS= USCAT1.
IEF285I   $KBDT01.CONTROL2.DATA                        KEPT
IEF285I   VOL SER NOS= TS0005.
IEF285I   STEP1.FT06F001                               SYSOUT
IEF285I   PLOT                                         KEPT
IEF285I   VOL SER NOS= PLOTKX.
IEF285I   SYS82354.T102439.RA000.KXWIDOW2.R0000002     DELETED
IEF285I   VOL SER NOS= SYSB03.
IEF285I   SYS82354.T102439.RA000.KXWIDOW2.R0000003     DELETED
IEF285I   VOL SER NOS= SYSB02.
IEF285I   SYS82354.T102439.RA000.KXWIDOW2.R0000004     DELETED
IEF285I   VOL SER NOS= SYSB04.
IEF285I   $KBDT01.WIDOWS2.DATA                         KEPT
IEF285I   VOL SER NOS= TS0005.
IEF373I STEP /STEP1   / START 82354.1114
IEF374I STEP /STEP1   / STOP  82354.1117 CPU    0MIN 09.49SEC SRB    0MIN 00.39SEC VIRT   300K SYS   236K
******************************************************************************************************************
*                                                                                                                *
*                                        KOMAND DATA ACQUISITION SYSTEM                                          *
*                                                                                                                *
* STEP NAME     STEP1        START TIME 11.14.42.79     VIRT SYS  USED  236  K     PAGE INS           52  STEP CPU      00.00.07.21 *
* PGM NAME      GPC11051     STOP  TIME 11.17.36.44     VIRT CORE USE   300  K     PAGE OUTS          63  JOB  CPU      00.00.07.21 *
* DISPATCH PRTY 73           ELAP. TIME 00.02.53.65     SWAPS/PAGES     1/    36   SRB TIME    00.00.00.29  CONDITION CODE      0016 *
* PGN                19      SERVICE UN      19,971     TRANS ACT TIME 00.02.44.93                                                    *
*                                                                                                                *
******************************************************************************************************************
*                                               EXCP STATISTICS                                                  *
*                                                                                                                *
* UNIT    EXCP COUNT     UNIT    EXCP COUNT     UNIT    EXCP COUNT     UNIT    EXCP COUNT     UNIT    EXCP COUNT     UNIT    EXCP COUNT *
*                                                                                                                *
*  74E            6      2CF             0      40E             2      59F           122      24A             0      242             0 *
*  2C2          656      40E             3                                                                        *
* EXCP TOTAL        789       VIO PAGE INS           0      VIO PAGE OUTS          0      PAGES SWAPPED IN        29  *
******************************************************************************************************************
IEF375I  JOB /KXWIDOW2/ START 82354.1114
IEF376I  JOB /KXWIDOW2/ STOP  82354.1117 CPU    0MIN 09.49SEC SRB    0MIN 00.39SEC
******************************************************************************************************************
*                                                                                                                *
*                                        KOMAND DATA ACQUISITION SYSTEM                                          *
```

```
*  JOB LOG NUMBER - KXWIDOW2 82354 10.22.28.57          CPU TIME     00.00.07.21           SRB TIME              00.00.00.29   *
*                                                                                                                              *
*  PROGRAMMER   KDAVIS.160LBK.X4777                     INIT DATE   12/20/82    82.354     INITIATION TIME       11.14.42.79   *
*                                                                                                                              *
*  ACCTG DATA   261472                                  TERM DATE   12/20/82    82.354     TERMINATION TIME      11.17.36.48   *
*                                                                                                                              *
*  OS-VS2 REL   03.8                                    PGN/SERVICE     19/     19,971     ELAPSED TIME          00.02.53.69   *
*                                                                                                                              *
*  SYSTEM ID    B3                                      CLASS              K               COMPLETION STATUS           C0016   *
*                                                                                                                              *
********************************************************************************************************************************
```

JOB WIDOWS CREEK SCRUBBER SLUDGE BORROW - EXCAVATION

```
JOB   WIDOWS CREEK SCRUBBER SLUDGE BORROW - EXCAVATION
BAS
SIZE     100.000   100.000     0.0        0.0          600.000    33.333    3600.000       1200.000    44.444    5200.000
EDIT      16     0
CNTL      0.040     0.100          1          7    0     0     0     0     0     0     0                            15          15
CNTL (7X,F4.0,2X,F4.0,2X,F5.1,1X,8A1,4X,I2,1X,4I1)
CNTL       1     2     3     0     0     0     0    12   4   5   6   7   8   9  10  11
CNTL        1200.0000      3600.0000      606.7000       0.0            0.0            0.0     0   0   PAH-1
CNTL        1600.0000      3600.0000      600.8999       0.0            0.0            0.0     0   0   PAH-2
CNTL        2000.0000      3600.0000      608.2000       0.0            0.0            0.0     0   0   PAH-3
CNTL        2400.0000      3600.0000      615.6001       0.0            0.0            0.0     0   0   PAH-4
CNTL        2800.0000      3600.0000      621.2000       0.0            0.0            0.0     0   0   PAH-5
CNTL        3200.0000      3600.0000      595.6001       0.0            0.0            0.0     0   0   PAH-6
CNTL        3200.0000      4000.0000      617.8000       0.0            0.0            0.0     0   0   PAH-7
CNTL        3200.0000      4400.0000      624.2000       0.0            0.0            0.0     0   0   PAH-8
CNTL        2800.0000      4000.0000      617.3000       0.0            0.0            0.0     0   0   PAH-9
CNTL        2400.0000      4000.0000      613.7000       0.0            0.0            0.0     0   0   PAH-10
CNTL        2800.0000      4400.0000      615.3999       0.0            0.0            0.0     0   0   PAH-11
CNTL        2400.0000      4400.0000      606.2000       0.0            0.0            0.0     0   0   PAH-12
CNTL        1200.0000      3200.0000      602.3000       0.0            0.0            0.0     0   0   PAH-13
CNTL        1200.0000      2800.0000      600.8999       0.0            0.0            0.0     0   0   PAH-14
CNTL        1200.0000      2400.0000      597.7000       0.0            0.0            0.0     0   0   PAH-15
CNTL        1600.0000      3200.0000      605.5000       0.0            0.0            0.0     0   0   PAH-16
CNTL        1600.0000      2800.0000      601.3000       0.0            0.0            0.0     0   0   PAH-17
CNTL        1600.0000      2400.0000      602.6001       0.0            0.0            0.0     0   0   PAH-18
CNTL        1600.0000      2000.0000      597.0000       0.0            0.0            0.0     0   0   PAH-19
CNTL        2000.0000      3200.0000      609.3000       0.0            0.0            0.0     0   0   PAH-20
CNTL        2400.0000      3200.0000      602.7000       0.0            0.0            0.0     0   0   PAH-21
CNTL        2000.0000      2800.0000      600.1001       0.0            0.0            0.0     0   0   PAH-22
CNTL        2400.0000      2800.0000      591.2000       0.0            0.0            0.0     0   0   PAH-23
CNTL        2000.0000      2400.0000      605.3999       0.0            0.0            0.0     0   0   PAH-24
CNTL        2400.0000      2400.0000      607.1001       0.0            0.0            0.0     0   0   PAH-25
CNTL        2000.0000      2000.0000      595.1001       0.0            0.0            0.0     0   0   PAH-26
CNTL        2400.0000      2000.0000      612.3000       0.0            0.0            0.0     0   0   PAH-27
CNTL        2000.0000      1600.0000      612.3999       0.0            0.0            0.0     0   0   PAH-28
CNTL        2800.0000      3200.0000      591.2000       0.0            0.0            0.0     0   0   PAH-29
CNTL        2800.0000      2800.0000      602.1001       0.0            0.0            0.0     0   0   PAH-30
CNTL        2800.0000      2400.0000      628.3000       0.0            0.0            0.0     0   0   PAH-31
CNTL        3200.0000      4800.0000      613.2000       0.0            0.0            0.0     0   0   SLH-1
CNTL        3000.0000      4600.0000      614.1001       0.0            0.0            0.0     0   0   SLH-2
CNTL        3000.0000      4200.0000      616.1001       0.0            0.0            0.0     0   0   SLH-3
CNTL        3000.0000      3800.0000      608.0000       0.0            0.0            0.0     0   0   SLH-4
CNTL        3000.0000      3400.0000      599.8000       0.0            0.0            0.0     0   0   SLH-5
CNTL        2600.0000      4600.0000      604.6001       0.0            0.0            0.0     0   0   SLH-6
CNTL        2600.0000      4200.0000      607.8999       0.0            0.0            0.0     0   0   SLH-7
CNTL        2600.0000      3800.0000      614.2000       0.0            0.0            0.0     0   0   SLH-8
CNTL        2600.0000      3400.0000      606.5000       0.0            0.0            0.0     0   0   SLH-9
CNTL        2600.0000      3000.0000      595.3000       0.0            0.0            0.0     0   0   SLH-10
CNTL        2200.0000      4200.0000      606.3000       0.0            0.0            0.0     0   0   SLH-11
CNTL        2200.0000      3800.0000      606.3999       0.0            0.0            0.0     0   0   SLH-12
CNTL        2200.0000      3400.0000      601.6001       0.0            0.0            0.0     0   0   SLH-13
CNTL        2200.0000      3000.0000      593.8999       0.0            0.0            0.0     0   0   SLH-14
CNTL        2200.0000      2600.0000      585.2000       0.0            0.0            0.0     0   0   SLH-15
CNTL        2000.0000      4400.0000      599.8999       0.0            0.0            0.0     0   0   SLH-16
CNTL        2000.0000      4000.0000      605.3999       0.0            0.0            0.0     0   0   SLH-17
CNTL        1800.0000      4200.0000      599.6001       0.0            0.0            0.0     0   0   SLH-18
CNTL        1800.0000      3800.0000      604.6001       0.0            0.0            0.0     0   0   SLH-19
CNTL        1800.0000      3400.0000      604.7000       0.0            0.0            0.0     0   0   SLH-20
CNTL        1800.0000      3000.0000      594.2000       0.0            0.0            0.0     0   0   SLH-21
CNTL        1800.0000      2600.0000      600.2000       0.0            0.0            0.0     0   0   SLH-22
CNTL        1600.0000      4000.0000      598.2000       0.0            0.0            0.0     0   0   SLH-23
CNTL        1400.0000      4200.0000      597.6001       0.0            0.0            0.0     0   0   SLH-24
CNTL        1400.0000      3800.0000      601.6001       0.0            0.0            0.0     0   0   SLH-25
```

```
CNTL      1400.0000     3400.0000        599.5000        0.0            0.0            0.0       0    0    SLH-26
CNTL      1400.0000     3000.0000        595.5000        0.0            0.0            0.0       0    0    SLH-27
CNTL      1200.0000     4000.0000        595.8000        0.0            0.0            0.0       0    0    SLH-28
CNTL      1000.0000     4200.0000        589.0000        0.0            0.0            0.0       0    0    SLH-29
CNTL      1000.0000     3800.0000        592.3000        0.0            0.0            0.0       0    0    SLH-30
BEND          61 CONTROL POINTS
DATMIN = 0.58519995E+03DATMAX = 0.62830005E+03
PHS4
SKIP      0.020
BOLD      5.000
BLEV      2.000
BRDR
END
*******************  END PLOTTER TAPE BLOCK NUMBER    1  *******************
*******************  END PLOTTER TAPE BLOCK NUMBER    2  *******************

IHO900I EXECUTION TERMINATING DUE TO ERROR COUNT FOR ERROR NUMBER  217

IHO217I FIOCS - END OF DATA SET ON UNIT    5

TRACEBACK  ROUTINE  CALLED FROM ISN   REG. 14    REG. 15    REG.  0    REG.  1

           IBCOM                      001159A0   001292D4   00000001   00115908

           CNTCTL                     4211F91C   001154E0   C5D5C440   00000000

           MCNT                       6211D0BA   0011F6C0   0013E05C   0011CEEC

           MAIN                       00025E90   0011CE78   007BC928   00114FF8

ENTRY POINT=  0011CE78
```

SUMMARY OF ERRORS FOR THIS JOB	ERROR NUMBER	NUMBER OF ERRORS
	217	1

```
KK           KK  XX          XX  WW          WW  IIIIIIIIII  DDDDDDDDDDD   OOOOOOOOOOO  WW          WW   2222222222
KK         KK    XX          XX  WW          WW  IIIIIIIIII  DDDDDDDDDDDD  OOOOOOOOOOOO WW          WW  222222222222
KK       KK       XX        XX   WW          WW      II      DD         DD OO        OO WW          WW  22          22
KK     KK          XX      XX    WW          WW      II      DD         DD OO        OO WW          WW              22
KKKKK               XX    XX     WW          WW      II      DD         DD OO        OO WW          WW              22
KKKKKK                XXXX       WW          WW      II      DD         DD OO        OO WW          WW            22
KK   KK               XXXX       WW    WW    WW      II      DD         DD OO        OO WW    WW    WW          22
KK     KK           XX    XX     WW   WWWW   WW      II      DD         DD OO        OO WW   WWWW   WW        22
KK       KK        XX      XX    WW WW  WW WW        II      DD         DD OO        OO WW WW  WW WW       22
KK         KK     XX        XX   WWWW    WWWW        II      DD         DD OO        OO WWWW    WWWW    22
KK          KK   XX          XX  WWW      WWW    IIIIIIIIII  DDDDDDDDDDDD  OOOOOOOOOOOO WWW      WWW    222222222222
KK           KK  XX          XX  WW        WW    IIIIIIIIII  DDDDDDDDDDD   OOOOOOOOOOO  WW        WW    222222222222


KXWIDOW2 JOB NUMBER 7517              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            KXWIDOW2 JOB NUMBER 7517
KXWIDOW2 JOB NUMBER 7517              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            KXWIDOW2 JOB NUMBER 7517
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
KDAVIS.160LBK.X4777                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            KDAVIS.160LBK.X4777
KDAVIS.160LBK.X4777                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            KDAVIS.160LBK.X4777
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
ORIGIN TSO $KBDT01                    ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            ORIGIN TSO $KBDT01
ORIGIN TSO $KBDT01                    ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            ORIGIN TSO $KBDT01
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
START DATE 20 DEC 82.354              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            START DATE 20 DEC 82.354
START TIME 11.14.39                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            START TIME 11.14.39
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
STOP  DATE 20 DEC 82.354              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            STOP  DATE 20 DEC 82.354
STOP  TIME 11.17.36                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            STOP  TIME 11.17.36
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
XEQ   TIME 00.02.56                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            XEQ   TIME 00.02.56
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
PRINTER 0E8                           ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            PRINTER 0E8
ENDDC TIME 11.18.10                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            ENDDC TIME 11.18.10
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
     19 CARDS READ                    ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                 19 CARDS READ
      0 CARDS PUNCHED                 ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                  0 CARDS PUNCHED
     88 LINES PRINTED                 ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                 88 LINES PRINTED
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
KDAVIS.160LBK.X4777                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC            KDAVIS.160LBK.X4777

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KK        KK  XX         XX  WW         WW  IIIIIIIIII  DDDDDDDDDDD   CCCCCCCCCCCC  WW         WW  2222222222
KK       KK    XX       XX   WW         WW  IIIIIIIIII  DDDDDDDDDDDD  CCCCCCCCCCCC  WW         WW 222222222222
KK      KK      XX     XX    WW         WW      II      DD        DD  CC        CC  WW         WW 22          22
KK  KK           XX   XX     WW         WW      II      DD        DD  CC        CC  WW         WW             22
KKKKK             XX XX      WW         WW      II      DD        DD  CC        CC  WW         WW             22
KKKKKK             XXXX      WW         WW      II      DD        DD  CC        CC  WW         WW            22
KK   KK            XXXX      WW    WW   WW      II      DD        DD  CC        CC  WW    WW   WW          22
KK    KK          XX  XX     WW   WWWW  WW      II      DD        DD  CC        CC  WW   WWWW  WW        22
KK     KK        XX    XX    WW WW  WW WW       II      DD        DD  CC        CC  WW WW  WW WW       22
KK      KK      XX      XX   WWWW    WWWW       II      DD        DD  CC        CC  WWWW    WWWW     22
KK       KK    XX        XX  WWW      WWW   IIIIIIIIII  DDDDDDDDDDDD  CCCCCCCCCCCC  WWW      WWW  222222222222
KK        KK  XX          XX WW        WW   IIIIIIIIII  DDDDDDDDDDD   CCCCCCCCCCCC  WW        WW  222222222222


KXWIDOW2 JOB NUMBER 7517              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              KXWIDOW2 JOB NUMBER 7517
KXWIDOW2 JOB NUMBER 7517              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              KXWIDOW2 JOB NUMBER 7517
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
KDAVIS.160LBK.X4777                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              KDAVIS.160LBK.X4777
KDAVIS.160LBK.X4777                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              KDAVIS.160LBK.X4777
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
ORIGIN TSO $KBDT01                    ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              ORIGIN TSO $KBDT01
ORIGIN TSO $KBDT01                    ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              ORIGIN TSO $KBDT01
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
START DATE 20 DEC 82.354              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              START DATE 20 DEC 82.354
START TIME 11.14.39                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              START TIME 11.14.39
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
STOP  DATE 20 DEC 82.354              ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              STOP  DATE 20 DEC 82.354
STOP  TIME 11.17.36                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              STOP  TIME 11.17.36
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
XEQ   TIME 00.02.56                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              XEQ   TIME 00.02.56
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
PRINTER OE8                           ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              PRINTER OE8
ENDDC TIME 11.18.10                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              ENDDC TIME 11.18.10
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
     19 CARDS READ                    ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                   19 CARDS READ
      0 CARDS PUNCHED                 ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                    0 CARDS PUNCHED
     88 LINES PRINTED                 ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                   88 LINES PRINTED
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                      ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
KDAVIS.160LBK.X4777                   ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC              KDAVIS.160LBK.X4777


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KK          KK   XX          XX   WW          WW   IIIIIIIIII   DDDDDDDDDDD    000000000000   WW          WW    SSSSSSSSSS
KK        KK     XX          XX   WW          WW   IIIIIIIIII   DDDDDDDDDDDD   000000000000   WW          WW   SSSSSSSSSSSS
KK      KK        XX        XX    WW          WW       II       DD         DD  00          00   WW          WW   SS          SS
KK    KK           XX      XX     WW          WW       II       DD         DD  00          00   WW          WW   SS
KKKKK               XX    XX      WW          WW       II       DD         DD  00          00   WW          WW   SSS
KKKKKK                XXXX        WW          WW       II       DD         DD  00          00   WW          WW    SSSSSSSSS
KK    KK              XXXX        WW    WW    WW       II       DD         DD  00          00   WW    WW    WW     SSSSSSSSS
KK     KK           XX    XX      WW   WWWW   WW       II       DD         DD  00          00   WW   WWWW   WW            SSS
KK       KK        XX      XX     WW WW  WW WW         II       DD         DD  00          00   WW WW  WW WW               SS
KK         KK     XX        XX    WWWW      WWWW       II       DD         DD  00          00   WWWW      WWWW   SS          SS
KK           KK  XX          XX   WWW        WWW   IIIIIIIIII   DDDDDDDDDDDD   000000000000   WWW        WWW   SSSSSSSSSSSS
KK            KK XX          XX   WW          WW   IIIIIIIIII   DDDDDDDDDDD    000000000000   WW          WW    SSSSSSSSSS


KXWIDOWS JOB NUMBER 7344               TVADC TVADC TVADC TVADC TVADC TVADC               KXWIDOWS JOB NUMBER 7344
KXWIDOWS JOB NUMBER 7344               TVADC TVADC TVADC TVADC TVADC TVADC               KXWIDOWS JOB NUMBER 7344
                                       TVADC TVADC TVADC TVADC TVADC TVADC
KDAVIS.160LBK.X4777                    TVADC TVADC TVADC TVADC TVADC TVADC               KDAVIS.160LBK.X4777
KDAVIS.160LBK.X4777                    TVADC TVADC TVADC TVADC TVADC TVADC               KDAVIS.160LBK.X4777
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
ORIGIN TSO $KBDT01                     TVADC TVADC TVADC TVADC TVADC TVADC               ORIGIN TSO $KBDT01
ORIGIN TSO $KBDT01                     TVADC TVADC TVADC TVADC TVADC TVADC               ORIGIN TSO $KBDT01
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
START DATE 15 DEC 82.349               TVADC TVADC TVADC TVADC TVADC TVADC               START DATE 15 DEC 82.349
START TIME 13.05.08                    TVADC TVADC TVADC TVADC TVADC TVADC               START TIME 13.05.08
                                       TVADC TVADC TVADC TVADC TVADC TVADC
STOP  DATE 15 DEC 82.349               TVADC TVADC TVADC TVADC TVADC TVADC               STOP  DATE 15 DEC 82.349
STOP  TIME 13.08.46                    TVADC TVADC TVADC TVADC TVADC TVADC               STOP  TIME 13.08.46
                                       TVADC TVADC TVADC TVADC TVADC TVADC
XEQ   TIME 00.03.38                    TVADC TVADC TVADC TVADC TVADC TVADC               XEQ   TIME 00.03.38
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
PRINTER OE8                            TVADC TVADC TVADC TVADC TVADC TVADC               PRINTER OE8
TVADC TIME 13.10.18                    TVADC TVADC TVADC TVADC TVADC TVADC               TVADC TIME 13.10.18
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
     19 CARDS READ                     TVADC TVADC TVADC TVADC TVADC TVADC                    19 CARDS READ
      0 CARDS PUNCHED                  TVADC TVADC TVADC TVADC TVADC TVADC                     0 CARDS PUNCHED
     88 LINES PRINTED                  TVADC TVADC TVADC TVADC TVADC TVADC                    88 LINES PRINTED
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
                                       TVADC TVADC TVADC TVADC TVADC TVADC
KDAVIS.160LBK.X4777                    TVADC TVADC TVADC TVADC TVADC TVADC               KDAVIS.160LBK.X4777


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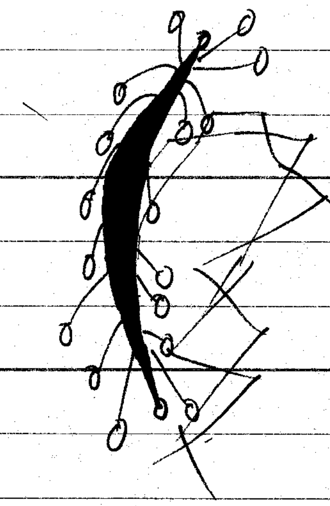

```
*   RJP NEWS   *
****************
*
*          *****************WELCOME TO THE NEW DATA CENTER*****************
*          -----------------CURRENT MOVE INFORMATION--------------------
*          FOR THE LATEST MOVE INFORMATION, USERS MAY LIST DATA SET
*          D.US907002.WWWDD.DATA, WHERE WWW = MON, TUE, WED, THR, FRI,
*          AND DD = THE DATE.
*               LATEST DATA SET IS D.US907002.MON13.DATA
*
*          ---------------------------------------------------------------
*          ***********************IEHPROGM**********************************
*          WHEN USING THE CATLG STATEMENT ON IEHPROGM, SPECIFY 3350 ON
*          VOL= PARAMETER.  DO NOT SPECIFY DASD OR SYSDA.  HSM WILL NOT
*          HANDLE THIS SITUATION.
*          ***************************************************************
*          ---------------KNOXVILLE SCHEDULED POWER OUTAGE--------------
*          THERE WILL BE A SCHEDULED OUTAGE ON SAT., DEC. 18, FROM 5.00 PM
*          UNTIL SUN., DEC. 19 @ 1.00 PM AT SL59-K.  THE FOLLOWING WILL BE
*          AFFECTED:  CONTROLLERS A000, A500, A680, A7A0, A920, ALL
*          SYSTEM 3 USERS, REMOTES 01, 11, 38, 43, 45.
*          ---------------------------------------------------------------
*          ***************************************************************
*
*
*
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IAT6140 JOB ORIGIN FROM GROUP=RGROUP01, DSP=IR , DEVICE=INTRDR , 000
 12:37:23 IAT4401  LOCATE FOR STEP=STEP1     DD=STEPLIB  DSN=SYS4.TS922089.PLOTLOAD
 12:37:23 IAT4402 UNIT=3350     ,VOL(S)=SOFT02
 12:37:23 IAT4401  LOCATE FOR STEP=STEP1     DD=FT05F001 DSN=$KBDT01.CONTROL.DATA
 12:37:23 IAT4402 UNIT=3350     ,VOL(S)=TS0003
 12:37:23 IAT4401  LOCATE FOR STEP=STEP1     DD=FT16F001 DSN=$KBDT01.WIDOWS.DATA
 12:37:23 IAT4402 UNIT=3350     ,VOL(S)=TS0003
 12:37:25 IAT5220 JOB 7344 (KXWIDOWS) IS INELIGIBLE FOR SETUP ON SYSC
 12:37:25 IAT5295 DD=STEPLIB  UNIT=3350      VOLUME=SOFT02 DSN=
 12:37:25 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
 12:37:25 IAT5295 DD=FT05F001 UNIT=3350      VOLUME=TS0003 DSN=
 12:37:25 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
 12:37:25 IAT5295 DD=FT09F001 UNIT=TAPE      VOLUME=PLOTKD DSN=
 12:37:25 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
 12:37:25 IAT5295 DD=FT16F001 UNIT=3350      VOLUME=TS0003 DSN=
 12:37:25 IAT5230 NO DEVICES AVAILABLE OF THE TYPE REQUESTED
 12:37:25 IAT5110 JOB 7344 (KXWIDOWS) USES     D SOFT02
 12:37:25 IAT5110 JOB 7344 (KXWIDOWS) USES     D TS0003
 12:37:25 IAT5110 JOB 7344 (KXWIDOWS) GET      T PLOTKD ,NL
 12:53:51 IAT5200 JOB 7344 (KXWIDOWS) IN SETUP ON MAIN=SYSA
 12:53:51 IAT5210 STEPLIB  USING D SOFT02 ON 44E
 12:53:51 IAT5210 FT05F001 USING D TS0003 ON 40D
 12:53:51 IAT5210 FT09F001 RSRVD T PLOTKD ON 58F   ,NL,RING
 13:05:09 IAT2000 JOB 7344 KXWIDOWS SELECTED SYSA      GRP=BATCH
 13:05:16  IEF403I KXWIDOWS - STARTED - TIME=13.05.14
 13:05:21  IEF234E D 58F,,,KXWIDOWS,STEP1
 13:05:21 *IEC501A M 58F,PLOTKD,NL,800 BPI,KXWIDOWS,STEP1
 13:07:19 PLOT IS 045**************************************************************************************************************
 13:08:44  TVA002I KXWIDOWS SYSA01 9A9 BC=01024   EXCP=00004   DDN=FT14F001
 13:08:45  TVA002I KXWIDOWS SYSA01 9A9 BC=01024   EXCP=00009   DDN=FT14F001
 13:08:45  TVA002I KXWIDOWS TS0003 40D BC=00256   EXCP=00002   DDN=FT05F001
 13:08:45  TVA002I KXWIDOWS PLOTKD 58F BC=00060   EXCP=00060   DDN=FT09F001
 13:08:45  TVA001I          PLOTKD 58F TR=000,TW=000,EG=000,CL=000,N=000,SIO=00071
 13:08:45  IEC502E K 58F,PLOTKD,NL,KXWIDOWS,STEP1
 13:08:45  TVA002I KXWIDOWS TS0003 40D BC=00512   EXCP=00003   DDN=FT16F001
 13:08:45  TVA002I KXWIDOWS SOFT02 44E BC=00000   EXCP=00003   DDN=STEPLIB
 13:08:46  IEF404I KXWIDOWS - ENDED - TIME=13.08.46
 13:08:46 IAT5410 KEEP      T PLOTKD ON 58F,SYSA
 13:08:46 IAT5400 JOB 7344 (KXWIDOWS) IN BREAKDOWN
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```
//KXWIDOWS JOB 261472,KDAVIS.160LBK.X4777,CLASS=K,MSGLEVEL=1             00000010
//*MAIN ORG=RGROUP01                                                    00000020
//*OPERATOR  PLOTTING INSTRUCTIONS                                      JOB 07344
//*OPERATOR                                                             JOB 07344
//*OPERATOR  KXWIDOWS,261472,KDAVIS                                     JOB 07344
//*OPERATOR  THIS IS A CALCOMP PLOT,PLEASE TRANSMIT & PLOT IN KNOXVILLEJOB 07344
//*OPERATOR PLEASE MAIL THE PRINTOUT TO K.DAVIS AT 160 LB-K             JOB 07344
//STEP1 EXEC PGM=GPC11051,TIME=05                                       00000080
//STEPLIB DD DSN=SYS4.TS922089.PLOTLOAD,DISP=SHR                        00000090
//FT05F001 DD DSN=$KBDT01.CONTROL.DATA,DISP=SHR                         00000100
//FT06F001 DD SYSOUT=A                                                  00000110
//FT07F001 DD DUMMY                                                     00000120
//FT09F001 DD UNIT=(TAPE,,DEFER),DCB=DEN=2,VOL=SER=PLOTKD,LABEL=(,NL),  00000130
//       DISP=(,KEEP),DSN=PLOT                                          00000140
//FT10F001 DD DUMMY                                                     00000150
//FT11F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000160
//FT13F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000170
//FT14F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000180
//FT16F001 DD DSN=$KBDT01.WIDOWS.DATA,DISP=SHR                          00000190
    1       //KXWIDOWS JOB 261472,KDAVIS.160LBK.X4777,CLASS=K,MSGLEVEL=1             00000010
    2       //STEP1 EXEC PGM=GPC11051,TIME=05                                       00000080
    3       //STEPLIB DD DSN=SYS4.TS922089.PLOTLOAD,DISP=SHR                        00000090
    4       //FT05F001 DD DSN=$KBDT01.CONTROL.DATA,DISP=SHR                         00000100
    5       //FT06F001 DD SYSOUT=A                                                  00000110
    6       //FT07F001 DD DUMMY                                                     00000120
    7       //FT09F001 DD UNIT=(TAPE,,DEFER),DCB=DEN=2,VOL=SER=PLOTKD,LABEL=(,NL),  00000130
            //       DISP=(,KEEP),DSN=PLOT                                          00000140
    8       //FT10F001 DD DUMMY                                                     00000150
    9       //FT11F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000160
   10       //FT13F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000170
   11       //FT14F001 DD UNIT=SYSPL,SPACE=(CYL,(5,5))                              00000180
   12       //FT16F001 DD DSN=$KBDT01.WIDOWS.DATA,DISP=SHR                          00000190
```

```
IEF236I ALLOC. FOR KXWIDOWS STEP1
IEF237I 44E  ALLOCATED TO STEPLIB
IEF237I 2CF  ALLOCATED TO SYS00251
IEF237I 40D  ALLOCATED TO FT05F001
IEF237I JES3 ALLOCATED TO FT06F001
IEF237I DMY  ALLOCATED TO FT07F001
IEF237I 58F  ALLOCATED TO FT09F001
IEF237I DMY  ALLOCATED TO FT10F001
IEF237I 249  ALLOCATED TO FT11F001
IEF237I 2A2  ALLOCATED TO FT13F001
IEF237I 2A9  ALLOCATED TO FT14F001
IEF237I 40D  ALLOCATED TO FT16F001
TVA002I KXWIDOWS SYSA01 9A9 BC=01024   EXCP=00004   DDN=FT14F001
TVA002I KXWIDOWS SYSA01 9A9 BC=01024   EXCP=00009   DDN=FT14F001
TVA002I KXWIDOWS TS0003 40D BC=00256   EXCP=00002   DDN=FT05F001
TVA002I KXWIDOWS PLOTKD 58F BC=00060   EXCP=00060   DDN=FT09F001
TVA001I          PLOTKD 58F TR=000,TW=000,EG=000,CL=000,N=000,SIO=00071
TVA002I KXWIDOWS TS0003 40D BC=00512   EXCP=00003   DDN=FT16F001
TVA002I KXWIDOWS SOFT02 44E BC=00000   EXCP=00003   DDN=STEPLIB
IEF142I KXWIDOWS STEP1 - STEP WAS EXECUTED - COND CODE 0016
IEF285I   SYS4.TS922089.PLOTLOAD                      KEPT
IEF285I   VOL SER NOS= SOFT02.
IEF285I   SYS1.USRCAT1                                KEPT
IEF285I   VOL SER NOS= USCAT1.
IEF285I   $KBDT01.CONTROL.DATA                        KEPT
IEF285I   VOL SER NOS= TS0003.
IEF285I   STEP1.FT06F001                              SYSOUT
IEF285I   PLOT                                        KEPT
IEF285I   VOL SER NOS= PLOTKD.
IEF285I   SYS82349.T123719.RA000.KXWIDOWS.R0000002    DELETED
IEF285I   VOL SER NOS= SYSA02.
IEF285I   SYS82349.T123719.RA000.KXWIDOWS.R0000003    DELETED
IEF285I   VOL SER NOS= SYSA04.
IEF285I   SYS82349.T123719.RA000.KXWIDOWS.R0000004    DELETED
IEF285I   VOL SER NOS= SYSA01.
IEF285I   $KBDT01.WIDOWS.DATA                         KEPT
IEF285I   VOL SER NOS= TS0003.
IEF373I STEP /STEP1    / START 82349.1305
IEF374I STEP /STEP1    / STOP  82349.1308 CPU    0MIN 06.57SEC SRB    0MIN 00.03SEC VIRT   300K SYS   184K
***************************************************************************************************************
*                                                                                                             *
*                                            KOMAND DATA ACQUISITION SYSTEM                                   *
*                                                                                                             *
* STEP NAME      STEP1       START TIME 13.05.14.55   VIRT SYS  USED  184  K    PAGE INS         61  STEP CPU      00.00.04.73 *
* PGM NAME       GPC11051    STOP  TIME 13.08.46.72   VIRT CORE USE   300  K    PAGE OUTS        62  JOB  CPU      00.00.04.73 *
* DISPATCH PRTY 73           ELAP. TIME 00.03.32.17   SWAPS/PAGES     1/    11  SRB TIME   00.00.00.02  CONDITION CODE    0016 *
* PGN              19        SERVICE UN      11,945   TRANS ACT TIME 00.03.26.24                                              *
*                                                                                                             *
***************************************************************************************************************
*                                                     EXCP STATISTICS                                         *
*                                                                                                             *
* UNIT    EXCP COUNT    UNIT   EXCP COUNT    UNIT   EXCP COUNT    UNIT   EXCP COUNT    UNIT   EXCP COUNT    UNIT   EXCP COUNT *
*                                                                                                             *
*  44E            3     9CF           0      40D           2      58F          60      249           0      2A2           0 *
*  2A9            9     40D           3                                                                                     *
* EXCP TOTAL       77      VIO PAGE INS          0      VIO PAGE OUTS          0      PAGES SWAPPED IN        11            *
***************************************************************************************************************
IEF375I  JOB /KXWIDOWS/ START 82349.1305
IEF376I  JOB /KXWIDOWS/ STOP  82349.1308 CPU    0MIN 06.57SEC SRB    0MIN 00.03SEC
***************************************************************************************************************
*                                                                                                             *
*                                            KOMAND DATA ACQUISITION SYSTEM                                   *
*                                                                                                             *
*  JOB LOG NUMBER - KXWIDOWS 82349 12.37.15.64           CPU TIME    00.00.04.73          SRB TIME        00.00.00.02 *
*                                                                                                             *
```

```
*  PROGRAMMER  KDAVIS.160LBK.X4777                     INIT DATE  12/15/82   82.349    INITIATION TIME      13.05.14.55   *
*                                                                                                                         *
*  ACCTG DATA  261472                                  TERM DATE  12/15/82   82.349    TERMINATION TIME     13.08.46.75   *
*                                                                                                                         *
*  OS-VS2 REL  03.8                                    PGN/SERVICE     197   11,945    ELAPSED TIME         00.03.32.20   *
*                                                                                                                         *
*  SYSTEM ID   A3                                      CLASS             K             COMPLETION STATUS          C0016   *
*                                                                                                                         *
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```
JOB  WIDOWS CREEK SCRUBBER SLUDGE BORROW
BAS
SIZE    400.000   400.000     0.0        0.0          600.000    33.333    3600.000      1200.000    44.444    5200.000
EDIT     16    0
CNTL      0.040     0.100          1          7   0    0    0    0    0    0    0                    15          15
CNTL (7X,F4.0,2X,F4.0,2X,F5.1,1X,8A1,4X,I2,1X,4I1)
CNTL     1    2    3    0    0    0    0   12   4   5   6   7   8   9  10  11
CNTL      1200.0000    3600.0000    600.7000      0.0          0.0          0.0      0   0   PAH-1
CNTL      1600.0000    3600.0000    594.8999      0.0          0.0          0.0      0   0   PAH-2
CNTL      2000.0000    3600.0000    602.2000      0.0          0.0          0.0      0   0   PAH-3
CNTL      2400.0000    3600.0000    609.6001      0.0          0.0          0.0      0   0   PAH-4
CNTL      2800.0000    3600.0000    615.2000      0.0          0.0          0.0      0   0   PAH-5
CNTL      3200.0000    3600.0000    589.6001      0.0          0.0          0.0      0   0   PAH-6
CNTL      3200.0000    4000.0000    611.8000      0.0          0.0          0.0      0   0   PAH-7
CNTL      3200.0000    4400.0000    618.2000      0.0          0.0          0.0      0   0   PAH-8
CNTL      2800.0000    4000.0000    611.3000      0.0          0.0          0.0      0   0   PAH-9
CNTL      2400.0000    4000.0000    607.7000      0.0          0.0          0.0      0   0   PAH-10
CNTL      2800.0000    4400.0000    609.3999      0.0          0.0          0.0      0   0   PAH-11
CNTL      2400.0000    4400.0000    600.2000      0.0          0.0          0.0      0   0   PAH-12
CNTL      1200.0000    3200.0000    596.3000      0.0          0.0          0.0      0   0   PAH-13
CNTL      1200.0000    2800.0000    594.8999      0.0          0.0          0.0      0   0   PAH-14
CNTL      1200.0000    2400.0000    591.7000      0.0          0.0          0.0      0   0   PAH-15
CNTL      1600.0000    3200.0000    599.5000      0.0          0.0          0.0      0   0   PAH-16
CNTL      1600.0000    2800.0000    595.3000      0.0          0.0          0.0      0   0   PAH-17
CNTL      1600.0000    2400.0000    596.6001      0.0          0.0          0.0      0   0   PAH-18
CNTL      1600.0000    2000.0000    591.0000      0.0          0.0          0.0      0   0   PAH-19
CNTL      2000.0000    3200.0000    603.3000      0.0          0.0          0.0      0   0   PAH-20
CNTL      2400.0000    3200.0000    596.7000      0.0          0.0          0.0      0   0   PAH-21
CNTL      2000.0000    2800.0000    594.1001      0.0          0.0          0.0      0   0   PAH-22
CNTL      2400.0000    2800.0000    585.2000      0.0          0.0          0.0      0   0   PAH-23
CNTL      2000.0000    2400.0000    599.3999      0.0          0.0          0.0      0   0   PAH-24
CNTL      2400.0000    2400.0000    601.1001      0.0          0.0          0.0      0   0   PAH-25
CNTL      2000.0000    2000.0000    589.1001      0.0          0.0          0.0      0   0   PAH-26
CNTL      2400.0000    2000.0000    606.3000      0.0          0.0          0.0      0   0   PAH-27
CNTL      2000.0000    1600.0000    606.3999      0.0          0.0          0.0      0   0   PAH-28
CNTL      2800.0000    3200.0000    585.2000      0.0          0.0          0.0      0   0   PAH-29
CNTL      2800.0000    2800.0000    596.1001      0.0          0.0          0.0      0   0   PAH-30
CNTL      2800.0000    2400.0000    622.3000      0.0          0.0          0.0      0   0   PAH-31
CNTL      3200.0000    4800.0000    607.2000      0.0          0.0          0.0      0   0   SLH-1
CNTL      3000.0000    4600.0000    608.1001      0.0          0.0          0.0      0   0   SLH-2
CNTL      3000.0000    4200.0000    610.1001      0.0          0.0          0.0      0   0   SLH-3
CNTL      3000.0000    3800.0000    602.0000      0.0          0.0          0.0      0   0   SLH-4
CNTL      3000.0000    3400.0000    593.8000      0.0          0.0          0.0      0   0   SLH-5
CNTL      2600.0000    4600.0000    598.6001      0.0          0.0          0.0      0   0   SLH-6
CNTL      2600.0000    4200.0000    601.8999      0.0          0.0          0.0      0   0   SLH-7
CNTL      2600.0000    3800.0000    608.2000      0.0          0.0          0.0      0   0   SLH-8
CNTL      2600.0000    3400.0000    600.5000      0.0          0.0          0.0      0   0   SLH-9
CNTL      2600.0000    3000.0000    589.3000      0.0          0.0          0.0      0   0   SLH-10
CNTL      2200.0000    4200.0000    600.3000      0.0          0.0          0.0      0   0   SLH-11
CNTL      2200.0000    3800.0000    600.3999      0.0          0.0          0.0      0   0   SLH-12
CNTL      2200.0000    3400.0000    595.6001      0.0          0.0          0.0      0   0   SLH-13
CNTL      2200.0000    3000.0000    587.8999      0.0          0.0          0.0      0   0   SLH-14
CNTL      2200.0000    2600.0000    579.2000      0.0          0.0          0.0      0   0   SLH-15
CNTL      2000.0000    4400.0000    593.8999      0.0          0.0          0.0      0   0   SLH-16
CNTL      2000.0000    4000.0000    599.3999      0.0          0.0          0.0      0   0   SLH-17
CNTL      1800.0000    4200.0000    593.6001      0.0          0.0          0.0      0   0   SLH-18
CNTL      1800.0000    3800.0000    598.6001      0.0          0.0          0.0      0   0   SLH-19
CNTL      1800.0000    3400.0000    598.7000      0.0          0.0          0.0      0   0   SLH-20
CNTL      1800.0000    3000.0000    588.2000      0.0          0.0          0.0      0   0   SLH-21
******************  END PLOTTER TAPE BLOCK NUMBER    1  ********************
CNTL      1800.0000    2600.0000    594.2000      0.0          0.0          0.0      0   0   SLH-22
CNTL      1600.0000    4000.0000    592.2000      0.0          0.0          0.0      0   0   SLH-23
CNTL      1400.0000    4200.0000    591.6001      0.0          0.0          0.0      0   0   SLH-24
CNTL      1400.0000    3800.0000    595.6001      0.0          0.0          0.0      0   0   SLH-25
CNTL      1400.0000    3400.0000    593.5000      0.0          0.0          0.0      0   0   SLH-26
```

```
CNTL      1400.0000      3000.0000       589.5000       0.0          0.0          0.0       0   0   SLH-27
CNTL      1200.0000      4000.0000       589.8000       0.0          0.0          0.0       0   0   SLH-28
CNTL      1000.0000      4200.0000       583.0000       0.0          0.0          0.0       0   0   SLH-29
CNTL      1000.0000      3800.0000       586.3000       0.0          0.0          0.0       0   0   SLH-30
BEND         61 CONTROL POINTS
DATMIN = 0.57919995E+03DATMAX = 0.62230005E+03
PHS4
SKIP      0.020
BOLD      4.000
BLEV      5.000
BROR
END
*******************  END PLOTTER TAPE BLOCK NUMBER    2  ********************

IHO900I EXECUTION TERMINATING DUE TO ERROR COUNT FOR ERROR NUMBER  217

IHO217I FIOCS - END OF DATA SET ON UNIT    5

TRACEBACK  ROUTINE  CALLED FROM ISN   REG. 14    REG. 15    REG.  0    REG.  1

           IBCOM                      001159A0   001292D4   00C00001   00115908

           CNTCTL                     4211F91C   001154E0   C5D5C440   00000000

           MCNT                       6211D0BA   0011F6C0   0013E050   0011CEEC

           MAIN                       00033920   0011CE78   007FC928   00114FF8

ENTRY POINT=  0011CE78
```

```
SUMMARY OF ERRORS FOR THIS JOB   ERROR NUMBER   NUMBER OF ERRORS
                                      217               1
```

```
KK          KK  XX          XX  WW          WW  IIIIIIIIII   DDDDDDDDDDD    000000000000  WW          WW   SSSSSSSSSS
KK        KK    XX          XX  WW          WW  IIIIIIIIII   DDDDDDDDDDDD   000000000000  WW          WW  SSSSSSSSSSSS
KK      KK        XX      XX    WW          WW      II       DD        DD  00          00  WW          WW  SS          SS
KK    KK            XX  XX      WW          WW      II       DD        DD  00          00  WW          WW  SS
KKKKK                XX  XX     WW          WW      II       DD        DD  00          00  WW          WW  SSS
KKKKKK                XXXX      WW          WW      II       DD        DD  00          00  WW          WW   SSSSSSSSS
KK    KK              XXXX      WW    WW    WW      II       DD        DD  00          00  WW    WW    WW    SSSSSSSSS
KK     KK           XX  XX      WW   WWWW   WW      II       DD        DD  00          00  WW   WWWW   WW           SSS
KK       KK       XX      XX    WW WW  WW WW        II       DD        DD  00          00  WW WW  WW WW             SS
KK         KK    XX        XX   WWWW      WWWW      II       DD        DD  00          00  WWWW      WWWW  SS         SS
KK          KK  XX          XX  WWW        WWW  IIIIIIIIII   DDDDDDDDDDDD   000000000000  WWW        WWW  SSSSSSSSSSSS
KK           KK XX          XX  WW          WW  IIIIIIIIII   DDDDDDDDDDD    000000000000  WW          WW   SSSSSSSSSS


KXWIDOWS JOB NUMBER 7344                          ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                KXWIDOWS JOB NUMBER 7344
KXWIDOWS JOB NUMBER 7344                          ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                KXWIDOWS JOB NUMBER 7344
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
KDAVIS.160LBK.X4777                               ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                KDAVIS.160LBK.X4777
KDAVIS.160LBK.X4777                               ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                KDAVIS.160LBK.X4777
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
ORIGIN TSO $KBDT01                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                ORIGIN TSO $KBDT01
ORIGIN TSO $KBDT01                                ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                ORIGIN TSO $KBDT01
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
START DATE 15 DEC 82.349                          ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                START DATE 15 DEC 82.349
START TIME 13.05.08                               ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                START TIME 13.05.08
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
STOP  DATE 15 DEC 82.349                          ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                STOP  DATE 15 DEC 82.349
STOP  TIME 13.08.46                               ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                STOP  TIME 13.08.46
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
XEQ   TIME 00.03.38                               ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                XEQ   TIME 00.03.38
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
PRINTER 0E8                                       ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                PRINTER 0E8
ENDDC TIME 13.10.48                               ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                ENDDC TIME 13.10.48
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
        19 CARDS READ                             ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                        19 CARDS READ
         0 CARDS PUNCHED                          ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                         0 CARDS PUNCHED
        88 LINES PRINTED                          ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                        88 LINES PRINTED
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
                                                  ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC
KDAVIS.160LBK.X4777                               ENDDC ENDDC ENDDC ENDDC ENDDC ENDDC                KDAVIS.160LBK.X4777

*******************************************************************************************************************
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```

1/10/85 RAH

CALCOMP DATA SHEET

TR TR+6'

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
SS-1	1110	2990		598.8
SS-2	1120	3385		603.5
SS-3	1140	3785		599.4
SS-4	1205	4050		592.5
SS-5	1605	4150		599.5
SS-6	2000	4275		604.3
SS-7	2270	4340		609.0
SS-8	2610	4510		608.6
SS-9	2890	4610		619.2
SS-10	3090	4395		626.3
SS-11	3120	4120		609.9
SS-12	3170	3800	Replace w/US-12 ✓	597.4
SS-13	3120	3560		600.7
SS-14	2985	3360		601.0
SS-15	2700	3160	Replace w/US-15A ✓	581.2
SS-16	2480	2950		593.1
SS-17	2760 ⟷	2250	589.8 ✓ ~~590~~ →	598.8
SS-18	2560 ⟷	2020		597.0
SS-19	2570 ⟷	1600		601.0
SS-20	1405	3190		603.7
SS-21	1400	3990		597.5
SS-22	1005	3185		603.3
SS-23	1005	3590	599.5 ✓ ~~600.5~~ →	610.[illegible]
SS-24	1005	3985	Replace w/US-24	571.2
SS-25	1205	4385		591.8
SS-26	1605	4390		599.4
SS-27	2065	4490		602.7

1/10/85 pg. 2 of.

CALCOMP DATA SHEET

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
SS-28	2400	4720		607.5
SS-29	2790	4800		607.1
SS-30	3120	4790		620.9
SS-31	3400	4200		633.2
SS-32	5330	3730		600.8
SS-33	3210	3200		601.0
SS-34	1800	2790		603.2
SS-35	1600	2990		604.9
SS-36	2000	2990		607.6
SS-37	1800	3190		607.5
SS-38	~~[illegible]~~ 2200	~~[illegible]~~ 3195		605.1
SS-39	1600	3425	✓	603.9
SS-40	2000	3390		607.8
SS-41	2400	3400		611.4
SS-42	2200	3600		609.1
SS-43	2600	3600		615.1
SS-44	2000	3800		604.0
SS-45	2800	3900		626.2
SS-46	2000	4060		600.2
SS-47	2600	4000		609.5
SS-48	2400	4195		609.5
SS-49	2810	4320		618.3
SS-50	~~[illegible]~~ 1905	2790		601.3
[illegible]				
[illegible]				
SS-53				
SS-54				

CALCOMP DATA SHEET

Mike 2272 Replace

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
US-12	3165	3795		602
~~US-15~~	~~2795~~	~~3155~~		~~586.5~~
US-15A	2695	3155		591
US-24	1000	3980		587.5

1" = 400'
CI = 5' 4th Boco

Title: Widows Creek Scrubber Sludge Borrow

CALCOMP DATA SHEET

PAH-1
SLH-2

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
PAH-1	1200	3600	600.7	606.7
PAH-2	1600	3600	594.9	600.9
PAH-3	2000	3600	602.2	608.2
PAH-4	2400	3600	609.6	615.6
PAH-5	2800	3600	615.2	621.2
PAH-6	3200	3600	589.6	595.6
PAH-7	3200	4000	611.8	617.8
PAH-8	3200	4400	618.2	624.2
PAH-9	2800	4000	611.3	617.3
PAH-10	2400	4000	607.7	613.7
PAH-11	2800	4400	609.4	615.4
PAH-12	2400	4400	600.2	606.2
PAH-13	1200	3200	596.3	602.3
PAH-14	1200	2800	594.9	600.9
PAH-15	1200	2400	591.7	597.7
PAH-16	1600	3200	599.5	605.5
PAH-17	1600	2800	(-595.3)	601.3
PAH-18	1600	2400	596.6	602.6
PAH-19	1600	2000	591.0	597.0
PAH-20	2000	3200	603.3	609.3
PAH-21	2400	3200	596.7	602.7
PAH-22	2000	2800	594.1	600.1
PAH-23	2400	2800	(-585.2)	591.2
PAH-24	2000	2400	599.4	605.4
PAH-25	2400	2400	601.1	607.1
PAH-26	2000	2000	(-589.1)	595.1
PAH-27	2400	2000	(-606.3)	612.3

CALCOMP DATA SHEET

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35		
PAH-28	2000	1600	(-606.4)		612.4
PAH-29	2800	3200	585.2		591.2
PAH-30	2800	2800	596.1		602.1
PAH-31	2800	2400	622.3		628.3
				*	1/10/85 [illegible]
SLH-1	3200	4800	607.2	620.7	613.2
SLH-2	3000	4600	608.1	618.9	614.1
SLH-3	3000	4200	610.1	623.2	616.1
SLH-4	3000	3800	602.0	612.2	608.0
SLH-5	3000	3400	593.8	604.6	599.8
SLH-6	2600	4600	598.6	610.4	604.6
SLH-7	2600	4200	601.9	614.7	607.9
SLH-8	2600	3800	608.2	618.4	614.2
SLH-9	2600	3400	600.5	613.5	606.5
SLH-10	2600	3000	589.3		595.3
SLH-11	2200	4200	600.3	610.7	606.3
SLH-12	2200	3800	600.4	611.0	606.4
SLH-13	2200	3400	595.6	608.7	601.6
SLH-14	2200	3000	587.9		593.9
SLH-15	2200	2600	579.2		585.2
SLH-16	2000	4400	593.9	605.9 [illegible]	599.9
SLH-17	2000	4000	599.4	608.7	605.4
SLH-18	1800	4200	593.6	605.0	599.6
SLH-19	1800	3800	598.6	609.7	604.6
SLH-20	1800	3400	598.7	606.9	604.7

CALCOMP DATA SHEET

Widow Creek
Scrubber Sludge Borrow

0 CNTL 4	6 X·COORD. 15	16 Y·COORD. 25	26 Z·VALUE 35	
SLH-21	1800	3000	588.2 602.1	594.2
SLH-22	1800	2600	594.2 604.3	600.2
SLH-23	1600	4000	592.2 604.3	598.2
SLH-24	1400	4200	591.6 602.0	597.6
SLH-25	1400	3800	595.6 607.9	601.6
SLH-26	1400	3400	593.5 604.9	599.5
SLH-27	1400	3000	589.5 602.0 602.9	595.5
SLH-28	1200	4000	589.8 601.4	595.8
SLH-29	1000	4200	583.0 597.0	589.0
SLH-30	1000	3800	586.3	592.3
[illegible]	[illegible]	[illegible]		[illegible]
RP-1	3120	[illegible]		[illegible]
RP-[illegible]	[illegible]	4440		616.[illegible]
RP-[illegible]	2815	4000		618.1
RP-[illegible]	[illegible]200	[illegible]		[illegible]

A 16

27 March 1984

TENNESSEE VALLEY AUTHORITY
DATA SERVICES BRANCH
AND MAPPING SERVICES BRANCH

WIDOWS CREEK STEAM PLANT
FORCED OXIDIZED SCRUBBER SLUDGE
DISPOSAL AREA
FOUNDATION EXPLORATION
SPLIT SPOON HOLES

Hole	Ala. East Coordinates
SS-1	X= 526,658.34 Y= 1,600,771.69
SS-2	X= 526,644.33 Y= 1,601,171.98
SS-3	X= 526,680.33 Y= 1,601,571.49
SS-4	X= 526,744.23 Y= 1,601,830.54
SS-5	X= 527,145.68 Y= 1,601,924.53
SS-6	X= 527,547.51 Y= 1,602,043.51
SS-7	X= 527,823.46 Y= 1,602,104.39
SS-8	X= 528,150.67 Y= 1,602,249.49
SS-9	X= 528,452.39 Y= 1,602,360.14
SS-10	X= 528,647.74 Y= 1,602,137.87
SS-11	X= 528,664.83 Y= 1,601,856.74
SS-12	X= 528,710.09 Y= 1,601,541.01
SS-13	X= 528,656.50 Y= 1,601,301.80

Hole	Ala. East Coordinates
SS-14	X= 528,459.69 Y= 1,601,100.17
SS-15	X= 528,230.98 Y= 1,600,906.03
SS-16	X= 528,002.28 Y= 1,600,711.89
SS-17	X= 527,773.57 Y= 1,600,517.75
SS-18	X= 527,544.86 Y= 1,600,323.61
SS-19	X= 527,122.29 Y= 1,600,364.71
SS-20	X= 526,931.31 Y= 1,600,967.63
SS-21	X= 526,943.30 Y= 1,601,767.55
SS-22	X= 526,531.36 Y= 1,600,973.62
SS-23	X= 526,537.35 Y= 1,601,373.58
SS-24	X= 526,543.35 Y= 1,601,773.54
SS-25	X= 526,749.32 Y= 1,602,170.50
SS-26	X= 527,149.28 Y= 1,602,164.51
SS-27	X= 527,615.73 Y= 1,602,257.52
SS-28	X= 527,954.07 Y= 1,602,477.46
SS-29	X= 528,355.15 Y= 1,602,546.45
SS-30	X= 528,687.60 Y= 1,602,530.21
SS-31	X= 528,946.07 Y= 1,601,937.51

Hole	Ala. East Coordinates
SS-32	X= 528,940.07 Y= 1,601,537.56
SS-33	X= 528,731.10 Y= 1,600,940.64
SS-34	X= 527,325.26 Y= 1,600,561.68
SS-35	X= 527,128.29 Y= 1,600,764.65
SS-36	X= 527,528.24 Y= 1,600,758.66
SS-37	X= 527,331.26 Y= 1,600,961.63
SS-38	X= 527,731.22 Y= 1,600,955.63
SS-39	X= 527,134.80 Y= 1,601,199.63
SS-40	X= 527,534.23 Y= 1,601,158.62
SS-41	X= 527,934.18 Y= 1,601,152.62
SS-42	X= 527,737.22 Y= 1,601,355.59
SS-43	X= 528,137.16 Y= 1,601,349.59
SS-44	X= 527,540.24 Y= 1,601,558.58
SS-45	X= 528,341.65 Y= 1,601,646.56
SS-46	X= 527,544.21 Y= 1,601,823.54
SS-47	X= 528,143.17 Y= 1,601,749.55
SS-48	X= 527,946.19 Y= 1,601,952.52
SS-49	X= 528,357.40 Y= 1,602,071.90

Hole	Ala. East Coordinates
SS-50	X= 526,925.31 Y= 1,600,567.67

Point	Northing	Easting	T.O.R
PAH-1	1601352	526730	600.7
PAH-2	1601352	527130	594.9
PAH-3	1601352	527530	602.2
PAH-4	1601352	527930	609.6
PAH-5	1601352	528330	615.2
PAH-6	1601352	528730	589.6
PAH-7	1601752	528730	611.8
PAH-8	1602152	528730	618.2
PAH-9	1601752	528330	611.3
PAH-10	1601752	527930	607.7
PAH-11	1602152	528330	609.4
PAH-12	1602152	527930	600.2
PAH-13	1600952	526730	596.3
PAH-14	1600552	526730	594.9
PAH-15	1600152	526730	591.7
PAH-16	1600952	527130	599.5
PAH-17	1600552	527130	595.3
PAH-18	1600152	527130	596.6
PAH-19	1599752	527130	591
PAH-20	1600952	527530	603.3
PAH-21	1600952	527930	596.7
PAH-22	1600552	527530	594.1
PAH-23	1600552	527930	585.2
PAH-24	1600152	527530	599.4
PAH-25	1600152	527930	601.1
PAH-26	1599752	527530	589.1
PAH-27	1599752	527930	606.3
PAH-28	1599352	527530	606.4
PAH-29	1600952	528330	585.2
PAH-30	1600552	528330	596.1
PAH-31	1600152	528330	622.3
SLH-1	1602552	528730	607.2
SLH-2	1602352	528530	608.1
SLH-3	1601952	528530	610.1
SLH-4	1601552	528530	602
SLH-5	1601152	528530	593.8
SLH-6	1602352	528130	598.6
SLH-7	1601952	528130	601.9
SLH-8	1601552	528130	608.2
SLH-9	1601152	528130	600.5
SLH-10	1600752	528130	589.3
SLH-11	1601952	527730	600.3
SLH-12	1601552	527730	600.4
SLH-13	1601152	527730	595.6
SLH-14	1600752	527730	587.9
SLH-15	1600352	527730	579.2
SLH-16	1602152	527530	593.9
SLH-17	1601752	527530	599.4
SLH-18	1601952	527330	593.6
SLH-19	1601552	527330	598.6
SLH-20	1601152	527330	598.7

SLH-21	1600752	527330	588.2
SLH-22	1600352	527330	594.2
SLH-23	1601752	527130	592.2
SLH-24	1601952	526930	591.6
SLH-25	1601552	526930	595.6
SLH-26	1601152	526930	593.5
SLH-27	1600752	526930	589.5
SLH-28	1601752	526730	589.8
SLH-29	1601952	526530	583
SLH-30	1601552	526530	586.3

EVALUATION OF ENGINEERING PROPERTIES AND WET STACKING DISPOSAL OF WIDOWS CREEK FGD GYPSUM-FLY ASH WASTE

by

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ABSTRACT

Wet stacking of by-product gypsum has been practiced by the phosphate fertilizer industry for more than 25 years. The ability to use wet stacking for disposal of flue gas desulfurization (FGD) gypsum was first demonstrated during an Electric Power Research Institute sponsored project on Chiyoda Thoroughbred 121 FGD gypsum produced at the Scholz Electric Generating Station of Gulf Power Company in Sneads, Florida. Wet stacking of FGD gypsum containing fly ash, however, has not been previously demonstrated. Accordingly, as part of an overall project investigating various FGD waste disposal alternatives, the Tennessee Valley Authority constructed a pilot-scale wet stacking disposal facility to evaluate the feasibility of wet stacking FGD gypsum-fly ash waste produced at the Widows Creek Steam Plant in Stevenson, Alabama. Operational experience and results from geotechnical laboratory testing performed on the waste are presented. The results indicate that although the Widows Creek FGD gypsum-fly ash had settling, dewatering, and structural characteristics not as favorable for stacking as phosphogypsum or CT 121 FGD gypsum, they were adequate for wet stacking. Therefore, the project findings should extend the ability of the utility industry to employ wet stacking disposal to facilities which also use FGD/forced oxidation systems as the primary particulate removal process.

INTRODUCTION AND OVERVIEW OF WIDOWS CREEK STEAM PLANT

The Tennessee Valley Authority (TVA) has been developing scrubber operating and waste disposal experience with limestone flue gas desulfurization (FGD) systems via a series of demonstration projects on Unit 8 of the Widows Creek Steam Plant in Stevenson, Alabama (1) (2) (3). Unit 8 is a coal-fired 550-MW boiler which became operational in 1964, and is the newest of eight coal-fired units at Widows Creek. With its sister unit, Unit 7, it occupies a separate powerhouse about one-quarter mile from the powerhouse containing Units 1 through 6. The aggregate capacity of the eight units is 1,950 MW. A schematic site plan of the Widows Creek Steam Plant is shown in Figure 1.

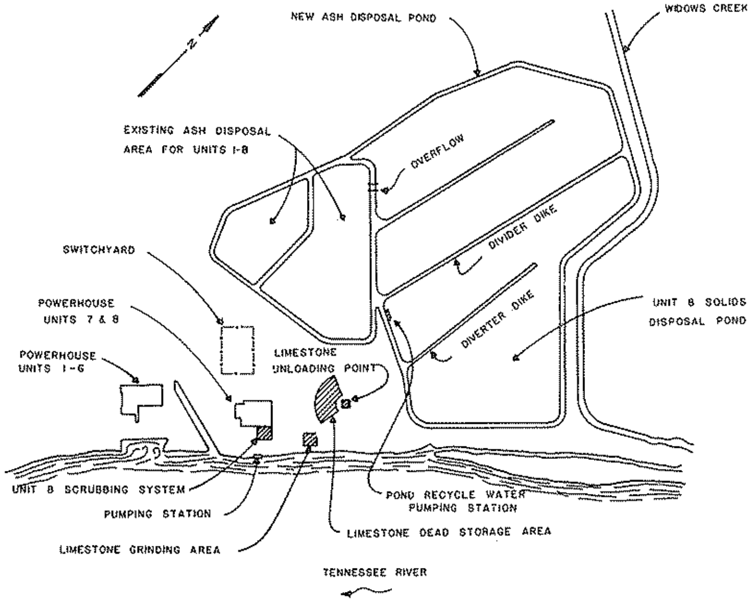

Figure 1. Widows Creek Steam Plant Site Plan.

Various landfilling methods involving dewatering, stabilization, and fixation of FGD calcium sulfite wastes produced by Unit 8 have been studied by TVA. Primary among these studies was the use of dry fly ash for stabilization of dewatered FGD calcium sulfite waste and landfill disposal. This methodology did not appear feasible for Unit 8, because insufficient dry fly ash was available for stabilization.

Subsequently, one of the four modules of the Unit 8 FGD system was modified to permit forced oxidation of calcium sulfite to calcium sulfate (gypsum), which is a waste considered more suitable for disposal. As part of an evaluation of various disposal alternatives for FGD gypsum-fly ash waste, a wet stacking disposal demonstration project was initiated. Gypsum produced as a by-product at phosphate fertilizer plants, i.e., phosphogypsum, is disposed of using the wet stacking method, and hence it was anticipated that FGD gypsum-fly ash waste could also be disposed of using the wet stacking method.

boiler. One FGD train is connected to each of the four flue gas ducts from the boiler. A schematic illustration of the Unit 8 FGD scrubber system is presented in Figure 2.

As shown, the FGD scrubber consists of an adjustable throat venturi followed by a grid-type absorber spray tower. For the forced-oxidation demonstration project, the D train was modified to allow forced oxidation of the scrubber sludge by installing air-sparging and turbine agitation equipment in the D train absorber and venturi circulation tanks.

The forced oxidation of calcium sulfite to calcium sulfate requires: aeration of the scrubber slurry in the absorber and venturi circulation tanks at atmospheric pressure; and maintaining a suitable pH in the slurry at the point of air introduction. Since the scrubber was also used as the primary particulate removal system, the resulting waste was a combination of calcium sulfate and fly ash. Unreacted limestone and unoxidized calcium sulfite also occurred within the waste.

Aeration in the absorber and venturi circulation tanks was provided by four screw type diesel air compressors. The compressors were rated at 1,600 acfm and 100 psig at the outlet. Air flow to the absorber and venturi circulation tanks was controlled by a rubber pinch valve at the inlet to the tanks. The venturi circulation tank was 18 feet in diameter and 25 feet high with a working capacity of 40,700 gallons (Figure 3). The absorber circulation tank was 33 feet in diameter and 25 feet high with a working capacity of 147,000 gallons (Figure 3).

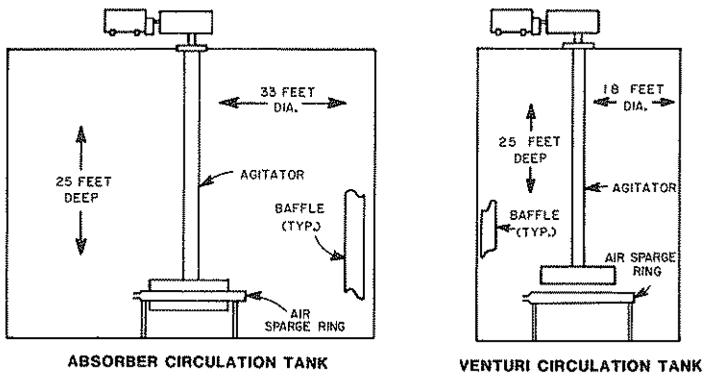

Figure 3. Absorber and Venturi Circulation Tanks.

Normally, only two compressors were needed for complete oxidation, with the other two compressors serving as standby units. The compressed air was distributed within the absorber and venturi circulation tanks by means of a sparge ring (Figure 4) consisting of a perforated annular duct surrounding the agitator impeller. The sparge rings were held above the tank floor by supports welded to the floor.

The turbine agitators installed inside and directly above the sparge rings in the absorber and venturi tank, respectively, were significantly larger than standard circulation tank agitators to enhance mixing. The bladed turbine ash waste produced at Widows Creek, a laboratory testing program was performed to characterize the engineering properties of the waste relevant to wet stacking disposal, and to provide properties for use in the design of a full-scale facility (4). The chemical composition, crystal morphology, and physical characteristics of the waste are first addressed. Specific engineering properties regarding settling, consolidation, permeability and shear strength are subsequently discussed.

CHEMICAL COMPOSITION AND CRYSTAL MORPHOLOGY

The chemical compositon of a FGD gypsum-fly ash waste is expected to influence its engineering properties. Generally, the presence of calcium sulfite, due to reduced oxidation levels, inhibits dewatering, decreases settling rates, increases compressibility, and decreases permeability and shear strength. Further, high fly ash content wastes are expected to be less suitable for wet stacking than those higher in gypsum content.

During operation of the scrubber facility, the chemical composition of gypsum-fly ash solids within the venturi bleed stream was typically determined three times daily. The chemical composition of the venturi bleed stream solids was characterized by the following average constituents:

- 41% gypsum
- 43% fly ash
- 13% limestone
- 0.7% sulfite

As shown, the chemical composition was characterized by essentially equal weights of gypsum and fly ash with 13% unreacted limestone and 0.7% unoxidized calcium sulfite. The low calcium sulfite content resulted from the high average degree of oxidation achieved of 97.9%. The fly ash content never decreased below

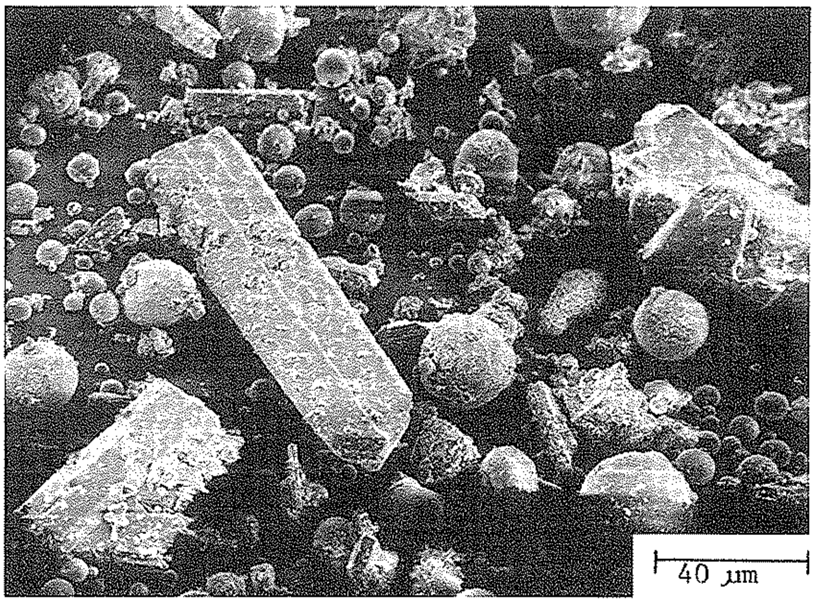

Figure 5. Scanning Electron Photomicrograph of FGD Gypsum-Fly Ash Waste.

limestone, with the gypsum, fly ash and unoxidized calcium sulfite phases occurring within the minus 74 μm size fraction.

The particle size distribution is similar to that previously reported for Widows Creek gypsum-fly ash waste (5), and is also consistent with particle size distributions typically reported for FGD gypsum (6)(7) and fly ash (6).

The specific gravity of the gypsum-fly ash waste was determined to vary from 2.34 to 2.93 with an average of 2.50 ± 0.14. This average value is in general agreement with the specific gravity of 2.46 reported for a waste with 25% gypsum and 75% fly ash (7) and 2.29 reported for a waste with 55% gypsum, 20% limestone, 25% fly ash, and 1% calcium sulfite (5). For comparison, the specific gravity of the various minerals within the waste are: gypsum (2.33); calcium sulfite (2.50); magnetite (5.18); hematite (5.25); calcium carbonate (2.70); magnesium carbonate (2.85); and quartz (2.66). A much higher specific gravity is calculated using the mineral specific gravities and the weight percent of each mineral within the waste. The measured average gypsum-fly ash waste specific gravity of 2.50, however, is consistent with the expected value using a fly ash specific gravity of 2.50 as often reported. The fly ash specific gravity is typically lower than its constituent mineral specific gravities, due to the "porous" nature of the spheres.

SEDIMENTATION CHARACTERISTICS

Settling tests performed on the venturi bleed stream solids indicated that the settling rate, Q, varied from a minimum of 0.32 cm/min, for a poor level of oxidation (62.9%), to a maximum of 4.8 cm/min with an overall average of 3.0 cm/min. The effect of oxidation of solids on the settling rate is presented in Figure 7. As expected, although the data are limited, the settling rate decreases

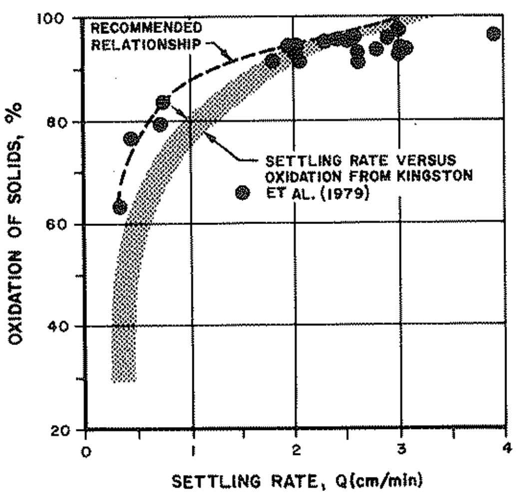

Figure 7. Settling Rate Versus Oxidation of Solids.

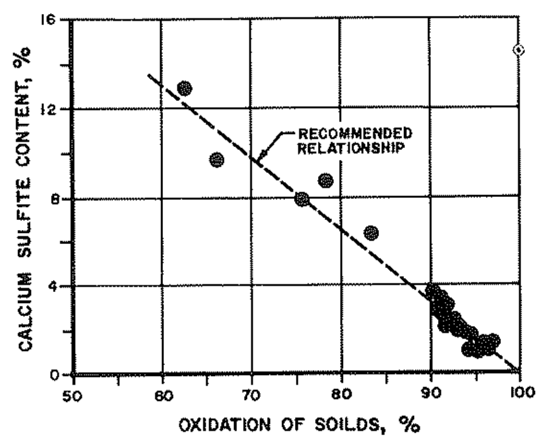

Figure 8. Oxidation of Solids Versus Calcium Sulfite Content

markedly below an oxidation level of approximately 90% when the calcium sulfite content exceeds about 3% (Figure 8).

approximately 1.5 cm/min rather than 3.0 cm/min, and a "final" settled solids content of 58% rather than 63.5%.

Correlations between gypsum and fly ash content with settling rate and "final" settled solids content were attempted. No definitive correlations were apparent. As shown in Figure 10, however, weak trends of decreasing settling rate and decreasing "final" settled solids content with increasing fly ash content were observed.

COMPRESSIBILITY AND CONSOLIDATION CHARACTERISTICS

The void ratio, e, (or solids contents) versus effective vertical consolidation stress, $\bar{\sigma}_{vc}$, curve developed for the FGD gypsum-fly ash waste from the slurry-consolidation and settling tests is presented in Figure 11. As shown, the void ratio, e, ranges from 1.3 (S=65.9%) at low effective stresses typical of self-weight consolidation stresses existing after sedimentation, to 0.80 (S=75.8%) at an effective stress of 4.0 kg/cm^2 which corresponds approximately to the effective stress existing at the base of a 150-foot high stack. The compression ratio, or slope of the void ratio versus effective stress curve expressed in terms of strain is approximately 0.05 between stresses of 0.01 to 1.0 kg/cm^2. Comparatively, this compression ratio is similar to that expected for a loose sand. At low stresses between 0.001 to 0.01 kg/cm^2, i.e., below less than 1 foot of material, the material is relatively more compressible, with a compression ratio of 0.14.

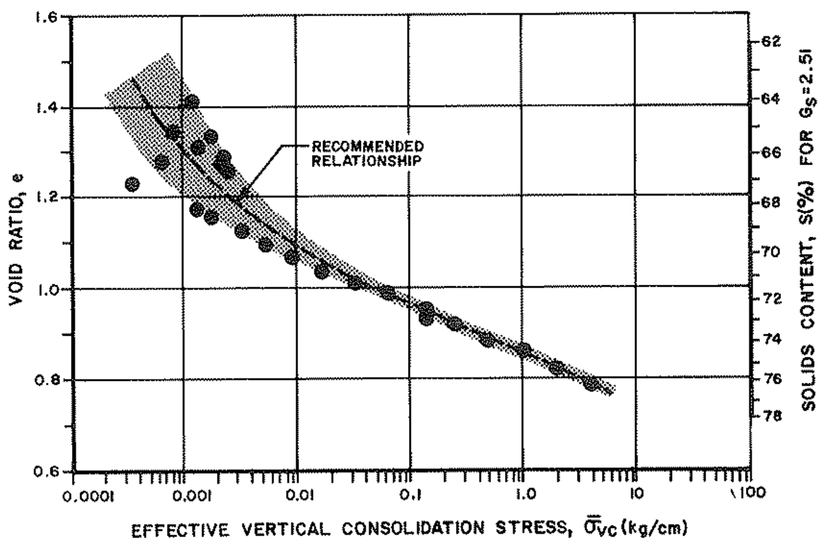

Figure 11. Void Ratio Versus Effective Stress Compressibility Curve.

Typically, FGD gypsums consolidate quickly under self-imposed or externally applied loads. Following consolidation, drained creep or secondary compression occurs resulting in slight increases in dry density with time at a given effective stress. The Widows Creek FGD gypsum-fly ash waste was also found to consolidate quickly with representative coefficients of consolidation, c_v, in the range of 0.01 to 0.10 cm^2/sec. For comparison, low to high plasticity clays typically have coefficients of consolidation in the range of 0.001 to 0.0001 cm^2/sec.

Stress-strain curves for Widows Creek FGD gypsum-fly ash waste from three consolidated drained triaxial tests performed on undisturbed samples recovered from the pilot-scale stack are presented in Figure 14. The test samples displayed pre-shear solids contents, S, of 71.2% to 74.1%, dry densities, γ_d, of 78.2 lb/ft^3 to 84.0 lb/ft^3 and were isotropically consolidated under effective confining stresses, $\bar{\sigma}_c$, of 0.5 to 3.0 kg/cm^2. The samples display similar behavior mobilizing peak strengths at axial strains, ϵ, of 6.7% to 11.5% and displaying slight strain softening behavior or decreases in strength with additional strain. Volume change measurements during drained shear indicate that the samples initially compressed (i.e., positive volume change), prior to a slight increase in volume at large strains.

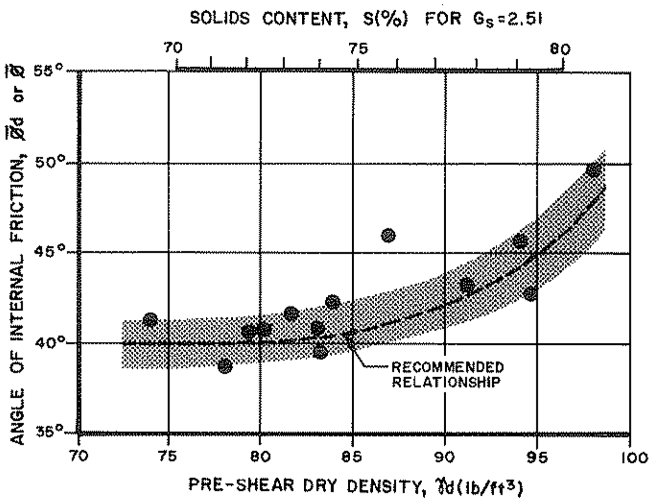

Figure 13. Dry Density Versus Angle of Internal Friction.

WET STACKING OF GYPSUM IN THE PHOSPHATE FERTILIZER INDUSTRY

Wet stacking of by-product gypsum, i.e., phosphogypsum, has been practiced by the phosphate fertilizer industry for more than 25 years. In Florida alone, more than 21 million tons of phosphogypsum are disposed of annually using the wet stacking method. The resulting gypsum stacks are typically large (50 to 300 acres), structurally stable stockpiles reaching heights greater than 100 feet. A gypsum stack located near Bartow, Florida is shown in Figure 15.

DESIGN CONSIDERATIONS

Wet stacking as performed by the phosphate fertilizer industry uses the upstream method of construction. In this method, illustrated in Figure 16, an earthen starter dike is first constructed to form a sedimentation pond and stacking area. Gypsum is pumped to the sedimentation pond in slurry form, usually at 15 to 20 percent solids, and allowed to settle and drain to approximately 60 to 70 percent solids. Process water is decanted and returned to the plant. Once sufficient gypsum sediments within the pond, the gypsum is excavated with a dragline to raise the perimeter dikes of the stack. The cast gypsum is then shaped to form a road on the crest of the dike using a bulldozer. The process of sedimentation, excavation, and raising of the perimeter dikes continues on a regular basis during the active life of the stack.

Using the upstream method of construction, some gypsum stacks have reached heights exceeding 100 feet with slopes as steep as 1.5 horizontal to 1.0

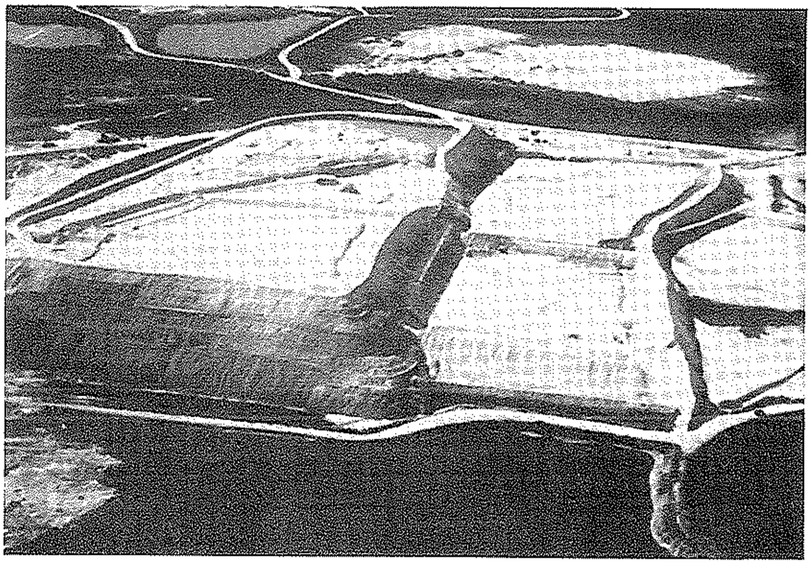

Figure 15. Phosphate Fertilizer Plant Gypsum Stack Near Bartow, Florida.

It is possible to operate a gypsum stack so the coarser material is deposited around the perimeter of the stack while simultaneously providing sufficient retention time for the finer particles to settle within the interior of the stack. This is accomplished by using an elevated ditch to carry the gypsum around the periphery of the stack and to create a ponded area within the interior of the stack. This concept is shown schematically on Figure 17.

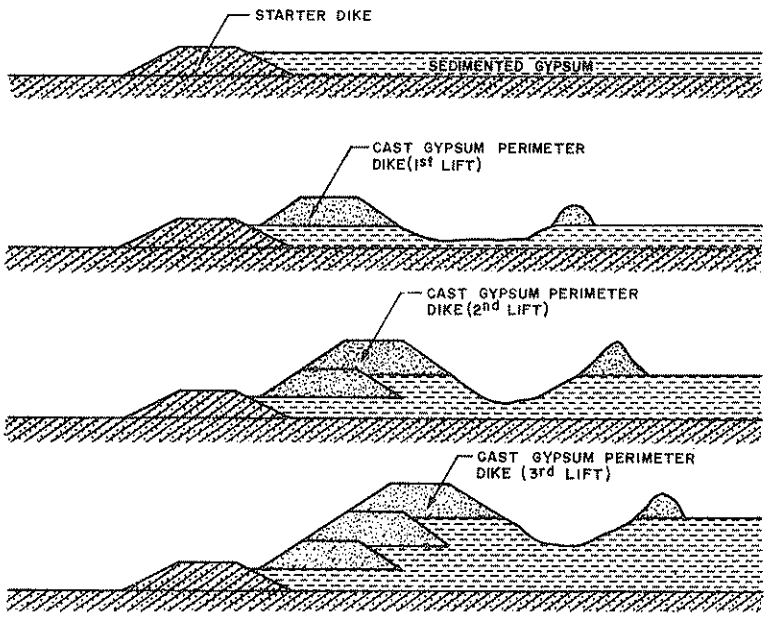

Figure 16. Upstream Method of Gypsum Stack Construction.

It is not common to provide erosion protection on the outside slope of a gypsum stack. Experience indicates there is essentially no erosion of the slope from rainfall, and dusting has not been a significant problem. If long-term maintenance and reclamation require the slopes be grassed, it may be expedient to flatten the slopes to 2.5 horizontal to 1.0 vertical or flatter as the stack is raised. These flatter slopes will generally hold topsoil cover and can be maintained using conventional equipment.

Gypsum stacks within the phosphate fertilizer industry are generally built as steeply as possible so that the storage capacity of the stack is maximized. If an average slope flatter than the angle of repose is required for stability, the perimeter dikes are generally offset from the outer perimeter as shown in Figure 19 to form benches in the slope. The excess material can be removed with a dragline to provide a uniform slope.

The wet stacking method of waste disposal was also demonstrated for FGD gypsum during operation of the Chiyoda Thoroughbred 121 Scrubber at the Scholz Electric Generating Station of Gulf Power Company in Sneads, Florida (6). A pilot scale gypsum stack similar to those used in the phosphate industry was successfully constructed (Figure 20) at Plant Scholz using the essentially pure gypsum produced by the CT 121 process.

EVALUATION OF WET STACKING DISPOSAL OF WIDOWS CREEK FGD GYPSUM-FLY ASH WASTE

Gypsum-fly ash waste was initially discharged into a 1.0-acre disposal area at Widows Creek on November 15, 1982 and continued intermittently through August 4, 1983. During this time, the scrubber was operational for 70 days and sufficient waste was provided to raise a 0.3-acre stack to a height of about 10 to 12 feet. The venturi bleed stream solids content varied considerably during operation of the scrubber from a minimum of 1.6% to a maximum of 15.7%, with an average of 8.1%. Based on an average venturi bleed stream solids content of 8.1%, average venturi bleed stream flow rate of 100 gal/min and 70 days of scrubber operation, an estimated 3,600 tons of waste were deposited within the disposal area. Waste deposited within the disposal area was characterized by approximately equal portions of gypsum and fly ash with average constituent contents of 42% gypsum, 43% fly ash, 13% unreacted limestone and 0.7% unoxidized calcium sulfite.

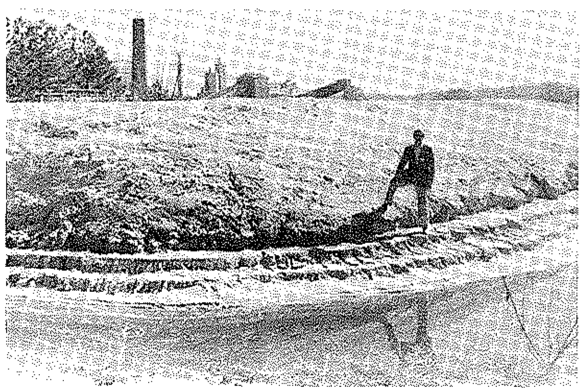

Figure 20. CT-121 FGD Gypsum Stack.

horizontal to 1.0 vertical. Below the line of seepage the slopes were flat and sloughing of the cast slope immediately above the line of seepage was observed. The use of relatively flat slopes at the toe of the stack or an internal drain may be necessary to prevent similar conditions in a full-scale facility.

Figure 23. Completed Cast Gypsum Fly Ash Perimeter Dike.

In a full-scale wet stacking disposal facility some of the handling problems encountered during the demonstration project may be minimized by the use of an elevated rim ditch along the perimeter of the stack. Rehandling of the waste during casting, however, may still be required. The ability to allow drying/ dewatering periods of 30 days in the rim ditch and/or pond prior to raising the stack should be considered in the design of a stack. Further, the stacking characteristics are sensitive to the fly ash and calcium sulfite content. Accordingly, gypsum-fly ash waste should be produced with a minimum amount of fly ash and calcium sulfite. Based on experience at Widows Creek, fly ash contents should be maintained less than 40% and calcium sulfite contents less than 1%. Improvement in the stackability of the gypsum-fly ash waste will result if the fly ash and calcium sulfite contents are minimized and the gypsum content maximized.

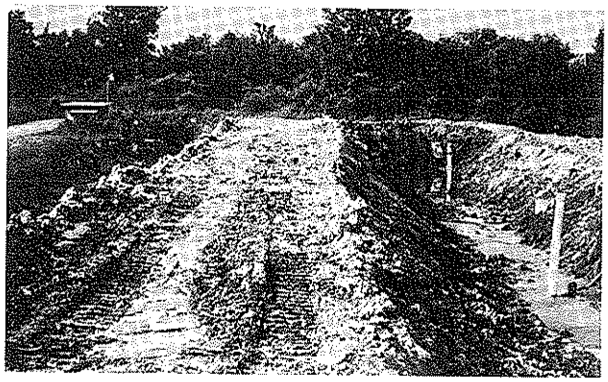

Figure 24. Completed Cast Gypsum Fly Ash Perimeter Dike.

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CONCEPTUAL DESIGN RECOMMENDATIONS FOR CONSTRUCTION AND MANAGEMENT OF THE WIDOWS CREEK FGD GYPSUM-FLY ASH WASTE DISPOSAL FACILITY

Introduction

The recommendations presented herein are for use in the conceptual design of the proposed Widows Creek flue gas desulfurization (FGD) gypsum-fly ash waste disposal facility. The recommendations are based upon the results of field observations and laboratory testing performed during construction and operation of a 0.3-acre, 12-foot high pilot-scale stacking facility at Widows Creek; and experience with phosphogypsum stacking facilities in the phosphate fertilizer industry. The recommendations are not based upon detailed seepage, stability, water and material balance, etc. analyses, which are required for final design.

Waste Generation

Forced oxidization flue gas desulfurization scrubbers are scheduled for installation on Units 7 and 8 of the Widows Creek steam plant in Stevenson, Alabama. The combined capacity of the two units is 1100 megawatts (MW).

Gypsum-fly ash waste for the full-scale facility is projected by TVA to be generated at the following rates:

Unit	Slurry Solids Content (%)	Flow Rate (gal/min)	Gypsum-Fly Ash Waste (tons/day)
7	17	2200	2500
8	14	2800	2570
Combined	15	5000	5070

Note, that based on the pilot plant operation using one of the four parallel FGD trains on Unit 8, that an average slurry solids content of only 8% was achieved at a flow rate on the order of 100 gal/min. Accordingly, based on pilot plant operation a similar average slurry solids content of 8% at a flow rate of about 400 gal/min would be expected for all four Unit 8 FGD trains. The selected Unit 8 design slurry solids content of 14% and flow rate of 2800 gal/min, therefore, is substantially higher than indicated by the pilot plant operation.

Using the design parameters, the scrubber is projected to generate 1,850,000 tons of gypsum-fly ash waste per year at a 100% capacity factor. For the next 12 years the best available TVA estimates indicate a capacity factor of approximately 60%, resulting in 1,110,000 tons of gypsum-fly ash waste generated per year. For the conceptual design recommendations contained herein, a slightly higher capacity factor of 82% was used, corresponding to 300 days of operation per year and 1,517,000 tons of gypsum-fly ash waste generated per year.

Engineering Properties and Practical Implications

Based on field and laboratory investigations of the engineering properties of the Widows Creek FGD gypsum-fly ash waste performed during operation of the pilot-scale stacking facility, the following engineering properties are recommended for design considerations relating to construction and management of a full-scale wet stacking disposal facility.

Physical Characteristics

The Widows Creek FGD gypsum-fly ash waste was predominantly a non-plastic silt-sized material with a range of 64 to 100% and an average of 76% of the particles finer than the 74 μm size (Figure 1), and less than 10% finer than the 2 μm size. The specific gravity was determined to vary from 2.34 to 2.93 with an average of 2.50. Since the waste contains hydrated minerals (i.e., $CaSO_4 \cdot 2H_2O$ and $CaSO_3 \cdot \frac{1}{2}H_2O$) a drying temperature range of 40^oC to 50^oC was used for evaluating moisture content and dry density.

Chemical Composition and Effects on Engineering Properties

Overall, the chemical composition of the Widows Creek FGD gypsum-fly ash waste generated during the pilot-scale test program was characterized by the following average constituents:

- 41% gypsum
- 43% fly ash
- 13% limestone
- 0.7% sulfite

Large deviations from these averages occurred, with fly ash contents ranging from 27 to 76%, gypsum contents ranging from 6 to 62% and limestone contents ranging from 0.3 to 42%. Calcium sulfite contents ranged from 0.2 to 12.9%, although 78% of the tested samples displayed sulfite contents of 0.0 to 0.5%. A slightly lower fly ash content and slightly higher gypsum content is being projected by TVA for the full-scale facility.

Generally, the test data indicated that over the range found during the pilot-scale study, the chemical composition of the waste had little effect on the consolidation, permeability and shear strength properties of the gypsum-fly ash waste. Accordingly, the engineering properties recommended below are applicable for gypsum-fly ash waste produced with a chemical composition within the range found during operation of the scrubber for gypsum, fly ash and limestone contents, and for calcium sulfite contents generally less than 1%. Improvements in the engineering properties (i.e., increased shear strength and coefficient of permeability) and stackability of the waste can be expected, however, by minimizing the fly ash content. Calcium sulfite contents should also always be maintained as low as possible to optimize the stackability of the waste.

Material and Water Balance Considerations

The dry density of sedimented gypsum-fly ash waste within a stack will increase with depth. A minimum dry density of 68 lb/ft^3 is expected at the surface, increasing to a dry density of about 80 lb/ft^3 at a depth of 5 feet, to approximately 86 lb/ft^3 at a depth of 100 feet, and to approximately 88 lb/ft^3 at a depth of 150 feet* with an overall average of about 85 lb/ft^3 for a 150-foot high stack.

Gypsum-fly ash waste below submerged ponds or the phreatic surface within the stack will have a degree of saturation, S_n, of 100%. Essentially all of a ponded stack, therefore, except the cast gypsum crest road and gypsum above the phreatic surface within the stack slope will be 100% saturated. For an average gypsum-fly ash waste specific gravity of 2.50 and a dry density of 85 lb/ft^3, the free water moisture content for 100% saturation is 33.4%. The resulting average total unit weight is 113.4 lb/ft^3.**

In summary, the following average properties are recommended for preliminary or feasibility-type material and water balance calculations for a 150-foot high stack.

- Dry density, γ_d = 85 lb/ft^3
- Total saturated unit weight, γ_t = 113.4 lb/ft^3
- Moisture content, w_n = 33.4%
- Solids content, S = 75.0%
- Degree of saturation, S_n = 100%

Sedimentation Characteristics

Widows Creek FGD gypsum-fly ash waste will settle relatively quickly provided oxidation levels are greater than 95% with corresponding sulfite contents generally less than 1%. For oxidation levels greater than 95%, settling rates are projected to range from about 2.0 to 3.0 cm/min (Figure 2). For determining minimum detention areas and times for clarification of decanted process water, however, a lower value of 0.5 cm/min is recommended to allow for settling of finer particles within the waste.

The "final" settled solids content determined at the end of sedimentation generally ranged from 64 to 68% (Figure 3). For a specific gravity of 2.50, these settled solids contents correspond to dry densities of 64.8 to 71.7 lb/ft^3 and total saturated unit weights of 101.3 to 105.4 lb/ft^3. Similar values can be expected for sedimented waste in the wet stacking disposal area after sedimentation, but prior to consolidation under subsequent layers of sedimented waste.

*Assuming pore pressures are hydrostatic, i.e., increase linearly with depth such as occurs for a stack on a relatively impervious base.

**Where total unit weight, $\gamma_t = \gamma_d\,(1+w_n)$.

Consolidation Characteristics

Following sedimentation, the gypsum-fly ash waste will be moderately compressible at the very low stresses of 0.001 to 0.01 kg/cm^2 (Figure 4). At the higher consolidation stresses which will exist below the upper few feet of the sedimented waste, the compressibility will be lower, characterized by a compression ratio, CR, of 0.05 which is similar to that of a loose sand.

Typically, FGD gypsums consolidate very quickly under self-imposed or external applied loads. Following consolidation, drained creep or secondary compression occurs resulting in slight increases in dry density with time at a given effective stress. The Widows Creek FGD gypsum-fly ash waste was also found to consolidate quickly with representative coefficients of consolidation, c_v, in the range of 0.01 to 0.10 cm^2/sec. The one-dimensional coefficient of secondary compression, C_α, governing the magnitude of drained creep or secondary compression was characterized by an average value of 0.15%. This value is relatively small and, hence, the effects of secondary compression may be neglected in the design of the gypsum-fly ash stack.

Permeability and Seepage Analyses

Based on the measured coefficients of permeability of Widows Creek FGD gypsum-fly ash waste (Figure 5), little variability is expected in the coefficient of permeability within a 150-foot high stack. Typically, coefficients of permeability ranging from $3x10^{-4}$ cm/sec for sedimented gypsum-fly ash waste, to $1x10^{-4}$ cm/sec for gypsum-fly ash waste consolidated under an effective stress similar to that at the base of 150-foot high stack are expected. For preliminary or feasibility-type seepage analyses an overall representative average coefficient of permeability of $2x10^{-4}$ cm/sec is recommended. Variations from this average may be expected where the gypsum-fly ash is generally coarser, such as near the slurry discharge point, and where the gypsum-fly ash is generally finer, such as near spillways.

Uniform sedimented gypsum-fly ash waste is expected to be isotropic with respect to permeability. Due to the segregation of particle sizes which inherently occurs during any hydraulic disposal method, layering of the waste will occur which may result in anisotropic permeability. The anisotropy ratio is not expected to be very large and seepage evaluations may be performed using an isotropic coefficient of permeability.

Vertical shrinkage cracks may increase the vertical permeability, k_v, relative to the horizontal permeability, k_h, on a macro field scale. The effect of shrinkage cracks on the macroscopic permeability of the gypsum-fly ash stack are difficult to quantify in seepage evaluations. However, since the effects are likely to be localized and since shrinkage cracks in the pond become at least partially filled with sedimented material, the stack may be modeled as homogeneous and isotropic with respect to permeability.

Shear Strength and Stability Analyses

For effective-stress or drained stability analyses the following average peak shear strength determined from laboratory triaxial tests on gypsum-fly ash waste (Figure 6) and predicted average in situ density are recommended for preliminary and/or feasibility type stability analyses for the 150-foot high stack:

- Effective friction angle, $\bar{\phi} = 40^{o}$
- Effective cohesion, $\bar{c} = 0$
- Total saturated unit weight, $\gamma_t = 113.4\ lb/ft^3$

Field Observations of Pilot-Scale Wet Stacking Facility and Practical Implications

The pilot plant Widows Creek FGD gypsum-fly ash stack was raised to a height of 12 feet using the upstream method of construction. Accordingly, it appears feasible to use wet stacking for disposal of FGD gypsum-fly ash waste provided alternating compartments and rim ditching are used to allow a period for drying and desiccation prior to stacking.

During construction of the stack the pond was drained and a drying/dewatering period of 7 to 53 days allowed prior to stacking. Even with the drying/dewatering period, however, only coarser material near the inlet to the stack was easily cast. Sedimented gypsum-fly ash waste further from the inlet was difficult to cast and required considerable rehandling due to the tendency to slough and "run" into a flat slope immediately after casting. At the end of the first few days of construction the trafficability of the cast dikes was generally poor. In some areas, the cast dike was not capable of supporting a light dozer. With continued rehandling and drying/dewatering, the cast dikes were eventually satisfactorily constructed. Based on the results of in situ moisture content and density determinations, it appears that drying/dewatering of the sedimented gypsum-fly ash waste to a moisture content of 25% or less is necessary before the material can be easily cast and shaped into a trafficable starter dike. Dry densities of 85 lb/ft^3 or greater can generally then be expected in the cast starter dikes.

The slopes of the cast starter dike after stacking were steep, generally 1.0 horizontal to 1.0 vertical. Below the line of seepage the slopes were flat and sloughing of the cast slope immediately above the line of seepage was observed. The use of relatively flat slopes at the toe of the stack or a toe drain may be necessary to prevent similar conditions in a full-scale facility.

The slope of the surface of the sedimented gypsum-fly ash waste was determined after each filling period. The measured flow slope varied from 2 feet per 1000 feet after the initial filling to 8.5 feet per 1000 feet after the second filling. For design, a flow slope of 6.5 feet per 1000 feet, as measured after the third filling, is tentatively recommended until additional measurements are made on the full-scale facility.

In a full-scale wet stacking disposal facility some of the handling problems encountered during the test program may be minimized by the use of an elevated rim ditch along the perimeter of the stack. Rehandling of the waste during casting, however, may still be required. The ability to allow a drying/dewatering period of at least 30 days in the rim ditch and/or pond prior to raising the stack will be necessary and should be considered in the design of the stack. Further, the stacking characteristics are sensitive to the fly ash and calcium sulfite content. Accordingly, gypsum-fly ash waste should preferably not be produced for the full-scale stack with an average fly ash content appreciably greater than about 40% (i.e., greater than the average percentage produced by the pilot plant) or with an average calcium sulfite greater than about 1%. Improvement in the stackability of the gypsum-fly ash waste may result if the fly ash and calcium sulfite content can be reduced and the gypsum content increased. If gypsum-fly ash waste is occasionally produced with elevated fly ash or calcium sulfite contents during short periods of time the waste can still be disposed of within the stack, but should be diverted into the interior of the pond rather than deposited within the rim ditch.

Stack Management Considerations

Upstream Method of Construction

Based upon the results of the pilot-scale stacking project, it appears that the Widows Creek FGD gypsum-fly ash waste is a suitable construction material allowing for storage to a level above the earthen embankments forming the initial sedimentation pond. Once sufficient gypsum-fly ash waste has settled in the pond against the earthen starter dike, some of the settled gypsum-fly ash waste can be excavated and stacked along the inside edge of the earthen dike with a dragline and then shaped with a dozer to form subsequent starter dikes. This is done in accordance with the upstream method of construction as schematically illustrated in Figure 7. The cast dikes are typically raised 3 to 5 feet each lift. A minimum crest width of 30 feet should be maintained to provide a trafficable road along the top of the cast dike. The ditch formed on the upstream side of the earthen starter dike along the stack perimeter will collect runoff, seepage and minor accidental spills from the stack, and can also be used to return decanted process water from the stack to the plant or surge pond.

Rim-Ditching

Management of the stack can be improved if peripheral rim-ditching is used in conjunction with the upstream method of construction as opposed to one-point slurry discharge. Gypsum-fly ash slurry is made to flow in an elevated perimeter rim-ditch around the stack perimeter with sluices cut through the inside bank of the ditch through which the finer fraction of the gypsum-fly ash waste flows into the center of the pond, as schematically illustrated in Figure 8. Rim-ditching should provide coarse gypsum-fly ash waste along the perimeter of the stack which is more suitable for starter dike construction from strength, seepage and handling standpoints. It should be noted that with a rim-ditch, the gypsum-fly ash slurry discharge line does not need to be moved laterally and only needs to be raised vertically as the stack rises. If waste is occasionally produced with an elevated fly ash or calcium sulfite content, it should be diverted into the interior of the stack rather than deposited in the rim ditch.

The flow slope that the gypsum-fly ash waste was found to develop within the pilot-scale stack varied widely from 2 feet per 1000 feet to 8.5 feet per 1000 feet. For conceptual design, a flow slope of 6.5 feet per 1000 feet is tentatively suggested until additional measurements are made on the full-scale facility. Accordingly, when planning the distribution of gypsum-fly ash waste around the stack within rim ditches, a slope of 6.5 feet per 1000 feet should be used for the ditches.

Prior to stacking gypsum-fly ash waste from the rim ditches, a drying and dewatering period will be necessary. Based on observations at the pilot-scale stack, a minimum period of 30 days should be allowed for in planning the management of the stack.

Compartments

The stack should be divided into a minimum of two compartments. This allows for raising the starter dikes of one compartment while the other is active for gypsum-fly ash waste deposition. If needed, process water can be stored within the interior ponded section of the compartment even while the rim ditches are drying in preparation for raising of the cast starter dikes. To allow sedimentation of the gypsum-fly ash waste to occur and to allow clarification of the process water, a working depth of 1 to 3 feet of water should be maintained in the active compartment. A minimum freeboard of 3 feet should always be maintained between the pond water surface within the stack and the cast perimeter dike.

Stack Slopes

A side slope of 3.0 horizontal to 1.0 vertical (3.0H:1.0V) is tentatively projected by TVA for the full-scale stack. During casting of the starter dikes via a dragline, however, steeper slopes will result (i.e., 1.5H:1.0V). The slopes can be subsequently reshaped after casting to 3.0H:1.0V using a dozer. The acceptability of an overall average slope of 3.0H:1.0V must be verified with stability analyses during final design.

Operating Equipment

Once the rim-ditch system is well established, construction of starter dikes can proceed by using a dragline to excavate gypsum-fly ash waste from the rim-ditch and a dozer to shape and compact the excavated material. Management of the full-scale stack will require as a minimum a D6 dozer and a dragline with a 70-foot boom and a 2 to 3 cubic yard bucket. Typically, 100 to 200 feet of starter dike can be cast by one dragline in a day. A second dragline may become necessary: if the waste must be substantially rehandled during casting; if drying periods substantially longer than 30 days become necessary; or when the ratio of stack perimeter to stack area becomes large such as near completion of the stack.

Decant Structures

Figure 9 presents a schematic illustration of the recommended stage decant spillway system for use in decanting process water from the inner settling compartment. The spillway box is typically constructed of plywood and/or with individual boards. Stainless steel fittings and fasteners are used in corrosive environments. The discharge pipe is typically high density polyethylene. Seepage shields (at least 2) are recommended for the section of pipe through the cast perimeter dike. In this system, the intake spillway box and horizontal section of the discharge pipe are removed and raised each time the spillway needs raising, and an extension is added to the inclined section of the discharge pipe running down the outside slope. Alternatively, a movable wood flume can also be used for the inclined section. This spillway system is more advantageous than a fixed vertical rise type structure because it can be easily repaired, relocated or replaced, and is not subjected to increasing pressure and potential piping as the surface of the pond rises. The stage decant spillway system is economically feasible when the intake spillway box is located close to the edge of the gypsum stack. To improve management and operation of the pond it is recommended that two spillways are installed in each settling compartment.

Schematic Layout and Operation

Stack Layout

A schematic layout of the approximately 144-acre wet stacking disposal facility proposed by TVA is illustrated in Figure 10. As shown, the stack consists of a 61-acre Phase I area and an 83-acre Phase II area. A 9-acre runoff sump and surge pond is located along the west side of the Phase I area.*

A final stack height of 150 feet has tentatively been selected by TVA for conceptual design. For the combined Phase I and II base area of approximately 144 acres and 3.0H to 1.0V overall side slope, the final top area is projected to be approximately 50 acres. This area is adequate for sedimentation of gypsum-fly ash waste and clarification of process water.

The total Phase I and II storage volume available in a 150-foot high stack is approximately 14,900 acre-feet. For a projected average waste generation rate of 1,517,000 tons per year (based on a 82% capacity factor) and an average in situ dry density of 85 lb/ft^3, the stack will provide approximately 18 years of storage capacity.** The stack, therefore, will rise at an overall average rate of about 8.3 feet per year, varying from about 6 feet per year for the 144-acre base area to about 16 feet per year for the 50-acre final top area.

Stack Operation

Initially, we recommend that the Phase I area is divided into two approximately 30-acre ponds as schematically shown in Figure 11. Pond A should initially be

*Stack layout taken from TVA during number IOE231-01 titled "Conceptual Plan - Scrubber Waste Disposal Area" dated February 24, 1983.
**At a capacity factor of 100%, the stack will provide approximately 15 years of storage capacity.

filled with gypsum-fly ash waste to a depth of 5 to 8 feet. This is about the minimum initial depth practical to allow raising of the perimeter dike. For an average depth of 6.5 feet and projected average waste production rate of 4,160 tons per day, approximately 82 days will be required to fill Pond A. Once Pond A is full, a ditch can be excavated within the gypsum-fly ash waste to transport slurry to Pond B. Pond A can then be left to dry for 30 days or until the waste is sufficiently dry to allow casting of the perimeter dike as previously shown in Figures 7 and 8. Including the divider dike, approximately 4800 lineal feet of dike will be cast around Pond A. Assuming that 100 feet of dike are cast per day, 48 days will be required to raise the perimeter dike. Since approximately 82 days will also be required to fill Pond B to an average depth of 6.5 feet, sufficient time should be available for Pond A to dry and for the cast dike to be raised prior to filling Pond B.

During the initial filling period the rim ditch around the perimeter of the stack will not be fully developed. To transport slurry within the stack and to allow deposition of coarser gypsum-fly ash waste around at least part of the perimeter, TVA proposes to construct a small internal earthen dike parallel to and upstream from the starter dike to form a "ditch" along part of the perimeter of the stack. The use of this "ditch" during start-up will allow the deposition of coarser gypsum-fly ash waste around at least part of the stack perimeter by breaching the internal dike to divert the finer waste into the interior pond. We recommend that the internal dike be located sufficiently upstream of the starter dike such that the cast perimeter dike can be constructed as previously shown in Figure 7. Accordingly, the internal earthen dike can be constructed at the location schematically illustrated for the internal cast dike in the second diagram on Figure 7. The internal dike can then be raised simultaneously with the cast perimeter dike using gypsum-fly ash to form the elevated rim ditch.

Once Pond B is filled, Pond A can again be used while Pond B dries and its perimeter dike is raised. The initial use of two smaller ponds during Phase I rather than only one pond is recommended to allow TVA to obtain operating experience on an initially smaller area; and because two ponds are considered necessary so that one pond can be drying while the second pond is actively receiving waste.

After the initial filling period and stacking in each pond, a rim ditch system should be established to transport the slurry within the stack and to allow deposition of coarser gypsum-fly ash waste around the perimeter for use in raising the dikes (Figure 12). The rim ditches can be breached at any point to allow waste to flow into the interior pond. The furthest spillway from the breach should be used to decant clarified water. The rim ditches are needed along the perimeter of the stack and along at least one side of the divider dike. Two spillways are shown in each pond in opposite corners to provide flexibility in operating the rim ditches and sedimenting waste within the interior pond.

Phase I can be operated as two ponds for 1.5 to 2.0 years until the stack reaches a height of about 25 feet. Prior to this time the Phase II area should be constructed. Once the Phase II area is available, the stack can be divided into two larger ponds of 61 and 83 areas as shown in Figure 13. Two spillways are recommended for each pond at opposite corners, and a rim ditch is shown around the perimeter of the stack. Decanted process water can be returned to the surge pond through the ditch along the toe of the stack on the upstream side of the earthen starter dike.

Initially, the Phase II pond will require about 225 days for filling to an average depth of 6.5 feet. For the approximately 5800 lineal feet of perimeter dike surrounding the Phase II pond, about 58 days will be required to raise the perimeter dike. Using a 30-day drying period and 58-day construction period, the Phase I pond must be used for at least 88 days to allow raising of the Phase II pond. Since over 100 days will be required to fill the Phase I pond sufficient time will be available for each pond to be dried for a period of 30 days prior to raising the perimeter dike. The two-pond layout shown in Figure 13 can be used until the stack is completed. The location of the divider dike can be moved as the stack rises to provide two similar size ponds.

Reclamation

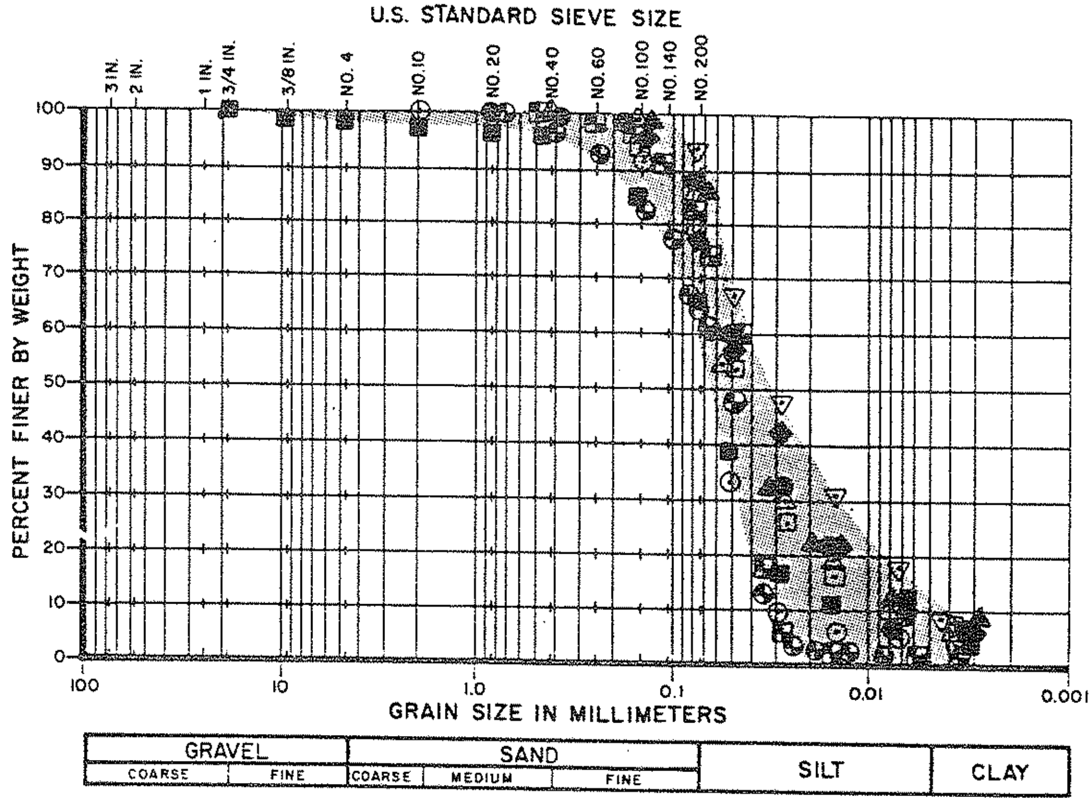
For compliance with regulatory agency requirements, TVA plans to reclaim the facility with a soil and grass cover. Reclamation of the slopes concurrent with construction of the stack, however, is not recommended. Instead, reclamation should be performed after the facility is retired.

Monitoring

During initial operation of the facility a monitoring program is recommended to document the operational characteristics of the full-scale plant and stack, and to measure engineering properties of the gypsum-fly ash waste for comparison to the selected design parameters. The monitoring program should include investigation of the following items:

- Scrubber Operational Characteristics
  - Slurry solids content
  - Slurry flow rate
- Stack Operational Characteristics
  - Flow slope of waste
  - Drying/dewatering time before waste can be cast
  - Production efficiency of dragline to cast perimeter dikes (i.e., feet per day)
- Engineering Properties of Waste
  - Mineralogy
  - Oxidation
  - Settling rate
  - Particle size distribution
  - Settled solids content and dry density of sedimented waste
  - Solids content and dry density of waste cast in perimeter dikes

Additionally, undisturbed samples of both sedimented and cast gypsum-fly ash waste should be obtained after the stack is in operation for laboratory triaxial and permeability testing. As part of the field monitoring program, a system of piezometers should also be installed in the stack and foundation for monitoring pore pressures as the stack climbs.



SYMBOL	SAMPLE	-74 µm (%)
⊙	S-1A	64
⊡	S-5A	80
△	S-6	85
●	S-7A	89
■	S-8A	64
◆	S-8B	78
▲	S-9	87
▽	S-10	94
⊕	B1	68
⊞	B3	81

Figure 1. Particle Size Distribution of Sedimented Gypsum-Fly Ash Waste

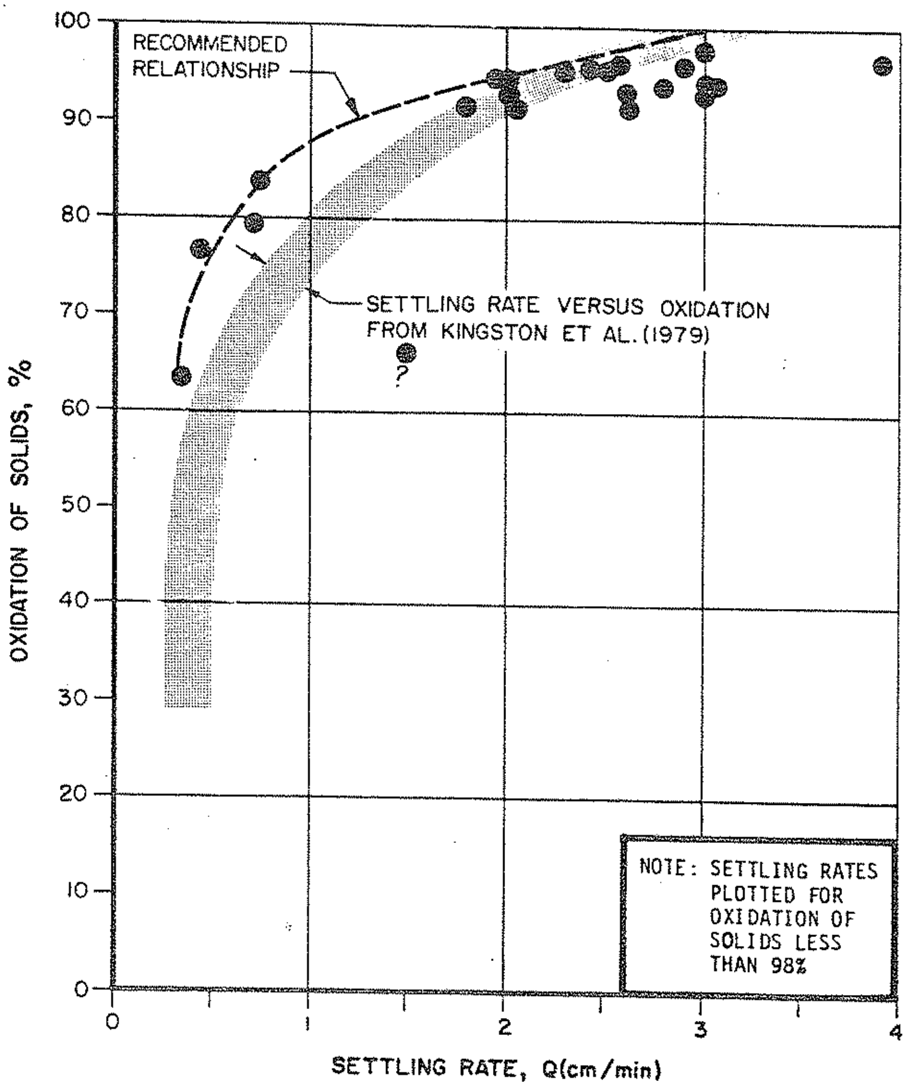


Figure 2. Settling Rate Versus Oxidation

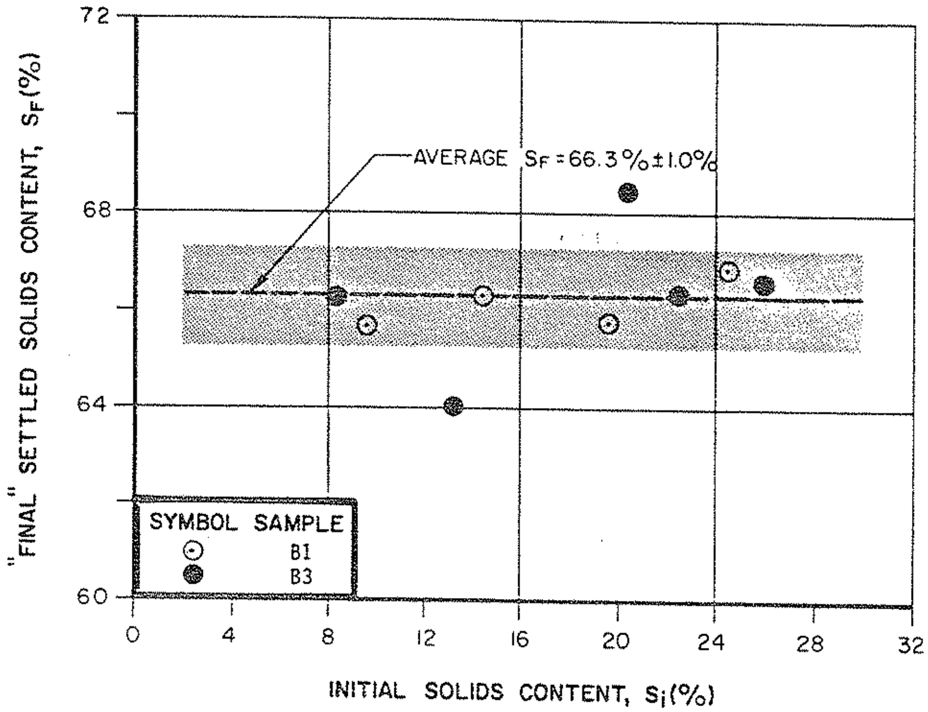


Figure 3. Initial Solids Content Versus "Final" Settled Solids Content

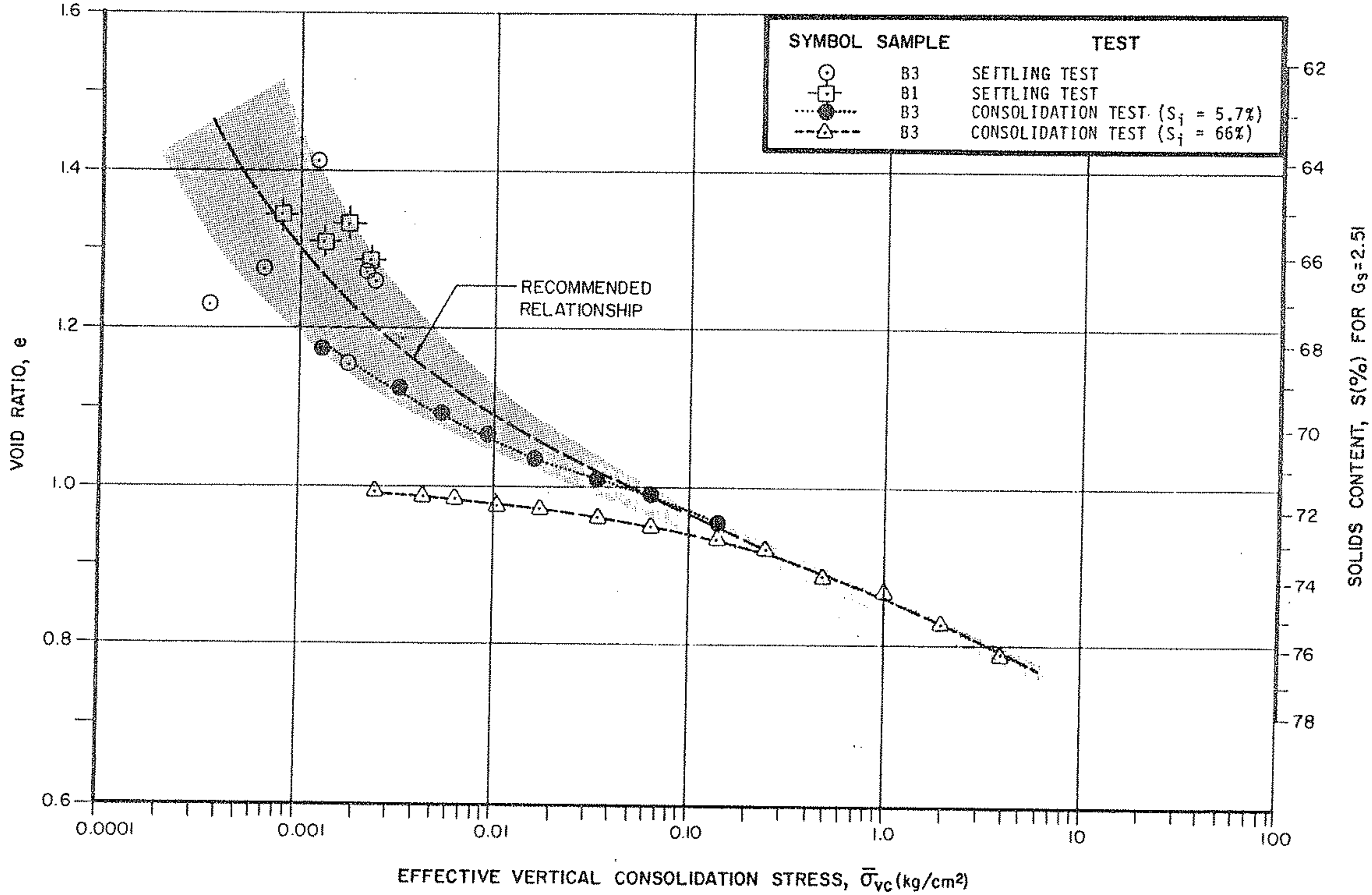


Figure 4. Void Ratio Versus Effective Stress

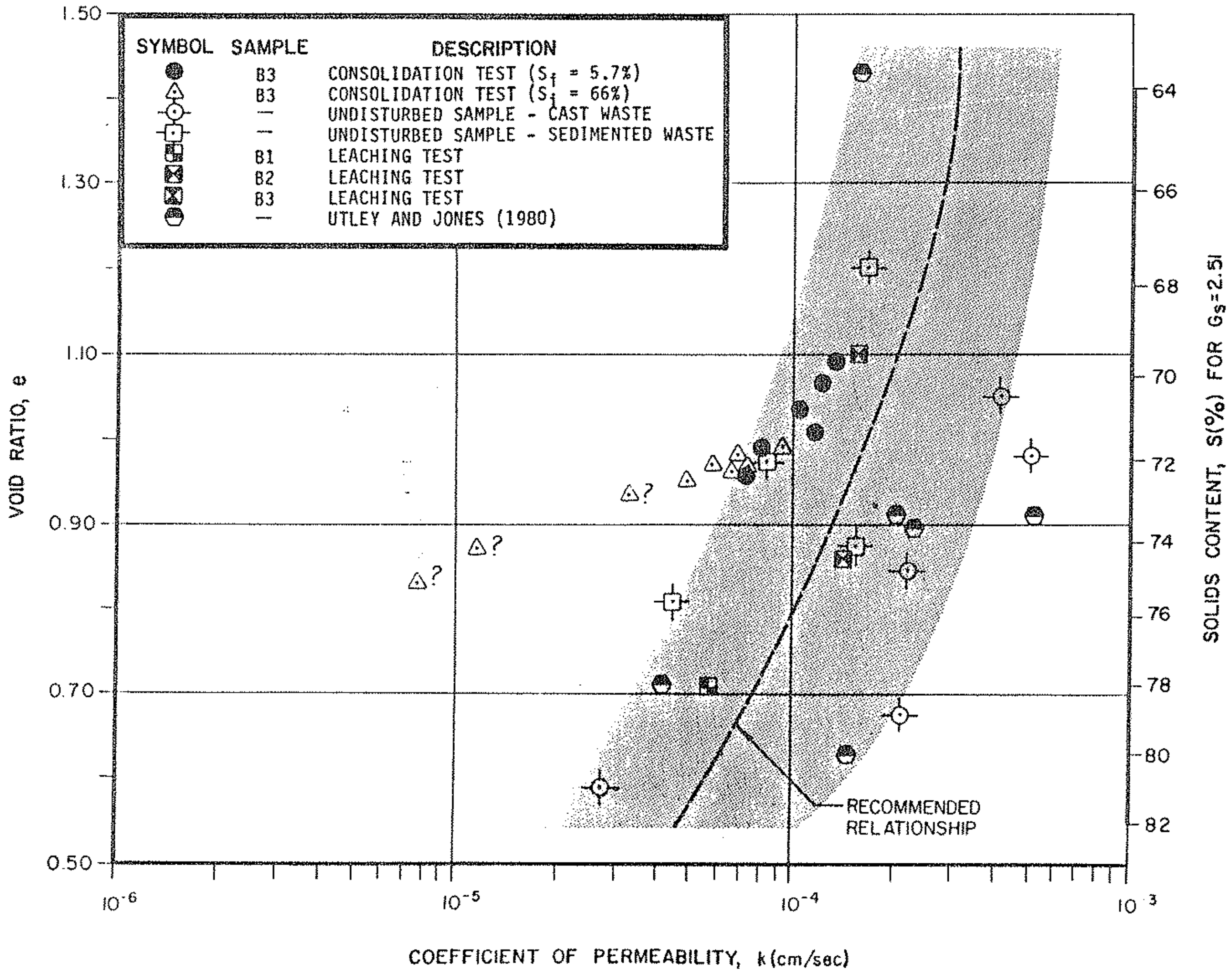


Figure 5. Void Ratio Versus Coefficient of Permeability

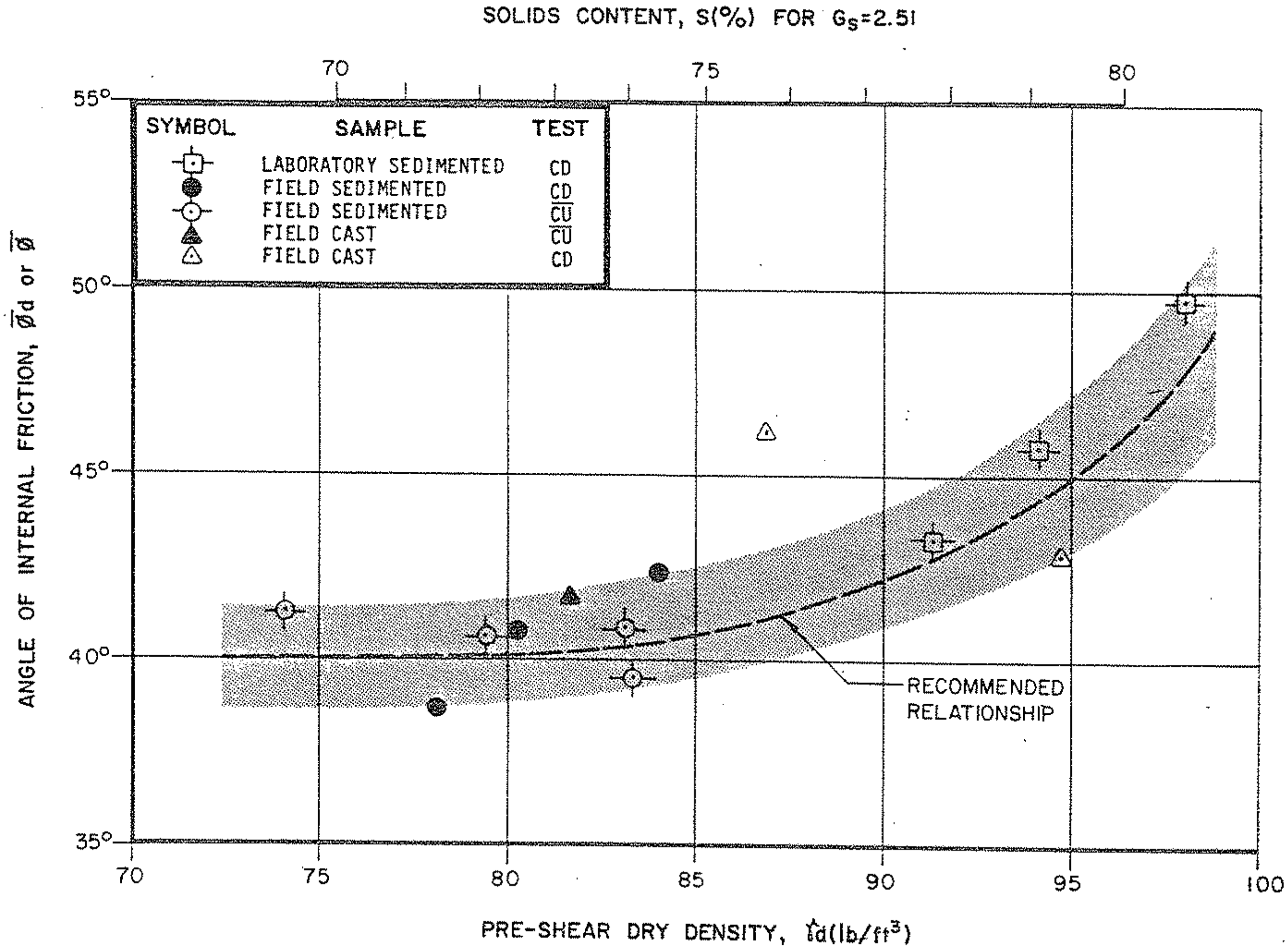


Figure 6. Pre-Shear Dry Density Versus Angle of Internal Friction

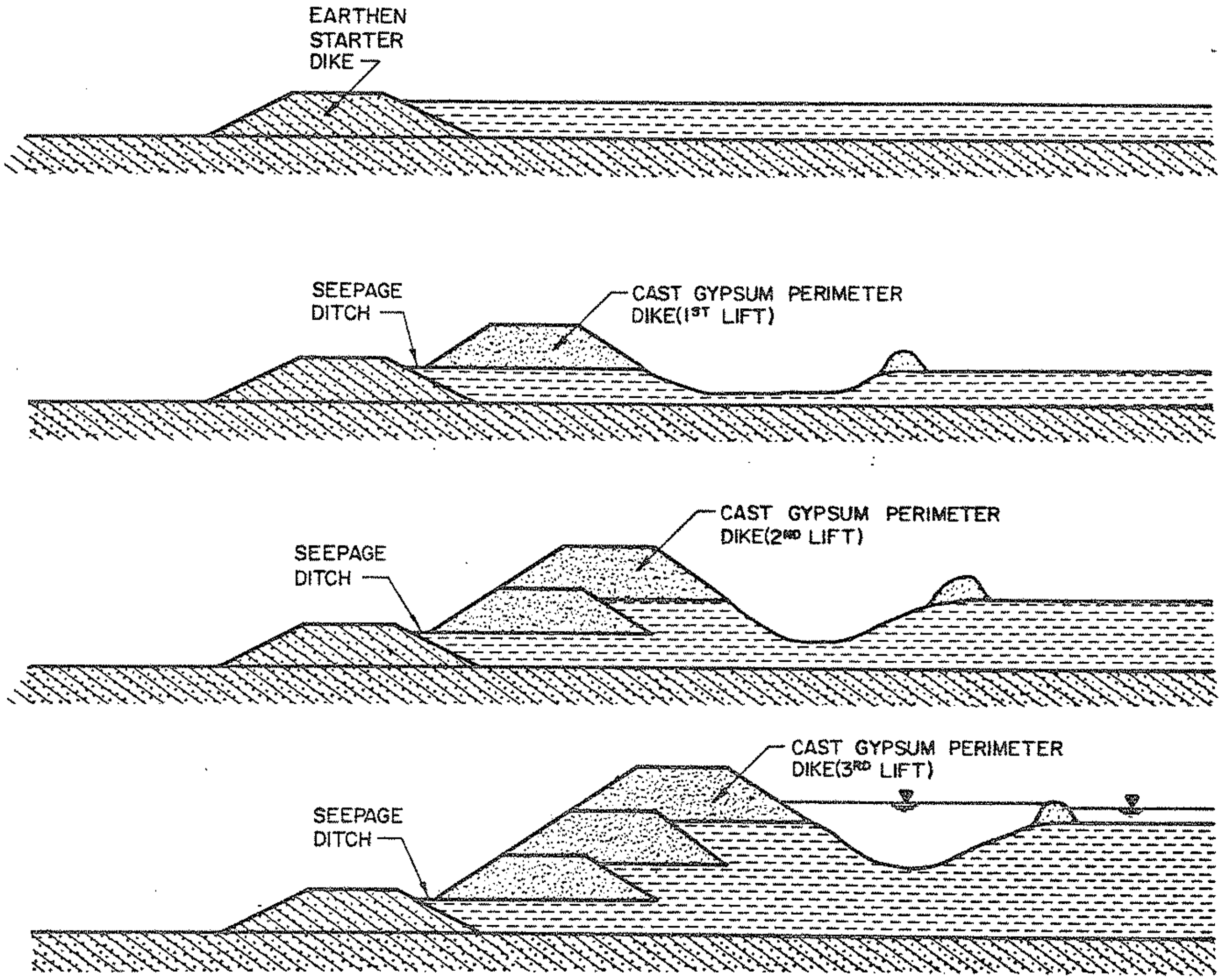


Figure 7. Schematic of Upstream Method of Gypsum Stack Construction

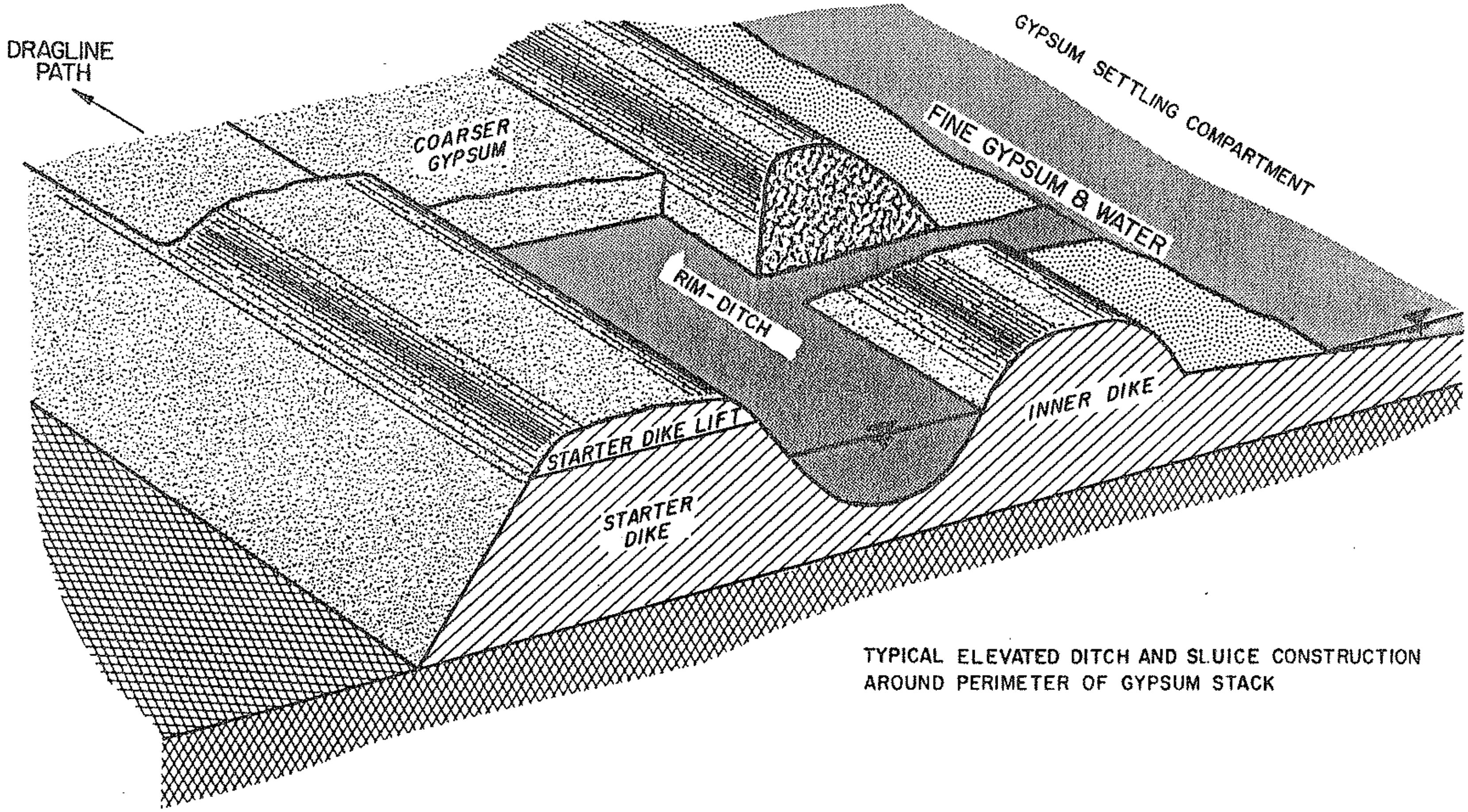


Figure 8. Schematic of Perimeter Rim-Ditch

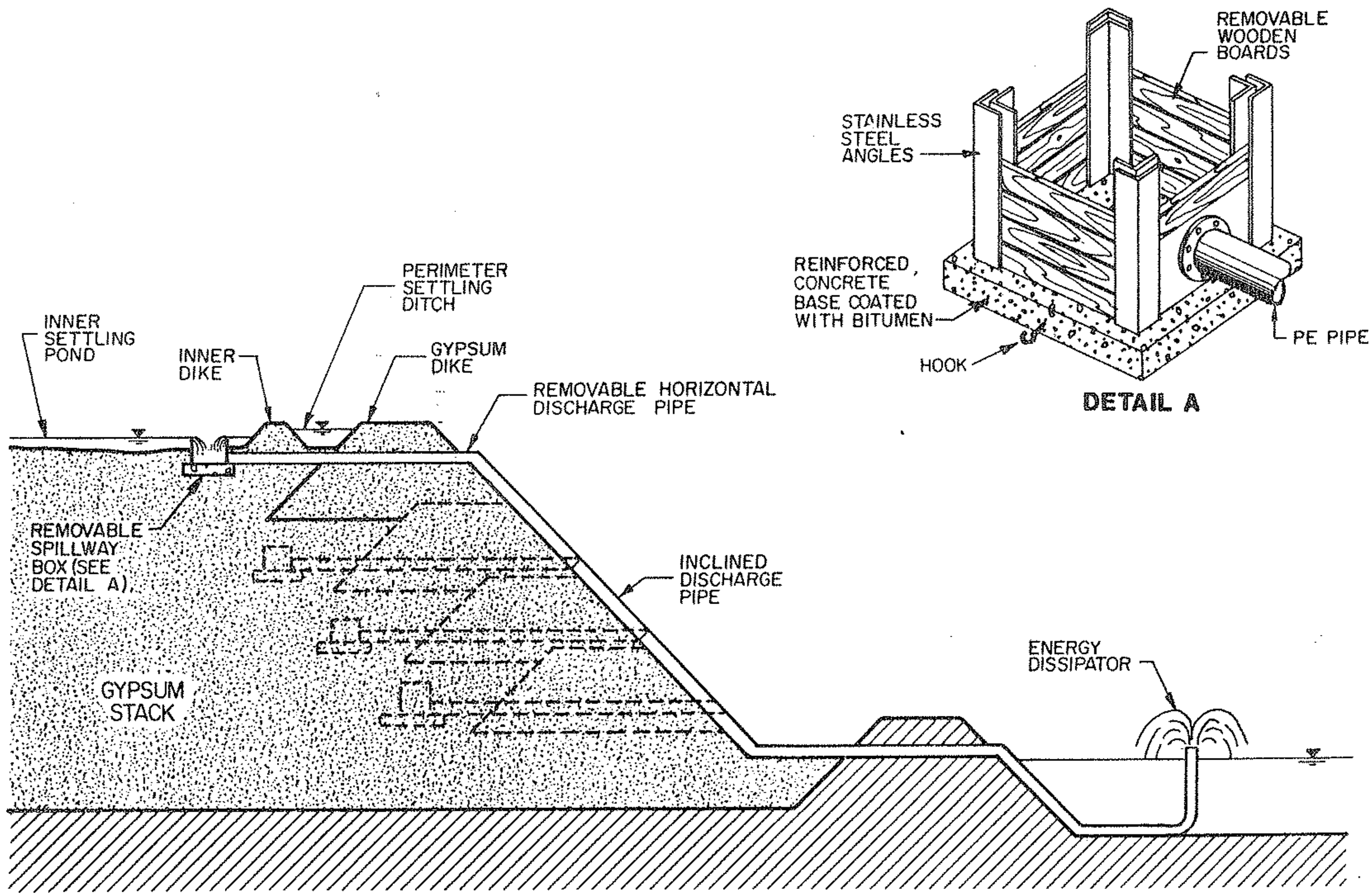


Figure 9. Schematic of Stage Decant Spillway System

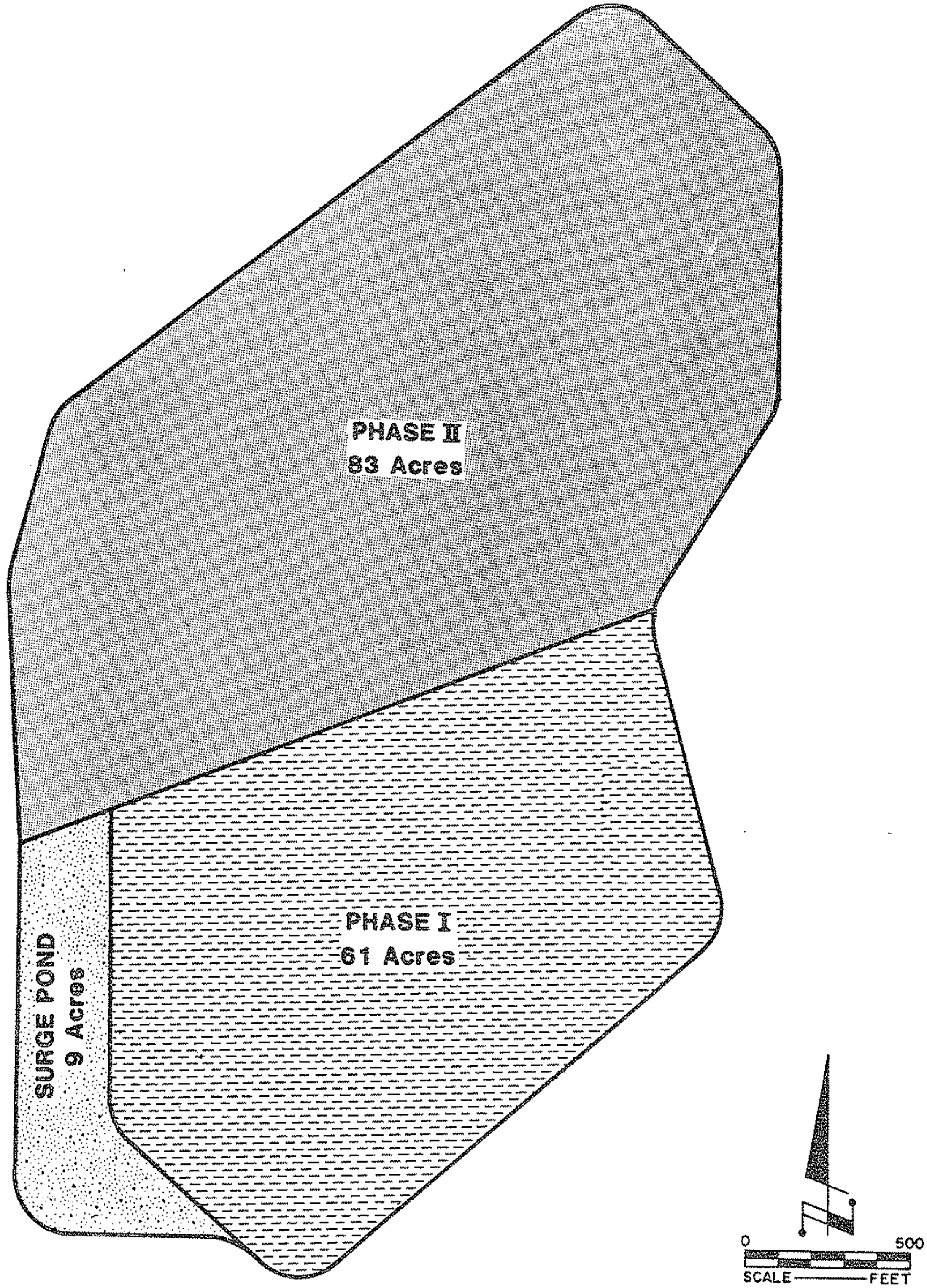


Figure 10. Schematic Layout of Wet Stacking Disposal Facility

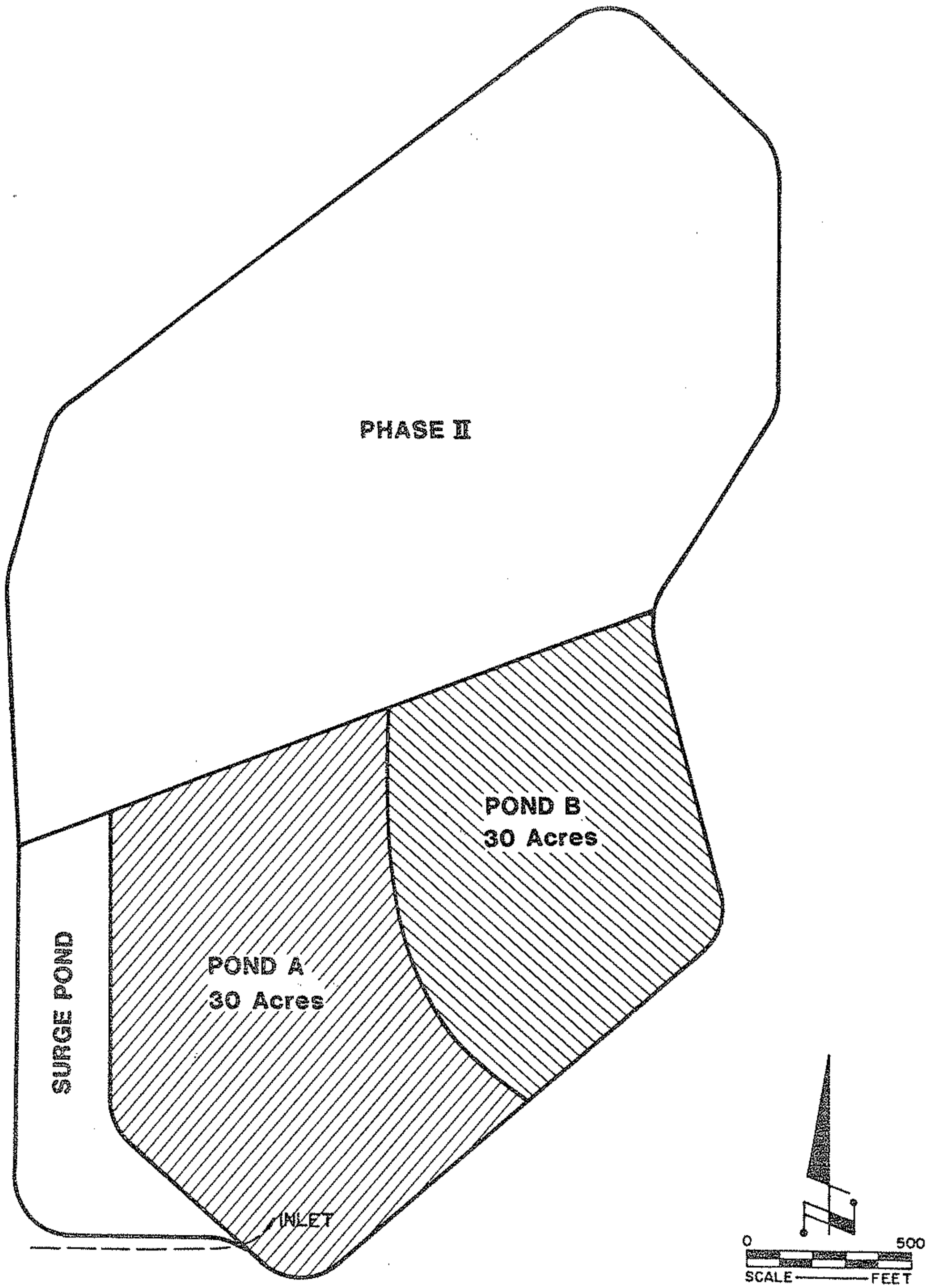


Figure 11. Schematic Layout for Initial Filling of Phase I Area

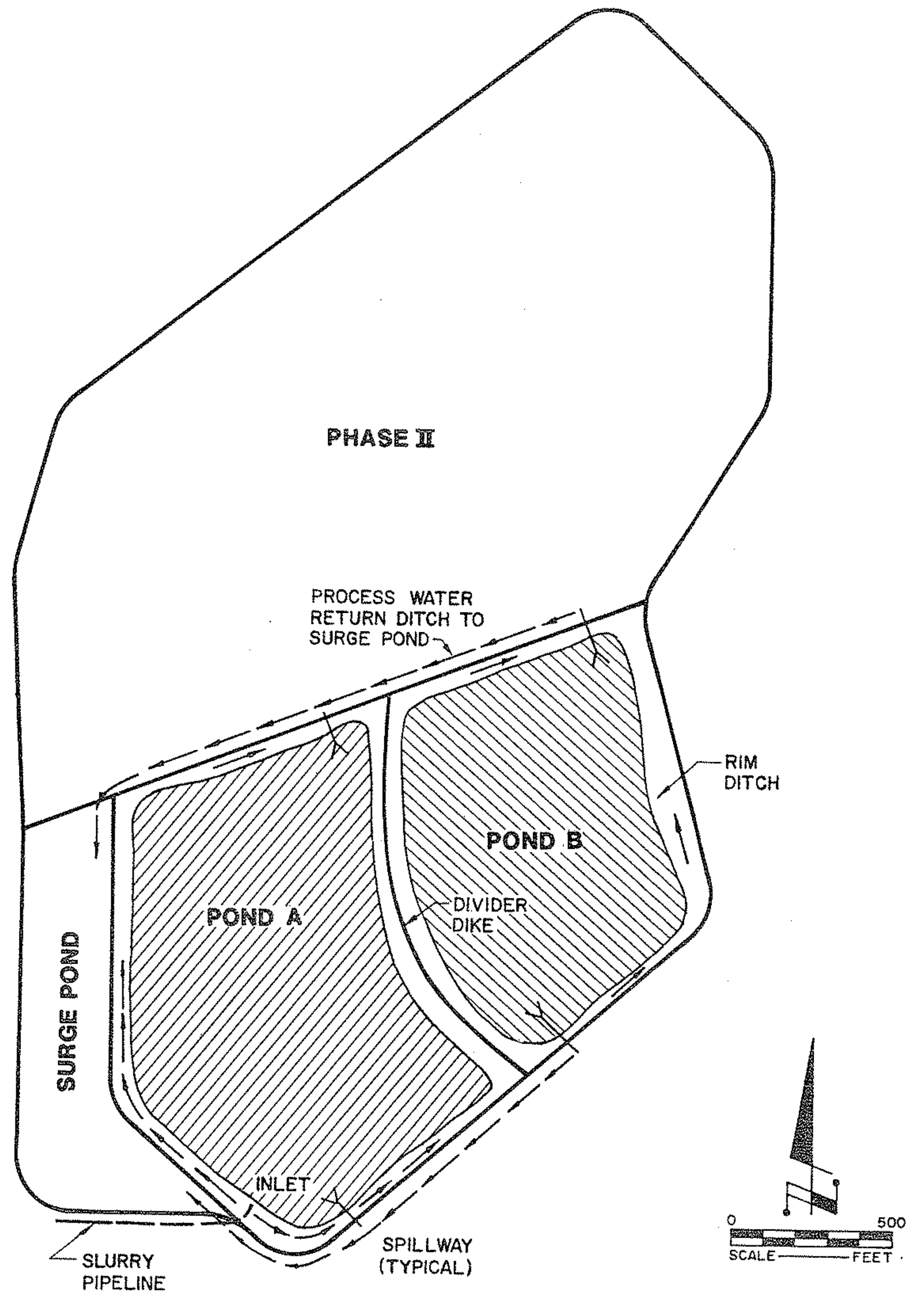


Figure 12. Schematic Pond Layout, Rim Ditches and Spillway Locations for Phase I Ponds