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NATIONAL DAM INSPECTION PROGRAM. WOLFF FARM DAM, NDI NUMBER PA-...ETC(U)
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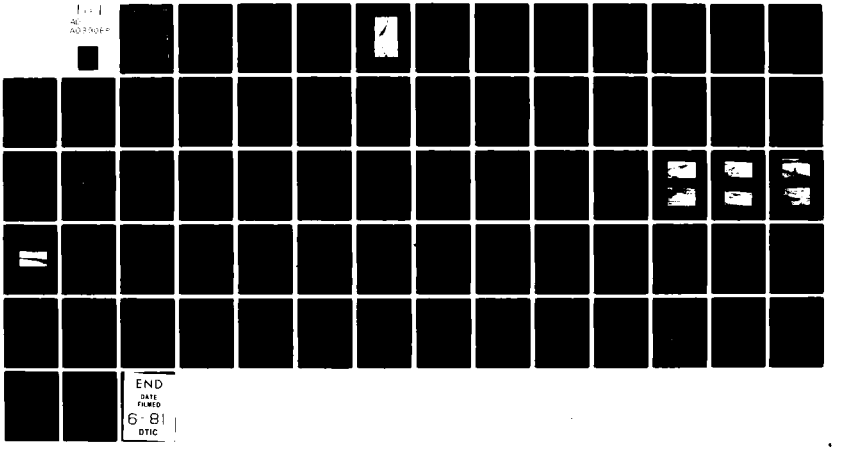

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SUSQUEHANNA RIVER BASIN
WOLFF FARM DAM
PETERS ORCHARDS COMPANY

NDI NO. PA-01115
DER NO. 21-179

CUMBERLAND COUNTY, PENNSYLVANIA

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DACW31-81-C-0013

PREPARED FOR

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

BY
Berger Associates
Harrisburg, Pennsylvania 17105

APRIL 1981

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: WOLFF FARM DAM

State & State No.: PENNSYLVANIA, 21-179

County: CUMBERLAND

Stream: TRIBUTARY TO HUNTERS RUN

Date of Inspection: October 16, 1980

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

In accordance with the Corps of Engineers' evaluation guidelines, the size classification of this dam is small and the hazard classification is significant. These classifications indicate that the Spillway Design Flood (SDF) should be in the range of the 100 year frequency to one-half the Probable Maximum Flood (PMF). The recommended SDF for this structure is the 100 year frequency. The spillway capacity is sufficient for passing this peak inflow without overtopping the dam. The spillway, therefore, is considered to be adequate.

The following recommendations are presented for immediate action by the owner:

1. That the downstream slope be mulched and provided with a dense protective cover.

2. That the source of the subsidence over the 12-inch outlet pipe be identified and corrected.

3. That the dumped rock at the outlet pipe be rearranged to provide an unobstructed discharge.

4. That the discharge channel of the emergency spillway be directed away from the downstream embankment slope or provided with protective cover to prevent erosion.

5. That a method be developed for closure in an emergency of the upstream end of the 6-inch drawdown pipe.

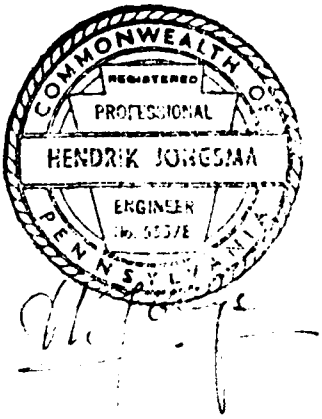
6. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.

7. That an operation and maintenance manual be prepared for guidance in the operation of the dam during normal and emergency conditions, and that a schedule be developed for the annual inspection of the dam and its appurtenant structures.

SUBMITTED BY:

BERGER ASSOCIATES, INC.
HARRISBURG, PENNSYLVANIA

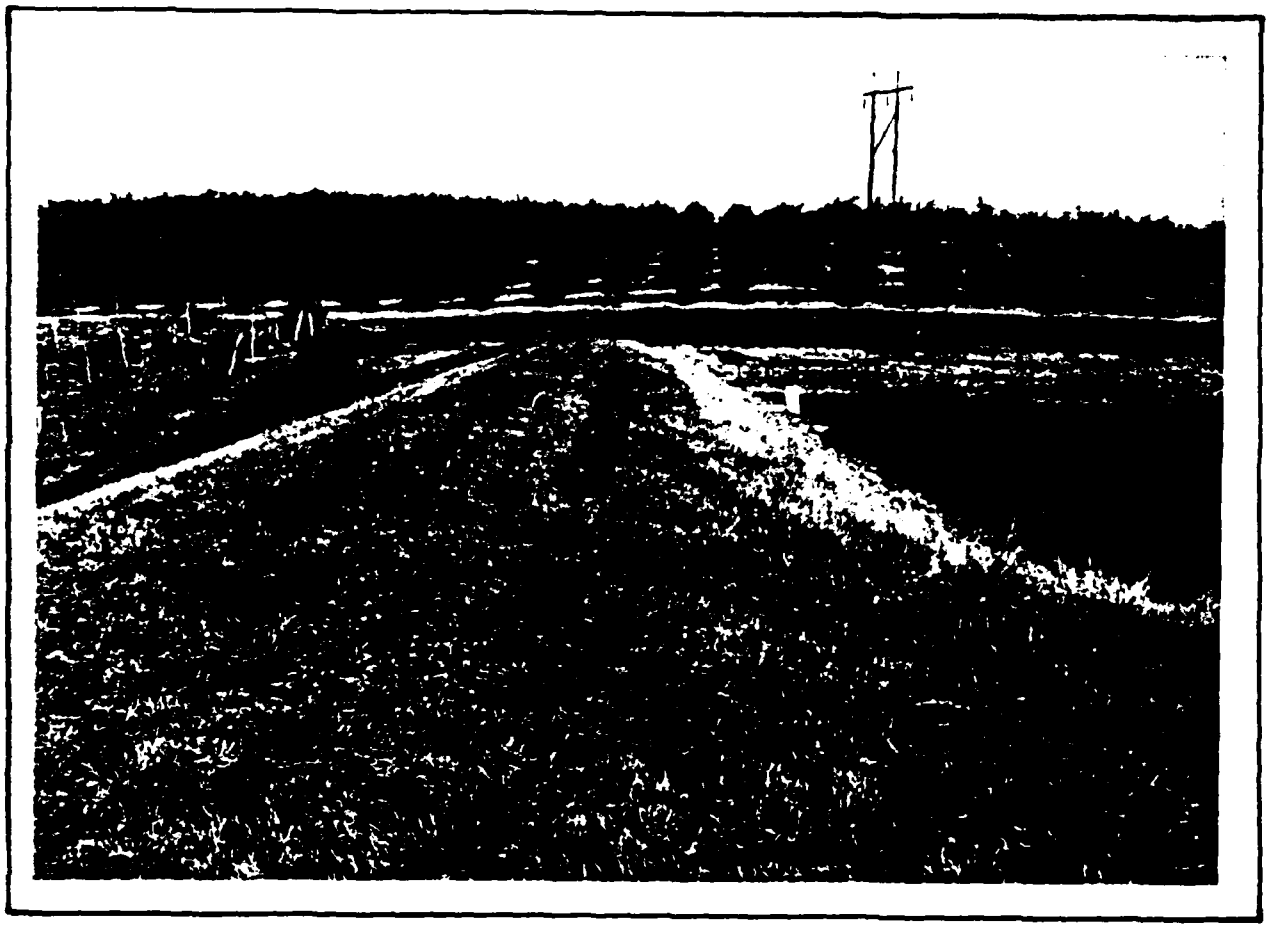
DATE: April 3, 1981



APPROVED BY:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

DATE: 21 MAY 81



OVERVIEW

WOLFF FARM DAM

Photograph No. 1

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

WOLFF FARM DAM

NDI NO. PA-01115
DER NO. 21-179

SECTION 1 - 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 of this inspection is to determine if the dam constitutes a hazard to human life and property.

1.2 DESCRIPTION OF PROJECT

A. Description of Dam and Appurtenances

Note: Normal pool elevation was estimated from the U.S.G.S. Quadrangle sheet at elevation 795.0. This elevation is used in this report as the top of the principal spillway (Photograph No. 6).

Wolff Farm Dam is an earthfill structure with a maximum embankment height of about 28 feet. The reservoir is used for irrigation purposes and is located on an orchard farm. The length of the embankment is about 390 feet.

The principal spillway is an 18-inch vertical drop inlet pipe with a 12-inch outlet pipe. An emergency spillway is located in the right abutment. It is a grass lined channel with a bottom width of 21 feet and a crest elevation at .4 feet above the principal spillway. A swale is located beyond the left abutment with a crest elevation of 1.4 feet above the principal spillway and .6 feet below the low point in the dam profile. There is a 6-inch drawdown pipe extending through the embankment near the center of the dam. This pipe has a downstream control valve. It is also used for irrigation purposes.

B. Location: South Middleton Township, Cumberland County
U.S.G.S. Quadrangle - Mt. Holly Springs, Pa.
Latitude 40°-04.0', Longitude 77°-10.3'
Appendix E, Plates I & II

C. Size Classification: Small: Height - 28 feet
Storage - 95 acre-feet

D. Hazard Classification: Significant (refer to Section 3.1.E.)

E. Ownership: Peters Orchards Company
Mr. John F. Peters
R.D. #1
Gardners, PA 17324

F. Purpose: Irrigation

G. Design and Construction History

The dam was designed by the owner with assistance from the local Soil Conservation Service office. Drawings were not prepared for these facilities. The contractor was John Walters, Newville, Pennsylvania, and the year of construction was 1966.

H. Normal Operating Procedures

The 6-inch pipe is used regularly during the growing season for irrigation water supply. All inflow above the normal pool is discharged through the principal spillway and the emergency spillway.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

From files:	N.A.
Computed for this report:	0.16

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

Maximum known flood (estimated from records of U.S.G.S. gage on nearby Conococheaque Creek)	25
Outlet works at low pool Elev. 775	1.0
Outlet works at pool Elev. 795	1.8
Principal spillway capacity at pool Elev. 797 (low point of dam)	8

Emergency spillway capacity at pool Elev. 797	116
Emergency spillway swale capacity at pool Elev. 797	35
Total discharge capacity at pool Elev. 797	159

C. Elevation (feet above mean sea level)

Top of dam (low point)	797
Top of dam (design crest)	Unknown
Principal spillway crest	795
Emergency spillway crest	795.4
Upstream portal invert (estimated)	769
Downstream portal invert	766
Streambed at downstream toe of dam (estimate)	769

D. Reservoir (miles)

Length of normal pool (Elev. 795)	0.1
Length of maximum pool (Elev. 797)	0.1

E. Storage (acre-feet)

Spillway crest (Elev. 795)	81
Top of dam (Elev. 797)	95

F. Reservoir Surface (acres)

Spillway crest (Elev. 795)	6.4
Top of dam (Elev. 797)	7.3

G. Dam

Refer to Plates A-I and A-II in Appendix A for schematic plan and section.

Type: Earthfill.

Length: 390 feet.

Height: 28 feet.

Top Width: Design - Unknown; Survey - 10 feet.

Side Slopes:

	Design	Surveyed
Upstream	Unknown	3.5H to 1V
Downstream	Unknown	2.85H to 1V

Zoning: Unknown. A clay blanket was placed upstream after construction was completed to reduce leakage.

Cutoff: Unknown.

Grouting: None.

H. Outlet Facilities

Type: 6" diameter cast iron pipe.

Closure: Valve on downstream end.

Downstream Invert Elevation: 766

Location: *Near center of dam.*

I. Spillway

Principal

Type: 18" diameter CMP drop inlet.

Outlet: 12" diameter CMP.

Location: Near center of dam.

Crest Elevation: 795

Invert Elevation: 792

Emergency

Type: Uncontrolled, sod lined, broad crested weir.

Width: 21' on bottom with side slopes of 2.5H:1V on right and 4.7H:1V on left.

Crest
Elevation: 795.4

Location: Right abutment.

Swale

Type: Uncontrolled, sod lined, broad crested weir.

Width: 60'±

Crest
Elevation: 796.4

Location: Left abutment.

J. Regulating Outlets

See section 3.1.H. above.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Engineering design data for Wolff Farm Dam does not exist. The owner stated that the general layout for the dam and its appurtenant structure were laid out by himself with assistance of the local office of the Soil Conservation Service. Drawings were not prepared for the facilities. It is unknown what the original design dam crest elevation was.

2.2 CONSTRUCTION

The dam was constructed in 1966. The contractor was John Walters, Newville, Pennsylvania. Records of construction do not exist. The owner stated that borrow material was obtained from the reservoir area. Original construction did not include the principal spillway.

2.3 OPERATION

Records of operation are not maintained by the owner. Seepage through the embankment fill occurred shortly after completion. A clay blanket was installed on the upstream slope. Maximum pool levels have not been recorded. An unreported amount of damage of the downstream slope occurred during the Agnes storm (June 1972) in the area of the waste channel of the emergency spillway. To reduce flow through this spillway, the owner installed the principal spillway. The inlet elevation is about 0.4 feet below the crest of the emergency spillway. The inlet consists of an 18-inch drop inlet pipe and discharges through a 12-inch corrugated metal pipe. This 12-inch pipe was located in a shallow trench excavated through the embankment.

2.4 EVALUATION

A. Availability

Engineering design and construction data do not exist.

B. Adequacy

Because of the lack of engineering data, the assessment of the dam is based on visual inspection only.

C. Operating Records

Operating records have not been maintained.

D. Post Construction Changes

Post construction changes reported by the owner consisted of the placement of an upstream blanket in the reservoir and the installation of the principal spillway.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

A. General

The general appearance of Wolff Farm Dam is good. The embankment appears to be well maintained, although the downstream slope has only a sparse cover of weeds. The principal spillway is an 18-inch drop inlet constructed after the embankment was completed.

The visual inspection check list and sketches of the general plan and profile of the dam, as surveyed during the inspection, are presented in Appendix A of this report. Photographs of the facilities taken during the inspection are reproduced in Appendix C.

Mr. John F. Peters, the owner, accompanied the inspectors on the day of inspection.

B. Embankment

The dam is located in a rather flat area with a nearly level area beyond its left abutment and a gentle slope at its right abutment. The reservoir was 3.5 feet below its normal pool elevation at the time of the inspection. There were no indications of seepage or slope instability.

The exposed upstream slope below normal pool level is about 3.5H to 1V. The crest of the dam is on a straight alignment and has a well maintained grass cover. The surveyed profile (Plate A-II, Appendix A) indicates about half a foot variation in elevation along the crest and a low swale beyond the left abutment. This swale has a good grass cover and can be used as an overflow section. The downstream slope is uniform with a sparse growth of mowed weeds (Photographs No. 4 and No. 7). The exposed embankment surface consists of a sandy soil and could be easily eroded if overtopping would occur. A small subsidence area was noticed near the downstream toe over the 12-inch principal spillway outlet pipe. It is possible that a leak exists in the outlet pipe in this area and is the source of the settlement.

C. Appurtenant Structures

The principal spillway consists of an 18-inch drop inlet pipe which discharges through a 12-inch corrugated metal pipe (Photograph No. 6). This spillway was installed after the 1972 Agnes storm to reduce the flow through the grassed spillway in the right abutment. The outlet pipe was constructed close to the surface through the embankment (Photograph No. 7). The pipe daylights at the downstream toe. To prevent erosion, heavy riprap has been placed over the outlet, reducing

the effectiveness of the discharge. The original spillway, which is now the emergency spillway, is located in the right abutment and is a grassed earth channel. The approach is directly from the reservoir. The approach to the weir and the abutments are in good condition and are adequately protected for erosion, except where vehicles have caused some tracks. The discharge channel is situated along the downstream embankment slope, and it appears that erosion can occur in this area. It is recommended that the flow be directed away from the slope, or that adequate protection against erosion be provided.

The swale near the left abutment appears to be sufficiently protected for the amount of flow that is expected until the dam is overtopped.

A 6-inch drawdown line was installed near the bottom of the embankment fill. This line is open at the upstream end and has a valve at the downstream toe. The valve is located in a small valve pit (Photograph No. 7) and is used for irrigation purposes.

D. Reservoir Area

The area surrounding the reservoir has flat slopes (Photograph No. 8) and is cultivated land, mostly orchards. Because of the gentle slopes in these areas, sedimentation does not appear to be a problem. There is a small farm pond about 1,500 feet upstream from the dam under consideration.

E. Downstream Channel

The immediate downstream channel is a grassed swale which eventually enters into a wooded area. One house is located near the stream, about 1,000 feet downstream from the dam. A potential hazard to life exists downstream if the dam fails; however, the probable loss of lives would be less than a few. The hazard category for the Wolff Farm Dam is therefore considered to be "Significant."

3.2 EVALUATION

The overall visual evaluation of the facilities indicates that the Wolff Farm Dam is in good condition. However, it is strongly recommended that the downstream slope be provided with a more stable cover. The discharge through the emergency spillway should be directed away from the embankment and the source of the settlement over the 12-inch outlet pipe should be identified and the condition corrected.

The rock protection at the outlet pipe should be rearranged so as not to block the open end of the pipe.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

Wolff Farm Dam was constructed for irrigation purposes. The need for irrigation of orchards is generally in spring and summer. All inflow is stored until pool level reaches the crest of the principal spillway. Operational procedures are limited to opening the valve on the 6-inch pipe when required for irrigation.

4.2 MAINTENANCE OF DAM

The crest and downstream slope of the embankment are mowed regularly. Reseeding of the surfaces has not occurred.

4.3 MAINTENANCE OF OPERATING FACILITIES

The only operating facility is the valve in a valve pit. This valve is used regularly during the early growing season.

4.4 WARNING SYSTEM

There is no formally organized surveillance and downstream warning system in existence at the present time.

4.5 EVALUATION

The operational procedures for Wolff Farm Dam are minimal. It is recommended that the maintenance of the dam should include the reseeding of the downstream slope to provide adequate protection against erosion.

A formal surveillance plan and downstream warning system should be developed for implementation during periods of heavy or prolonged precipitation.

SECTION 5 - HYDROLOGY/HYDRAULICS

5.1 EVALUATION OF FEATURES

A. Design Data

Hydrologic and hydraulic analysis for Wolff Farm Dam does not exist.

B. Experience Data

There are no records of flood levels at Wolff Farm Dam. Based on records of the U.S.G.S. stream gage on Concocheaque Creek at nearby Fayetteville, Pennsylvania, the maximum inflow to Wolff Farm Dam during the 1972 flood is estimated to be 25 cfs. A small amount of erosion was reported to have occurred at the spillway discharge channel.

C. Visual Observations

It was noted that a natural shallow swale is located near the left abutment. The high point of this swale is at elevation 796.4, 1.4 feet above the principal spillway crest and 1.0 feet above the emergency spillway crest. Flow through this area was included in the discharge capacity calculations (Appendix D). This swale, beyond the left abutment, directs the flow away from the abutment. Discharge through the emergency spillway could erode the downstream slope. Improved protection of the slope is required.

No other conditions were observed that would indicate that the appurtenant structures of the dam could not operate satisfactorily until the dam is overtopped. A small dam is located a short distance upstream of Wolff Farm Dam. This impoundment is included in the calculations contained in Appendix D.

D. Overtopping Potential

Wolff Farm Dam has a total storage capacity of 95 acre-feet and an overall height of 28 feet above streambed. These dimensions indicate a size classification of "Small." The hazard classification is "Significant" (see Section 3.1.E.).

The recommended Spillway Design Flood (SDF) for a dam having the above classifications is in the range of the 100 year flood to one-half the Probable Maximum Flood (PMF). Because of the small size of the dam and small downstream population, the recommended SDF is the 100 year flood. For this dam, the SDF peak inflow is 249 cfs (see Appendix D for HEC-1 inflow computations).

Comparison of the estimated SDF peak inflow of 249 cfs with the estimated spillway discharge capacity of 159 cfs indicates that a potential for overtopping of the Wolff Farm Dam exists.

An estimate of the storage effect of the reservoir and routing of the computed inflow hydrograph through the reservoir shows that this dam has the necessary storage available to pass the SDF without overtopping. The spillway-reservoir system can pass the SDF with about 0.3' of freeboard, based on the existing low point in the dam profile and including flow through the low swale in the left abutment.

E. Spillway Adequacy

Calculations show that the spillway discharge capacity and reservoir storage capacity, based on the present low point in the dam profile, combine to pass the SDF without overtopping (refer to Appendix D). The spillway, therefore, is considered 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 of Wolff Farm Dam did not detect any signs of seepage through the embankment or through the foundation. The embankment slopes were stable, without indications of sloughs or slides. A possible break in the 12-inch outlet pipe has caused a small cave-in or washout near the downstream slope. In order to maintain a stable downstream slope, additional cover is required on the exposed sandy soil.

2. Appurtenant Structures

The principal spillway was constructed after completion of the dam. The subsidence over the principal spillway outlet pipe could be the source of future problems and should be identified and corrected. The rock dumped over the outlet should be rearranged to open the end of the pipe. Realignment of the discharge channel of the emergency spillway away from the downstream slope, or a good protective cover of the downstream slope is considered necessary to prevent erosion of the embankment.

B. Design and Construction Data

Design and construction data for this dam do not exist. The visible embankment material appears to be sandy interspersed with small stones. The owner stated that a clay blanket was placed on the upstream slope to reduce or prevent seepage that occurred when the reservoir was first filled. This installation apparently has been successful since there has been no reported seepage since that time.

C. Operating Records

Operating records for this dam have not been maintained by the owner. The owner stated that seepage occurred after construction was completed but has been corrected. The original dam was provided with the present emergency spillway as the only outlet. Washouts occurred during the Agnes storm.

D. Post Construction Changes

A clay blanket was installed on the upstream slope and the principal spillway was constructed after completion of the dam.

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 indicates that Wolff Farm Dam is in good condition. The embankment appears to be stable, although the downstream slope requires additional vegetative cover to protect against erosion.

The hydrologic and hydraulic computations indicate that the combination of storage capacity and the discharge of the spillways are sufficient to pass the 100 year flood, the recommended SDF, without overtopping. The spillways are considered to be adequate.

B. Adequacy of Information

The visual inspection is considered to be sufficiently adequate for making a reasonable assessment of this dam.

C. Urgency

The recommendations presented below should be implemented immediately.

D. Additional Studies

Additional studies are not required at this time.

7.2 RECOMMENDATIONS

In order to assure the continued satisfactory operation of this dam, the following recommendations are presented for implementation by the owner:

1. That the downstream slope be mulched and provided with a dense protective cover.

2. That the source of the subsidence over the 12-inch outlet pipe be identified and corrected.

3. That the dumped rock at the outlet pipe be rearranged to provide an unobstructed discharge.

4. That the discharge channel of the emergency spillway be directed away from the downstream embankment slope or provided with a protective cover to prevent erosion.

5. That a method be developed for closure in an emergency of the upstream end of the 6-inch drawdown pipe.

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

7. That an operation and maintenance manual be prepared for guidance in the operation of the dam during normal and emergency conditions, and that a schedule be developed for the annual inspection of the dam and its appurtenant structures.

APPENDIX A

CHECK LIST OF VISUAL INSPECTION REPORT

CHECK LIST

PHASE I - VISUAL INSPECTION REPORT

PA DER # 21-179 NDI NO. PA-01115

NAME OF DAM Wolff Farm Dam HAZARD CATEGORY Significant

TYPE OF DAM Earthfill.

LOCATION South Middleton TOWNSHIP Cumberland COUNTY, PENNSYLVANIA

INSPECTION DATE 10/16/80 WEATHER Sunny TEMPERATURE 50's

INSPECTORS: H. Jongsma (Recorder) OWNER'S REPRESENTATIVE(s):

D. Shireman John F. Peters

A. Bartlett

J. Watson

NORMAL POOL ELEVATION: 795.0 (Estimated USGS) AT TIME OF INSPECTION: 791.5

BREAST ELEVATION: POOL ELEVATION:

SPILLWAY ELEVATION: 795.0 (principal) TAILWATER ELEVATION:

MAXIMUM RECORDED POOL ELEVATION: Unknown

GENERAL COMMENTS:

Farm pond used for irrigation. Good appearance. Normal pool elevation was set at top of drop inlet.

NDI NO. PA-01115

VISUAL INSPECTION
EMBANKMENT

	OBSERVATIONS AND REMARKS
A. SURFACE CRACKS	None evident.
B. UNUSUAL MOVEMENT BEYOND TOE	None detected.
C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES	Near toe, a small cave-in over outlet pipe. Downstream slope granular material, poor vegetation.
D. ALIGNMENT OF CREST: HORIZONTAL: VERTICAL:	Horizontal - good. Vertical- see profile Plate A-II.
E. RIPRAP FAILURES	No riprap.
F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY	Left abutment butts into flat ground. Right abutment at emergency spillway.
G. SEEPAGE	None detected. Pool was low.
H. DRAINS	None.
J. GAGES & RECORDER	None.
K. COVER (GROWTH)	Top is mowed grass; upstream mowed weeds; downstream slope mowed weeds.

NDI NO. PA-01115

VISUAL INSPECTION
OUTLET WORKS

	OBSERVATIONS AND REMARKS
A. INTAKE STRUCTURE	1. CMP drop inlet. Vertical inlet 18 inches. Horizontal outlet is a 12-inch CMP pipe placed after construction was completed. Outlet pipe follows slope of downstream slope. 2. 6-inch drain pipe with downstream valve.
B. OUTLET STRUCTURE	Dumped stone covered the outlet at downstream toe.
C. OUTLET CHANNEL	Grassed swale.
D. GATES	Valve on 6-inch pipe in valve pit at downstream toe.
E. EMERGENCY GATE	None.
F. OPERATION & CONTROL	Valve on 6-inch pipe operated regularly for irrigation.
G. BRIDGE (ACCESS)	Not required. Control at downstream end.

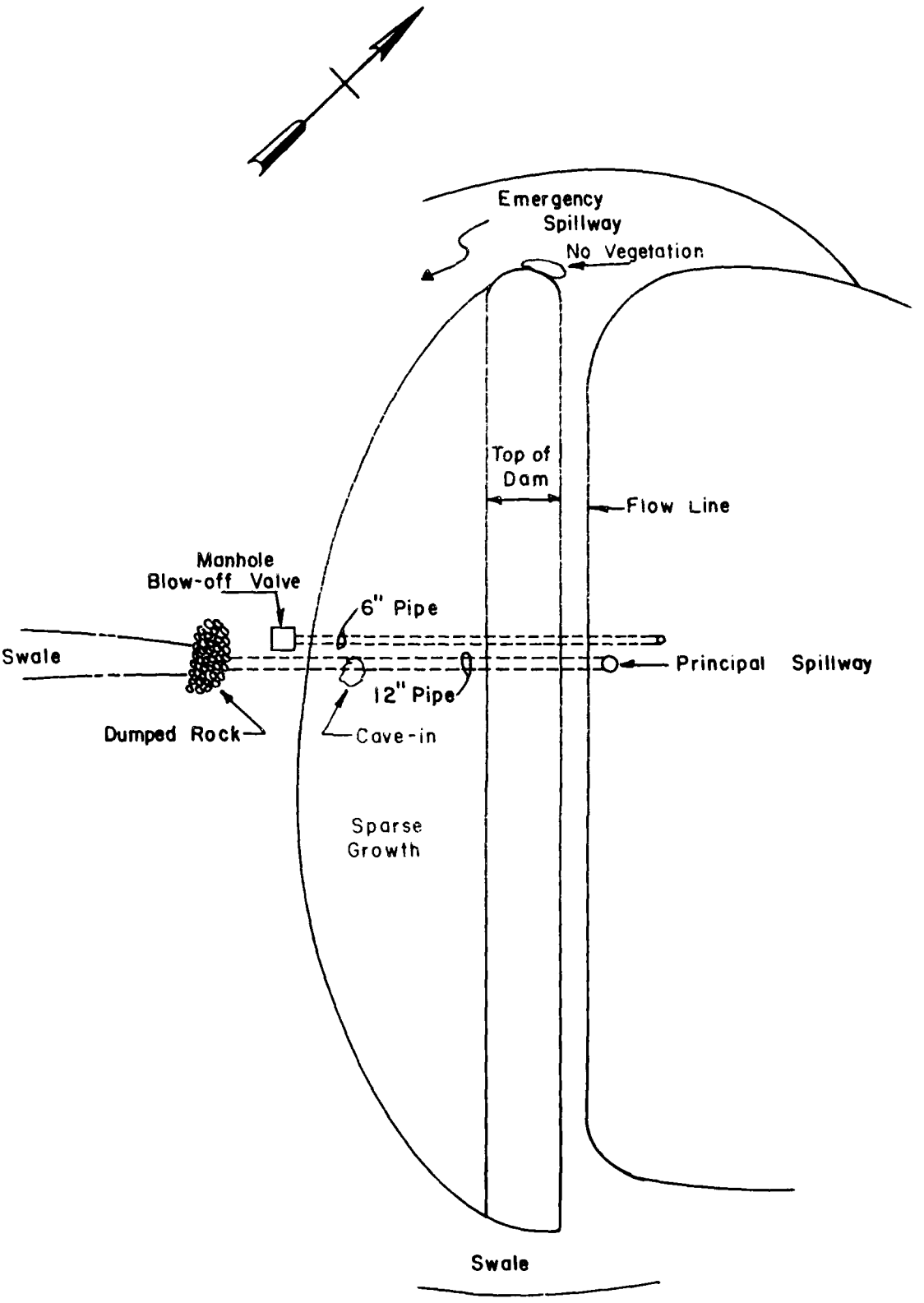
NDI NO. PA-01115

VISUAL INSPECTION
SPILLWAY
EMERGENCY

	OBSERVATIONS AND REMARKS
A. APPROACH CHANNEL	Unobstructed direct from reservoir in right abutment.
B. WEIR: Crest Condition Cracks Deterioration Foundation Abutments	Grassed channel. Mowed regularly. Right side is hill. Stable condition. Left side embankment fill with poor cover.
C. DISCHARGE CHANNEL: Lining Cracks Stilling Basin	Grassed slope along toe of embankment.
D. BRIDGE & PIERS	None.
E. GATES & OPERATION EQUIPMENT	None.
F. CONTROL & HISTORY	Unknown amount of flow during Agnes (1972). 12-inch outlet pipe installed to reduce use of emergency spillway

VISUAL INSPECTION

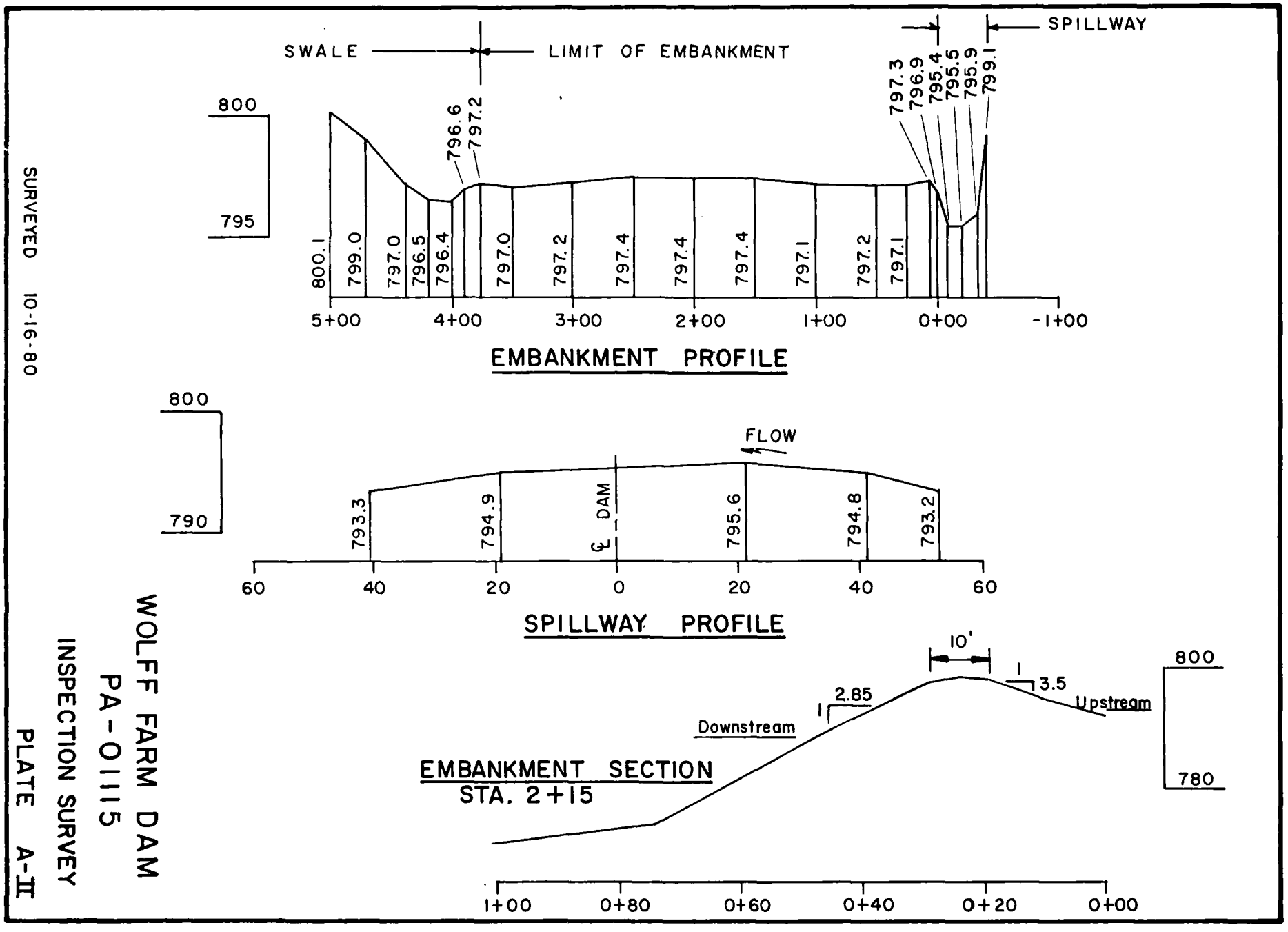
	OBSERVATIONS AND REMARKS
INSTRUMENTATION	
Monumentation	None.
Observation Wells	None.
Weirs	None.
Piezometers	None.
Staff Gauge	None.
Other	None.
RESERVOIR	
Slopes	Flat, farmland.
Sedimentation	None reported.
Watershed Description	Orchards. One farmland pond upstream.
DOWNSTREAM CHANNEL	
Condition	Wooded, stable.
Slopes	Flat.
Approximate Population	4
No. Homes	One adjacent to highway.



WOLFF FARM DAM
PA-01115
INSPECTION SURVEY

SURVEYED 10-16-80

PLATE A-I



SURVEYED 10-16-80

WOLFF FARM DAM
PA-01115
INSPECTION SURVEY

PLATE A-II

APPENDIX B

CHECK LIST OF ENGINEERING DATA

CHECK LIST
ENGINEERING DATA

PA DER # 21-179 NDI NO. PA-01115

NAME OF DAM Wolff Farm Dam

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	U.S.G.S. Quadrangle - Mt. Holly Springs, Pa. See Plate II, Appendix E
CONSTRUCTION HISTORY	Built in 1966. Assistance by S.C.S. Designed by owner. Contractor - John Walters, Newville, Pa.
GENERAL PLAN OF DAM	No design drawings.
TYPICAL SECTIONS OF DAM	No design drawings.
OUTLETS: PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	No plans.

ENGINEERING DATA

ITEM	REMARKS
RAINFALL & RESERVOIR RECORDS	No records.
DESIGN REPORTS	None.
GEOLOGY REPORTS	None.
DESIGN COMPUTATIONS: HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS: BORING RECORDS LABORATORY FIELD	None.
POST CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	Unknown. Presumably from reservoir area.

ENGINEERING DATA

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	Placed clay blanket on upstream slope for seepage. Installed drop inlet.
HIGH POOL RECORDS	No records.
POST CONSTRUCTION ENGINEERING STUDIES & REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM Description: Reports:	None reported.
MAINTENANCE & OPERATION RECORDS	No records.
SPILLWAY PLAN, SECTIONS AND DETAILS	No design drawings.

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT, PLANS & DETAILS	No plans.
CONSTRUCTION RECORDS	None.
PREVIOUS INSPECTION REPORTS & DEFICIENCIES	None.
MISCELLANEOUS	

NDI NO. PA- 01115

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Farmland.

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 795 Acre-Feet 81

TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev. 797 Acre-Feet 95

MAXIMUM DESIGN POOL: Elev. 797

TOP DAM: Elev. 797

SPILLWAY:	PRINCIPAL	EMERGENCY
a. Elevation	795	795.4
b. Type	Drop inlet.	Broad crested weir.
c. Width	18" diameter.	21'
d. Length	--	--
e. Location Spillover	Center of dam.	Right abutment.
f. Number and Type of Gates	None.	None.

OUTLET WORKS:

a. Type 6" cast iron pipe.

b. Location Center of dam.

c. Entrance inverts 769±.

d. Exit inverts 766

e. Emergency drawdown facilities 6" pipe.

HYDROMETEOROLOGICAL GAGES:

a. Type None.

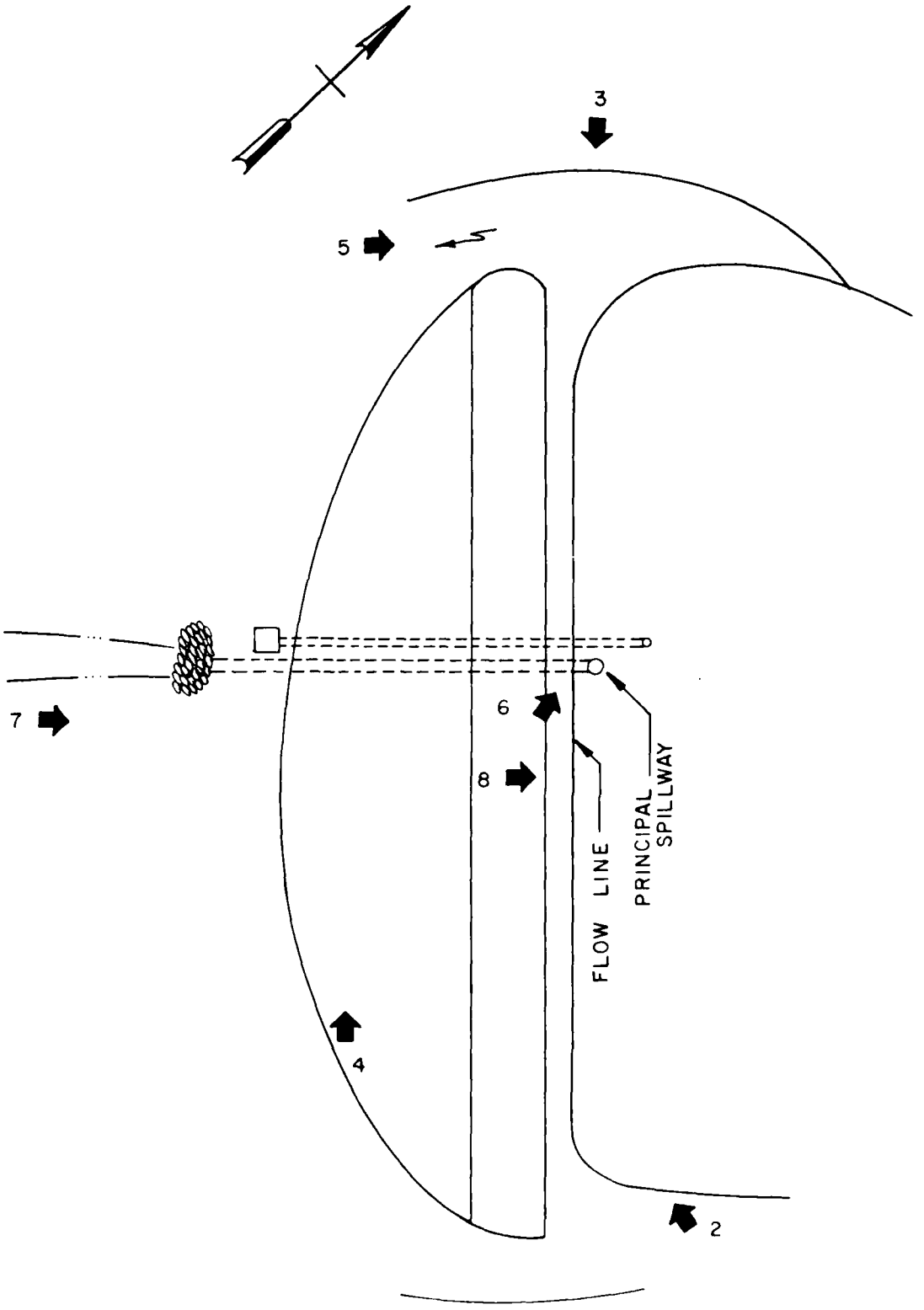
b. Location

c. Records

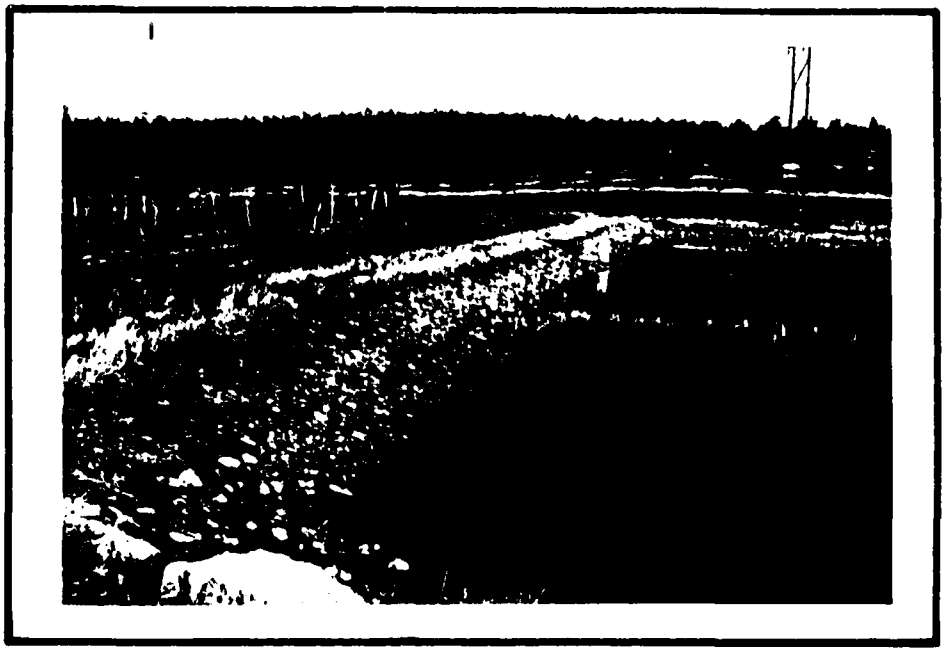
MAXIMUM NON-DAMAGING DISCHARGE: 159 cfs.

APPENDIX C

PHOTOGRAPHS



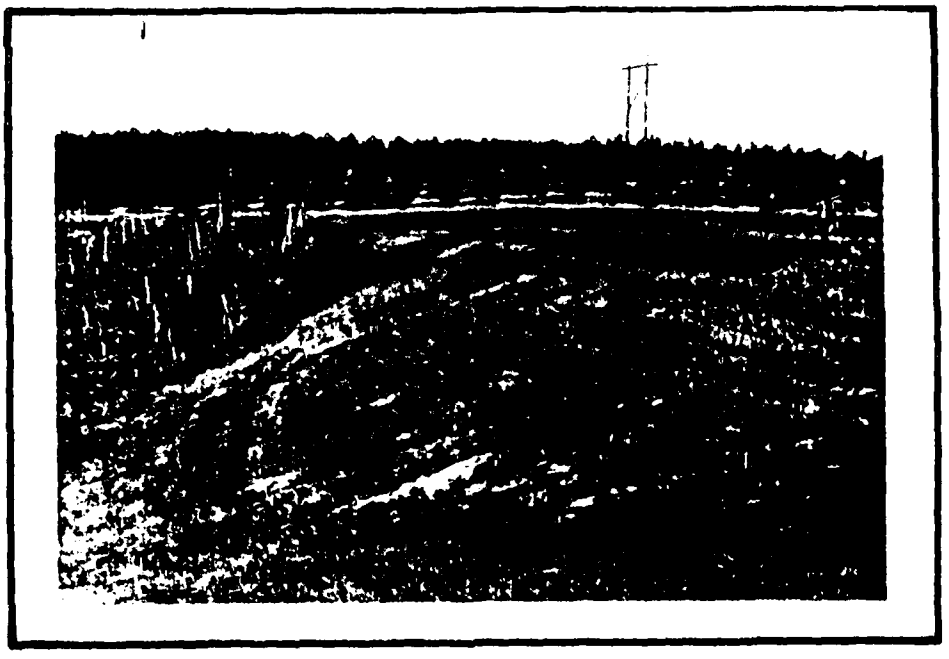
WOLFF FARM DAM
PA-01115
KEY MAP OF PHOTOGRAPHS
PLATE C-I



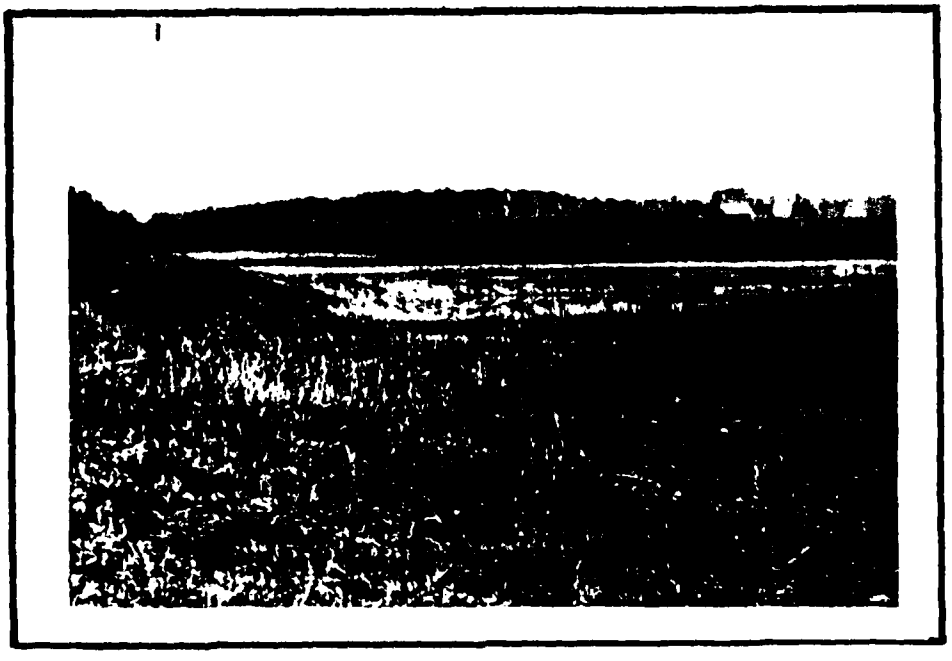
UPSTREAM SLOPE: EMERGENCY SPILLWAY AT RIGHT END - NO. 2

VIEW FROM RIGHT END: EMERGENCY SPILLWAY IN FOREGROUND - NO. 3

PA-01115
Plate C-II



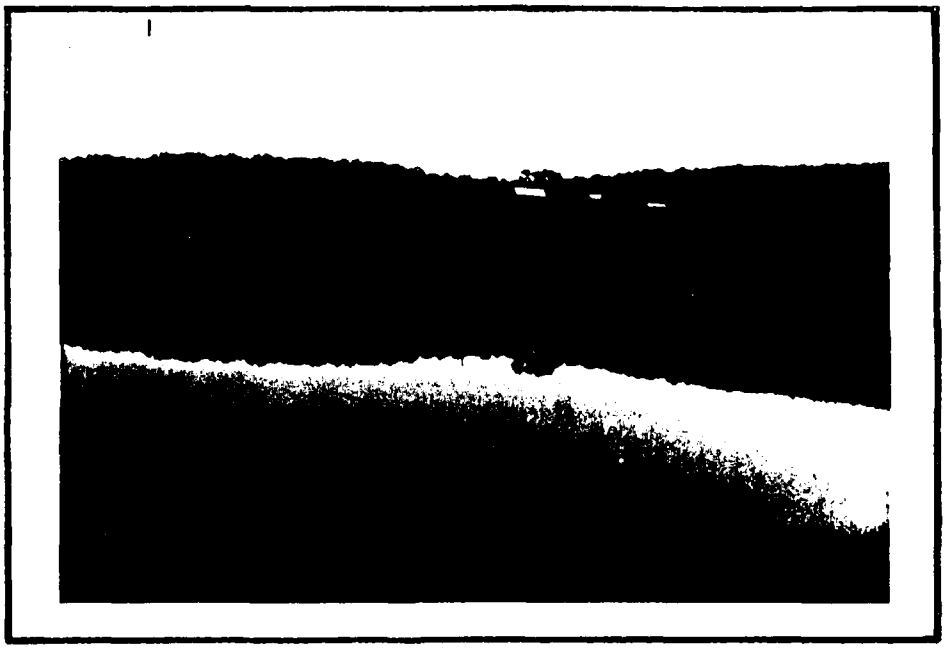
DOWNSTREAM SLOPE - NO. 4
NOTE: BARE SPOTS



EMERGENCY SPILLWAY LOOKING UPSTREAM - NO. 5

DETAIL OF PRINCIPAL SPILLWAY INTAKE - NO. 6

VALVE HOUSE AT DOWNSTREAM TOE FOR BLOW-OFF PIPE - NO. 7



RESERVOIR AND DRAINAGE AREA - NO. 8

PA-01115
Plate C-V

APPENDIX D

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 and maximum stage of each routed hydrograph at the outlet of the reach.

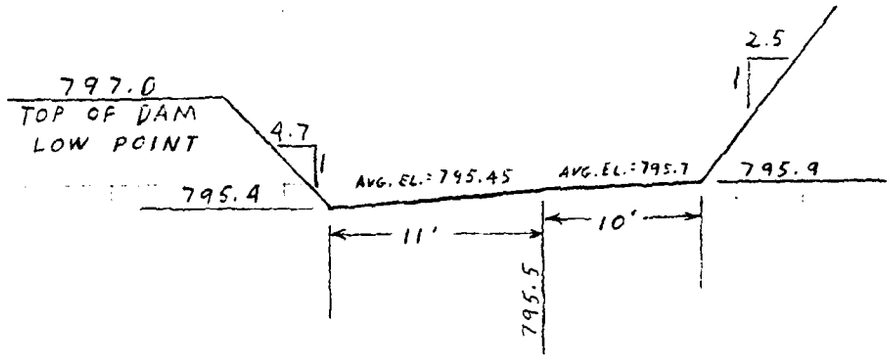
The output data provided by this program permits the comparison of downstream conditions just prior to a breach failure with that after a breach failure and the determination as to whether or not there is a significant increase in the hazard to loss of life as a result of such a failure.

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.

BY DR DATE 11/5/80 **BERGER ASSOCIATES** SHEET NO. 1 OF 12
CHKD. BY RLS DATE PROJECT 00590
SUBJECT WOLFF FARM POND

SPILLWAY RATING (EMERGENCY)



BROADCRESTED WEIR

C = 2.7 (KING'S HDBK)

$$Q = C L_1 (H_1)^{3/2} + C L_2 (H_2)^{3/2} + C L_3 (H_3)^{3/2} + C L_4 (H_4)^{3/2}$$

AT POOL LEVEL 797.0

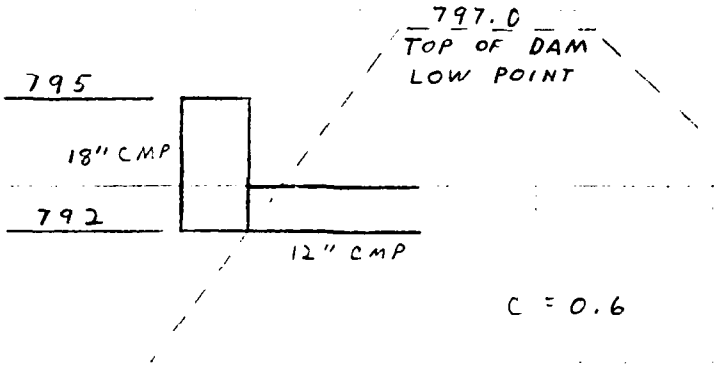
$H_1 = (797.0 - 795.4)/2 = 1.6/2 = .8'$
$L_1 = 4.7 \times 1.6 = 8'$
$H_2 = 797.0 - 795.45 = 1.55'$
$L_2 = 11'$
$H_3 = 797.0 - 795.7 = 1.3'$
$L_3 = 10'$
$H_4 = (797.0 - 795.9)/2 = 1.1/2 = .55'$
$L_4 = 2.5 \times 1.1 = 3'$

$$Q = 2.7((8 \times (.8)^{1.5}) + (11 \times (1.55)^{1.5}) + (10 \times (1.3)^{1.5}) + (3 \times (.55)^{1.5}))$$

$= 116$ CFS

BY RLS DATE 11/10/86 **BERGER ASSOCIATES** SHEET NO. 2 OF 12
CHKD. BY DATE PROJECT D0590
SUBJECT WOLFF FARM POND

PRINCIPAL SPILLWAY RATING



$$Q = CA\sqrt{2gH}$$

AT POOL LEVEL 797.0

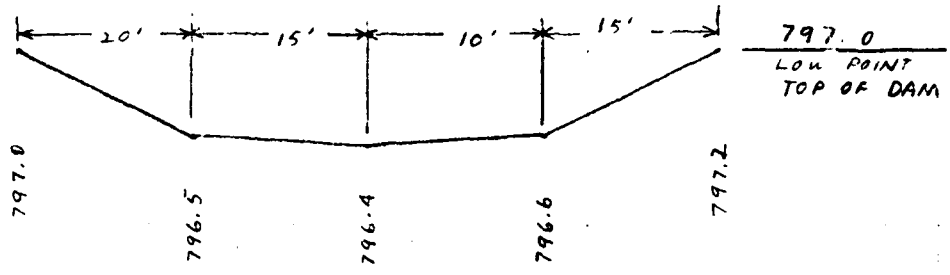
$H = 797.0 - 792.5 = 4.5'$

$$Q = 0.6 \times \pi \times (1)^2/4 \times (2 \times 32.2 \times 4.5)^{0.5}$$

$= 8$ CFS

BY RLS DATE 1/7/81 **BERGER ASSOCIATES** SHEET NO. 3 OF 12
CHKD. BY DATE PROJECT D0590
SUBJECT WOLFF FARM DAM

DISCHARGE THROUGH SWALE



SOD LINED SWALE
BROADCRESTED WEIR
C = 2.7 (KING'S HDBK)

$$Q = C L H^{3/2}$$

$$= C L_1 (H_1)^{3/2} + C L_2 (H_2)^{3/2} + C L_3 (H_3)^{3/2} + C L_4 (H_4)^{3/2}$$

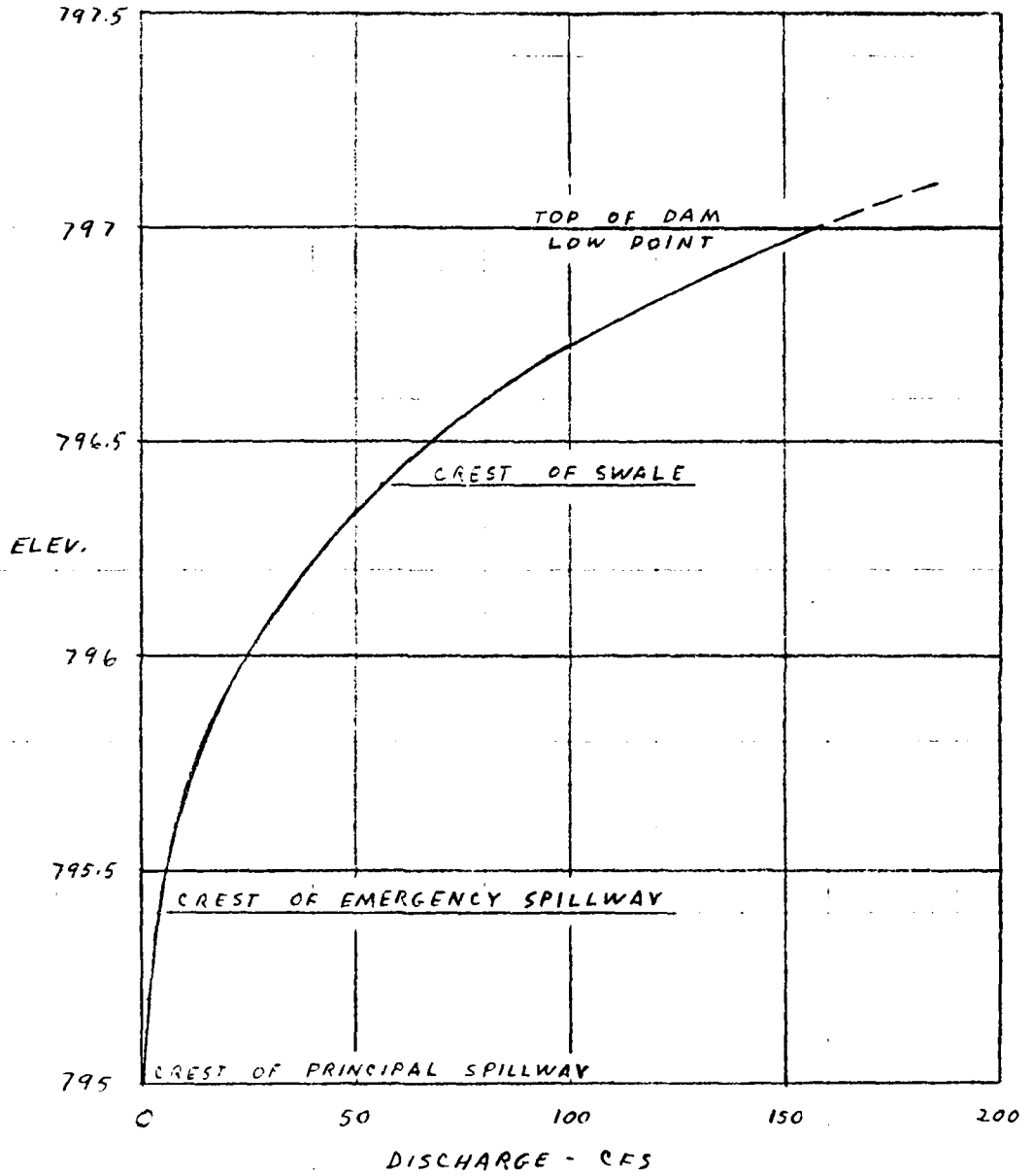
$L_1 = 20'$
$H_1 = (797.0 - 796.5)/2 = .25$
$L_2 = 15'$
$H_2 = 797.0 - ((796.5 + 796.4)/2) = .55'$
$L_3 = 10'$
$H_3 = 797.0 - ((796.4 + 796.6)/2) = .5'$
$L_4 = 15 \times 4/6 = 10'$
$H_4 = (797.0 - 796.6)/2 = .2'$

$$Q = 2.7 \times 20 \times (.25)^{1.5} + 2.7 \times 15 \times (.55)^{1.5} + 2.7 \times 10 \times (.5)^{1.5} + 2.7 \times 10 \times (.2)^{1.5}$$

$$= 35 \text{ CFS}$$

BY RLS DATE 1/7/91 **BERGER ASSOCIATES** SHEET NO. 4 OF 12
CHKD. BY DATE PROJECT D0590
SUBJECT WOLFF FARM DAM

DISCHARGE RATING CURVE



BY RLS DATE 12/1/80 **BERGER ASSOCIATES** SHEET NO. 5 OF 12
CHKD. BY DATE PROJECT D0590
SUBJECT WOLFF FARM POND

DISCHARGE THROUGH OUTLET WORKS

6" DIA. CAST IRON PIPE $N = .015$ (KINGS HDBK)
LENGTH = 200' ±
OUTLET ELEVATION = 766.4

$$Q = 1.486 \frac{A}{N} R^{2/3} S^{1/2}$$

AT POOL LEVEL 795

$S = (795 - 766.4)/200 = .143$

$$Q = 1.486 \times (\pi \cdot (.5)^2/4) \times (.5/4)^{2/3} \times (.143)^{.5}/.015$$

$= 1.8$ CFS

AT LOW POOL LEVEL 775

$S = (775 - 766.4)/200 = .043$

$$Q = 1.486 \times (\pi \cdot (.5)^2/4) \times (.5/4)^{2/3} \times (.043)^{.5}/.015$$

$= 1.0$ CFS

BY RLS DATE 1/12/81 **BERGER ASSOCIATES** SHEET NO. 6 OF 12
CHKD. BY ____ DATE PROJECT 00590
SUBJECT MOLLI FARM DAM

EMBANKMENT RATING

$Q = C L H^{3/2}$ C = 2.7 (WES MANUAL)

AT POOL ELEV 797.3

$2.7 \times 3 \times (.2)^{1.5} = 1$
$2.7 \times 22 \times (.1)^{1.5} = 2$
$2.7 \times 75 \times (.16)^{1.5} = 12$
$2.7 \times 33 \times (.1)^{1.5} = 3$
$2.7 \times 24 \times (.06)^{1.5} = 1$
$2.7 \times 75 \times (.2)^{1.5} = 18$
$2.7 \times 5 \times (.15)^{1.5} = 1$ $\Sigma = 38$ CFS

AT POOL ELEV 797.6

$2.7 \times 3 \times (.55)^{1.5} = 3$
$2.7 \times 22 \times (.4)^{1.5} = 15$
$2.7 \times 75 \times (.45)^{1.5} = 61$
$2.7 \times 50 \times (.35)^{1.5} = 28$
$2.7 \times 100 \times (.2)^{1.5} = 24$
$2.7 \times 50 \times (.3)^{1.5} = 22$
$2.7 \times 75 \times (.5)^{1.5} = 72$
$2.7 \times 11 \times (.3)^{1.5} = 5$ $\Sigma = 230$ CFS

AT POOL ELEV 798

$2.7 \times 3 \times (.95)^{1.5} = 8$
$2.7 \times 22 \times (.8)^{1.5} = 43$
$2.7 \times 75 \times (.85)^{1.5} = 159$
$2.7 \times 50 \times (.75)^{1.5} = 98$
$2.7 \times 100 \times (.6)^{1.5} = 125$
$2.7 \times 50 \times (.7)^{1.5} = 79$
$2.7 \times 75 \times (.9)^{1.5} = 173$
$2.7 \times 18 \times (.5)^{1.5} = 17$ $\Sigma = 692$ CFS

MAXIMUM KNOWN FLOOD AT DAMSITE

THERE ARE NO RECORDS OF POOL LEVELS FOR THIS DAM. BASED ON THE RECORDS OF THE GAGING STATION FOR CONOCOCHEAGUE CREEK AT NEARBY FAYETTEVILLE, PA. (DA 5.05 SQ MI) THE MAXIMUM DISCHARGE AT THE GAGE OCCURRED IN JUNE 1972 WHEN A DISCHARGE OF 392 CFS WAS OBSERVED. THE MAXIMUM INFLOW TO WOLFF FARM POND IS ESTIMATED TO BE:

$$Q = \left(\frac{16}{5.05}\right)^{0.8} \times 392$$

$$= 25 \text{ CFS}$$

DESIGN FLOOD

SIZE CLASSIFICATION

MAXIMUM STORAGE = 95 ACRE FEET
MAXIMUM HEIGHT = 28 FEET
SIZE CLASSIFICATION IS "SMALL"

HAZARD CLASSIFICATION

ONE HOME LOCATED NEAR THE DOWNSTREAM CHANNEL.
USE "SIGNIFICANT"

RECOMMENDED SPILLWAY DESIGN FLOOD

THE ABOVE CLASSIFICATIONS INDICATE USE OF AN SDF EQUAL TO THE 100 YEAR FLOOD TO ONE-HALF THE PROBABLE MAXIMUM FLOOD

[illegible]

[illegible] C 2.7

99 CFS

[illegible]

H 853 - 850 = 3

$Q = CA\sqrt{2gH}$

$= 0.6 \times \pi \times (.5)^2/4 \times (2 \times 32.2 \times 3)^{.5}$

= 1.6 CFS

BY [illegible] DATE 11/9/[illegible]

CHKD BY DATE

SUBJECT WOLFF FARM DAM

BERGER ASSOCIATES

SHEET NO. 9 OF 12

PROJECT D0590

100 YEAR FLOOD

[illegible] HYDROLOGIC [illegible] TROPICAL STORM AGNES'
NORTH ATLANTIC [illegible], U S ARMY, CORPS of ENGINEERS.

[illegible] AREA = [illegible] SQ MI

[illegible] = 1.75

[illegible] (DA)

[illegible] = 1.353

[illegible] = 35

[illegible] (F)

[illegible] = 39

[illegible] = 41

[illegible] = 2.6556

[illegible]

[illegible]

[illegible]

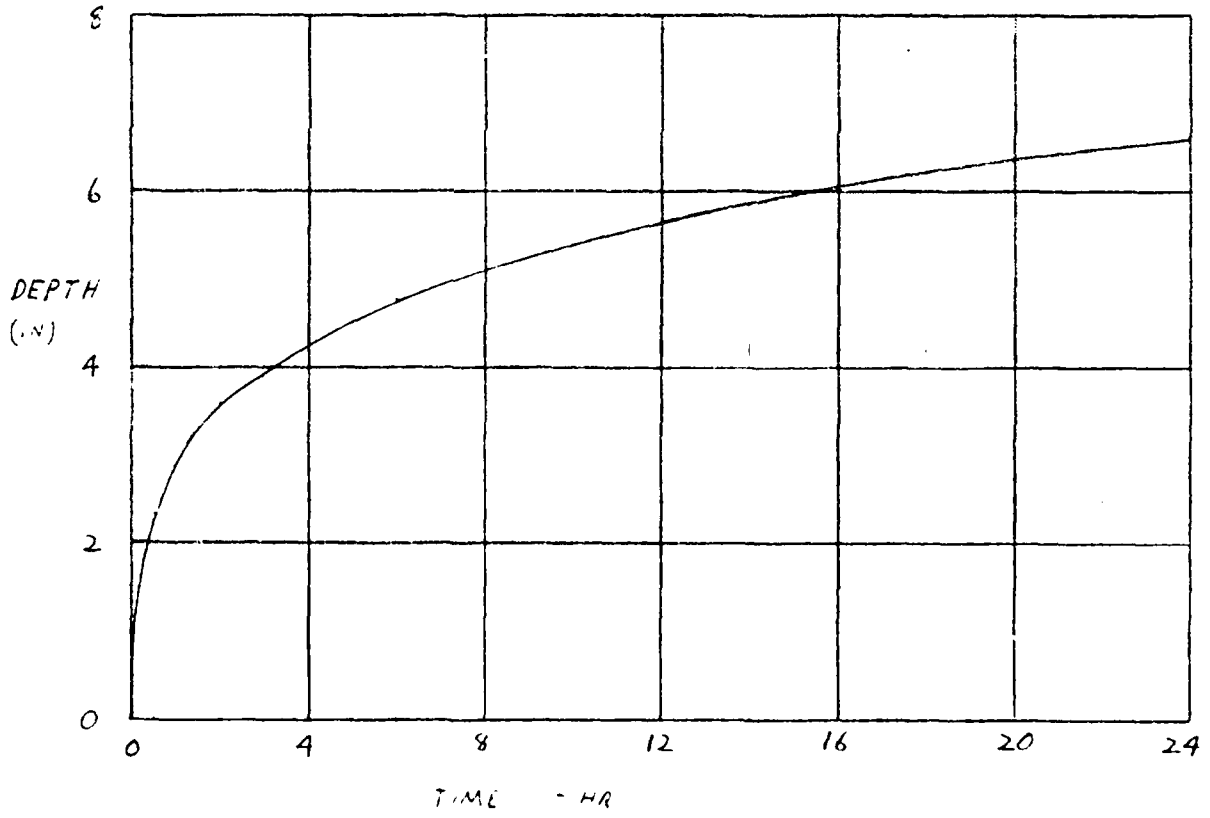
[illegible] = .14 [illegible]

BY RLS DATE 1/5/81 BERGER ASSOCIATES SHEET NO. 10 OF 12
CHKD. BY DATE PROJECT D0590
SUBJECT WOLFF FARM DAM

100 YR FLOOD (CONT.)

TOTAL RAINFALL (FROM TP-40)

DURATION (HR)	DEPTH (IN)
.5	2.35
1	2.89
2	3.60
3	3.92
6	4.79
12	5.66
24	6.62



BY RLS DATE 2/3/81 BERGER ASSOCIATES SHEET NO. 11 OF 12
CHKD. BY DATE PROJECT D0590
SUBJECT WOLFF FARM DAM

SCS PARAMETERS

SOIL TYPE :		CLASS
	HIGHFIELD	B
	GLENVILLE	C
	CATOCTIN	C

USE : CLASS C

COVER: FARMLAND SOME FOREST LAND

CN = 84

LAG: UPPER DAM

L = 1900'
Y = 150'/1900 × 100% = 7.895 %
S = (1000/CN) -10

$$LAG = \frac{(L)^{0.8} \times (S+1)^{0.7}}{1900 \times (Y)^{0.5}}$$

= .17 HR

WOLFF FARM DAM

L = 2000'
Y = 115'/2000 × 100% = 5.75 %
S = (1000/CN) -10

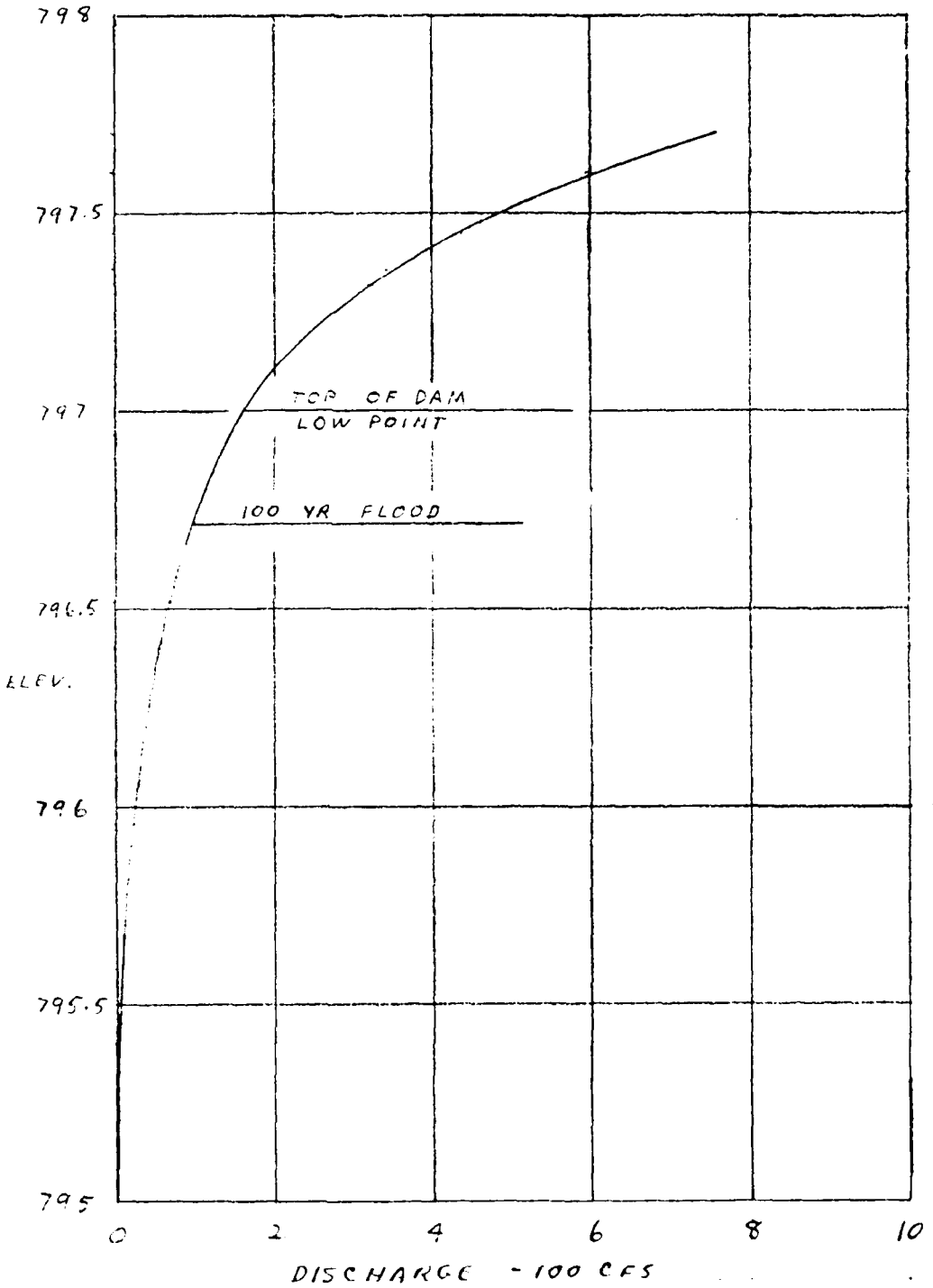
$$LAG = \frac{(L)^{0.8} \times (S+1)^{0.7}}{1900 \times (Y)^{0.5}}$$

= .20 HR

Q100 = 249 CFS ~ 244 CFS

BY RLS DATE 1/13/81 | BERGER ASSOCIATES | SHEET NO. 12 OF 12
CHKD. BY DATE | PROJECT D0590
SUBJECT WOLFF FARM DAM

SPILLWAY CAPACITY CURVE



HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: Wolff Farm Dam RIVER BASIN: Susquehanna

PROBABLE MAXIMUM PRECIPITATION (PMP) = 23.5 INCHES/24 HOURS[1]

(FOR FOOTNOTES SEE NEXT PAGE)

STATION		1	2	3	4
STATION DESCRIPTION		Upper Wolff Farm Pond	Upper Wolff Farm Dam	Wolff Farm Pond	Wolff Farm Dam
DRAINAGE AREA (SQUARE MILES)		.06		.10	
CUMULATIVE DRAINAGE AREA (SQUARE MILE)		.06	.06	.16	.16
ADJUSTMENT OF PMP FOR DRAINAGE AREA (%)[2]	6 HOURS				
	12 HOURS				
	24 HOURS				
	48 HOURS				
	72 HOURS				
SNYDER HYDROGRAPH PARAMETERS	ZONE [3]	15A		15A	
	C_p / C_t [4]	.54/1.15		.54/1.15	
	L (MILES)[5]	.38		.38	
	L_{ca} (MILES)[5]	.16		.16	
	$T_p = C_t (L \cdot L_{ca})^{0.3}$ (Hours)	.50		.50	
SPILLWAY DATA	CREST LENGTH (FT.)	Principal 6" Dia.	Emergency 33	Principal 18" Dia.	Emergency 32
	FREEBOARD (FT.)	3'	1.6	2.0	1.6
	DISCHARGE COEFFICIENT	0.6	2.7	0.6	2.7
	EXPONENT	--	1.5	--	1.5
	ELEVATION	850	851.4	795	795.4
AREA[6] (ACRES)	NORMAL POOL	850 = 4.4		795 = 6.4	
	ELEV. _____	860 = 6.0		810 = 12.9	
	ELEV. _____				
STORAGE (ACRE-FEET)	NORMAL POOL[7]	850 = 29		795 = 81	
	ELEV. _____ [8]	830 = 0		757 = 0	
	ELEV. _____ [8]				
	ELEV _____ [8]				

(1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.

(2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.

(3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).

(4) Snyder's Coefficients.

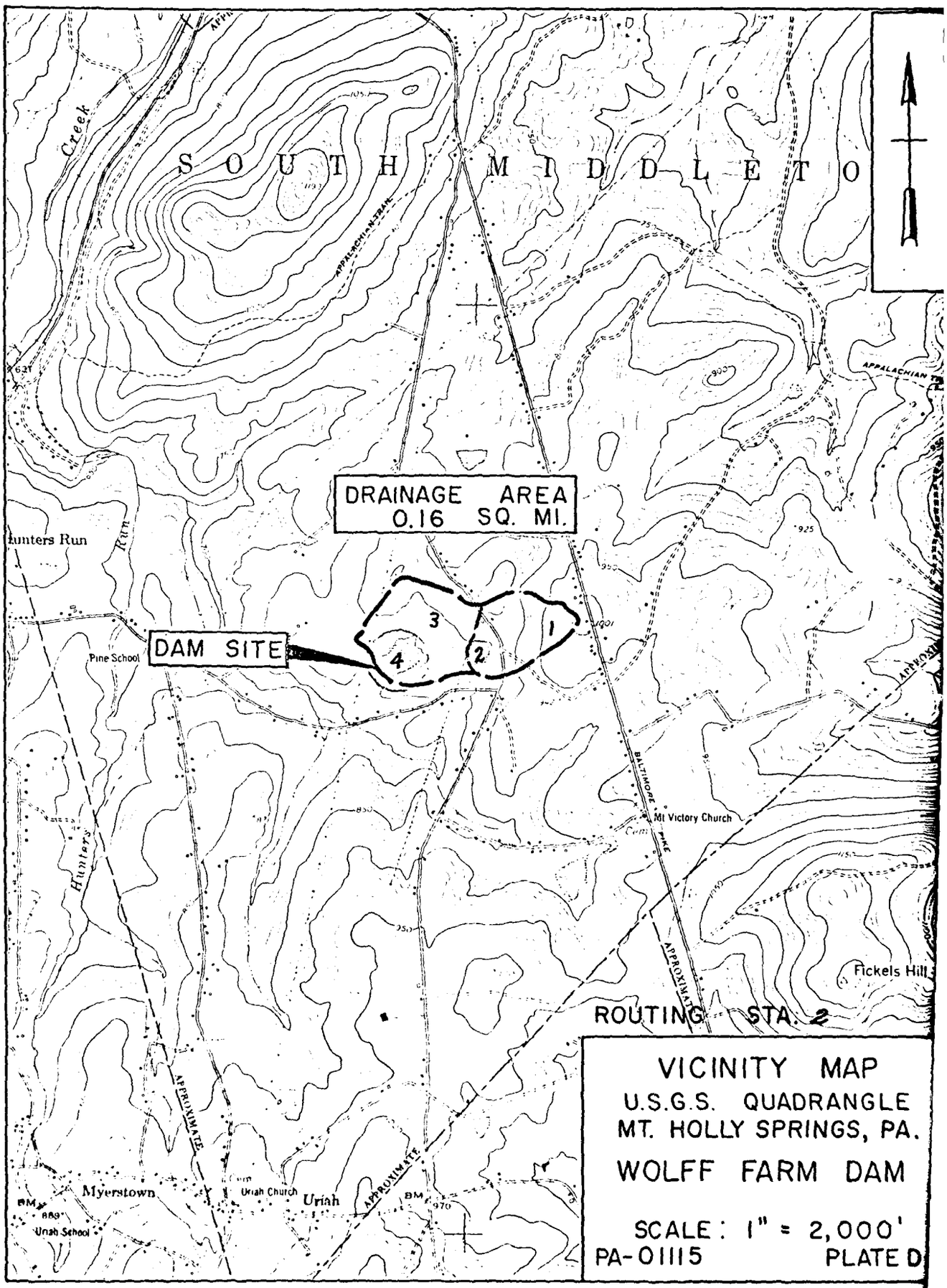
(5) L = Length of longest water course from outlet to basin divide.

L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.

(6) Planimetered area encompased by contour upstream of dam.

(7) PennDER files.

(8) Computed by conic method.



VICINITY MAP
U.S.G.S. QUADRANGLE
MT. HOLLY SPRINGS, PA.

WOLFF FARM DAM

SCALE: 1" = 2,000'

PA-01115 PLATE D

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  01 APR 80
**********
    1            A1     WOLFF FARM POND DAM    ****    UNNAMED TRIB. TO HUNTER RUN
    2            A2     SOUTH MIDDLETON TWP., CUMBERLAND COUNTY, PA.
    3            A3     NDI # PA-01115      PA DER # 21-179
    4            B   300      0     15      0      0      0      0      0     -4      0
    5            B1    5
    6            J     1      1      1
    7            J1    1
    8            K            1                                          1
    9            K1             INFLOW  HYDROGRAPH - UPPER WOLFF FARM POND
   10            M              2    .06           .16
   11            O    96
   12            O1  .01    .02    .02    .02    .02    .02    .02    .02    .02    .02
   13            O1  .02    .02    .02    .02    .02    .02    .02    .02    .02    .02
   14            O1  .02    .02    .02    .03    .03    .03    .03    .03    .03    .03
   15            O1  .03    .04    .04    .04    .05    .05    .06    .06    .07    .08
   16            O1  .08    .09    .10    .11    .16    .19    .28    .52   1.83    .23
   17            O1  .19    .14    .10    .10    .09    .08    .07    .07    .06    .06
   18            O1  .05    .05    .04    .04    .04    .03    .03    .03    .03    .03
   19            O1  .03    .03    .02    .02    .02    .02    .02    .02    .02    .02
   20            O1  .02    .02    .02    .02    .02    .02    .02    .02    .02    .02
   21            O1  .02    .02    .02    .02    .01    .01
   22            T                                                 -1    -84.
   23            W1          .17
   24            X  -1.5    -.05      2
   25            K    1       2                                          1
   26            K1             RESERVOIR  ROUTING - UPPER WOLFF FARM POND
   27            Y                             1
   28            Y1   1                                          29     -1
   29            Y4  850   851.4    852   852.5    853   853.5
   30            YS    0     1.1   12.9    44.9     96    563
   31            $A    0     4.4      6
   32            $E  830     850    860
   33            $$  850      .
   34            $D  853
   35            K            3                                          1
   36            K1             INFLOW HYDROGRAPH - WOLFF FARM POND
   37            M              2     .1            .16
   38            O    96
   39            O1  .01    .02    .02    .02    .02    .02    .02    .02    .02    .02
   40            O1  .02    .02    .02    .02    .02    .02    .02    .02    .02    .02
   41            O1  .02    .02    .02    .03    .03    .03    .03    .03    .03    .03
   42            O1  .03    .04    .04    .04    .05    .05    .06    .06    .07    .08
   43            O1  .08    .09    .10    .11    .16    .19    .28    .52   1.83    .23
   44            O1  .19    .14    .10    .10    .09    .08    .07    .07    .06    .06
   45            O1  .05    .05    .04    .04    .04    .03    .03    .03    .03    .03
   46            O1  .03    .03    .02    .02    .02    .02    .02    .02    .02    .02
   47            O1  .02    .02    .02    .02    .02    .02    .02    .02    .02    .02
   48            O1  .02    .02    .02    .02    .01    .01
   49            T                                                 -1    -84
   50            W1          .20
1  51            X  -1.5    -.05      2
   52            K    2       4                                          1
   53            K1             COMBINE HYDROGRAPHS AT WOLFF FARM POND
   54            K    1       5                                          1
```

```
   55            K1              RESERVOIR ROUTING - THRU WOLFF FARM POND
   56            Y                              1
   57            Y1    1                                                  81     -1
   58            Y4   795   795.2   795.4   795.5   795.7    796   796.4   796.7    797   797.3
   59            Y4 797.6     798
   60            Y5     0     1.4     3.9     5.8    11.2   24.9    55.7    94.5    159     283
   61            Y5   595    1233
   62            $A     0     6.4    12.9
   63            $E   757     795     810
   64            $$   795
   65            $D   797
   66            K     99
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                RUNOFF HYDROGRAPH AT          1
                                ROUTE HYDROGRAPH TO           2
                                RUNOFF HYDROGRAPH AT          3
                                COMBINE  2 HYDROGRAPHS AT     4
                                ROUTE HYDROGRAPH TO           5
                                END OF NETWORK

1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  01 APR 80
 **********************************

 RUN  DATE= 81/02/02.
      TIME= 15.33.04.
```

WOLFF FARM POND DAM **** UNNAMED TRIB. TO HUNTER RUN
SOUTH MIDDLETON TWP., CUMBERLAND COUNTY, PA.
NDI # PA-00115 PA DER # 21-179

JOB SPECIFICATION

NO	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 NRATIO= 1 LRTIO= 1

RTIOS= 1.00

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

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH - UPPER WOLFF FARM POND

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

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	2	.06	0.00	.16	0.00	0.000	0	0	0

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	-84.00	0.00	0.00

CURVE NO = -84.00 WETNESS = -1.00 EFFECT CN = 84.00

UNIT HYDROGRAPH DATA

TC= 0.00 LAG= .17

RECESSION DATA

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

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	6.62	4.78	1.84	780.
										(168.)(	121.)(	47.)(	22.09)

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

HYDROGRAPH ROUTING

RESERVOIR ROUTING - UPPER WOLFF FARM POND

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 8	0	0	0.000	0.000	0.000	29.	-1

STAGE	850.00	851.40	852.00	852.50	853.00	853.50
FLOW	0.00	1.10	12.90	44.90	96.00	568.00
SURFACE AREA=	0.	4.	6.			
CAPACITY=	0.	29.	81.			
ELEVATION=	830.	850.	860.			

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
850.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
853.0	0.0	0.0	0.

PEAK OUTFLOW IS 13. AT TIME 17.25 HOURS

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH - WOLFF FARM POND

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	2	.10	0.00	.16	0.00	0.000	0	0	0

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	-84.00	0.00	0.00

CURVE NO = -84.00 WETNESS = -1.00 EFFECT CN = 84.00

UNIT HYDROGRAPH DATA
TC= 0.00 LAG= .20

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

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	6.62	4.78	1.84	1296.
										(168.)(121.)(47.)(36.70)			

COMBINE HYDROGRAPHS

COMBINE HYDROGRAPHS AT WOLFF FARM POND

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

RESERVOIR ROUTING - THRU WOLFF FARM POND

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0

FOUTING 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	81.	-1

STAGE	795.00	795.20	795.40	795.50	795.70	796.00	796.40	796.70	797.00	797.30
	797.60	798.00								
FLOW	0.00	1.40	3.90	5.80	11.20	24.90	55.70	94.50	159.00	283.00
	595.00	1233.00								
SURFACE AREA=	0.	6.	13.							
CAPACITY=	0.	81.	223.							
ELEVATION=	757.	795.	810.							

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
795.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
797.0	0.0	0.0	0.

PEAK OUTFLOW IS 99. AT TIME 12.75 HOURS

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

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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
HYDROGRAPH AT	1	.06	1	169.
	(	.16)	(	4.77)(
ROUTED TO	2	.06	1	13.
	(	.16)	(	.37)(
HYDROGRAPH AT	3	.10	1	248.
	(	.26)	(	7.03)(
2 COMBINED	4	.16	1	249.
	(	.41)	(	7.05)(
ROUTED TO	5	.16	1	99.
	(	.41)	(	2.80)(

1

SUMMARY OF DAM SAFETY ANALYSIS
UPPER WOLFF FARM DAM

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	849.77	850.00	853.00
STORAGE	28.	29.	43.
OUTFLOW	0.	0.	96.

RATIO OF [redacted] SDF	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	852.00	0.00	38.	13.	0.00	13.75	0.00

1

SUMMARY OF DAM SAFETY ANALYSIS
WOLFF FARM DAM

PLAN 1 .....

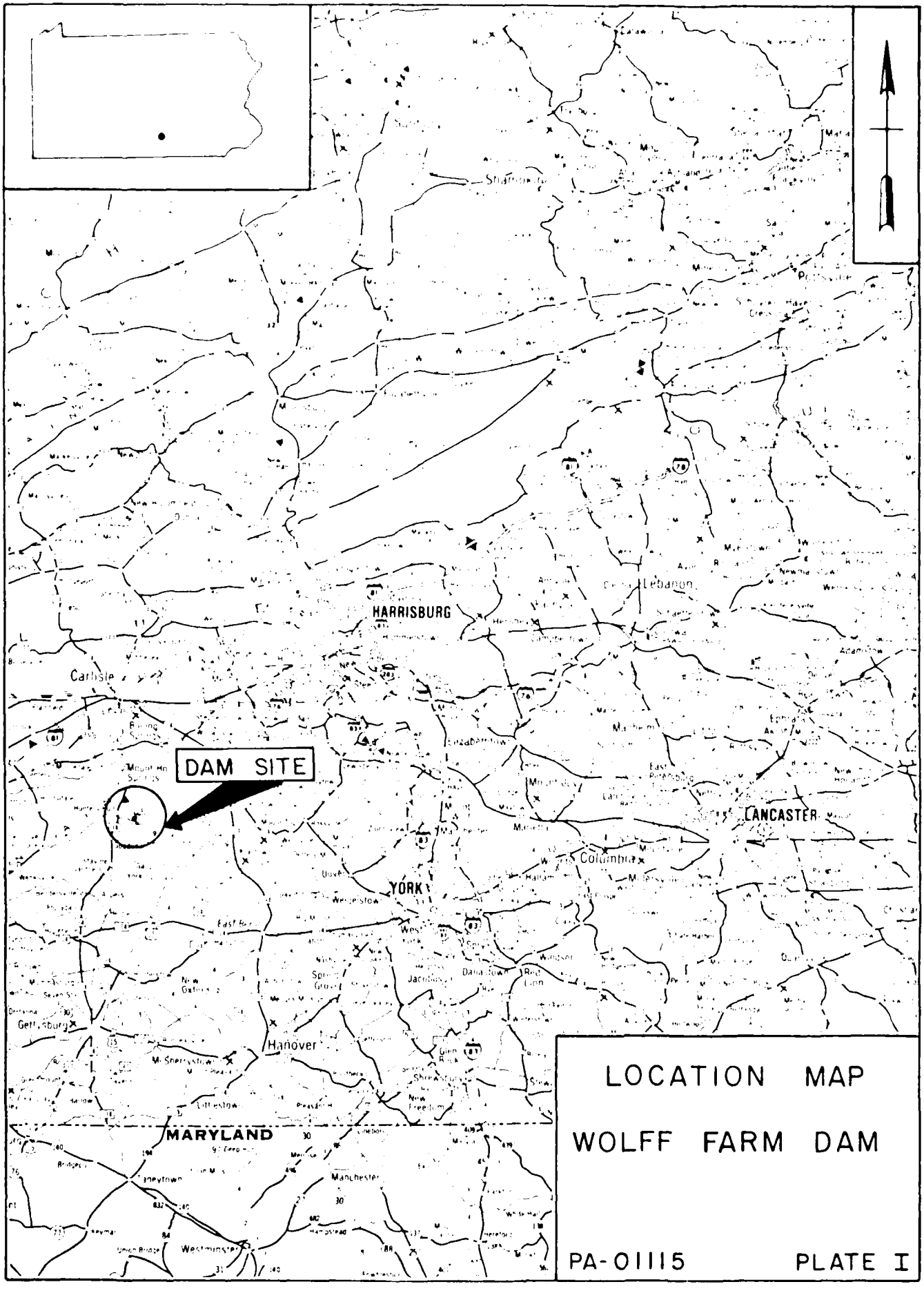
	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	794.97	795.00	797.00
STORAGE	81.	81.	95.
OUTFLOW	0.	0.	159.

RATIO OF [redacted] SDF	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	796.72	0.00	93.	99.	0.00	12.75	0.00

EOI ENCOUNTERED.
N>

APPENDIX E

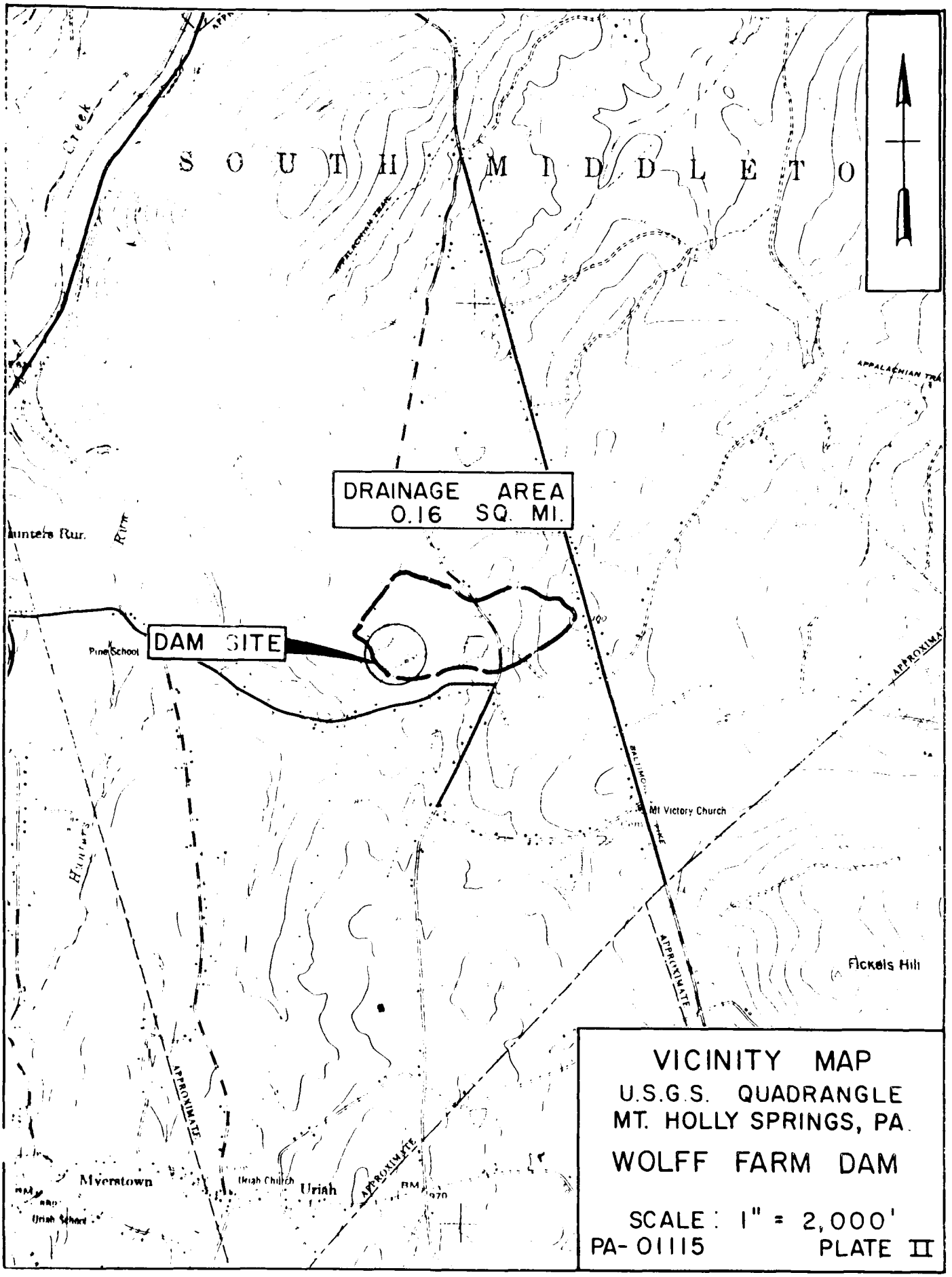
PLATES



LOCATION MAP

WOLFF FARM DAM

PA-01115 PLATE I



VICINITY MAP

U.S.G.S. QUADRANGLE
MT. HOLLY SPRINGS, PA.

WOLFF FARM DAM

SCALE: 1" = 2,000'

PA-01115 PLATE II

APPENDIX F

GEOLOGIC REPORT

GEOLOGIC REPORT

BEDROCK - DAM AND RESERVOIR

This area overlies the lavender aporhyolite (Metarhyolite) which is a hard, dense, altered rhyolite lava, ranging in color from brownish pink to dark purple. It contains white to pink phenocrysts depending on the specific location.

STRUCTURE

The dam is located on the rock ridge syncline. Jointing is abundant and highly developed in a platy irregular pattern. Open joints are characteristic, but quartz filling does occur. The dip ranges from 45-85° with a dip of about 50° in the vicinity of the dam.

OVERBURDEN

The overburden in this area most probably consists of a residual soil originating from the existing parent bedrock.

AQUIFER CHARACTERISTICS

The aporhyolite has a secondary porosity of very low magnitude, thus subsurface seepage should be of little concern.

DISCUSSION

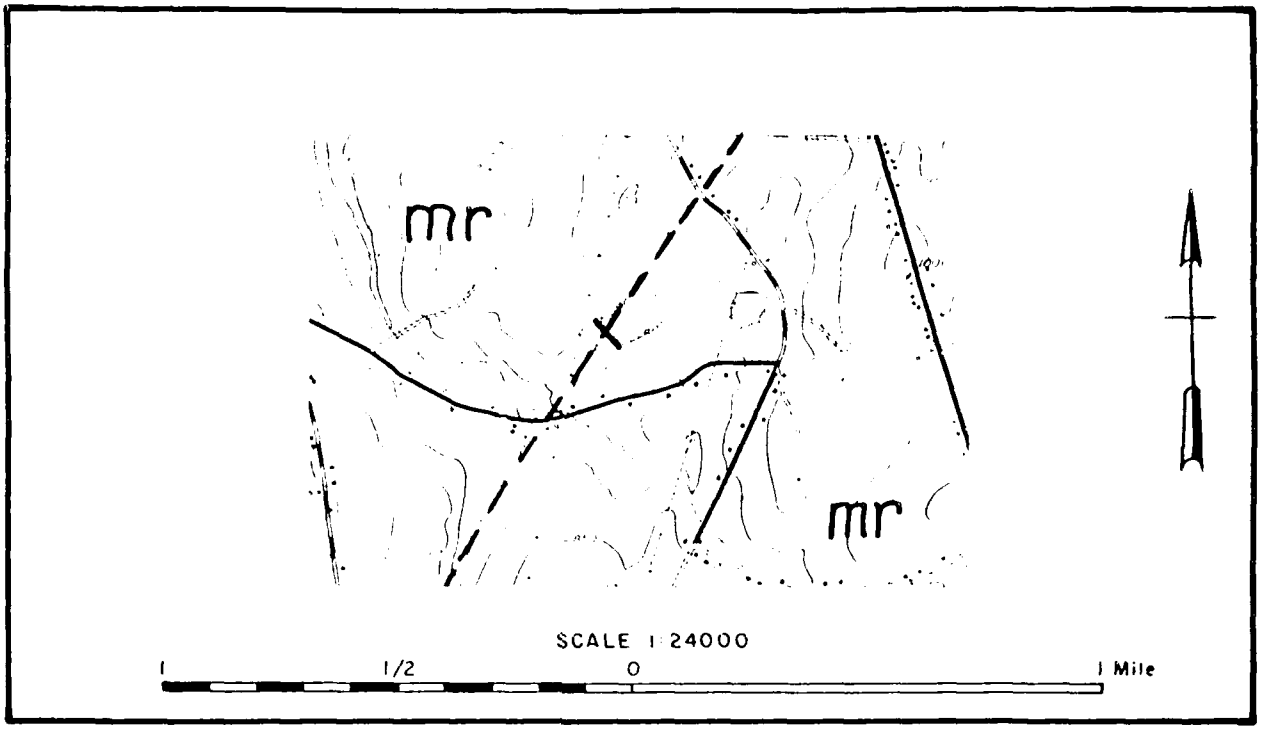
There are no available construction plans for this dam to determine whether or not the dam trench was excavated to bedrock. However, the aporhyolites to provide an excellent foundation base.

SOURCES OF INFORMATION

1. Freedman, J., 1967. Geology of a Portion of the Mt. Holly Springs Quadrangle, Adams and Cumberland Counties, Pennsylvania: Pennsylvania Geological Survey PR169.

2. McGlade, W.G., 1972. Engineering Characteristics of the Rocks of Pennsylvania: Pennsylvania Geological Survey EG-1.

GEOLOGIC MAP - WOLFF FARM POND



LEGEND

mr — Metarhyolite

— — — — Syncline


DA
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6-