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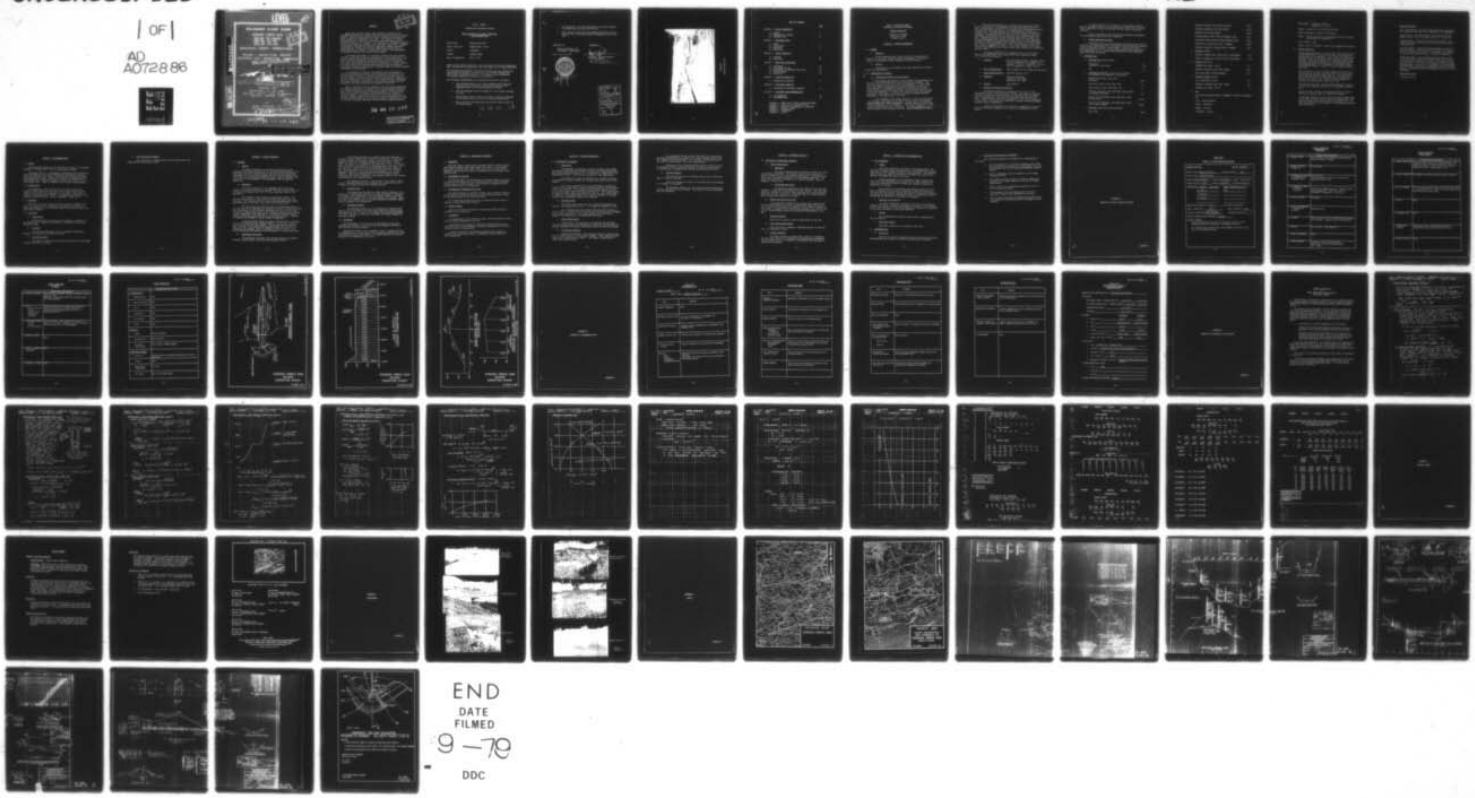

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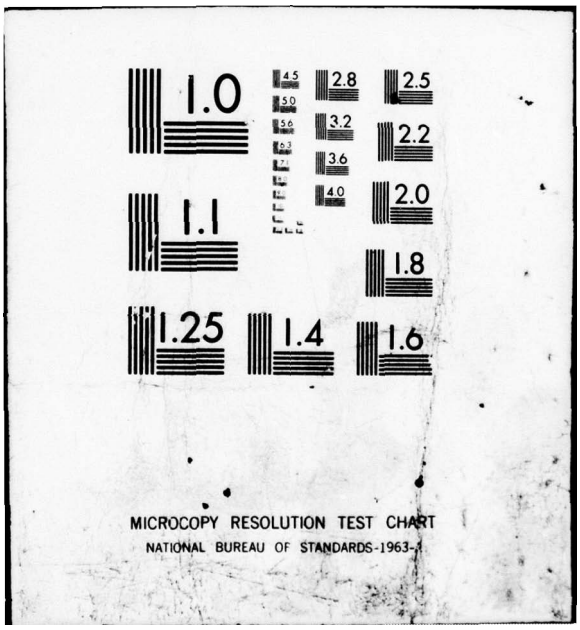
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LEVEL

DELAWARE RIVER BASIN

KOENIGS CREEK DAM
NDI NO. PA-00668
DER NO. 54-169
SCS NO. PA-425

SCHUYLKILL COUNTY, PENNSYLVANIA

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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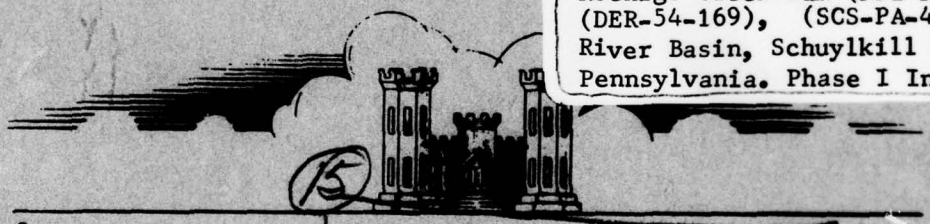

(15) Contract # DACW31-79-C-0012

PREPARED FOR

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

(12) 76p.

BY

Berger Associates, Inc.
Harrisburg, Pennsylvania

(11) JULY 1979

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PREFACE

This report has been prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT

NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITIONS
AND RECOMMENDATIONS

Name of Dam:	KOENIGS CREEK DAM
State & State No:	PENNSYLVANIA, 54-169
County:	SCHUYLKILL
Stream:	KOENIGS CREEK
Date of Inspection:	May 8, 1979

Based upon the visual inspection, past performance and existing engineering data, the dam and its appurtenant structures appear to be in good condition.

The hydrologic and hydraulic calculations indicate that the spillway for this dam has the capacity for passing the full Probable Maximum Flood (PMF) without overtopping the dam. On the basis of this information, the spillway capacity is considered to be adequate.

The following recommendations are presented for action by the owner:

1. That the maintenance of the slopes regarding weed, brush and tree growth be continued on an annual basis and that the woodchuck holes on the downstream slope be filled.

2. That the embankment crest be brought up to the design elevation of 735.6.

3. That periodic visits be made to the dam to inspect the approach to the inlet structure to be sure it remains unobstructed.

4. That a record of the maintenance activities be kept on file in the owners office.

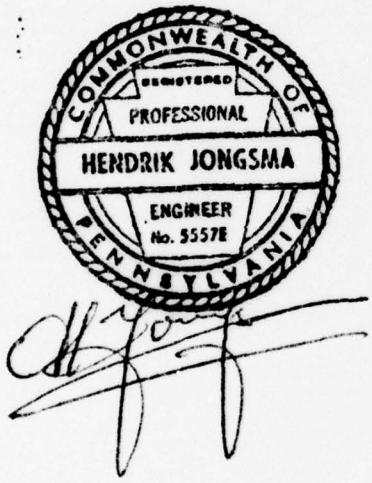
5. That drainage of the area downstream of the dam be improved to channel water away from the toe area.

6. That a formal surveillance and downstream warning system be developed for use during periods of prolonged or heavy rainfall.

SUBMITTED BY:

BERGER ASSOCIATES, INC.
HARRISBURG, PENNSYLVANIA

DATE: July 13, 1979



APPROVED BY:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

DATE 28 July 1979

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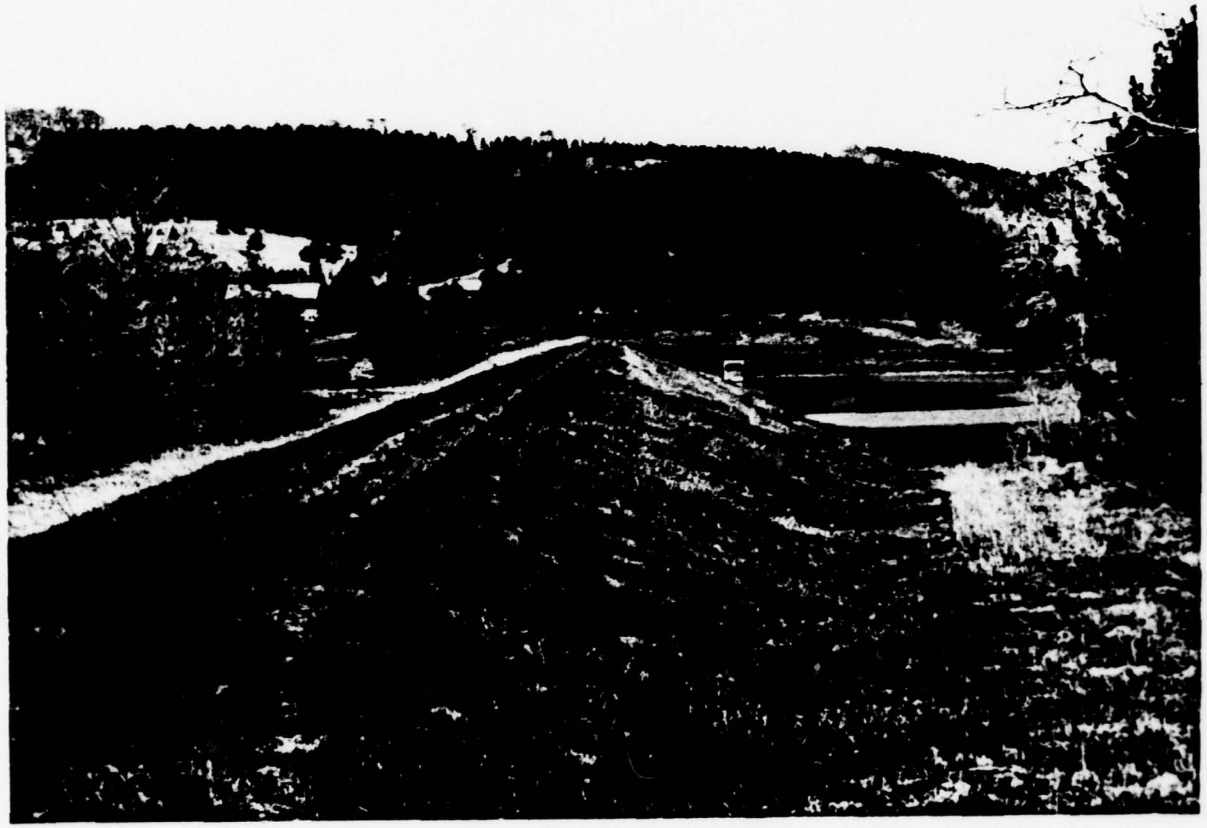

OVERVIEW

KOENIGS CREEK DAM

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

KOENIGS CREEK DAM

NDI-ID NO. PA-00668
DER-ID NO. 54-169
SCS NO. PA-425

SECTION I - PROJECT INFORMATION

1.1 GENERAL

A. Authority

The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspections of dams throughout the United States.

B. Purpose

The purpose is to determine if the dam constitutes a hazard to human life and property.

ABSTRACT

1.2 DESCRIPTION OF PROJECT

A. Description of Dam and Appurtenances

The Koenigs Creek Dam is a zoned earthfill dam designed by the U.S.D.A. Soil Conservation Service for flood control purposes. The principal features of the dam include the embankment, a concrete drop inlet type primary spillway and an emergency spillway section at the right abutment. The emergency spillway is constructed as an earth structure with the overflow section about 4.8 feet lower than the crest of the main embankment. A cutoff trench, with a ten foot bottom width and 1H to 1V side slopes, is located on centerline beneath the main embankment. Its depth varies to ten feet.

The embankment crest design elevation is 735.6 and its length is 1,180 feet. The height of the dam is 25 feet above the streambed. ~~Refer to Appendix F, Plate III and VI.~~ A seepage drain is located under the downstream slope of the embankment. This drain consists of a 6 inch diameter perforated pipe in a filter bed. The drain discharges to the outlet channel of the principal spillway. ~~Refer to Appendix F, Plate V.~~ CONT

CONT

The principal spillway is a reinforced concrete riser located at the upstream toe of the embankment near the right abutment of the dam. A pond drain is located 18.5 feet upstream of the spillway structure. A 15-inch cast iron pipe connects the submerged drain intake to the spillway unit. The plans indicate that a 1/4-inch plate is bolted onto a flange at the downstream end of this pipe at its terminus in the inlet structure. This plate is the only method of flow control through this pipe. The main discharge from the reservoir spills over the weir, into the spillway chamber then discharges through the base of the embankment, by means of a 24-inch diameter concrete water pipe, to the outlet channel at the toe of the downstream slope. There is no control on the 24-inch pipe. Refer to Appendix F, Plate VI. The 24-inch diameter outlet pipe is fitted with three concrete cutoff collars and is resting on a reinforced concrete cradle.

ABSTRACT

The design slopes for the embankment were 3H to 1V upstream and 2H to 1V downstream. These slope ratios were confirmed by land survey during this inspection.

B. Location: East Brunswick Township, Schuylkill County
U.S.G.S. Quadrangle, New Ringgold, PA
Latitude: 40°-41.4', Longitude: 75°-56'
Refer to Appendix F, Plates I and II

C. Size Classification: Small (Height 25 feet, Volume 369 acre-feet)

D. Hazard Classification: High (See Section 3.1.E)

E. Ownership: County of Schuylkill
Schuylkill Court House
Pottsville, PA 17901

F. Purpose: Flood Control

G. Design and Construction History

The Koenigs Creek Dam was designed by the U.S.D.A., Soil Conservation Service as Project PA-425 in 1960. The permit to construct the dam was issued to the Commissioners of Schuylkill County by Commonwealth of Pennsylvania, Water and Power Resources Board on March 30, 1961. Construction was started on September 12, 1961, and was completed in July, 1962. The project was constructed by Feeser Contracting Company, Schuylkill Haven, Pennsylvania.

Records of construction are limited to tabulations of items of work and the percent completed at the time of the submission of each report.

A slight revision to the location of the emergency spillway was the only modification to the dam during the construction of the dam. Refer to Appendix F, Plate III and Plate VII for initial and revised locations.

Refer to Appendix F for selected design drawings and Appendix E for photographs taken during this inspection.

H. Normal Operating Procedure

The Koenigs Creek Dam was designed as a flood control structure to protect the downstream areas of the Koenigs Creek during high intensity storms including the Borough of New Ringgold. There are no formal operating procedures for this facility aside from assuring that minimum flow requirements are met and providing maintenance of the embankment slopes and outlet facilities.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

From files	1.1
Computed for this report	1.0
Use	1.0

B. Discharge at Dam Site (cubic feet per second)
See Appendix C for hydraulic calculations

Maximum known flood, June, 1972 Estimated:	390
Pool drain outlet at pool Elev. 718	13
Outlet works at pool level Elev. 720	12
Principal Spillway, pool level Elev. 730.8 (crest of emergency spillway)	56
Total of both spillways, pool level Elev. 733.6 (design flood)	1,440
Total of both spillways, pool level Elev. 735.6 (top of dam, design)	3,280

C. Elevation (feet above mean sea level)

Top of dam	735.6

Emergency spillway crest (earth channel)	730.8
Principal spillway crest (drop inlet)	725.8
Sediment pool orifice invert	718.0
Upstream portal invert (24-inch diameter pipe)	711.7
Downstream portal invert (24-inch diameter pipe)	710.4
Streambed at centerline of dam - estimate	710.6
Maximum tailwater for design flood - estimate	716.5

D. Reservoir (miles)

Length of sediment pool (From U.S.G.S. Topo Sheet)	0.1
Length of maximum pool (From U.S.G.S. Topo Sheet)	0.5

E. Storage (acre-feet)

Sediment Pool (Elev. 718.0)	15
Emergency spillway crest (Elev. 730.8)	225
Top of dam (Elev. 735.0) Low point	369

F. Reservoir Surface (acres)

Top of dam (Elev. 735.6)	42
Emergency spillway crest (Elev. 730.8)	30
Sediment pool (Elev. 718.0)	6

G. Dam

For selected drawings refer to Appendix F, Plates III through VII.

Type: Zoned Earthfill.

Length: 1180 feet.

Height: 25 feet.

Top Width: 12 feet.

Side Slopes: Upstream - 3H to 1V
Downstream - 2H to 1V

Zoning: CL and GC core with GM and ML shell.

Refer to Appendix F, Plate VI for section.

Cutoff: Trench excavated to varying depth and 10 feet bottom width (Plate IV, Appendix F).

Grout Curtain: None.

Drain: Refer to Appendix F, Plate V for seepage drain details.

H. Outlet Facilities

The principal spillway is a concrete drop inlet structure with inside dimensions of 2.0 feet by 6.0 feet, located near the upstream toe of the embankment. Water enters the structure by flowing over the two 6.0-foot sides. From the bottom of the structure, water flows through a 127-foot-long 24-inch inside diameter, reinforced concrete pipe to the downstream side of the embankment where it is discharged to the stream channel after passing through a 10-foot by 15-foot plunge pool about 2 feet deep.

The two ends of the above structure support an 8-foot by 11.5-foot horizontal concrete slab which serves as an anti-vortex device and also prevents damage from ice. The underside of the horizontal slab is 1.0 feet above the top of the 6-foot sides of the tower so water enters the tower through two openings, each measuring 6.0 feet by 1.0 feet.

The structure also has a single orifice measuring 1.0 foot by 2.0 feet which maintains the level of the permanent sediment pool.

All of the above features are uncontrolled and are sized to provide the required amount of floodwater detention.

A low-level, 15-inch cast-iron pipe can be used to admit water to the inlet structure and thus drain the sediment pool. The type of closure on this pipe is shown on the plans as a 1/4-inch plate bolted onto the flange at the downstream end of the pipe in the riser.

I. Emergency Spillway

Type: Uncontrolled, sod-lined broad-crested weir and channel cut through the rock bank at the right end of the embankment.

Length of weir: The bottom width is 110 feet and the side slopes are 2H to 1V on the right and 2H to 1V on the left.

Crest elevation: 730.8 (4.8 feet below top of dam). This spillway receives no flow until the pool reaches the level of a 100-year flood.

Upstream channel: The spillway approach channel is 240 feet long and rises on a slope of about 1.0 percent. The crest is level for a distance of 20 feet. The channel curves sharply to the left as it passes around the end of the embankment.

Downstream channel: After passing the level 20-foot crest, the channel has a rather flat downstream slope for the first 20 feet, and then steepens to a slope of 7.0 percent for the final 130 feet. At the end of the excavated 150-foot section described above, water would be discharged to the undisturbed wooded hillside and descends an additional 12 feet to Koenigs Creek at a point about 300 feet downstream from the toe of the embankment.

J. Regulating Outlets

See Section 1.3.H.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The engineering design data for this dam are found in two principal documents: a design report, and the construction drawings.

The design report is a comprehensive documentary report with hydrologic and hydraulic data, soils investigation information including field and laboratory test results, slope stability analyses and design calculations and sketches. This report and full size drawings are in the PennDER files. Reduced drawings are found in the U.S.D.A. Soil Conservation files. Refer to Appendix F for selected design drawings.

2.2 CONSTRUCTION

The information on the construction of the dam is limited to progress reports which lists the major items of work and the percent complete at the time of the submission of the report. There are no records of any construction problems. One modification was made to the emergency spillway location. Refer to Appendix F, Plate VII.

2.3 OPERATION

There are no records of operation with the owner, PennDER or SCS files. The purpose of the facility is flood control and except for maintaining minimum flow in the Koenigs Creek below the dam, there is no operational procedure.

2.4 EVALUATION

A. Availability

The design report and construction drawings are available in the PennDER files. Reduced size drawings are available in the S.C.S. (Designer) files.

B. Adequacy

The available engineering data is considered sufficiently adequate for evaluating the design of the dam.

C. Operating Records

This dam is a flood control structure and there are no operating records maintained by the owner.

D. Post Construction Changes

There have been no modifications to this facility since the completion of construction in 1962.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

A. General

The general appearance of the Koenigs Creek Dam is good. Conditions which need attention include the continued maintenance of the embankment slope cover, maintaining an unobstructed flow for minimum requirements at the principal spillway inlet and filling numerous woodchuck holes on the downstream embankment slope. Refer to Appendix A for visual check list and Appendix E for photographs taken during this inspection.

B. Embankment

The visual inspection of the embankment did not find any evidence of structural distress or seepage. The water surface level, on the day of the inspection was 718± (17.5 feet below the crest of the embankment).

The embankment slope surfaces are reasonably uniform. The upstream slope cover is a light growth of weeds, some grass with some bare spots. The downstream cover is grass and medium weeds with several woodchuck holes in the slope. The crest cover is thick grass.

The near level area beyond the toe of the downstream slope on the left side of the embankment was observed to be wet at several locations. Close observation of this condition shows that the source of the water is above the observed pool level of the reservoir from the gently sloping sidehill downstream of the embankment. The drainage meanders through a lightly wooded area coming near the toe at several low points. There is no evidence that seepage is coming through the embankment.

A surveyed profile along the crest of the dam shows a variation of 0.1 to 0.6 foot below the design elevation. The 0.6 foot occurs at only one point near the left abutment. The average deviation would be about -0.1 foot. The upstream and downstream slopes were found to be essentially as designed. Refer to Appendix A, Plates II and III for survey information and Appendix E for photographs of existing facilities.

C. Appurtenant Structures

The appurtenant structures for this dam include the principal spillway, outlet conduit, pond drain and emergency spillway.

The principal spillway is a concrete drop inlet structure. It has three levels of intake none of which are controlled. The low level intake is defined on the design drawings as the pond drain. Refer to Appendix F, Plate VI. Discharge through this inlet is by a 15-inch pipe. The invert at the entrance to the structure is 712.5. A 1/4-inch plate is bolted to the flange at the downstream end of this pipe. The next inlet is a 12-inch by 16-inch uncontrolled orifice at elevation 718. The prime inlet is the weir crest at elevation 725.8. Refer to Appendix F, Plate VI. The principal spillway appears to be in good condition. Water was discharging from the 24-inch diameter outlet conduit into the outlet plunge pool. The exposed portion of the concrete pipe appeared to be in good condition.

The emergency spillway is covered with a firm stand of grass. It is in very good condition and it appears that erosion will not be a problem in the event of flood flow through this area.

D. Reservoir Area

This project was designed as a flood control structure. The reservoir is seldom filled and the water level fluctuates in response to rain storms. This fluctuation causes some slight erosion at the waterline around the reservoir, but it is not observed to be serious. Above the water, the reservoir area is partially grassed and partially wooded. Refer to Appendix E for photographs.

E. Downstream Channel

The downstream channel is the continuation of Koenigs Creek. There are 10 to 15 homes in the flood plain within the first mile downstream from the dam. A breach in the Koenigs Creek Dam would endanger more than a few lives in this area; therefore, the hazard category for this dam is "High".

3.2 EVALUATION

The conclusions, on the basis of the observations at this dam regarding the embankment, outlet structure and emergency spillway is that the dam is in good condition.

Continued maintenance of the embankment slopes, including filling of woodchuck holes, and maintenance of the emergency spillway area along with raising the embankment crest to the design elevation of 735.6 are measures to be considered at this time.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

This dam, being a flood control structure, does not require special operational procedures aside from regular maintenance. This includes the control of brush, heavy weeds, trees, etc., on the slope and the emergency spillway and the control of minimum flow in the Koenigs Creek below the dam.

4.2 MAINTENANCE OF THE DAM

As indicated above, the maintenance of the dam involves the control of growth on the slopes and in the emergency spillway area and seeding of bare spots to control erosion. Also filling of woodchuck holes on the downstream slope of the embankment.

4.3 MAINTENANCE OF OPERATING FACILITIES

The inlet structure or principal spillway has no apparent controls. The method for draining the reservoir involves removing a plate bolted to the downstream end of the pond drain pipe.

The uncontrolled intake ports need no special attention except to maintain a clear unobstructed approach.

4.4 WARNING SYSTEM

There is no formal surveillance or downstream warning system in operation for this facility.

4.5 EVALUATION

The maintenance of this facility is good. This conclusion is based upon the general appearance of the dam.

Attention should be given to filling the woodchuck holes on the downstream slope of the embankment, keeping the approaches to the inlet structure clear and unobstructed.

A formal surveillance and downstream warning system should be developed for use during periods of prolonged or heavy rainfall and other emergencies.

SECTION 5 - HYDROLOGY/HYDRAULICS

5.1 EVALUATION OF FEATURES

A. Design Data

The hydrologic and hydraulic analysis available from PennDER was complete and followed the methods outlined in the Engineering Handbook and the Hydrology Guide of the U.S. Department of Agriculture, Soil Conservation Service. The design was prepared by that organization.

The principal spillway was designed for a 100-year frequency storm having 4 inches of runoff, 915 cfs peak inflow and 53 cfs of peak outflow.

Top of dam, elevation 735.6, was established by routing the runoff from the 6-hour point rainfall moisture condition III and adding 2.0 feet of freeboard. It was checked by routing the runoff from the 1.25 x 6-hour point rainfall moisture condition III. This storm produced 12 inches of runoff, had a peak inflow of 3,244 cfs, and a peak outflow of 1,880 cfs. The maximum stage in the reservoir was 734.3. The peak outflow of top-of-dam pool elevation is 3,280 cfs.

B. Experience Data

This dam was built about 1962 with financial and design help from U.S. Soil Conservation Service. It is owned by Schuylkill County.

It is probable that the greatest flood since 1947 occurred on June 22, 1972. The peak inflow at the dam site for this storm is estimated to have been about 390 cfs. The project passed that flood without damage to the embankment or the appurtenant structures.

C. Visual Observations

On the date of the inspection, no conditions were observed that would indicate that the appurtenant structures of the dam could not operate satisfactorily during a flood event, until the dam is overtopped.

D. Overtopping Potential

Koenigs Creek Dam has a total storage capacity of 369 acre-feet and an overall height of 25 feet above streambed. These dimensions indicate a size classification of "Small". The hazard classification is "High" (see Section 3.1.E).

The recommended Spillway Design Flood (SDF) for a dam having the above classifications is one-half the Probable Maximum Flood to the full Probable Maximum Flood (PMF). For this dam, the PMF peak inflow is 2,293 cfs (see Appendix C for inflow computations).

Comparison of the estimated PMF peak inflow of 2,293 cfs with the estimated spillway discharge capacity of 2,720 cfs indicates that a potential for overtopping of the Koenigs Creek Dam does not exist.

E. Spillway Adequacy

Calculations show that the spillway carries the full PMF with about 0.5 feet of freeboard.

Since the spillway can handle the full PMF without overtopping, it is judged to be adequate.

The hydrologic analysis for this investigation was based upon existing conditions of the watershed. The effects of future development were not considered.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

A. Visual Observations

1. Embankment

The visual inspection did not observe or detect any signs of embankment instability. The original design report indicates a factor of safety of 2.0 on the upstream slope and 2.2 on the downstream slope under 95% standard compaction of the embankment materials. The slopes were surveyed to be virtually the same as designed. Refer to Appendix A, Plate A-III.

2. Appurtenant Structures

The emergency spillway was also found to be in very good condition. Conditions of instability were not observed. The inlet drop structure, referred to as the principal spillway was in sound condition. There were no signs of distress. The outlet pipe is in good condition and the plunge pool appears to be stable.

B. Design and Construction Data

The information contained in the design report indicate that this dam was designed using current and acceptable engineering procedures. Stability calculations are available in the report in support of the design. A complete set of construction drawings are in the file for record. These documents define the construction requirements of the dam.

C. Operating Records

There are no records of high or flood flows for this dam.

D. Post Construction Changes

There have been no changes or modifications made to this dam since its completion in 1962.

E. Seismic Stability

This dam is located in Seismic Zone 1 and it is considered that the static stability is sufficient to withstand minor earthquake-induced dynamic forces. No studies or calculations have been made to confirm this assumption.

SECTION 7 - ASSESSMENT AND RECOMMENDATIONS

7.1 DAM ASSESSMENT

A. Safety

The visual inspection, the review of the design report, construction drawings, and the correspondence in the PennDER files indicate that this is a well designed facility in good condition. The inspection did not detect any signs of instability or seepage that could be considered to endanger the safety of the dam.

Present maintenance of the embankment slopes, filling woodchuck holes and maintaining clear approach to the inlet structure are items to be considered in order to assure the continued satisfactory performance of the dam.

The results of the hydrologic and hydraulic analyses for the dam in accordance with the Corps of Engineers' evaluation guidelines, indicates that the spillway capacity and reservoir storage are sufficient for passing the PMF without overtopping the dam. On the basis of this information the spillway is considered to be adequate.

B. Adequacy of Information

The design information contained in the files are considered adequate for making a reasonable assessment of this dam. The conclusions reached that this dam is adequately designed and constructed is supported by the visual appearance of the entire facility.

C. Urgency

The recommendations presented below should be implemented as soon as possible.

D. Additional Studies

Additional studies are not required at this time.

7.2 RECOMMENDATIONS

A. Facilities

There are no special recommendations for the overall facilities. Recommendations are related to Operation and Maintenance Procedures.

B. Operation and Maintenance Procedures

The following operations are presented for consideration of the owner:

1. That the maintenance of the slopes regarding weed, brush and tree growth be continued on an annual basis, and that the woodchuck holes on the downstream embankment slope be filled.

2. That the embankment crest be brought up to the design elevation of 735.6.

3. That periodic visits be made to the dam to inspect the approach to the intake structure to be sure it remains unobstructed.

4. That a record of the maintenance activities be kept on file in the owners office.

5. That drainage of the area downstream of the dam be improved to channel water away from the toe area.

6. That a formal surveillance and downstream warning system be designed for use during periods of prolonged or heavy rainfall.

APPENDIX A

CHECKLIST OF VISUAL INSPECTION REPORT

CHECK LIST

PHASE I - VISUAL INSPECTION REPORT

PA DER # 54-169 NDI NO. PA-00668

NAME OF DAM Koenigs Creek Dam HAZARD CATEGORY High

TYPE OF DAM Zoned Earthfill

LOCATION East Brunswick TOWNSHIP Schuylkill COUNTY, PENNSYLVANIA

INSPECTION DATE 5/8/79 WEATHER Sunny-Warm TEMPERATURE 70-80

INSPECTORS: R. Houseal (Recorder) OWNER'S REPRESENTATIVE(s):

R. Steacy None

A. Bartlett

H. Jongsma

NORMAL POOL ELEVATION: 718.0 AT TIME OF INSPECTION:

BREAST ELEVATION: 735.6 POOL ELEVATION: 718.0

SPILLWAY ELEVATION: 718.0 Orifice 730.8 Emergency TAILWATER ELEVATION:

MAXIMUM RECORDED POOL ELEVATION: Unknown

GENERAL COMMENTS:

General appearance of the dam is very good. Several (7-8) woodchuck holes were observed on the downstream slope.

Wet condition was observed near left abutment of dam and at the toe of the downstream slope.

VISUAL INSPECTION
EMBANKMENT

	OBSERVATIONS AND REMARKS
A. SURFACE CRACKS	None observed - all surfaces, top and slopes appear reasonably uniform.
B. UNUSUAL MOVEMENT BEYOND TOE	None evident.
C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES	None observed. Several woodchuck holes are located in the downstream slope (7-8).
D. ALIGNMENT OF CREST: HORIZONTAL: VERTICAL:	Horizontal alignment is good. Vertical alignment appears good. Refer to profile of embankment in Appendix A, Plate A-II.
E. RIPRAP FAILURES	No riprap.
F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY	Abutments good.
G. SEEPAGE	Wet area noted at toe of downstream slope near left abutment. Appears to come from sidehill.
H. DRAINS	6" toe drain. See Appendix F.
J. GAGES & RECORDER	None.
K. COVER (GROWTH)	Upstream - grass and light weeds. Downstream - grass and medium weeds. Top - grass.

NDI NO. PA-00 668

VISUAL INSPECTION
OUTLET WORKS

	OBSERVATIONS AND REMARKS
A. INTAKE STRUCTURE	Concrete structure at toe of upstream slope. This structure, with a drop inlet type weir forms the principal spillway. Cannot gain access without a ladder and tools to unbolt plate on top.
B. OUTLET STRUCTURE	24" diameter concrete pipe from intake structure.
C. OUTLET CHANNEL	24" pipe discharges directly into the natural stream at the downstream toe. There is a small plunge pool here filled with large rocks.
D. GATES	None.
E. EMERGENCY GATE	None.
F. OPERATION & CONTROL	Maintenance only. No control structures. Inaccessible during during high pool levels.
G. BRIDGE (ACCESS)	None.

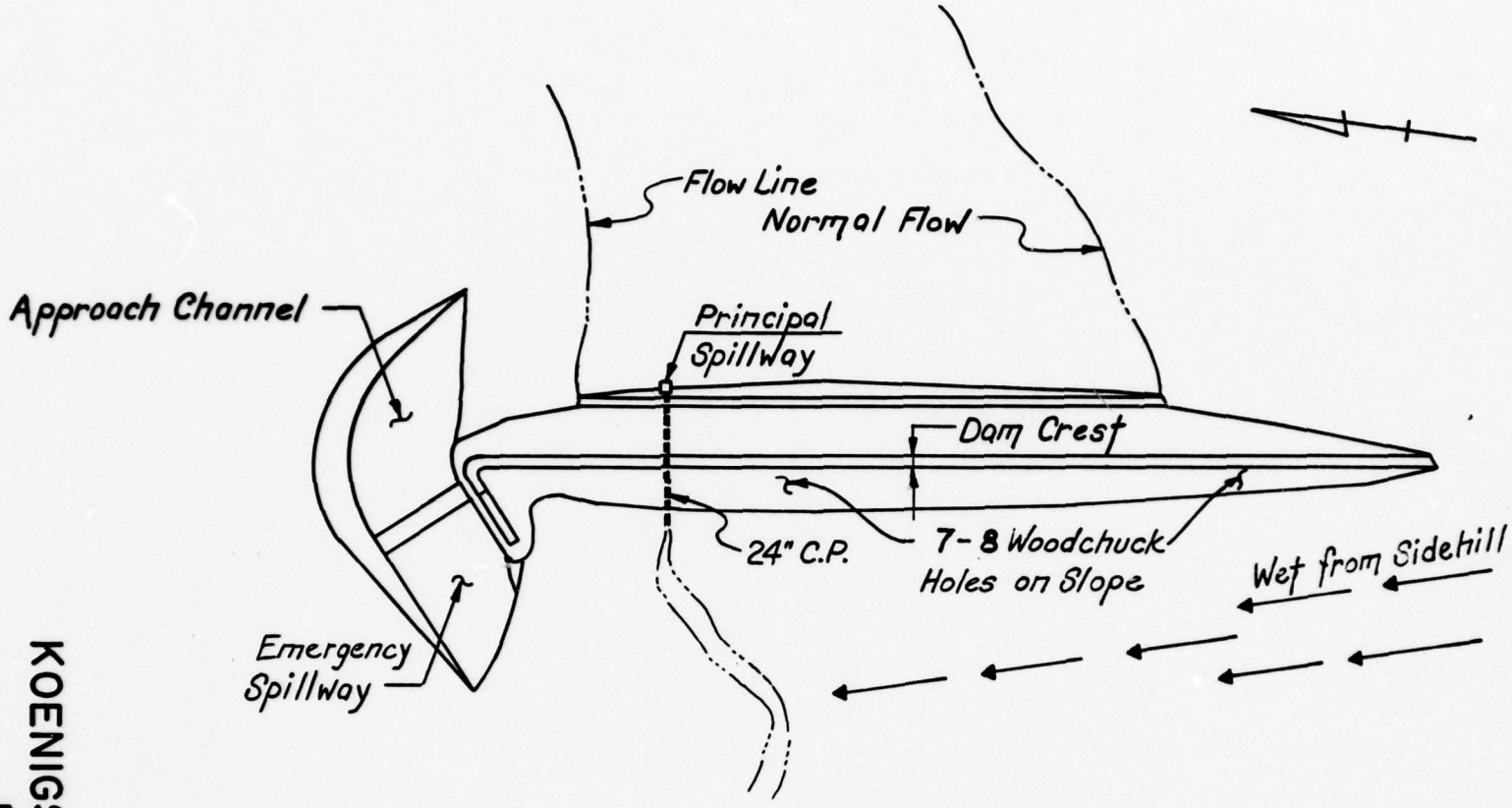
NDI NO. PA-00 668

VISUAL INSPECTION
SPILLWAY

	OBSERVATIONS AND REMARKS
A. APPROACH CHANNEL	Flow into the principal spillway is directly from the lake area. Emergency spillway has wide flat forebay beyond the right abutment.
B. WEIR: Crest Condition Cracks Deterioration Foundation Abutments	Broad crested weir as a drop inlet structure. Concrete structure is in good condition. Emergency spillway grassed with a 2H to 1V right abutment cut.
C. DISCHARGE CHANNEL: Lining Cracks Stilling Basin	Natural stream. Small plunge pool at end of pipe in the stream. Emergency spillway discharge directed away from toe of embankment.
D. BRIDGE & PIERS	None.
E. GATES & OPERATION EQUIPMENT	None.
F. CONTROL & HISTORY	None.

VISUAL INSPECTION

	OBSERVATIONS AND REMARKS
INSTRUMENTATION Monumentation	None.
Observation Wells	None.
Weirs	None.
Piezometers	None.
Staff Gauge	None.
Other	None.
RESERVOIR Slopes	Mostly woodland.
Sedimentation	None reported.
Watershed Description	Flat valley, lightly wooded.
DOWNSTREAM CHANNEL Condition	Natural stream, partially developed with cabins and homes.
Slopes	Flat.
Approximate Population	30 to 40
No. Homes	10 to 15 in first mile.



PLAN
KOENIGS CREEK DAM

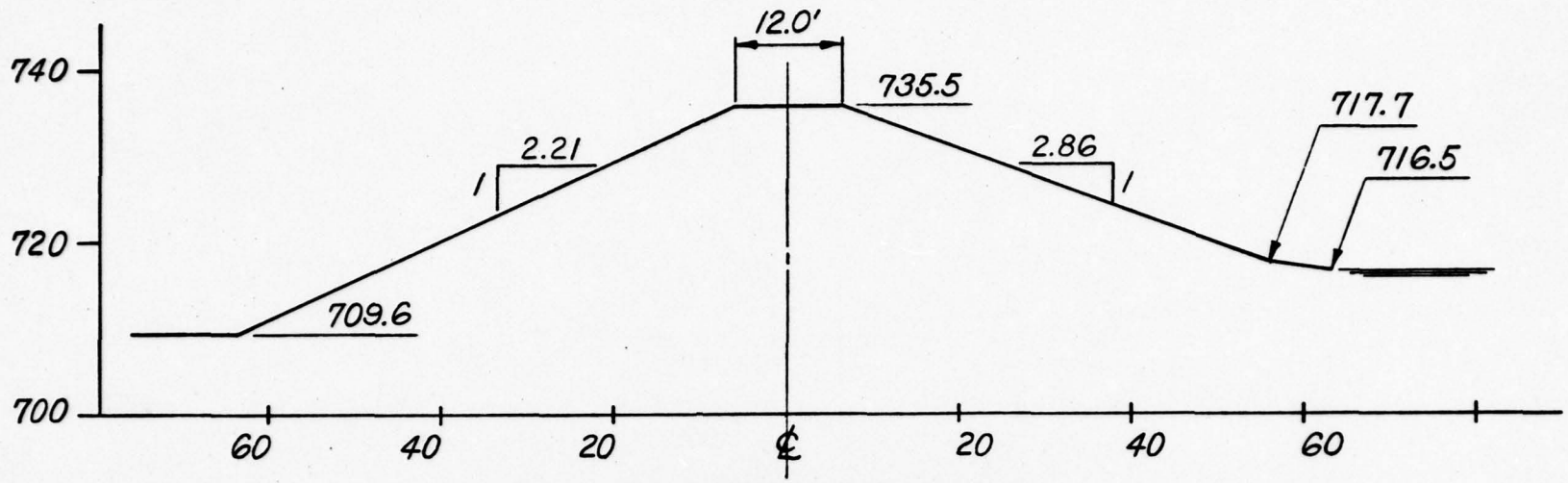
Surveyed 5/8/79

KOENIGS CREEK DAM
PA.668
INSPECTION SURVEY

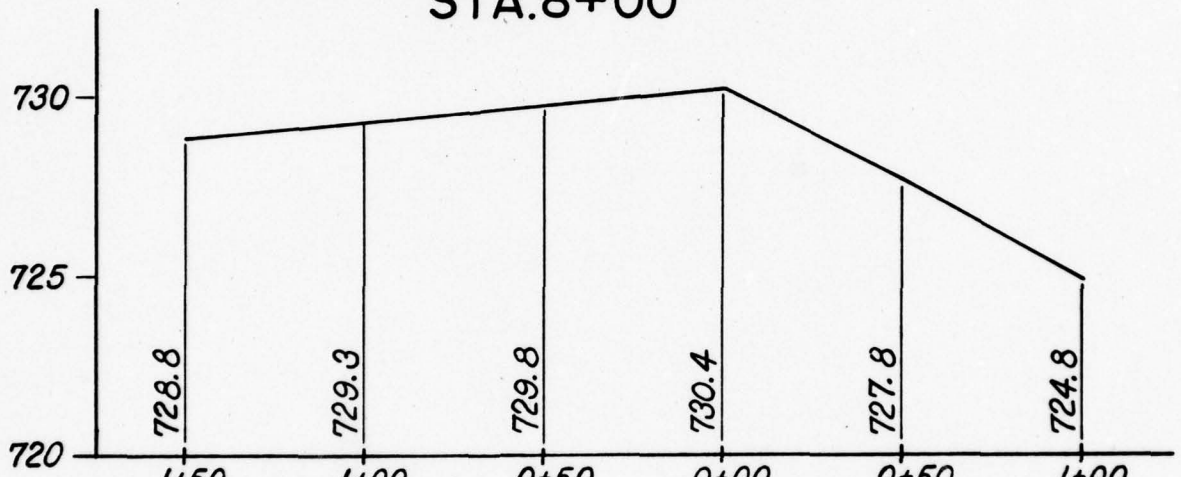
PLATE A-I

KOENIGS CREEK DAM
PA.668
INSPECTION SURVEY

PLATE A-II



DAM CROSS SECTION
STA.8+00



PROFILE SPILLWAY CHANNEL
STA.0+50

Surveyed 5/8/79

KOENIGS CREEK DAM
PA.668
INSPECTION SURVEY

PLATE A-III

APPENDIX B

CHECKLIST OF ENGINEERING DATA

CHECK LIST
ENGINEERING DATA

PA DER # 54-169 NDI NO. PA-00 668

NAME OF DAM Koenigs Creek Dam

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	U.S.G.S. Quadrangle, New Ringgold, PA See Plate II, Appendix F
CONSTRUCTION HISTORY	Progress report summaries are contained in the PennDER files.
GENERAL PLAN OF DAM	General plan included in construction drawings.
TYPICAL SECTIONS OF DAM	Section included in the construction drawings.
OUTLETS: PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	Spillway and outlet features are shown on the drawings. Hydrologic and hydraulic data are contained in the design report.

NDI NO. PA-00 668

ENGINEERING DATA

ITEM	REMARKS
RAINFALL & RESERVOIR RECORDS	Hydrologic information is in the design report.
DESIGN REPORTS	Design Report available in the PennDER file.
GEOLOGY REPORTS	Geologic Report in the Design Report.
DESIGN COMPUTATIONS: HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Data contained in design report includes H&H, and slope stability analysis.
MATERIALS INVESTIGATIONS: BORING RECORDS LABORATORY FIELD	Test pits, test boring, laboratory soil test results and field observations are included in the design report by SCS.
POST CONSTRUCTION SURVEYS OF DAM	Visual inspection by SCS representative on an annual basis.
BORROW SOURCES	Borrow sources and materials available from these sources are identified.

ENGINEERING DATA

ITEM	REMARKS
MONITORING SYSTEMS	There are no monitoring systems or devices.
MODIFICATIONS	No modifications since completion of construction.
HIGH POOL RECORDS	None.
POST CONSTRUCTION ENGINEERING STUDIES & REPORTS	Reports limited to inspection reports by PennDER.
PRIOR ACCIDENTS OR FAILURE OF DAM Description: Reports:	None reported.
MAINTENANCE & OPERATION RECORDS	Operation and maintenance summary reports are in the PennDER files.
SPILLWAY PLAN, SECTIONS AND DETAILS	Construction plans include drawings for principle and emergency spillways.

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT, PLANS & DETAILS	Operating equipment limited to the control valve on the outlet pipe.
CONSTRUCTION RECORDS	Progress summaries for work completed reported on a percentage basis.
PREVIOUS INSPECTION REPORTS & DEFICIENCIES	Regular inspection reports by PennDER. No major problems reported over life of dam.
MISCELLANEOUS	None.

NDI NO. PA-00668

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Cultivated and Woodland

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 725.8 Acre-Feet

TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev. 735.6 Acre-Feet

MAXIMUM DESIGN POOL: Elev. 733.6

TOP DAM: Elev. 735.6

SPILLWAY:	Principal	Emergency
a. Elevation	725.8	730.8
b. Type	Drop Structure	Earth Structure
c. Width	2 feet	--
d. Length	6 feet	110 feet
e. Location Spillover	In Riser Tower	Right Abutment
f. Number and Type of Gates	None	None

OUTLET WORKS:

a. Type 24-inch I.D. RC Water Pipe

b. Location Directly from Riser through embankment.

c. Entrance inverts 711.7

d. Exit inverts 710.4

e. Emergency drawdown facilities Drain Pipe with bolted plate for closure.

HYDROMETEOROLOGICAL GAGES:

a. Type None

b. Location

c. Records

MAXIMUM NON-DAMAGING DISCHARGE: Unknown

APPENDIX C

HYDROLOGY AND HYDRAULIC CALCULATIONS

SUMMARY DESCRIPTION
OF
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION

The hydrologic and hydraulic evaluation for this inspection report has employed computer techniques using the Corps of Engineers computer program identified as the Flood Hydrograph Package (HEC-1) Dam Safety Version.

The program has been designed to enable the user to perform two basic types of hydrologic analyses: (1) the evaluation of the overtopping potential of the dam, and (2) the capability to estimate the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. A brief summary of the computation procedures typically used in the dam overtopping analysis is shown below.

- Development of an inflow hydrograph to the reservoir.
- Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.
- Routing of the outflow hydrograph(s) of the reservoir to desired downstream locations. The results provide the peak discharge, time of the peak discharge and maximum stage of each routed hydrograph at the outlet of the reach.

The output data provided by this program permits the comparison of downstream conditions just prior to a breach failure with that after a breach failure and the determination as to whether or not there is a significant increase in the hazard to loss of life as a result of such a failure.

The results of the studies conducted for this report are presented in Section 5.

For detailed information regarding this program refer to the Users Manual for the Flood Hydrograph Package (HEC-1) Dam Safety Version prepared by the Hydrologic Engineering Center, U. S. Army Corps of Engineers, Davis, California.

SUBJECT Koenigs Creek Dam ID No. PA-668

COMPUTED BY RES DATE May 17, 1979 CHECKED BY JJR

Maximum Known Flood

At USGS Gaging Station 19 miles downstream maximum flood in period 1947-76 occurred on June 22, 1972. Discharge was 42,800 cfs. Drainage Area = 355 mi^2.

This site has drainage area = 1.0 mi^2

$\left(\frac{1}{355}\right)^{0.8} \times 42{,}800 = 390$ cfs

Pool Drain A pool drain consisting of 17 feet of 15-inch diameter corrugated metal pipe extends upstream from the bottom of the inlet tower at invert elevation 712.5. The inspection party was not able to determine the closure on this pipe.

Est Q at sediment pool level (718.0)

$Q = C a \sqrt{2gh}$ $C = 0.6$

$a = \pi R^2 = \pi (0.625)^2 = 1.23$

$h = 718.0 - 712.5 - 0.62 = 4.88$

$Q = 0.6 \times 1.23 \times \sqrt{64.3 \times 4.88} = 13$ cfs

Sediment Pool Orifice A 1.0 ft. by 2.0 ft. orifice in the upstream face of the inlet tower maintains the sediment pool level during periods of low flow. The invert is at elevation 718.0. Compute discharge at pool level 720.0.

$Q = Ca\sqrt{2gh}$ $C = 0.6$

$a = 1 \times 2 = 2\ ft^2$

$h = 720 - 718 - 0.5 = 1.5$

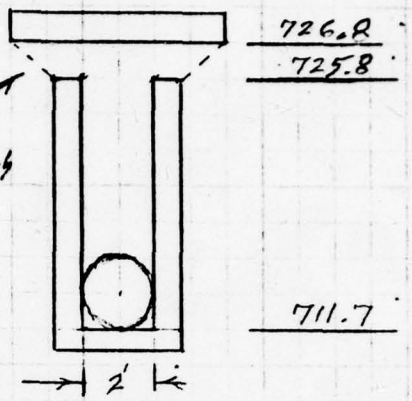
$Q = 0.6 \times 2 \times \sqrt{64.3 \times 1.5} = 12$ cfs

SUBJECT Koenigs Creek Dam ID No. PA-668

COMPUTED BY RES DATE May 17, 1979 CHECKED BY JPJr

Principal Spillway Rating

The principal spillway is concrete drop inlet structure. Inside dimensions are 2 feet by 6 feet. Water enters the tower by flowing over the tops of the two 6-foot sides. The two 2-foot sides are solid and support a horizontal concrete slab which acts as an anti-vortex device. The underside of the slab is 1.0 ft. above the top of the 6-foot sides. Thus water enters through two openings, each measuring 1' x 6'. Water leaves the tower via a 2-foot inside diameter concrete pipe, 127 ft long.



Section through drop inlet tower
No scale

Area of two openings $= 1 \times 12 = 12\ ft^2$.

Area of 2-foot dia. pipe $= \pi R^2 = 3.142\ ft^2$

Estimate pool level for 50 cfs.

Orifice

$Q = C a \sqrt{2gh}$ $\quad Q = 50$

$C = 0.6$ $\quad a = (1 \times 12) + (1 \times 2) = 14$

$50 = 0.6 \times 14 \times \sqrt{64.3 \times h}$

$\sqrt{64.3 \times h} = \dfrac{50}{0.6 \times 14} = 5.95$

$h = 0.55\ ft$

Pipe

$$H = \left[\frac{2.5204(1+K_e)}{D^4} + \frac{466.18 n^2 L}{D^{16/3}} \right] \left(\frac{Q}{10} \right)^2$$

$D = 2$, $K_e = 0.5$, $K_b = 1.0$, $K_T = 1.5$

$L = 127\ ft$, $n = 0.012$, $Q = 50$

SUBJECT Koenigs Cracked Dam ID No. PA 668

COMPUTED BY RES DATE May 17, 1979 CHECKED BY JJPJr

Principal Spillway Rating, Cont.

Pipe 50 cfs cont.

$$H = \left[\frac{2.5204 \times 2.5}{(2)^4} + \frac{466.18(0.012) \times 127}{(2)^{5.333}}\right]\left(\frac{50}{10}\right)^2$$

$$= \left[0.394 + 0.212\right] \times 25 = 15.15 \text{ ft}$$

Pool 50 cfs $= 710.4 + 1 + 0.55 + 15.15 = 727.1'$

Pool level 60 cfs

Orifice

$$60 = 0.6 \times 14 \times \sqrt{64.3 \times h}$$

$$\sqrt{64.3h} = \frac{60}{0.6 \times 14} = 7.143$$

$$h = 0.79 \text{ ft.}$$

Pipe 60 cfs $H = [0.606]\left(\frac{60}{10}\right)^2 = 21.82 \text{ ft.}$

Pool 60 cfs $= 710.4 + 1 + 0.79 + 21.82 = 734.0'$

Pool level 55 cfs

Orifice

$$55 = 0.6 \times 14 \times \sqrt{64.3 \times h}$$

$$\sqrt{64.3h} = \frac{55}{0.6 \times 14} = 6.55$$

$$h = 0.67 \text{ ft.}$$

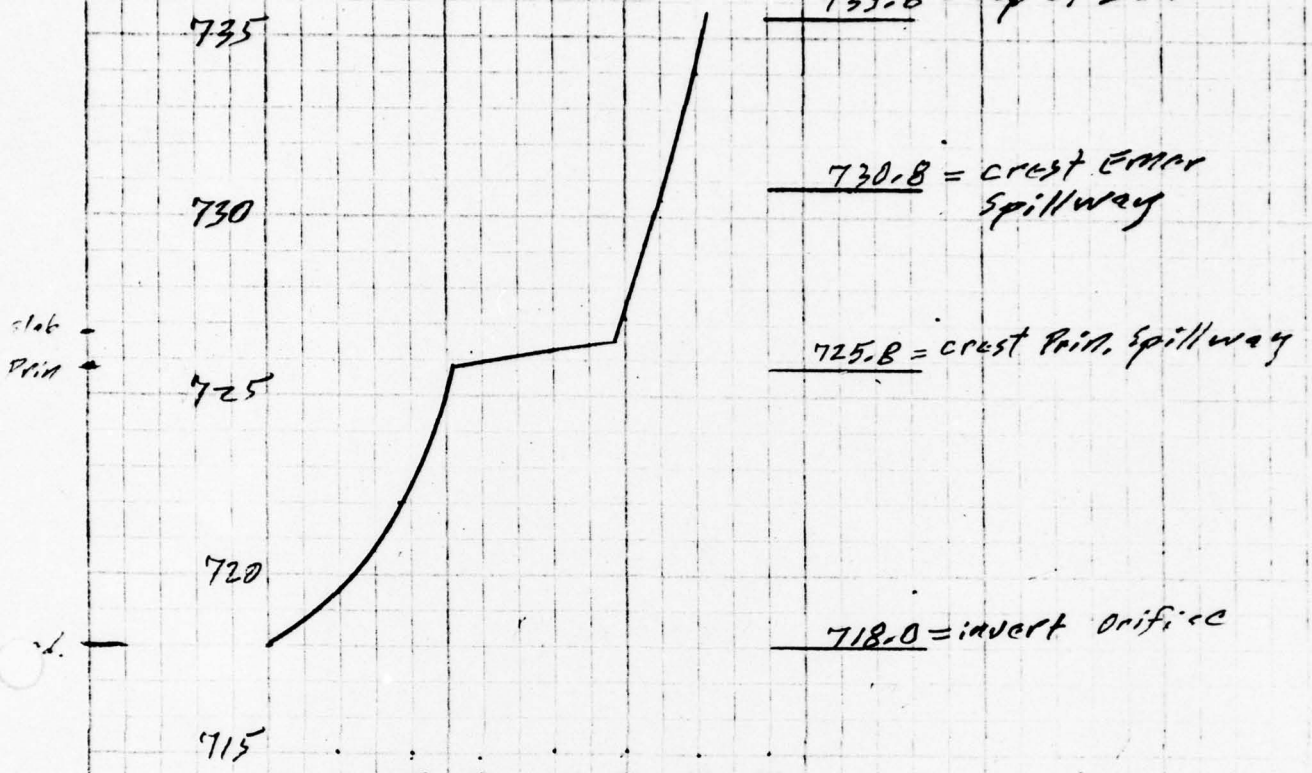
Pipe 55 cfs $H = [0.606]\left(\frac{55}{10}\right)^2 = 18.33 \text{ ft}$

Pool 55 cfs $= 710.4 + 1 + 0.67 + 18.33 = 730.4$

SUBJECT Koenigs Creek Dam, I.D. No. PA-665

COMPUTED BY RES DATE May 17, 1979 CHECKED BY JJPI

Principal Spillway Rating Cont.



Elev. 722 $Q = Ca\sqrt{2gh} = 0.6 \times 2\sqrt{64.3 \times (722 - 718.0 - 0.5)}$

$= 18$ cfs

Elev. 725.8 $Q = 0.6 \times 2 \times \sqrt{64.3 \times (725.8 - 718.5)}$

$= 26$ cfs

Elev. 726.3 $Q_{weir} = CLH^{3/2} = 2.84 \times 12 \times (0.5)^{3/2}$

$= 12.05$ cfs

$Q_{orifice} = 0.6 \times 2 \times \sqrt{64.3 \times (726.3 - 718.5)}$

$= 26.87$ cfs

$Q_{Total} = 12.05 + 26.87 = 39$ cfs

Ref. Brater + King, 6th Edition
Corifice Table 4-3
Cweir Table 5-3

SUBJECT Koenigs Creek Dam, I.D. No. IA-46

COMPUTED BY RES DATE May 21, 1979 CHECKED BY JJPJr

Emergency Spillway Rating Including Flow in Principal Spillway

For estimating backwater

Est. $V_{max} = 8$ ft/s

Est area $_{max} = \frac{3000 \text{ cfs}}{8}$

$= 375 \text{ ft}^2$

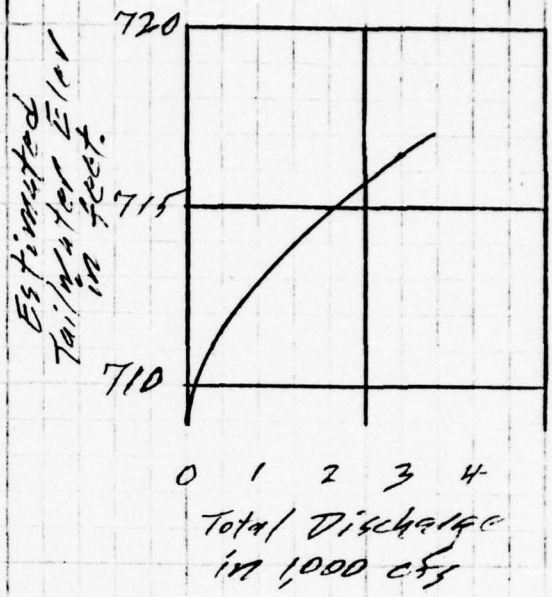
Area $= \frac{\text{depth} \times \text{width}}{2}$

depth $_{max} = \frac{375 \times 2}{100}$

$= 7.5$ ft.

Max tailwater Elev.

$= 709 + 7.5 = 716.5$



Pool Elev. 735.6

Est Q = 3,500 cfs

Est tailwater = 717.0

Est Back Water

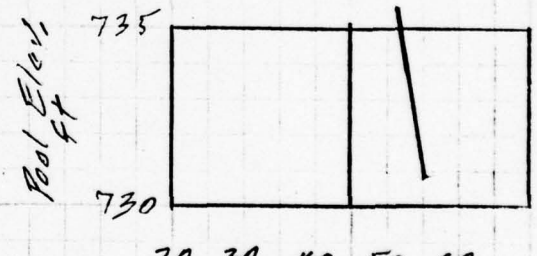
$= 717 - 710.6 = 6.4$ ft

Prin. Spill. Q = 52 cfs *

Pool Elev. 730.8

Est Backwater = 0

Prin. Spill. Q = 56 cfs

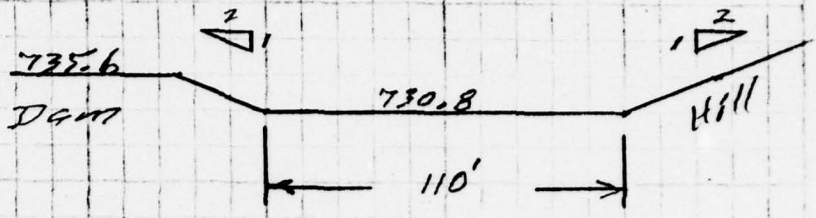


* USING PRINC. SPILLWAY RATING CURVE ON SHT 4, AT ELEV. 735.6 - 6.4' = 729.2 (APPROX.)

SUBJECT Koenigs Creek Dam, ID No. PA 668

COMPUTED BY RES DATE May 18, 1979 CHECKED BY JJPS

Emergency Spillway Rating



Spillway is lined with grass

Not to scale

Estimate Q using $Q = CLH^{3/2}$

C = 2.6 Ref. Brater + King, Table 5-3.

Top of dam Elev. 735.6

$Q = 2.6 \times 118 \times (4.8)^{3/2} = 3{,}230$ cfs

Principal/Spill. = 52

Total 3280

Safety check Elev. 734.3

$Q = 2.6 \times 115 \times (734.3 - 730.8)^{3/2} = 1958$ cfs

Prin. Spill = 52

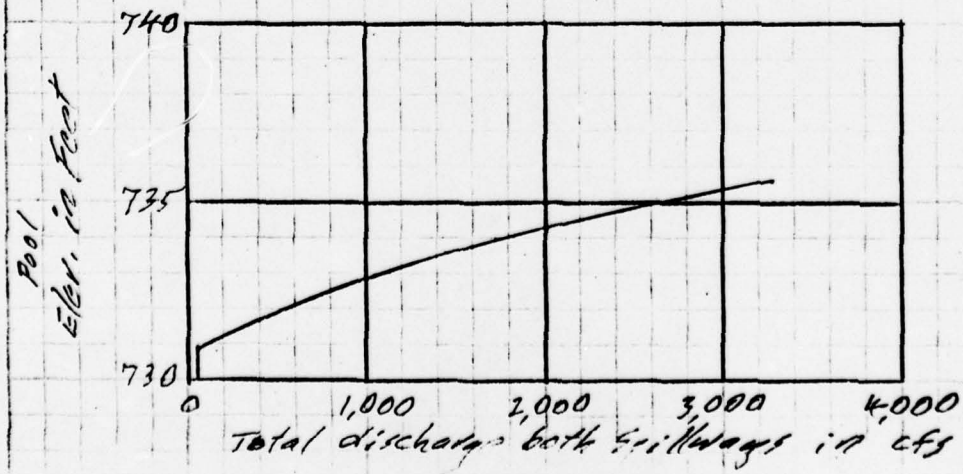
Total = 2010 cfs

Design High Water Elev. 733.6

$Q = 2.6 \times 114 \times (733.6 - 730.8)^{3/2} = 1389$ cfs

Prin. Spill = 52

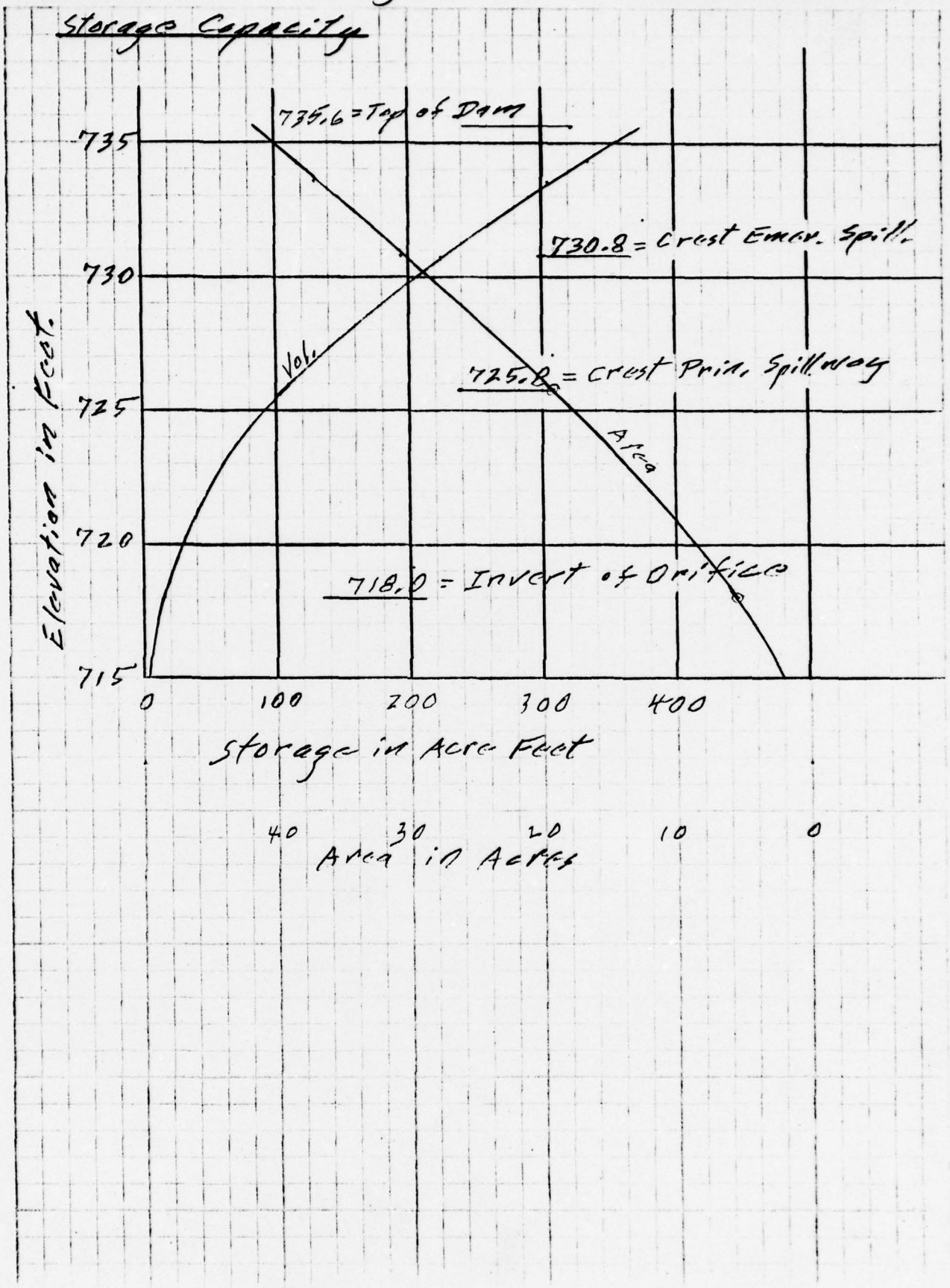
= 1,440 cfs



SUBJECT Koenigs Creek Dam, ID No. [illegible]

COMPUTED BY RES DATE May 18, 1979 CHECKED BY JSP Jr

Storage Capacity



BY RLS DATE 7/3/79 | BERGER ASSOCIATES | SHEET NO. 8 OF
CHKD. BY DATE | PROJECT D8490
SUBJECT KOENIGS CREEK

SIZE CLASSIFICATION

MAXIMUM STORAGE = 369 ACRE-FEET
MAXIMUM HEIGHT = 25 FEET
SIZE CLASSIFICATION IS "SMALL"

HAZARD CLASSIFICATION

SEVERAL HOUSES ARE NEAR THE DOWNSTREAM CHANNEL.
USE "HIGH"

RECOMMENDED SPILLWAY DESIGN FLOOD

THE ABOVE CLASSIFICATIONS INDICATE USE OF AN SDF EQUAL TO ONE-HALF THE PMF TO THE PROBABLE MAXIMUM FLOOD.

BY RLS DATE 7/3/79 | BERGER ASSOCIATES | SHEET NO. 9 OF
CHKD. BY DATE | PROJECT D8490
SUBJECT KOENIGS CREEK

HEC-1 DATA

DRAINAGE AREA = 1.0 SQ. MI.

DELAWARE BASIN REGION 6

$C_P = 0.4$

$C_T = 1.35$

LONGEST WATER COURSE = 1.52 mi.

L TO CENTROID = 0.76 mi.

$T_P = C_T (L \times L_{CA})^{.3}$

$T_P = 1.41$

RAINFALL (HMR-33)

INDEX = 22.6"

ZONE 6

INCREMENTAL RAINFALL

6 HR = 113%
12 HR = 123%
24 HR = 132%
48 HR = 143%

AREAS

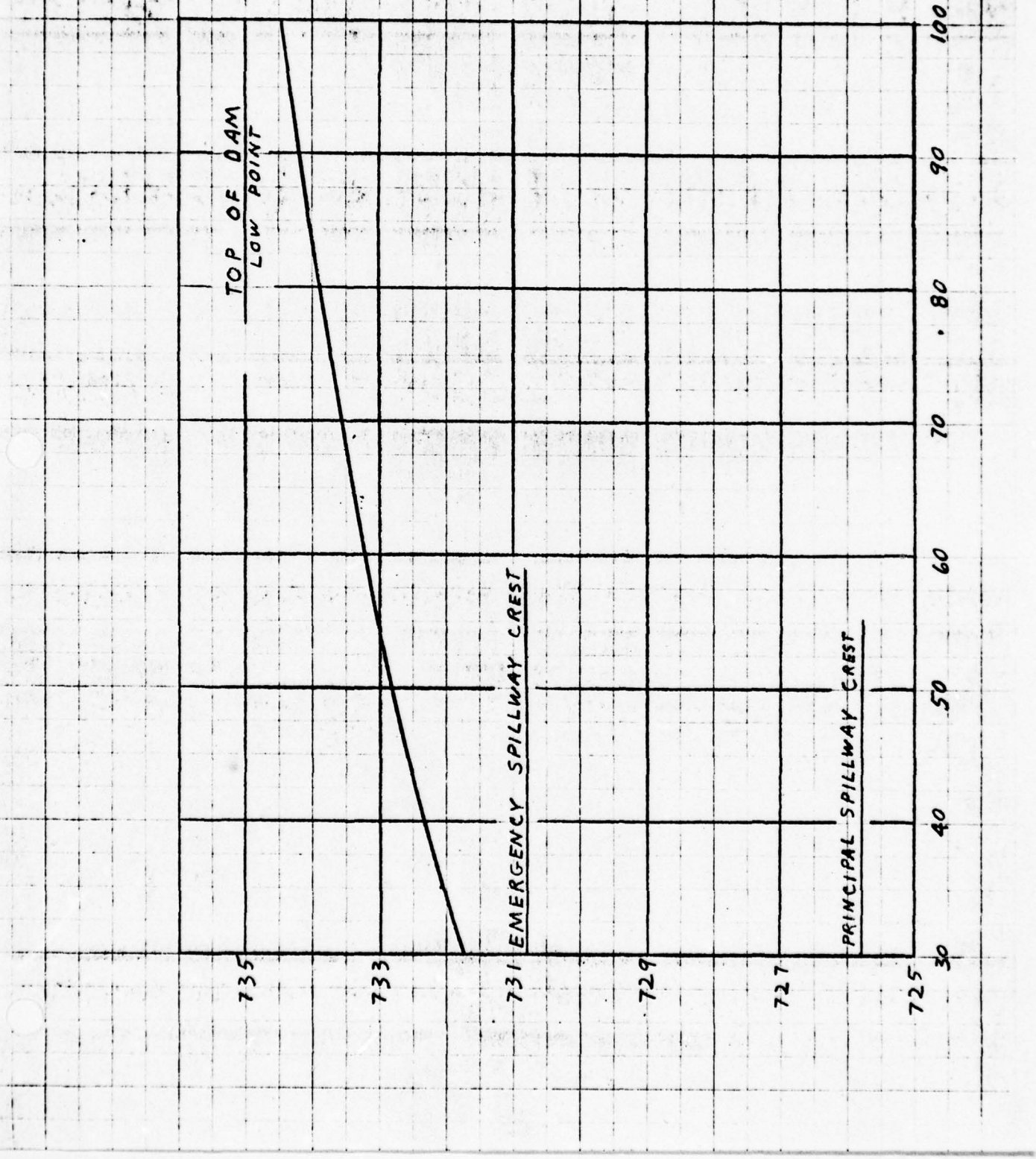
ELEV.: 718 = 5.5 ACRES
730.8 = 30 ACRES
735.6 = 42 ACRES FROM SCS CURVE
740 = 64 ACRES FROM USGS (PLANIMETERED)

ZERO STORAGE ELEVATION

ELEV. = 718 - (STORAGE x 3/AREA)
= 709.8

BY RLS DATE 7/3/79 BERGER ASSOCIATES SHEET NO. 10 OF
CHKD. BY DATE PROJECT D849
SUBJECT KOENIGS CREEK

SPILLWAY CAPACITY CURVE



```
                    JULY 1978
 LAST MODIFICATION  26 FEB 79
 ****************************
    1          A1     KOENIGS CREEK DAM   ****  KOENIGS CREEK
    2          A2     EAST BRUNSWICK TWP., SCHUYLKILL COUNTY, PA.
    3          A3     ND1 #  PA-00668     PA DER #  54-169     SCS #  PA-425
    4          B   300      0     15      0      0      0      0      0     -4      0
    5          B1    5
    6          J     1      9     1
    7          J1    1     .9    .8     .7     .6     .5     .35    .25    .15
    8          K            1                                  1
    9          K1                INFLOW  HYDROGRAPH
   10          M     1      1     1.0                                      1
   11          P           22.6   113    123    132    143
   12          T                                               1     .05
   13          W   1.41     .4
   14          X   -1.5    -.05    2
   15          K     1      2.                                 .     1
   16          K1               RESERVOIR  ROUTING
   17          Y                              1
   18          Y1    1                                         15     -1
   19          Y4   718    720    722   725.8  726.3  727.1  730.8  731.3  731.9  732.7
   20          Y4 733.6   734.3   735   735.5   736
   21          Y5    0     12     18     26     39     50     55     158    392    833
   22          Y5 1440    2010   2720   3463   5260
   23          $A    0    5.5     30     42     64
   24          $E 709.8   718   730.8  735.6   740
   25          $$   718
   26          $D   735
   27          K    99
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                RUNOFF HYDROGRAPH AT          1
                                ROUTE HYDROGRAPH TO           2
                                END OF NETWORK


1****************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  26 FEB 79
 ****************************

 RUN  DATE# 79/07/03.
      TIME# 05.15.06.



                    KOENIGS CREEK DAM   ****  KOENIGS CREEK
                    EAST BRUNSWICK TWP., SCHUYLKILL COUNTY, PA.
                    ND1 #  PA-00668     PA DER #  54-169     SCS #  PA-425

                                        JOB SPECIFICATION
                 NQ     NHR    NMIN    IDAY     IHR    IMIN   METRC    IPLT    IPRT   NSTAN
                300       0      15       0       0       0       0       0      -4       0
                                      JOPER     NWT   LROPT   TRACE
                                          5       0       0       0


                                    MULTI-PLAN ANALYSES TO BE PERFORMED
                                        NPLAN= 1 NRTIO= 9 LRTIO= 1
                          RTIOS=   1.00    .90    .80    .70    .60    .50    .35    .25    .15
```

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.00	0.00	1.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.60	113.00	123.00	132.00	143.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.41 CP= .40 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 60 END-OF-PERIOD ORDINATES, LAG= 1.41 HOURS, CP= .40 VOL= 1.00

12.	44.	90.	136.	170.	182.	173.	158.	144.	131.
119.	109.	99.	90.	82.	75.	68.	62.	57.	52.
47.	43.	39.	35.	32.	29.	27.	24.	22.	20.
18.	17.	15.	14.	13.	12.	11.	10.	9.	8.
7.	7.	6.	5.	5.	5.	4.	4.	3.	3.
3.	3.	2.	2.	2.	2.	2.	1.	1.	1.

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	25.85	23.45	2.41	60888.
										(657.)	(596.)	(61.)	(1724.16)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

RESERVOIR ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	0	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	15.	-1

STAGE	718.00	720.00	722.00	725.80	726.30	727.10	730.80	731.30	731.90

HYDROGRAPH ROUTING

RESERVOIR ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	0	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	15.	-1

STAGE	719.00	720.00	722.00	725.80	726.30	727.10	730.80	731.30	731.90	732.70
	733.60	734.30	735.00	735.50	736.00					
FLOW	0.00	12.00	18.00	26.00	39.00	50.00	55.00	158.00	392.00	833.00
	1440.00	2010.00	2720.00	3483.00	5260.00					
SURFACE AREA=	0.	6.	30.	42.	64.					
CAPACITY=	0.	15.	221.	393.	625.					
ELEVATION=	710.	718.	731.	736.	740.					

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
718.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
735.0	0.0	0.0	0.

PEAK OUTFLOW IS 2149. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 1909. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 1674. AT TIME 42.25 HOURS

PEAK OUTFLOW IS 1424. AT TIME 42.25 HOURS

PEAK OUTFLOW IS 1182. AT TIME 42.50 HOURS

PEAK OUTFLOW IS 920. AT TIME 42.75 HOURS

PEAK OUTFLOW IS 484. AT TIME 43.75 HOURS

PEAK OUTFLOW IS 157. AT TIME 46.00 HOURS

PEAK OUTFLOW IS 51. AT TIME 48.00 HOURS

1 ********** ********** ********** ********** **********

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS								
				RATIO 1 1.00	RATIO 2 .90	RATIO 3 .80	RATIO 4 .70	RATIO 5 .60	RATIO 6 .50	RATIO 7 .35	RATIO 8 .25	RATIO .1
HYDROGRAPH AT	1	1.00	1	2293.	2064.	1835.	1605.	1376.	1147.	803.	573.	34
	(	2.59)	(	64.94)(	58.44)(	51.95)(	45.46)(	38.96)(	32.47)(	22.73)(	16.23)(	9.7
ROUTED TO	2	1.00	1	2149.	1909.	1674.	1424.	1182.	920.	484.	157.	5
	(	2.59)	(	60.84)(	54.07)(	47.39)(	40.34)(	33.46)(	26.04)(	13.71)(	4.44)(	1.4

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	717.98	718.00	735.00
STORAGE	15.	15.	369.
OUTFLOW	0.	0.	2720.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	734.44	0.00	346.	2149.	0.00	42.00	0.00
.90	734.18	0.00	336.	1909.	0.00	42.00	0.00
.80	733.89	0.00	325.	1674.	0.00	42.25	0.00
.70	733.58	0.00	314.	1424.	0.00	42.25	0.00
.60	733.22	0.00	301.	1182.	0.00	42.50	0.00
.50	732.83	0.00	287.	920.	0.00	42.75	0.00
.35	732.07	0.00	261.	484.	0.00	43.75	0.00
.25	731.29	0.00	236.	157.	0.00	46.00	0.00
.15	728.21	0.00	152.	51.	0.00	48.00	0.00

1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
****
EOI ENCOUNTERED.
N>

APPENDIX D

GEOLOGIC REPORT

GEOLOGIC REPORT

Bedrock - Dam and Reservoir

Formation Name: Trimmers Rock Sandstone.

Lithology; Light olive gray to light brownish gray sandstone, interbedded with micaceous siltstone and micaceous shale. Sandstone beds composed largely of quartz sand grains cemented with quartz and clay. Siltstones are less pure, containing a higher percentage of sericite.

Structure

The dam is located on the north limb of an overturned anticline. The beds strike N70°E and dip 80°S, and are overturned, that is the original tops face north. There may be a major thrust fault a short distance south of the dam, but its existence is not certain. If it does exist, it is a bedding plane thrust and was not accompanied by much fracturing. Air photo fracture traces strike N20° to N40°W. The valley of Koenigs Creek at the dam is apparently controlled by N20°W fractures.

Overburden

Overburden consists of weathered sandstone on the valley sides and alluvium in the valley floor. The alluvium consists of silt, sand, clay and some gravel. It varies from five to more than thirty feet thick.

Aquifer Characteristics

The bedrock is composed of essentially impermeable materials and all ground water movement is along bedding planes and fractures. The alluvium has a matrix which is rather high in clay and is generally of low permeability. Some permeable streaks could be present.

Discussion

This dam was constructed with a cutoff trench which generally did not reach to bedrock. Some leakage under the trench through the alluvium is possible. Ground water movement along the N20°W fractures, at right angles to the dam axis is also possible. If leakage through the alluvium is not present, or if present, is not increasing, the foundation is probably reasonably sound.

Sources of Information

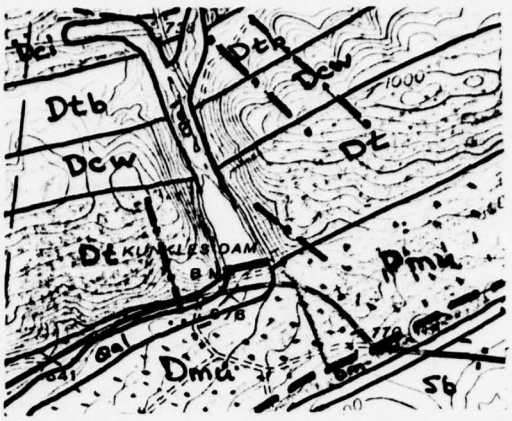
1. Wood, G.J., Jr. (1973) "Geologic Map of the Orwigsburg Quadrangle, Schuylkill County, Pa.". U.S. Geological Survey Map GQ 1029.

2. Wood, G.H., Jr., Troxler, J.P., and Kehn, T.M. (1969) "Geology of the West Central Part of the Southern Anthracite Field, and Adjoining Areas". U.S. Geological Survey, Prof. Pa. 602.

3. Air Photographs. Scale 1:20,000. Dated 1968.

4. Core Boring Logs in File.

GEOLOGIC MAP - Koenigs Creek Dam



(geology from U.S.G.S. Map GQ-1029)

Qal	alluvium	Dmu	Mahantango Fm.- upper shale member
Dci	Catskill Fm- Irish Valley Member	-·-·-	air photo fracture trace
Dtb	Catskill Fm.- Beaverdam Run Tongue	— — —	fault
Dcw	Catskill Fm.- Walcksville Tongue		
Dt	Trimmers Rock Sandstone		

SCALE 1:24000

1 0 1 MILE

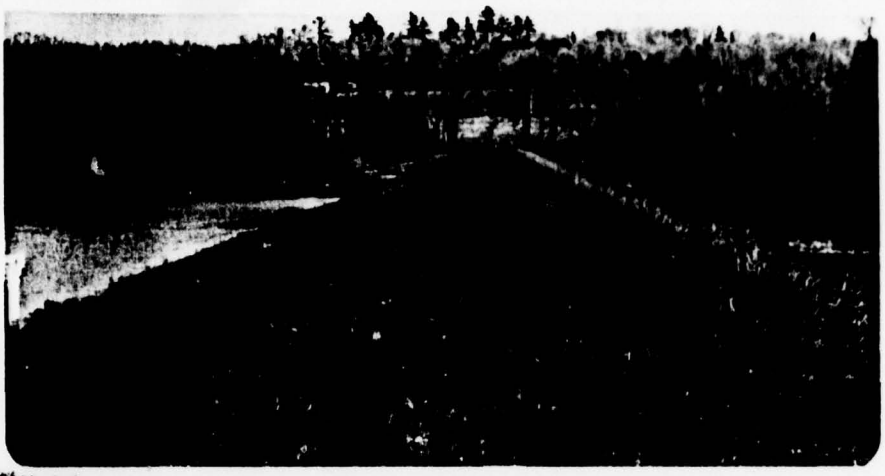
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

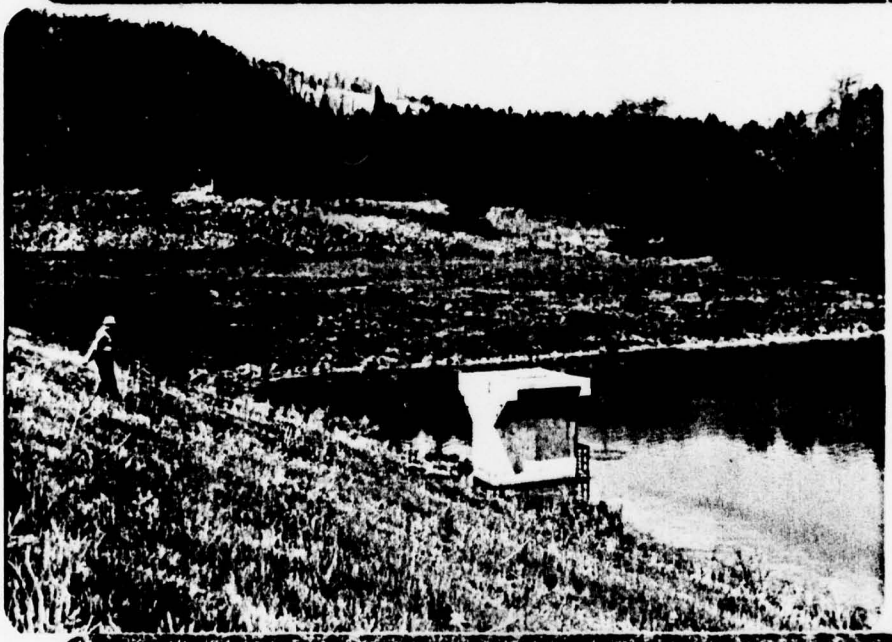
CONTOUR INTERVAL 20 FEET

APPENDIX E

PHOTOGRAPHS



Top of Dam
Looking to
Left Abutment

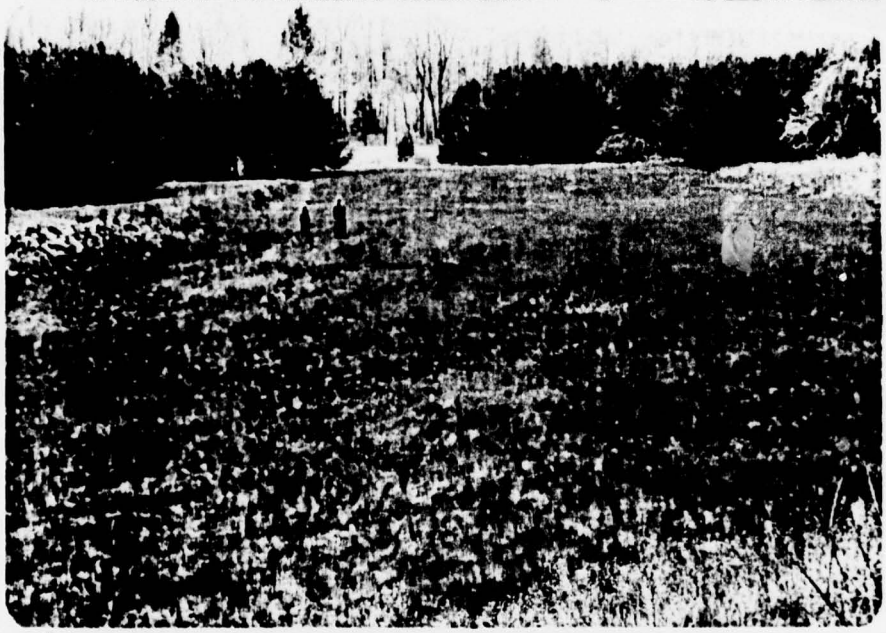


Intake Structure

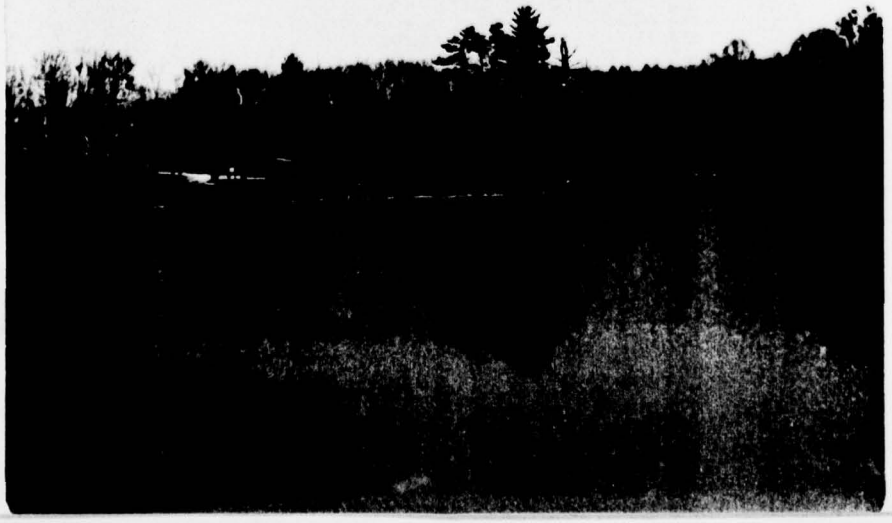
Outlet Pipe

PA-668
PLATE E-I

Downstream Channel
Outlet Pipe



Emergency Spillway
Looking
Downstream

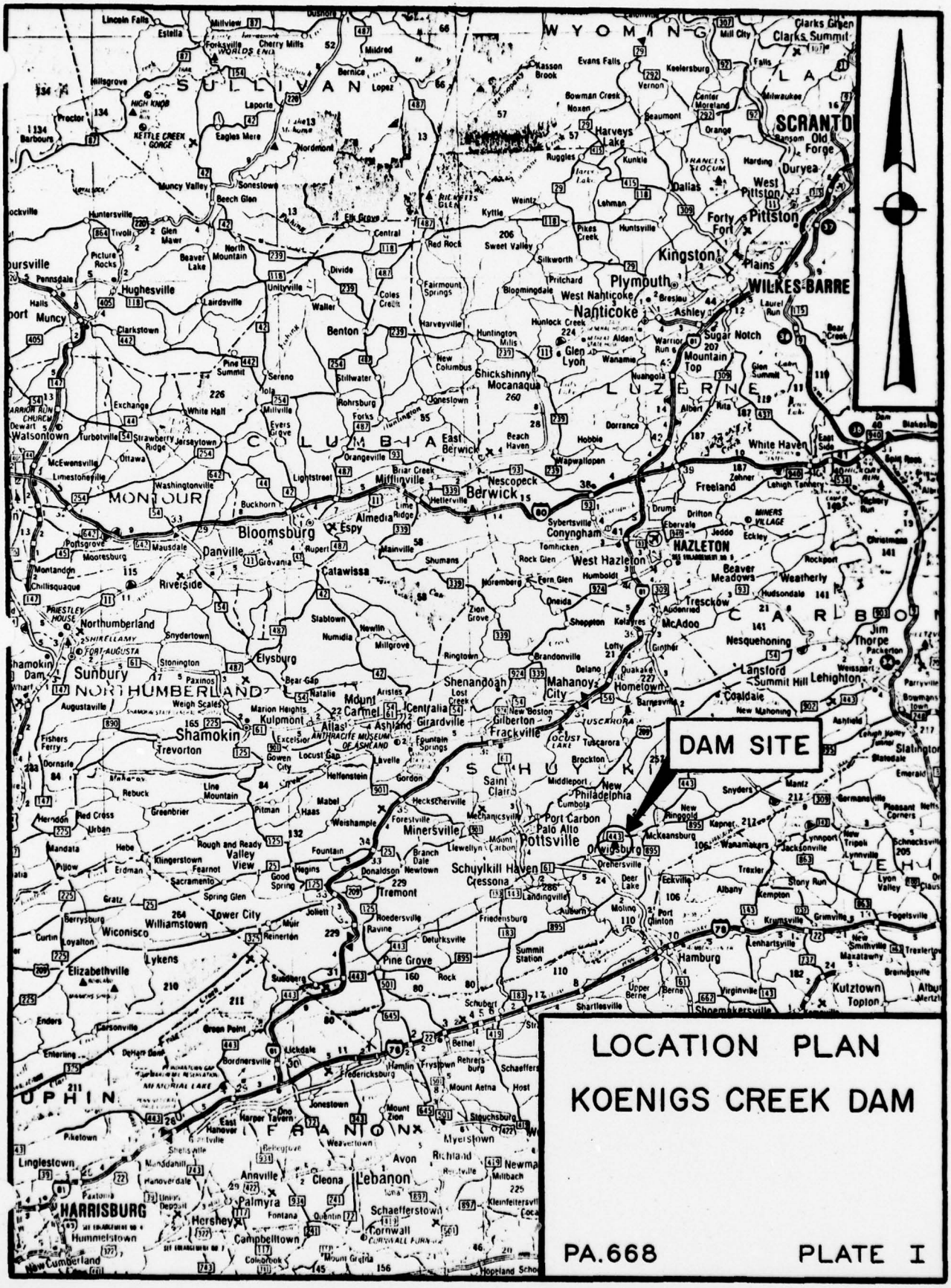


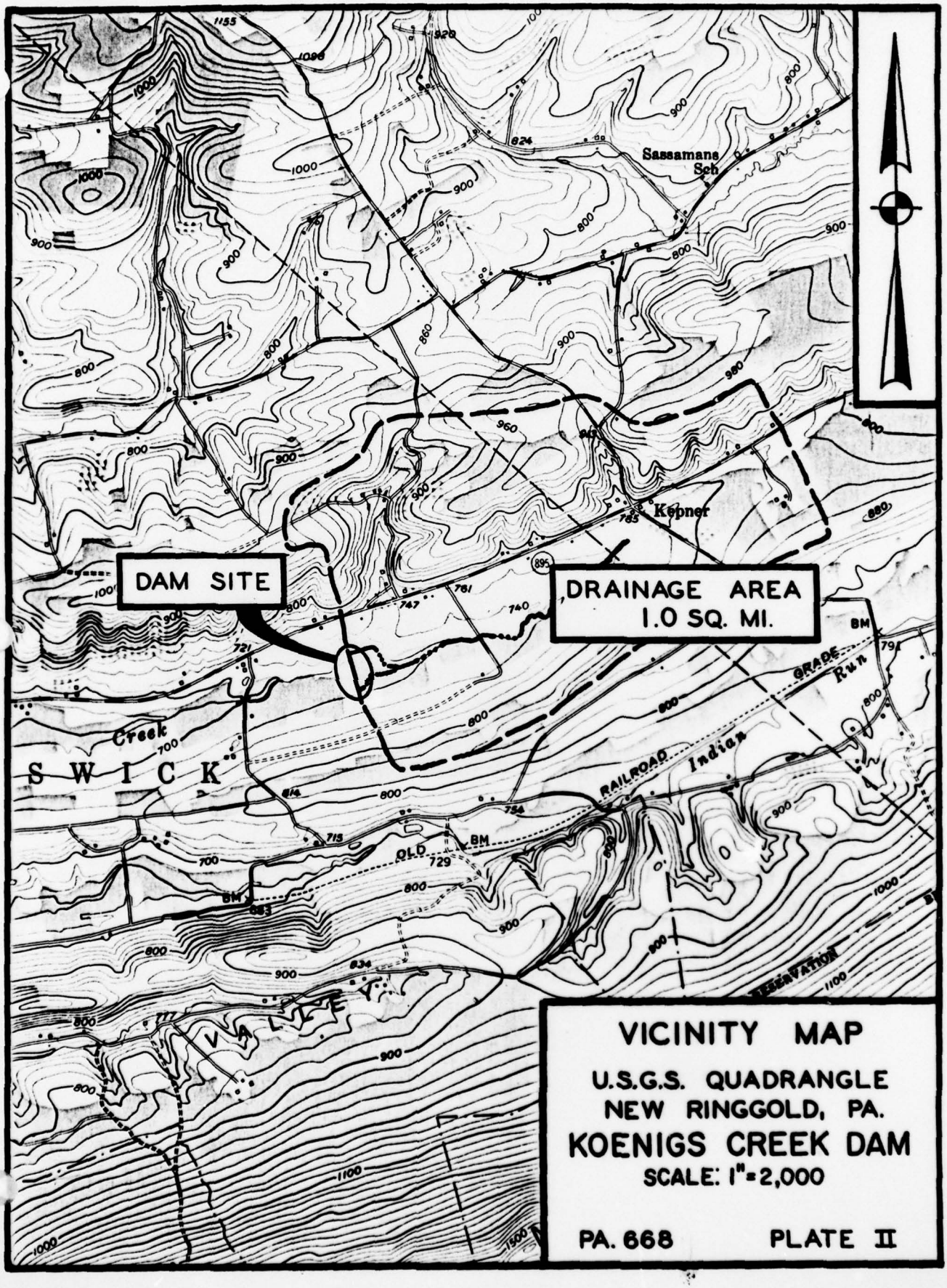
Normal Reservoir

PA-668
PLATE E-II

APPENDIX F

PLATES


DAM SITE
LOCATION PLAN
KOENIGS CREEK DAM
PA.668
PLATE I



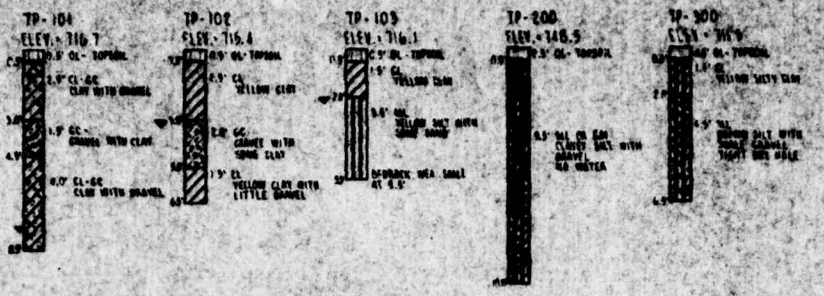
VICINITY MAP

U.S.G.S. QUADRANGLE
NEW RINGGOLD, PA.

KOENIGS CREEK DAM

SCALE: 1"=2,000

PA. 668 PLATE II



DATE OF GEOLOGIC INVESTIGATION : NOVEMBER '60
UNIFIED SOIL CLASSIFICATIONS BY VISUAL INSPECTION

N. 0° 45' W

SEDIMENT POOL ELEV. 710.0

RISER DETAIL SHEET

FLOOD DRAIN DETAILS SHEET

EMERGENCY SPILLWAY

DESIGN HIGH WATER EL 733.0

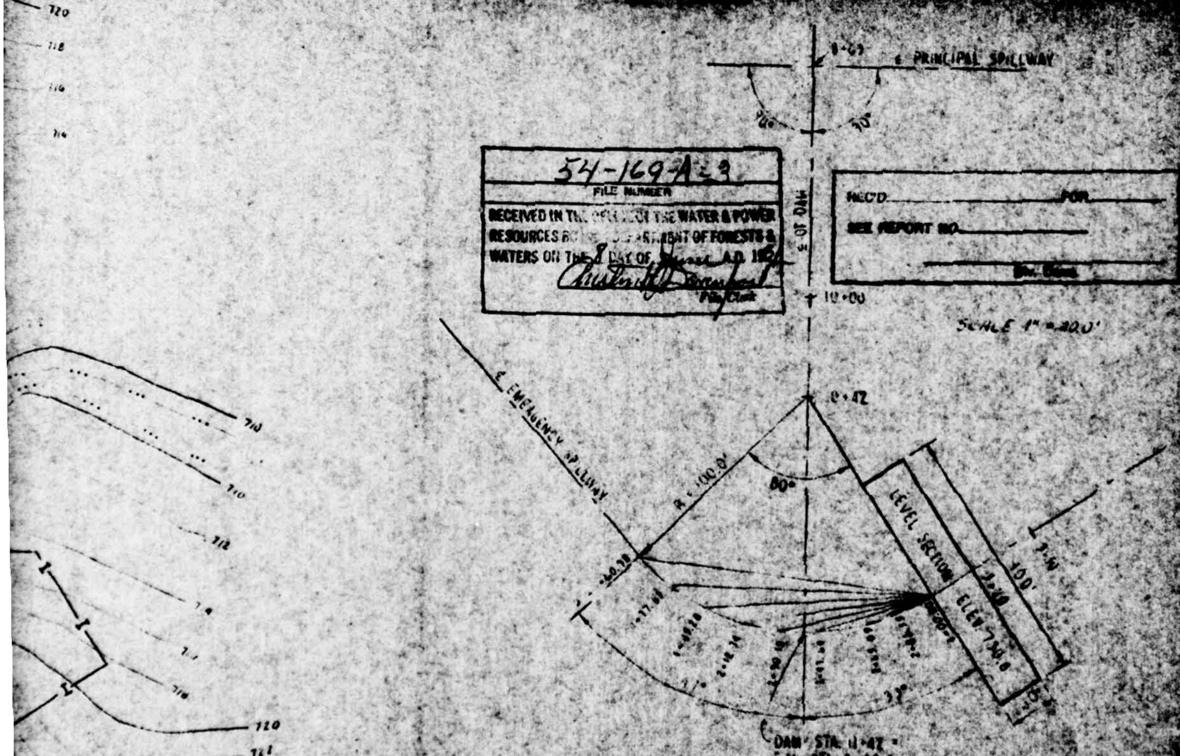
SEDIMENT POOL ELEV 710.0

LEGEND

- DRILL HOLE
- TEST PIT
- BENCH MARK
- REF. PT.
- STREAM
- PROPERTY LINE
- DESIGN HIGH WATER EL 733.0
- SEDIMENT POOL ELEV 710.0
- FENCE

SCALE 1" = 100'

STATION	DEFLECTION ∠	CHORD DIST.	CURVE DATA
3+00	0° 0'	0	R = 100'
2+82.57	5° 0'	17.43	∆ = 80°
2+65.09	10° 0'	17.43	T = 83.91'
2+47.66	15° 0'	17.43	E = 30.54'
2+30.23	20° 0'	17.43	M = 23.40'
2+12.80	25° 0'	17.43	C = 128.56'
1+95.37	30° 0'	17.43	LC = 139.62'
1+77.93	35° 0'	17.43	[illegible] = 3+00
1+60.38	40° 0'	17.43	PT = 1+60.38

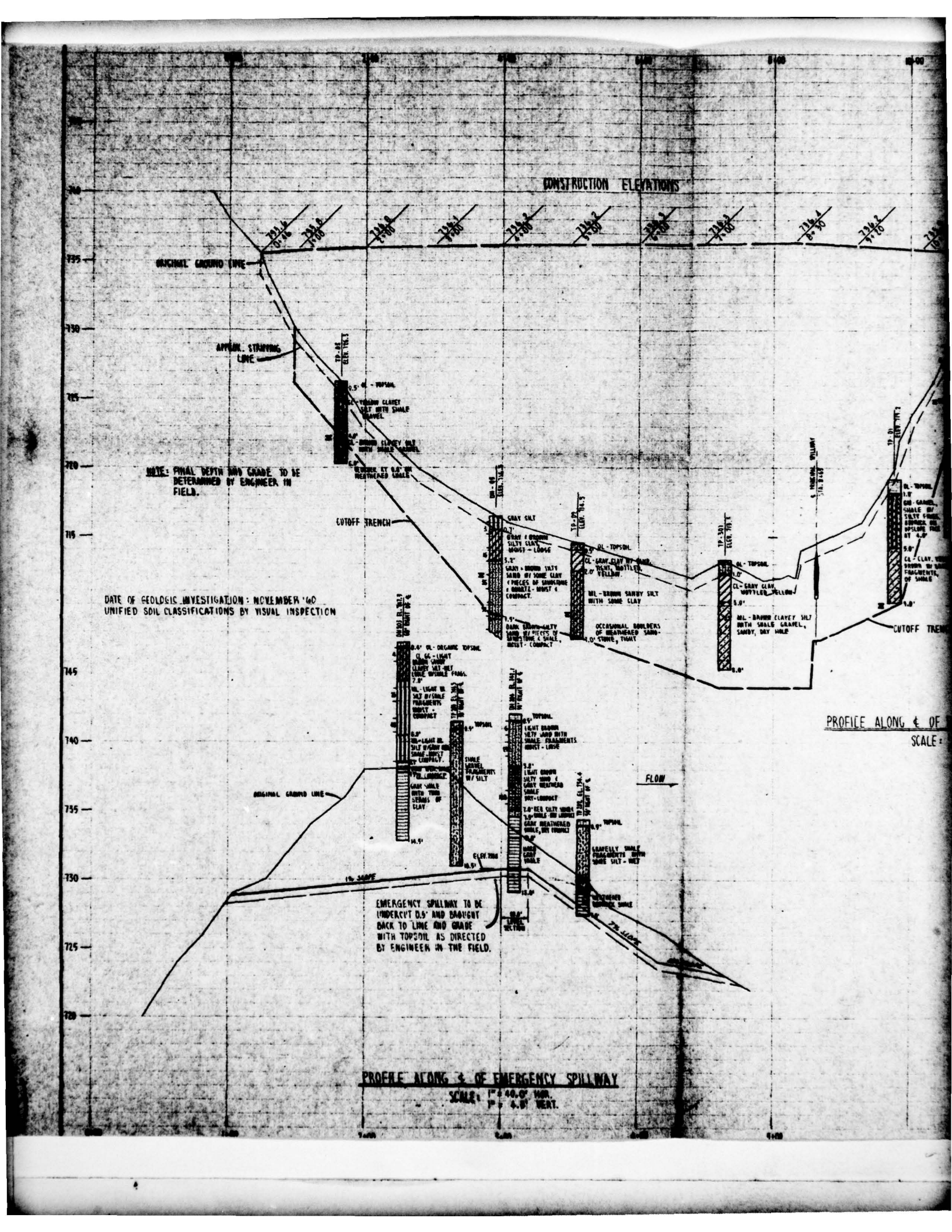


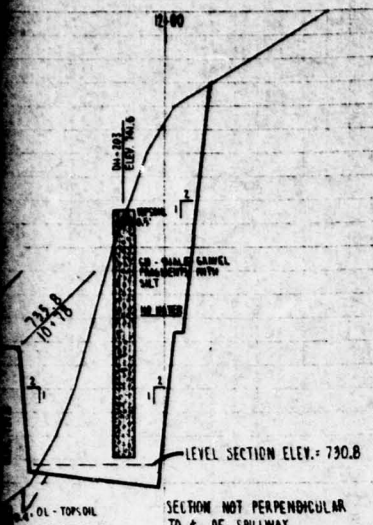
LAYOUT OF EMERGENCY SPILLWAY
& PRINCIPAL SPILLWAY

LITTLE SCHUYLKILL RIVER
WATERSHED PROJECT
SCHUYLKILL, CARBON [illegible]
FLOODWATER [illegible]
U.S. DEPARTMENT OF [illegible]
SOIL CONSERVATION [illegible]

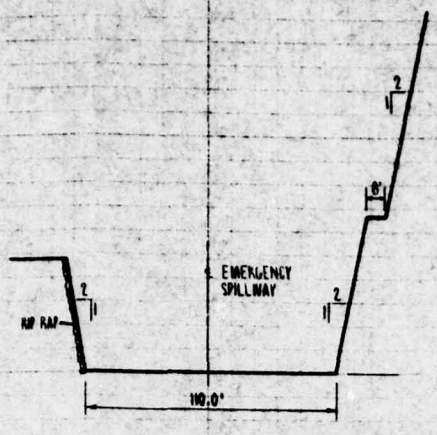
PA. 668
PLATE III

2

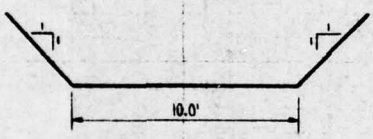

CONSTRUCTION ELEVATIONS
ORIGINAL GROUND LINE
APPROX. STRIPPING LINE
NOTE: FINAL DEPTH AND GRADE TO BE DETERMINED BY ENGINEER IN FIELD.
CUTOFF TRENCH
DATE OF GEOLOGIC INVESTIGATION: NOVEMBER '60
UNIFIED SOIL CLASSIFICATIONS BY VISUAL INSPECTION
PROFILE ALONG ℄ OF
SCALE:
ORIGINAL GROUND LINE
FLOW
1% SLOPE
EMERGENCY SPILLWAY TO BE UNDERCUT 0.5' AND BROUGHT BACK TO LINE AND GRADE WITH TOPSOIL AS DIRECTED BY ENGINEER IN THE FIELD.
PROFILE ALONG ℄ OF EMERGENCY SPILLWAY
SCALE: 1" = 40.0' HOR.
1" = 4.0' VERT.



SECTION NOT PERPENDICULAR TO ℄ OF SPILLWAY



TYPICAL SECTION OF EMERGENCY SPILLWAY



TYPICAL SECTION OF CUTOFF TRENCH

AM (LOOKING DOWNSTREAM)
= 80.0' HOR.
= 4.0' VERT.

54-169A-4
FILE NUMBER

RECEIVED IN THE OFFICE OF THE WATER & POWER RESOURCES BOARD, DEPARTMENT OF FORESTS & WATERS ON THE 8th DAY OF [illegible] A.D. 19[illegible]

File Clerk

REC'D _____ FOR _____

SEE REPORT NO. _____

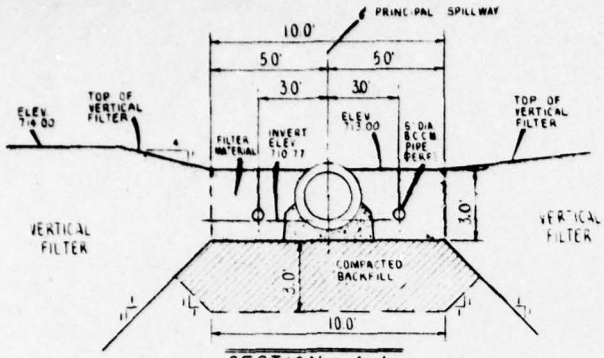
Div. Dams

LITTLE SCHUYLKILL RIVER
WATERSHED PROJECT
SCHUYLKILL, CARBON AND BERKS COUNTIES, PENNSYLVANIA
FLOODWATER RETARDING DAM PA-425
SCHUYLKILL COUNTY
PROFILES

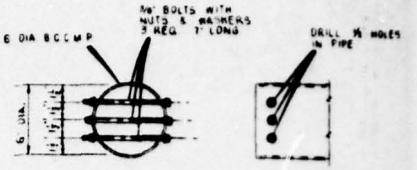
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	Date	Approved by
J.V. RISZDORFER	MAY '61	Title
Drawn		
W.H. MORGAN	MAY '61	Title
Traced		
Checked		Sheet No. 4
S.F. BASSLER	MAY '61	Drawing No. PA-425-P

PA. 668
PLATE IV 2

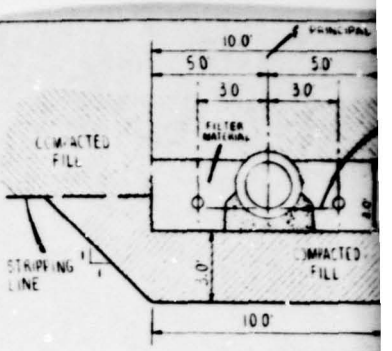


SECTION A-A

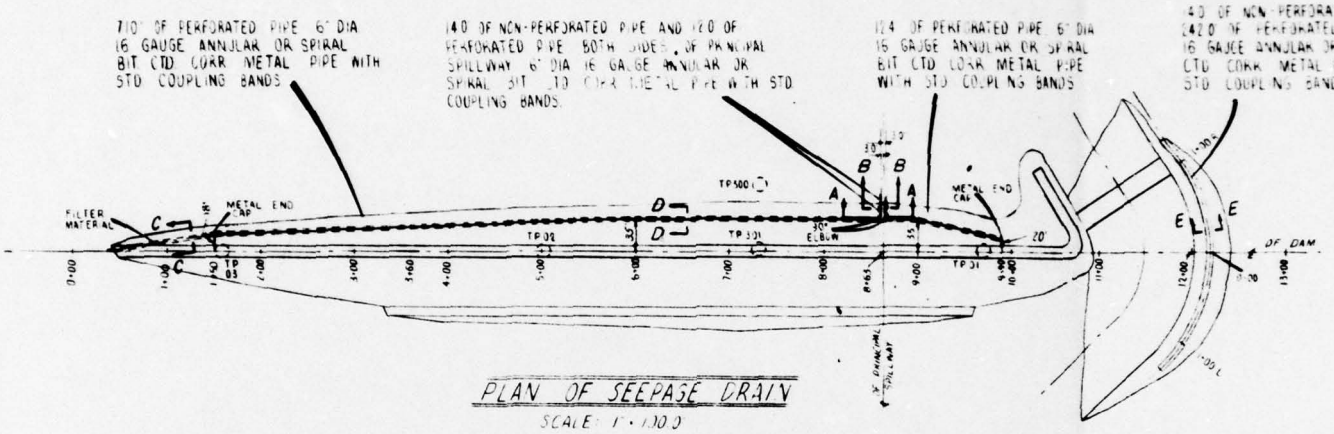


DETAILS OF SMALL ANIMAL GUARDS

3 REQUIRED SCALE: 1" = 1'-0"



SECTION B-B

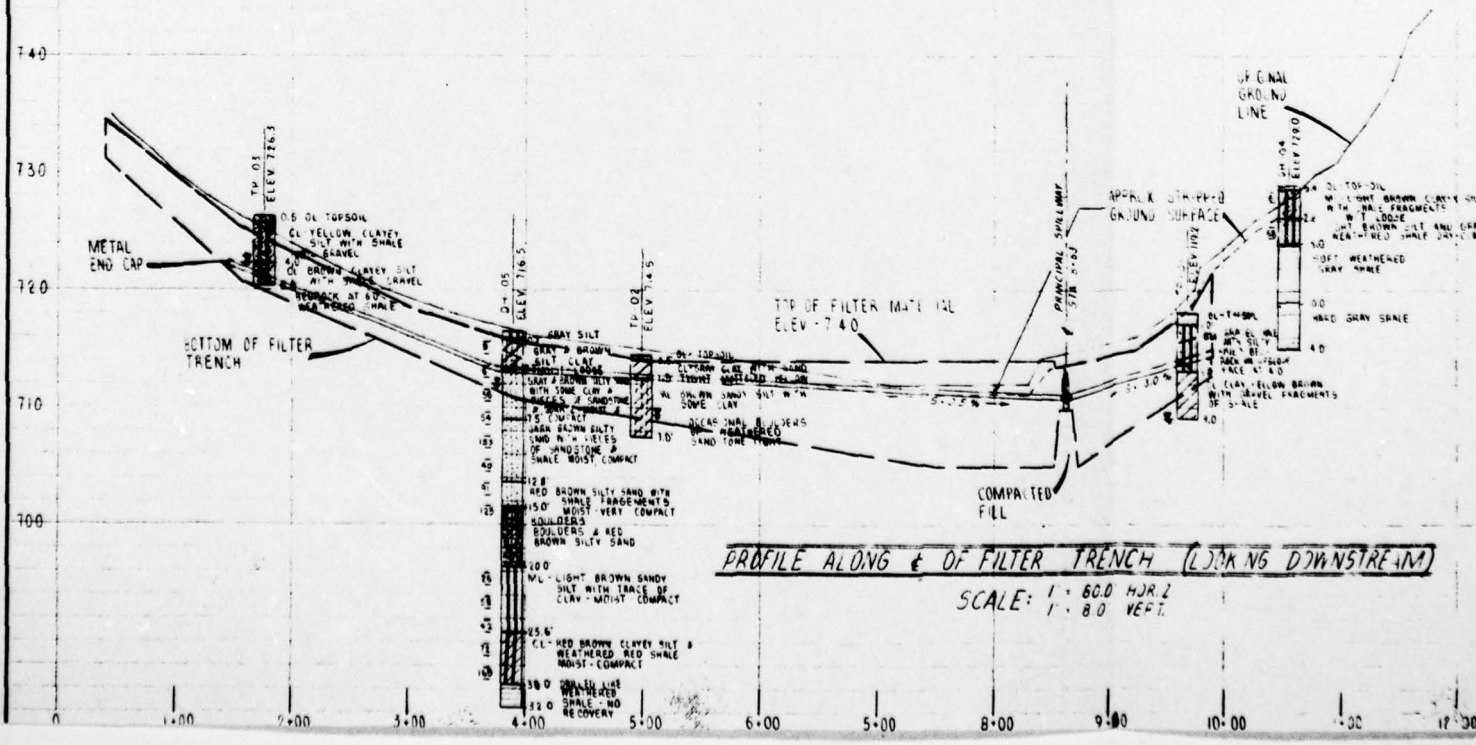


PLAN OF SEEPAGE DRAIN

SCALE: 1" = 100'

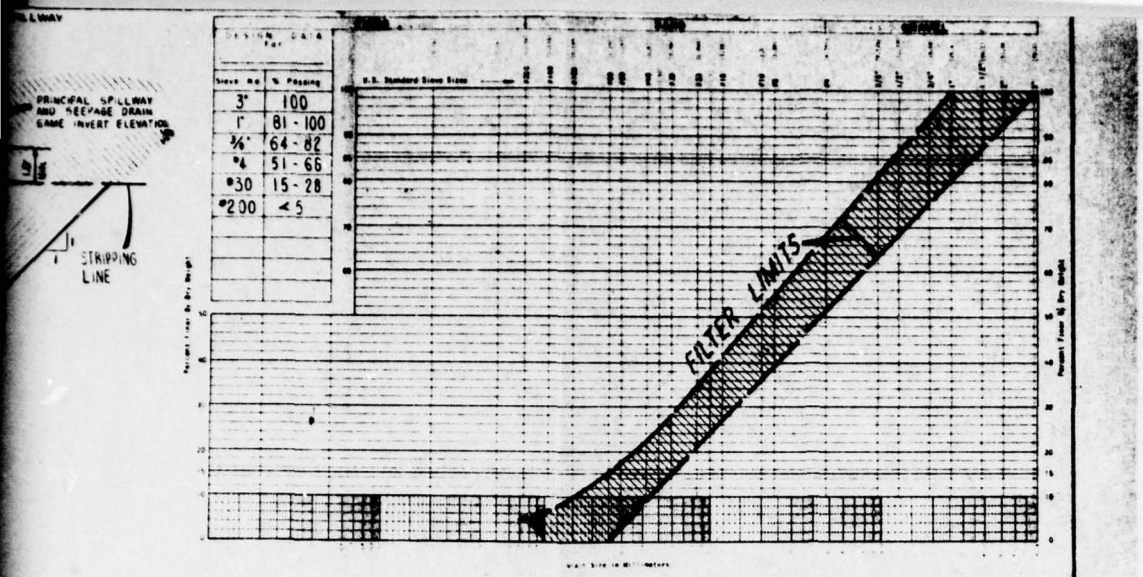
SECTION

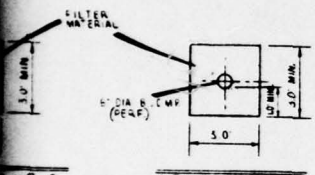
NOTE:
EXACT LOCATION OF BOTTOM OF FILTER TRENCH TO BE DETERMINED BY ENGINEER IN FIELD.



PROFILE ALONG ℄ OF FILTER TRENCH (LOOKING DOWNSTREAM)

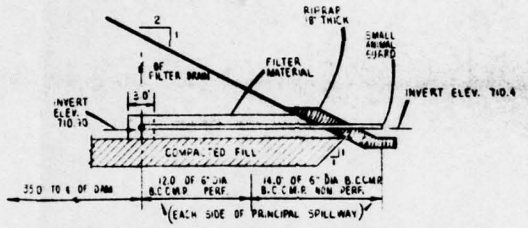
SCALE: 1" = 60.0' HOR.
1" = 8.0' VERT.





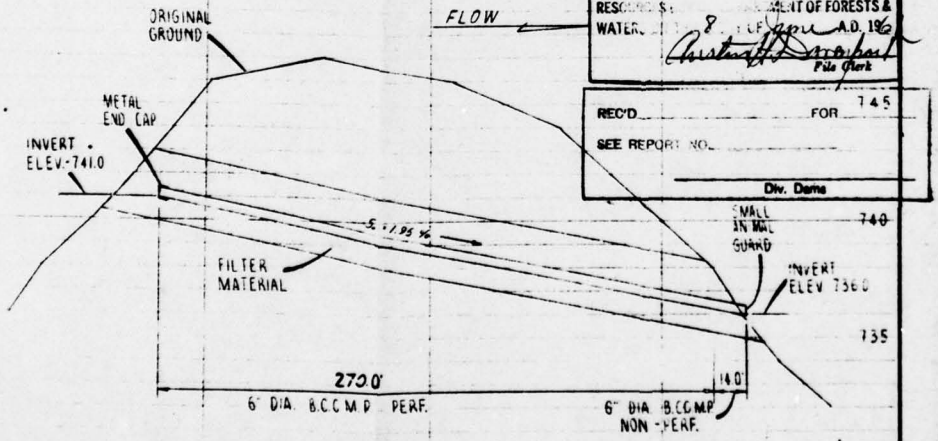
C-C

SECTION D-D



SECTION ALONG ℄ OF OUTLET PIPE

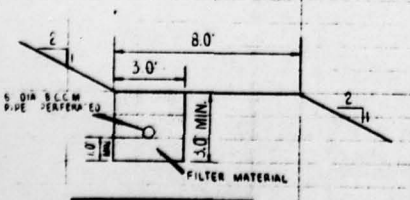
SCALE 1" = 10.0



SECTION ALONG ℄ OF EMERGENCY SPILLWAY DRAIN PIPE

SCALE: 1" = 40.0' HORIZ.
1" = 4.0' VERT.

2+70 L | 1+00 L | 0 | 1+00 R



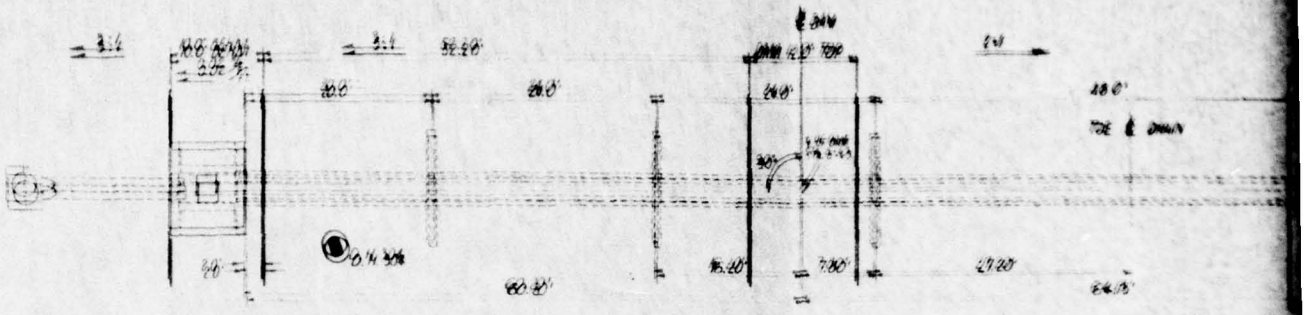
SECTION E-E

LITTLE SCHUYLKILL RIVER
WATERSHED PROJECT
SCHUYLKILL, CARBON AND BERKS COUNTIES, PENNSYLVANIA
FLOODWATER RETARDING DAM PA-425
SCHUYLKILL COUNTY
SEEPAGE DRAIN DETAILS

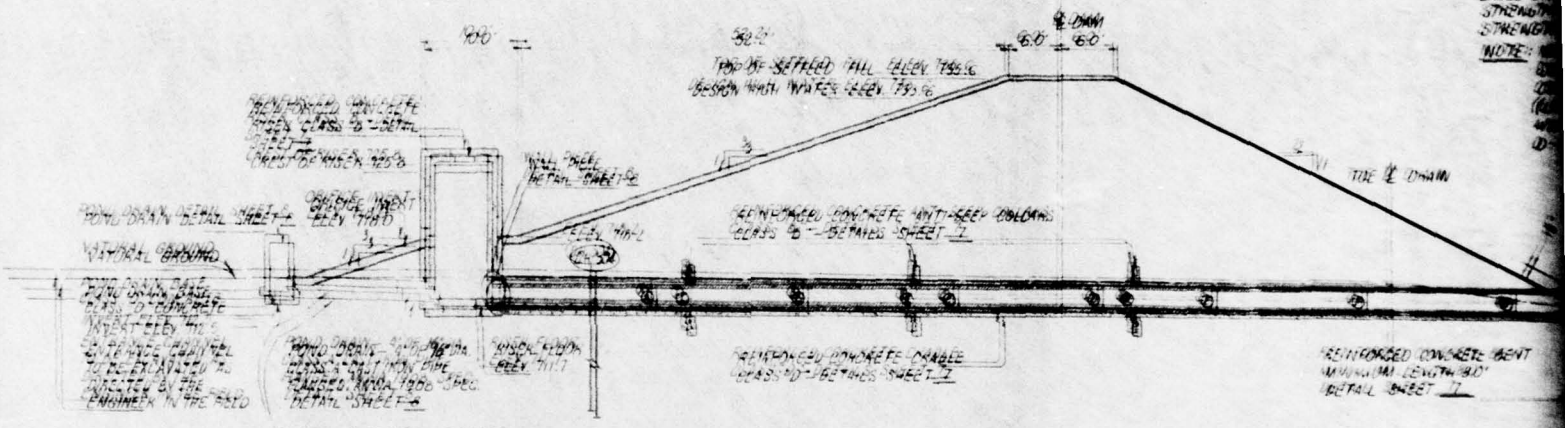
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	Date	Approved by	Title
J V RISZDORFER	MAY '61		
Drawn C. B FORD	MAY '61		
Traced			
Checked ROSSIER	MAY '61	Sheet No. 5 of 9 sheets	Drawing No. PA-425-P

PA. 668
PLATE V 2



PLAN VIEW
SCALE 1"=30'



PROFILE ALONG CENTERLINE OF PRINCIPAL SPILLWAY
& 90° TO DAM CENTERLINE
SCALE HORIZ. 1"=40'

EMBANKMENT SECTION		SOURCE OF MATERIAL			
ZONE OR HOMOGENEOUS AREA	DESCRIPTION	SOIL MATERIAL	TEST HOLE NO.		
1	CORE, CUT-OFF & CENTER SEC.	CL & GC	TH 1, TH 2, TH 3		BL
2	OUTSIDE SHELL	GM & ML	TH 1, TH 2, TH 3		BL

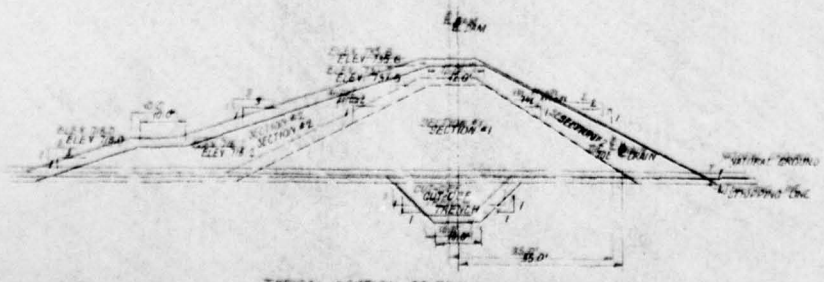
NOTES
1. REMOVE ALL LOOSE MATERIAL & ORGANIC MATERIAL PRIOR UNDER FILL AREAS.
2. FINAL EMBANKMENT & FOUNDATION TREATMENT TO BE DETERMINED IN THE FIELD BY THE ENGINEER

SOILS DATA

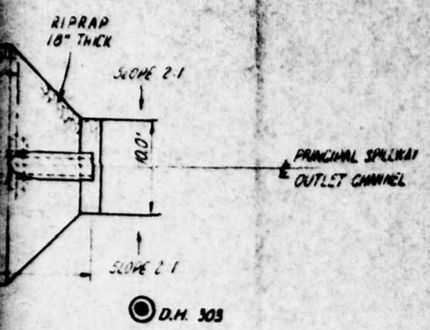
GEOLOGIC INVESTIGATION MADE BY [illegible] INTERPRETATIONS BY [illegible] INSPECTION

DTH 303

DTH 304



TYPICAL SECTION OF FILL SCALE 1"=20'

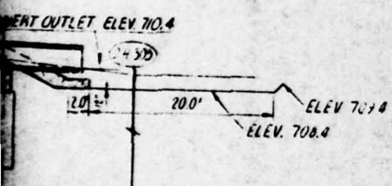


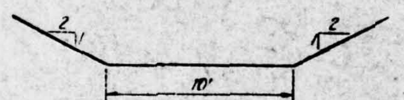
PIPE SECTION	POINT	DISTANCE ... END OF	SLOPE	INVERT ELEV. 24" I.D. PIPE
	[illegible]	[illegible]		[illegible]
1	A	[illegible]	[illegible]	[illegible]
2	B	92.33	[illegible]	[illegible]
3	C	[illegible]	[illegible]	711.[illegible]
4	D	60.33	[illegible]	711.[illegible]
5	E	48.33	[illegible]	[illegible]
6	F	32.33	[illegible]	[illegible]
7	G	16.33	[illegible]	710.[illegible]
8	OUTLET	0.00	[illegible]	710.[illegible]
	I	104.33	X	711.6[illegible]
	II	68.33	X	711.6[illegible]
	III	36.33	X	711.43

NOTE: DIMENSIONS FOR LENGTH OF PIPE ARE BASED ON NOMINAL LENGTHS & DO NOT INCLUDE CREEP.

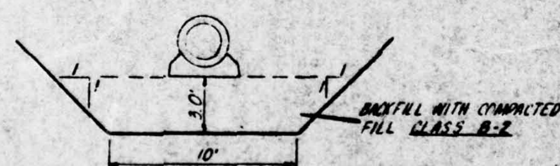
...ORCED CONCRETE WATER PIPE
...CTIONS
...CTION
...CE 12" WALL

...EAD 25 FT. LOAD: 13600 LBS. PER LIN. FT.
...D. OF 24 IN. MIN. 3 EDGE BEARING
...OR 0.001 IN. CRACK - 3261 LBS. PER LIN. FT.
...R 0.01 IN CRACK - 4337 LBS PER LIN. FT.
...PERMISSABLE PIPE & WALL PIECE JOINT
...SION SHALL BE 2 3/4" WITHOUT LOSING
...RESSION IN THE RUBBER GASKET.
... JOINT PIPE COMPANY - EXPANSION JOINT
... JOINT DEPTH - DRAWING NUMBER
...-946 OR EQUIVALENT.)





TYPICAL SECTION OF OUTLET CHANNEL



TYPICAL SECTION OF PRINCIPAL SPILLWAY EXCAVATION

LITTLE SCHUYLKILL RIVER
WATERSHED PROJECT
SCHUYLKILL, CARBON AND BERKS COUNTIES, PENNSYLVANIA
FLOODWATER RETARDING DAM PA-425
SCHUYLKILL COUNTY
PLAN-PROFILE OF PRINCIPAL SPILLWAY

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: JOHN MICALEY	Date: MAY '60	Approved by
Drawn: L. K. BECK	MAY '61	Title
Traced		Title
Checked: J. V. KRIZ...	MAY '61	PA-425 ...

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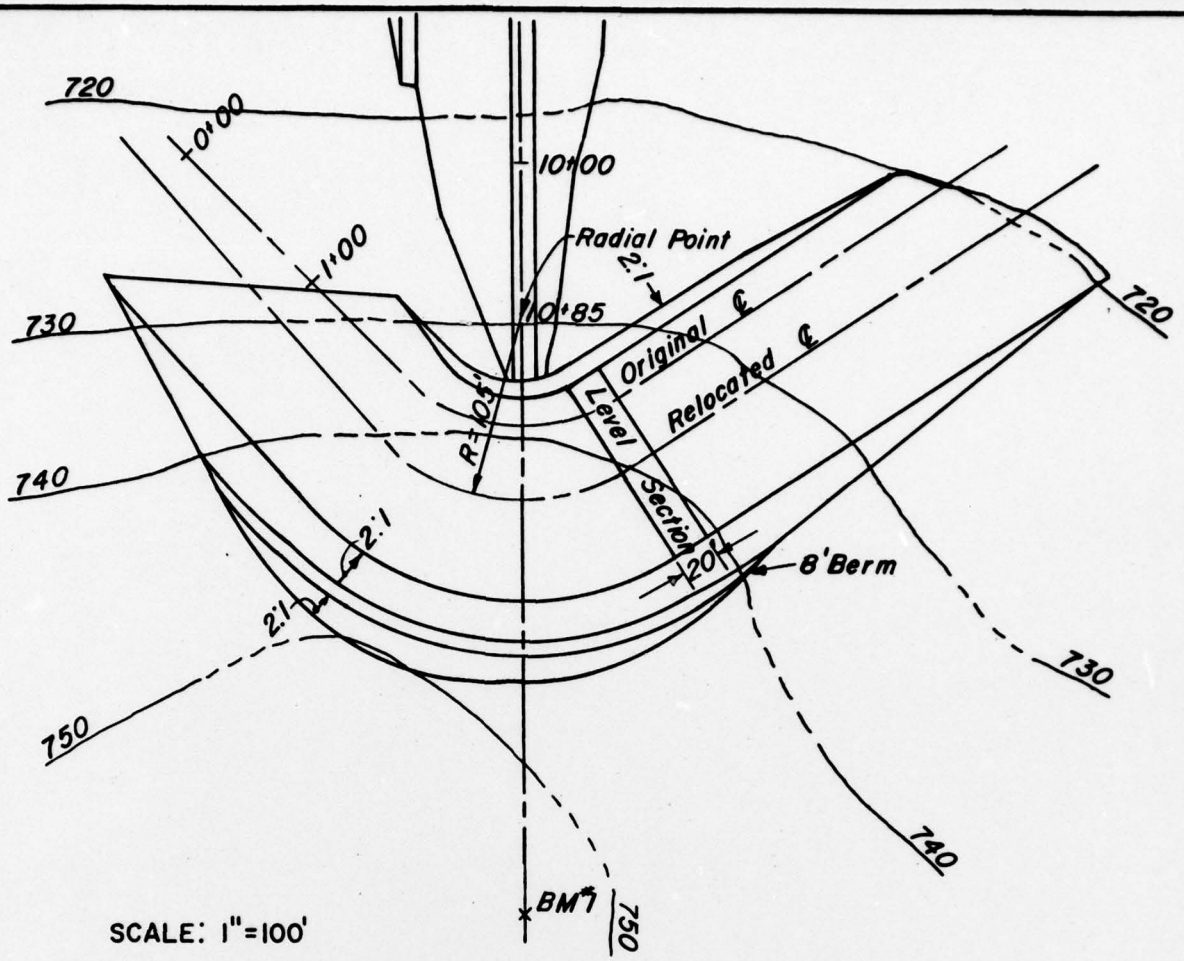
PLATE VI

2



EMERGENCY SPILLWAY RELOCATION

REVISIONS TO DRAWING PA-425 P (SHEET 3 OF 9)

NOTES:

1. *Dike & Rip Rap Shown on Original Drawing Have Been Deleted.*
2. *Dimensions, Elevations And Grades OF Spillway Same As Original Drawing.*
3. *Details Of Perforated Drain Same As On Original Drawing.*

Approved Paul E. Nylander
State Cons. Engr.

By G.V.B.
19 Jan. 62

Traced By Berger Assoiates
June, 1979

PA.-668
PLATE-VII