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NATIONAL DAM INSPECTION PROGRAM. NEGLEY DAM (NDI NUMBER PA-0094--ETC(U)
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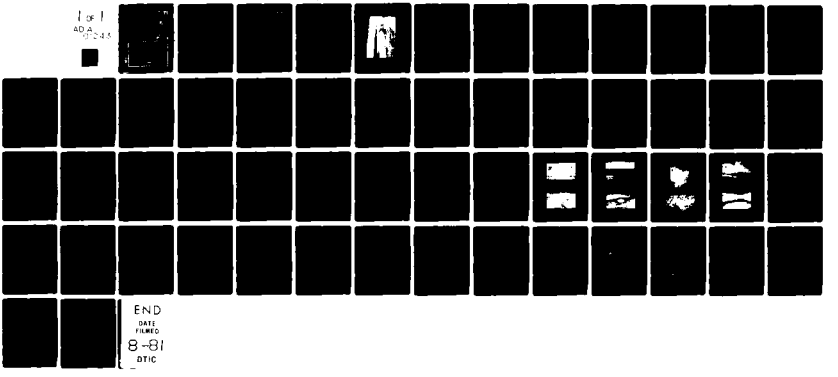

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SUSQUEHANNA RIVER BASIN
NEGLEY DAM
WILBUR R. NEGLEY, JR.

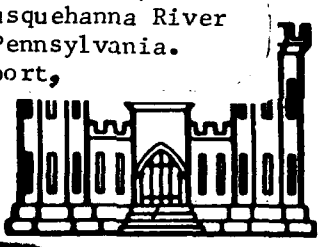
NDI NO. PA-00948
DER NO. 50-061

LEVEL II

PERRY COUNTY, PENNSYLVANIA.

PHASE I INSPECTION REPORT.
NATIONAL DAM INSPECTION PROGRAM.

(6) National Dam Inspection Program. Negley Dam (NDI Number PA-00948, DER Number 50-061), Susquehanna River Basin, Perry County, Pennsylvania. Phase I Inspection Report,



(10) Hendrik Jongsma

PREPARED FOR

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

(12) 56

(15) DACW31-81-C-0013

BY

Berger Associates
Harrisburg, Pennsylvania 17105

(11) JUNE 1981

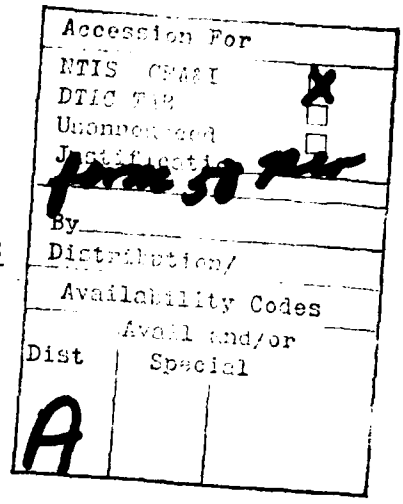
PREFACE

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: NEGLEY DAM

State & State No.: PENNSYLVANIA, 50-61

County: PERRY

Stream: TRIBUTARY TO LITTLE JUNIATA CREEK

Date of Inspection: NOVEMBER 4, 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 flood to one-half the Probable Maximum Flood (PMF). The recommended SDF for this structure is the 100 year flood. The spillway capacity is sufficient for passing the SDF 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 brush and weeds be removed in the seepage area at the downstream pipe outlet and that this area be maintained on a regular basis.

2. That the seepage condition at the downstream toe be observed on a regular basis. If turbidity or an increase in quantity is detected, immediate steps should be taken to correct the condition.

3. That provisions be made to provide for upstream closure of the drawdown pipe in case of an emergency.

4. That the groundhog hole be filled.

NEGLEY DAM NDI NO. PA-00948 DER NO. 50-061

WILBUR R. NEGLEY, JR. PERRY COUNTY

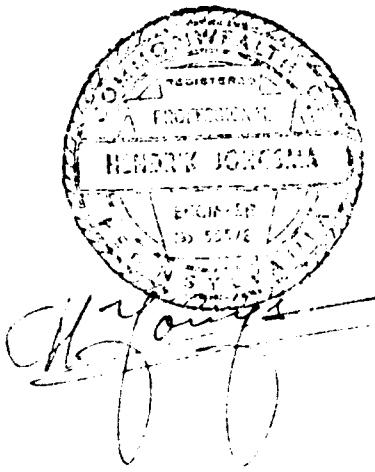
5. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.

6. 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

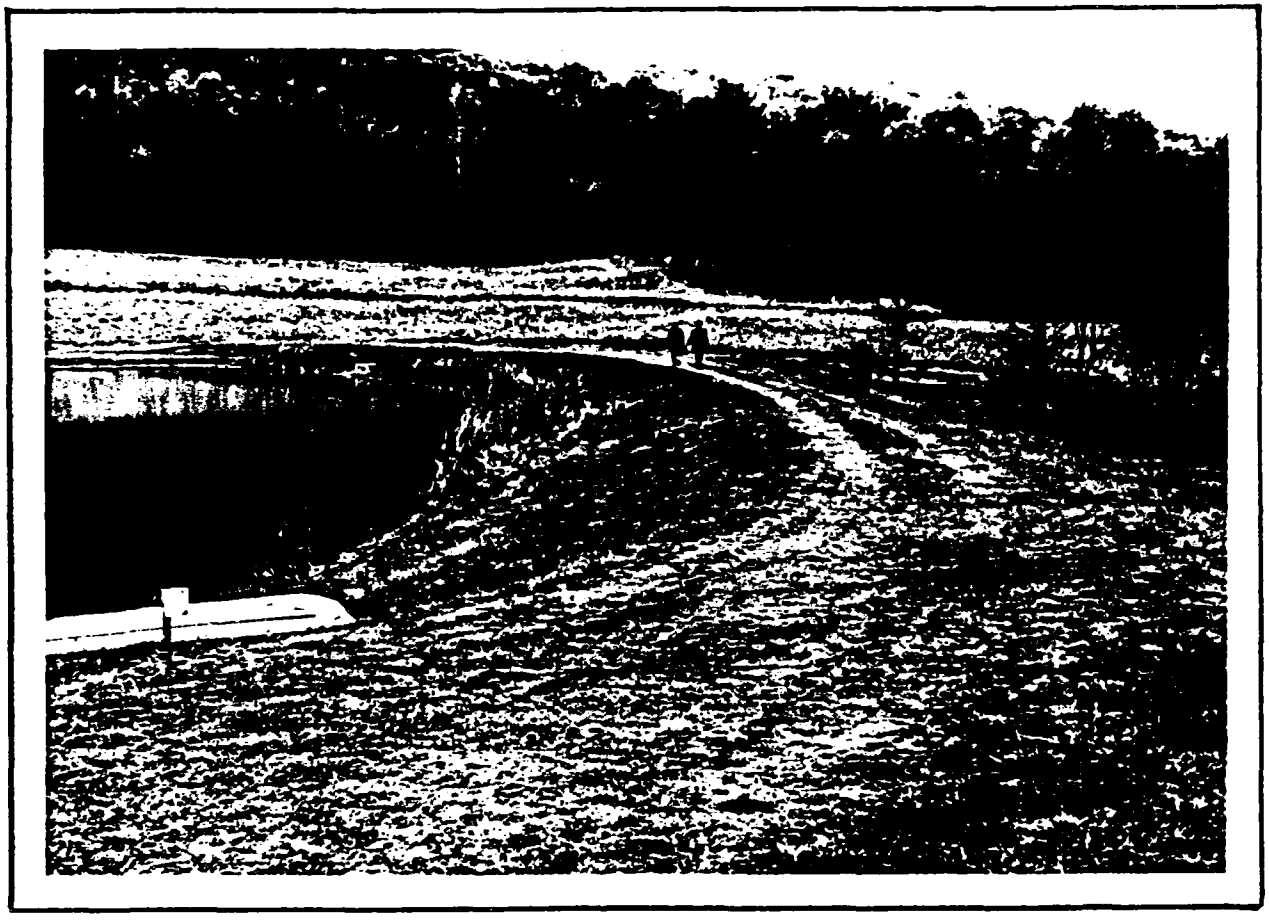
DATE: June 5, 1981



APPROVED BY:

JAMES W. PECK
Colonel, Corps of Engineers
Commander and District Engineer

DATE: 17 June 1981



OVERVIEW

NEGLEY DAM

Photograph No. 1

TABLE OF CONTENTS

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NEGLEY DAM

NDI NO. PA-00948
DER NO. 50-061

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 735.0. This elevation is used in this report as the top of the principal spillway (Photograph No. 5). This compares with a design elevation of 97.0 (Plate III, Appendix E).

Negley Dam is an earthfill structure with a maximum embankment height of 19 feet. The length of the embankment is about 470 feet.

The principal spillway is a 34-inch diameter vertical drop inlet pipe with an 18-inch outlet pipe. An emergency spillway is located in the left abutment. It consists of a grass lined channel with a bottom width of 47 feet and a crest elevation 0.9 foot above the principal spillway crest. The low point in the dam profile is located near the spillway at 3.2 feet above the principal spillway and is above the design crest elevation.

A 4-inch drawdown pipe extends through the embankment near the center of the dam. This pipe is controlled by a valve located at the downstream toe.

B. Location: Carroll Township, Perry County
U.S.G.S. Quadrangle - Newport, Pa.
Latitude 40°-23.4', Longitude 77°-09.6'
Appendix E, Plates I & II

C. Size Classification: Small: Height - 19 feet
Storage - 51 acre-feet

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

E. Ownership: Mr. Wilbur R. Negley, Jr.
R.D. #1, Box 99
Shermansdale, PA 17090
Tel. (717) 582-4930

F. Purpose: Recreation

G. Design and Construction History

The structure was designed by the Soil Conservation Service in their New Bloomfield, Pennsylvania, office for the present owners. The drawings were schematic (Plate III, Appendix E). The contractor, Kitner Brothers, Shermansdale, Pennsylvania, completed construction in October 1973. The Soil Conservation Service supervised the construction. A Pennsylvania Department of Environmental Resources (PennDER) permit was not required.

H. Normal Operating Procedures

All inflow is discharged through the uncontrolled principal spillway until the pool level reaches the crest of the emergency spillway. There are no operating procedures for these facilities.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

Computed for this report:	0.40

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 Bixler Run)	369
Outlet works at pool Elev. 735	0.6
Outlet works at low pool Elev. 725	0.4
Principal spillway capacity at pool Elev. 738.2 (low point of dam)	18.5

Emergency spillway capacity at pool Elev. 738.2 (low point of dam)	427
Total discharge capacity at pool Elev. 738.2	446

C. Elevation (feet above mean sea level)

Top of dam (low point)	738.2
Top of dam (design crest)	738
Principal spillway crest	735
Emergency spillway crest	735.9
Upstream invert of 4" drain pipe (estimated)	721
Downstream invert of 4" drain pipe	719.5
Streambed at downstream toe of dam (estimate)	719.5

D. Reservoir (miles)

Length of normal pool (Elev. 735)	0.1
Length of maximum pool (Elev. 738.2)	0.2

E. Storage (acre-feet)

Spillway crest (Elev. 735)	30
Top of dam (Elev. 738.2)	51

F. Reservoir Surface (acres)

Spillway crest (Elev. 735)	5.7
Top of dam (Elev. 738.2)	7.4

G. Dam

Refer to Plate III in Appendix E for plan and section.

Type:	Earthfill.
Length:	470 feet.
Height:	19 feet.
Top Width:	Design - 12 feet; Survey - 12 feet.

Side Slopes:		Design	Surveyed
	Upstream	2H to 1V	2.7H to 1V
	Downstream	3H to 1V	3.3H to 1V

Zoning: None.

Cutoff: A four foot deep, eight foot wide trench excavated along the centerline of the dam.

Grouting: None.

H. Outlet Facilities

Type: 4-inch diameter steel pipe.

Closure: 4-inch valve on downstream end.

Location: Near center of dam.

I. Spillway

Principal:

Type: Uncontrolled, circular concrete drop inlet, 34-inch diameter.

Outlet: 18-inch CMP.

Location: Between center of dam and left abutment.

Crest Elevation: 735

Emergency:

Type: Uncontrolled, sod lined, broad crested weir.

Weir Length: 47 feet on bottom with side slopes of 3.6H to 1V on left and 4.2H to 1V on right.

Location: Left abutment.

Crest Elevation: 735.9

J. Regulating Outlets

See Section 1.3.H. above.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Engineering design data for Negley Dam is limited to one schematic drawing and two sheets of calculations. This drawing is reproduced in Appendix E of this report. Calculations were made to determine the size and number of cutoff collars on the 18-inch principal spillway outlet and for the design of the emergency spillway. The spillway design, based on the "C" curve from PennDER, was for 390 cfs.

2.2 CONSTRUCTION

The dam was constructed by Kitner Brothers, Shermansdale, Pennsylvania, under the supervision of the Soil Conservation Service. Records of construction are not available. The owner stated in a telephone conversation that the borrow material, described as yellow clay, was obtained from the reservoir area.

2.3 OPERATION

Records of operation are not maintained by the owner. It was stated that the four inch blowoff valve is occassionally opened to remove sedimentation and to clean out the line. Seepage at the toe was reported to be constant. The owner stated that the emergency spillway has never been used.

2.4 EVALUATION

A. Availability

The schematic design drawing and design calculations were obtained from the S.C.S. office in New Bloomfield, Pennsylvania. The limited construction information was obtained by telephone from the owner.

B. Adequacy

The available engineering data is only sufficient to confirm that the dam was constructed in accordance with the general layout. Because of the lack of detailed engineering data, the assessment of the dam is based on a 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 replacement of the principal spillway intake. The concrete of the original structure deteriorated badly and was replaced in the fall of 1980 by the present concrete encased CMP.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

A. General

The general appearance of Negley Dam is good. The embankment appears to be well maintained, except for a small area at the downstream toe around the principal spillway pipe outlet. The principal spillway is a 34-inch drop inlet structure with an 18-inch outlet pipe. The emergency spillway, located in the left abutment, has a well defined channel.

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.

B. Embankment

The nineteen foot high embankment is located in an area with gentle slopes. The right abutment is close to a local road which parallels the reservoir. The slopes of the embankment and the crest of the dam have a well maintained grass mat. There were no indications of surface cracks, sloughing or other signs of an unstable condition. An area at the downstream toe around the outlets of the drawdown pipe and the principal spillway was wet and soggy with some small pools of standing water. Water movement was small and not measurable. Weeds and briars prevented close observation of this condition. At the time of inspection, the reservoir water level was 2.3 feet below normal pool elevation. It is recommended that this wet condition be kept under regular surveillance, especially during high pool levels. A groundhog hole was observed in the overgrown area.

The centerline of the dam is curved (concave upstream). The surveyed profile (Plate A-II, Appendix A) indicates that the crest of the dam is higher than the design crest elevation.

C. Appurtenant Structures

The principal spillway consists of a 34-inch CMP drop inlet pipe, encased in concrete (Photograph No. 5). Discharge is through an 18-inch CMP which terminates at the downstream toe. A small rock lined plunge pool prevents erosion. The area is overgrown with weeds and briars (Photograph No. 6). The outlet was constructed without a headwall.

The emergency spillway is located in the left abutment and consists of a grassed earth channel. The approach is directly from the reservoir (Photograph No. 3). The left side of the spillway is a corn

field with a nearly level surface. The spillway discharges away from the embankment and the channel is unobstructed.

A four inch valve is located to the right of the principal spillway outlet. This valve controls a four inch drawdown pipe. It was operated on the day of inspection.

D. Reservoir Area

The area surrounding the reservoir has gentle to moderate slopes and is mostly cultivated land with some homes along the local road (Photograph No. 9). The banks of the reservoir are stable. Sedimentation of the reservoir does not appear to be a serious problem.

E. Downstream Channel

The immediate downstream channel is a small creek through a lightly wooded area. The creek flows through a wide cultivated valley for about 6000 feet at which point it crosses underneath Pennsylvania Route 34. The creek drops about 100 feet in elevation over this length.

A house and a warehouse/manufacturing plant are located immediately below the dam (Photograph No. 2). There is a potential hazard for loss of a few lives downstream if the dam failed. The hazard category for Negley Dam is considered to be "Significant."

3.2 EVALUATION

The overall visual evaluation of the facilities indicates that the Negley Dam is in good condition. It is recommended that the area around the outlet pipes be cleared of brush and weeds on a regular basis. This will permit regular observation of the seepage condition.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

Negley Dam was constructed for recreational purposes, which are limited to fishing, boating and ice skating. A normal pool level is desired for these functions. All inflow is discharged through the principal spillway until the level reaches the crest of the emergency spillway. The blowoff valve is opened occassionally to clean out sedimentation.

4.2 MAINTENANCE OF EMBANKMENT

The embankment slopes and the crest of the dam appear to be mowed regularly and have a good appearance, except in the area around the pipe outlets. The wet condition in this area prevents the use of equipment.

4.3 MAINTENANCE OF OPERATING FACILITIES

The only operating facility is the four inch valve at the downstream toe. This valve is used occasionally.

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 Negley Dam are limited to mowing of the embankment. It is recommended that the maintenance of the dam include the clearing of brush and weeds in the area of the pipe outlet.

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

The hydrologic and hydraulic analysis available from PennDER and S.C.S. for Negley Dam was not very extensive. No area-capacity curve, frequency curve, unit hydrograph, design storm, design flood hydrograph, or flood routings were available. The S.C.S. data indicated that the emergency spillway was sized for a PennDER "C" curve discharge.

B. Experience Data

There are no records of flood levels at Negley Dam. Based on records of the U.S.G.S. stream gage on Bixler Run at nearby Loysville, Pennsylvania, the maximum inflow to Negley Dam occurred in June 1978. The estimated inflow of 369 cfs was passed without reported difficulties.

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 until the dam is overtopped.

D. Overtopping Potential

Negley Dam has a total storage capacity of 51 acre-feet and an overall height of 19 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 the small downstream population, the recommended SDF is the 100 year flood. For this dam, the SDF peak inflow is 253 cfs (see Appendix D for HEC-1 inflow computations).

Comparison of the estimated SDF peak inflow of 253 cfs with the estimated combined spillway discharge capacity of 446 cfs indicates that a potential for overtopping of Negley Dam does not exist.

E. Spillway Adequacy

Since the total spillway discharge capacity can pass the SDF without overtopping, the spillway is considered to be adequate.

The hydrologic analysis for this investigation was based upon existing conditons 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 Negley Dam did not detect any signs of sloughs, surface cracks or other indications of structural instability. Seepage was noticed in the area of the pipe outlets near the downstream slope. There was no measurable flow of water, and the condition is not considered to be serious. Regular observation, however, is recommended.

2. Appurtenant Structures

The principal spillway appeared to be adequate, and there were no signs of stability problems. The top part of the overflow section was recently replaced.

The emergency spillway has an adequate grass mat cover to prevent erosion.

B. Design and Construction Data

The available design and construction data are not sufficient to review the structural stability of the embankment. However, the surveyed slopes are flatter than the design slopes and are considered to be adequate for the height of the dam under consideration.

C. Operating Records

Operating records for this dam have not been maintained by the owner. The owner stated that the wet condition at the toe is without variation.

D. Post Construction Changes

The only reported post construction change is the replacement of the principal spillway overflow section. The original concrete section was of poor quality and deteriorated due to freeze-thaw cycles. The upper part was replaced with an encased corrugated metal pipe.

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 Negley Dam is in good condition. The embankment appears to be stable, although there is some seepage at the downstream toe of the embankment.

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 brush and weeds be removed in the seepage area at the downstream pipe outlets and that this area be maintained on a regular basis.

2. That the seepage condition at the downstream toe be observed on a regular basis. If turbidity or an increase in quantity is detected, immediate steps should be taken to correct the condition.

3. That provisions be made to provide for upstream closure of the drawdown pipe in case of an emergency.

4. That the groundhog hole be filled.

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

6. 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 # 50-061 NDI NO. PA-00 948

NAME OF DAM Negley Dam HAZARD CATEGORY Significant

TYPE OF DAM Earth embankment

LOCATION Carroll TOWNSHIP Perry COUNTY, PENNSYLVANIA

INSPECTION DATE 11-4-80 WEATHER Cloudy TEMPERATURE 40-50°

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

H. Jongsma None

R. Shireman

A. Bartlett

NORMAL POOL ELEVATION: 735.0 (Estimated USGS) AT TIME OF INSPECTION:

BREAST ELEVATION: 738.2 (low point) POOL ELEVATION: 732.7

735.9 (Emergency)

SPILLWAY ELEVATION: 735.0 (Principal) TAILWATER ELEVATION:

MAXIMUM RECORDED POOL ELEVATION: Unknown

GENERAL COMMENTS:

General appearance of the embankment is good. Horizontal alignment is curved. With the exception of a portion of the downstream slope in the vicinity of the outlet pipe and a 4-inch pipe control valve, the slopes and the crest are mowed. The area around the outlet is wet and soggy.

NDI NO. PA-00 948

VISUAL INSPECTION
EMBANKMENT

	OBSERVATIONS AND REMARKS
A. SURFACE CRACKS	None evident.
B. UNUSUAL MOVEMENT BEYOND TOE	None observed.
C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES	Embankment slope downstream is reasonably uniform. No distress evident. Groundhog hole in brush area. Upstream slope is uniform.
D. ALIGNMENT OF CREST: HORIZONTAL: VERTICAL:	Horizontal alignment is curved. Refer to Profile for vertical alignment.
E. RIPRAP FAILURES	No riprap.
F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY	Junctions with natural ground are good.
G. SEEPAGE	Wet area in the vicinity of the 18-inch outlet pipe and a 4-inch control valve. Water is moving but is not measurable.
H. DRAINS	None.
J. GAGES & RECORDER	None.
K. COVER (GROWTH)	Grass cover throughout, except the heavy brush area on the downstream slope in the vicinity of the outlet pipe and the 4-inch valve.

NDI NO. PA-00 948

VISUAL INSPECTION
OUTLET WORKS

	OBSERVATIONS AND REMARKS
A. INTAKE STRUCTURE	Horizontal 18-inch and CMP in vertical concrete overflow. 48 inch square, 34 inch diameter on top. Some erosion of embankment behind concrete. This condition not considered serious at this time.
B. OUTLET STRUCTURE	18 inch CMP - no endwall - located at toe of downstream toe. Discharges into a small rock lined pool.
C. OUTLET CHANNEL	Small creek channel through lightly wooded area.
D. GATES	None.
E. EMERGENCY GATE	4 inch valve. Valve was opened at time of this inspection. Downstream control.
F. OPERATION & CONTROL	None reported.
G. BRIDGE (ACCESS)	None.

NDI NO. PA-00 948

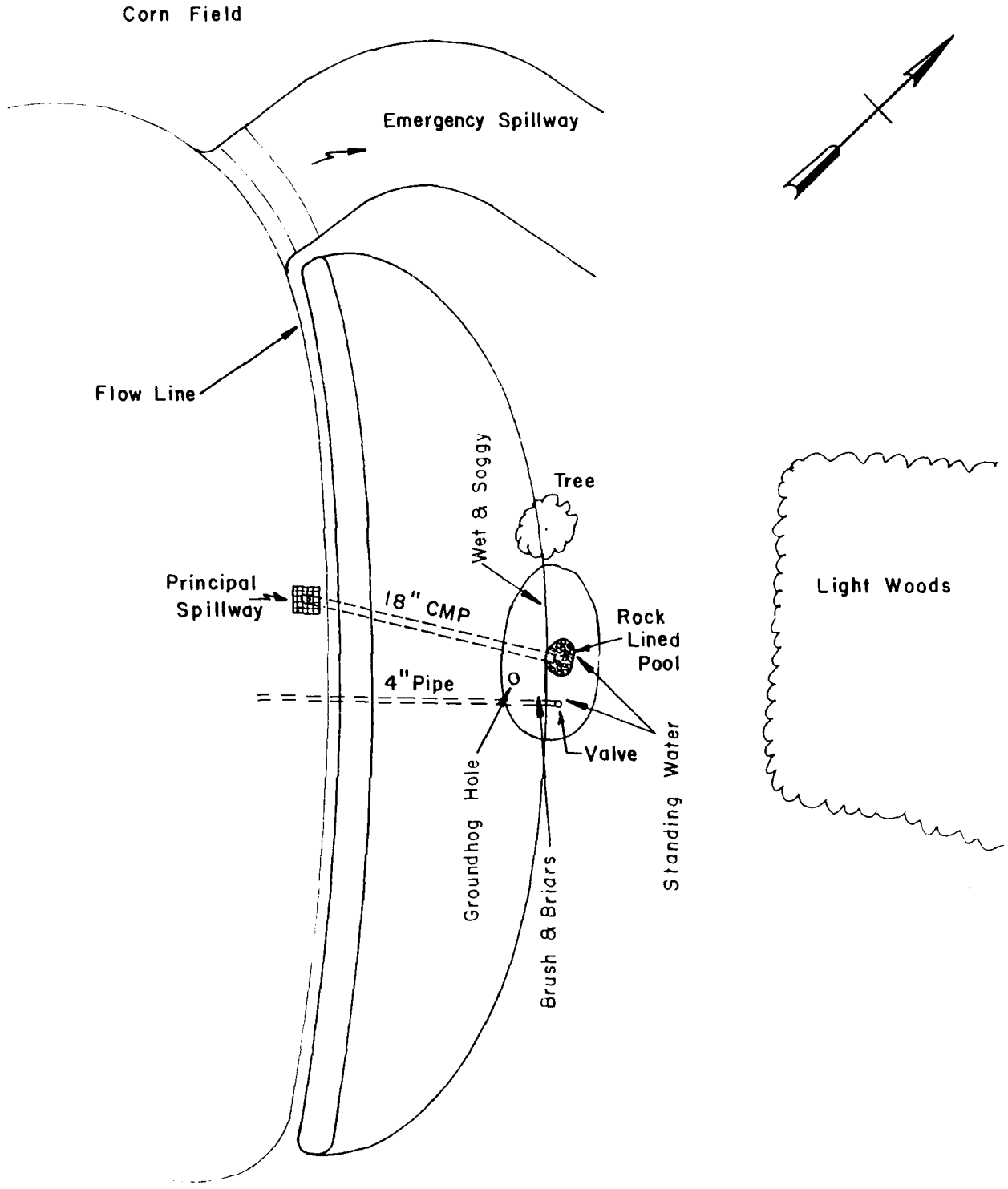
VISUAL INSPECTION
SPILLWAY
EMERGENCY SPILLWAY

	OBSERVATIONS AND REMARKS
A. APPROACH CHANNEL	Directly from reservoir on left side.
B. WEIR: Crest Condition Cracks Deterioration Foundation Abutments	Emergency spillway at left side of embankment. It is well defined and clear of obstructions.
C. DISCHARGE CHANNEL: Lining Cracks Stilling Basin	Small creek channel.
D. BRIDGE & PIERS	None.
E. GATES & OPERATION EQUIPMENT	None reported.
F. CONTROL & HISTORY	None reported.

NDI NO. PA-00 948

VISUAL INSPECTION

	OBSERVATIONS AND REMARKS
INSTRUMENTATION Monumentation	None.
Observation Wells	None.
Weirs	None.
Piezometers	None.
Staff Gauge	None.
Other	None.
RESERVOIR Slopes	Cultivated fields.
Sedimentation	None reported.
Watershed Description	Cultivated fields and woodlands.
DOWNSTREAM CHANNEL Condition	Small creek through lightly wooded area.
Slopes	Moderate 5-10° in the floodplain.
Approximate Population	3
No. Homes	One house and warehouse.



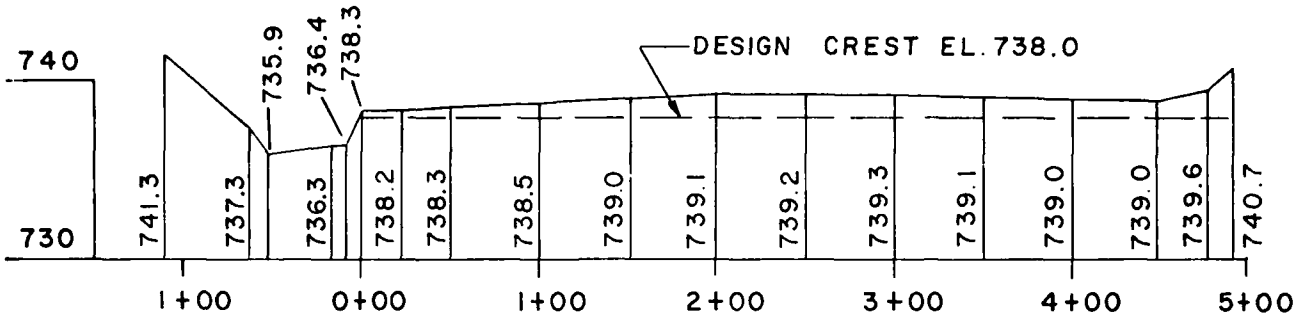
NEGLEY DAM

PA.-00948

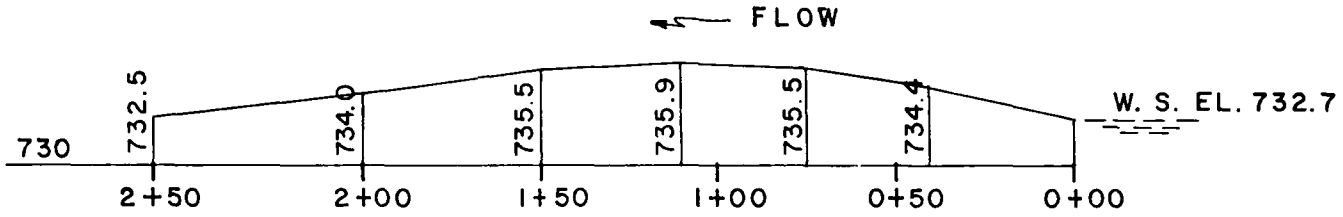
INSPECTION SURVEY

PLATE A-I

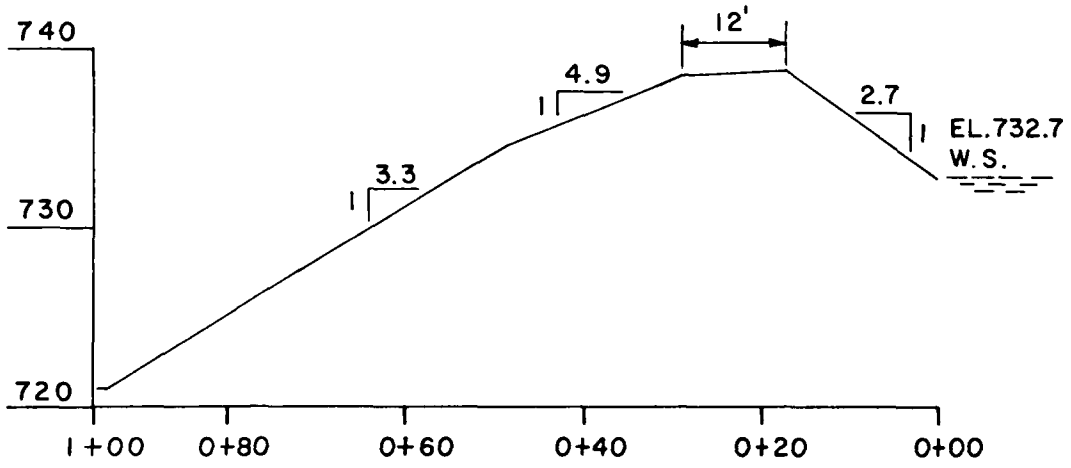
SURVEYED 11-4-80



EMBANKMENT PROFILE



SPILLWAY PROFILE



EMBANKMENT SECTION STA. 2+00

SURVEYED 11-4-80

NEGLEY DAM

PA-00948

INSPECTION SURVEY

PLATE A-II

APPENDIX B

CHECK LIST OF ENGINEERING DATA

CHECK LIST
ENGINEERING DATA

PA DER # 50-061 NDI NO. PA-00 948

NAME OF DAM Negley Dam

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	U.S.G.S. Quadrangle - Newport, Pa. See Plate II, Appendix E
CONSTRUCTION HISTORY	Constructed in 1973 by Kitner Brothers, Shermansdale, Pennsylvania, under supervision of Soil Conservation Service, New Bloomfield, Pennsylvania.
GENERAL PLAN OF DAM	Schematic Plan, Plate III, Appendix E.
TYPICAL SECTIONS OF DAM	Plate III, Appendix E.
OUTLETS: PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	Plate III, Appendix E.

NDI NO. PA-00 948

ENGINEERING DATA

ITEM	REMARKS
RAINFALL & RESERVOIR RECORDS	No records.
DESIGN REPORTS	No reports.
GEOLOGY REPORTS	None.
DESIGN COMPUTATIONS: HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Emergency spillway designed for "C" curve (390 cfs).
MATERIALS INVESTIGATIONS: BORING RECORDS LABORATORY FIELD	None.
POST CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	From reservoir area.

ENGINEERING DATA

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	None.
HIGH POOL RECORDS	No records.
POST CONSTRUCTION ENGINEERING STUDIES & REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM Description: Reports:	None.
MAINTENANCE & OPERATION RECORDS	No records.
SPILLWAY PLAN, SECTIONS AND DETAILS	Refer to Plate III, Appendix E.

NDI NO. PA-00 948

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT, PLANS & DETAILS	A 4-inch valve at downstream toe on blowoff line.
CONSTRUCTION RECORDS	No records.
PREVIOUS INSPECTION REPORTS & DEFICIENCIES	No records.
MISCELLANEOUS	

NDI NO. PA-00 948

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Woodland; small amount of farmland.

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 735.0 Acre-Feet 30

TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev. 738.2 Acre-Feet 51

MAXIMUM DESIGN POOL: Elev. 738.0

TOP DAM: Elev. 738.2

SPILLWAY:	PRINCIPAL	EMERGENCY
a. Elevation	735.0	735.9
b. Type	Circular concrete drop inlet	Sod lined, broad crested weir
c. Width	34" diameter	47'
d. Length	--	--
e. Location Spillover	Near center of dam	Left abutment
f. Number and Type of Gates	None	None

OUTLET WORKS:

a. Type 4" diameter steel pipe.

b. Location Near center of dam.

c. Entrance inverts 721

d. Exit inverts 719.5

e. Emergency drawdown facilities 4" valve on pipe.

HYDROMETEOROLOGICAL GAGES:

a. Type None.

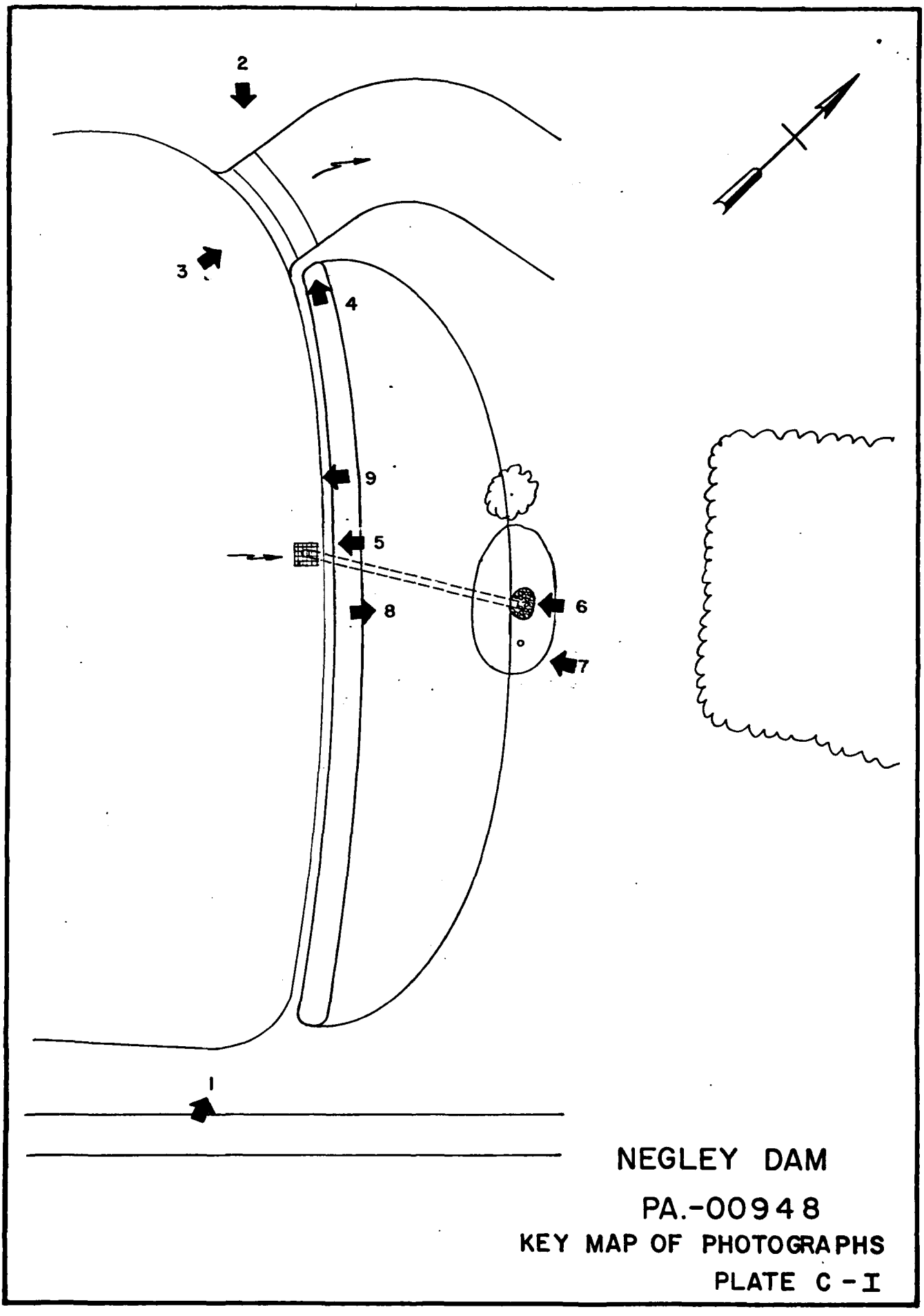
b. Location

c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 446 cfs

APPENDIX C

PHOTOGRAPHS



NEGLEY DAM

PA.-00948

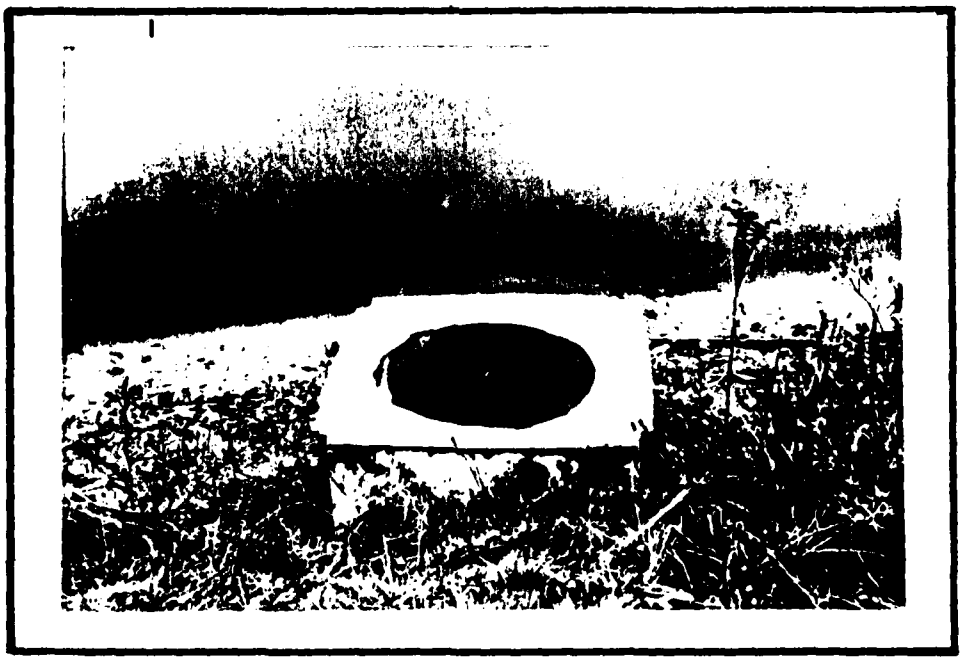
KEY MAP OF PHOTOGRAPHS

PLATE C-I

OVERVIEW FROM LEFT ABUTMENT - NO. 2
EMERGENCY SPILLWAY IN FOREGROUND

EMERGENCY SPILLWAY LOOKING DOWNSTREAM - NO. 3

LEFT ABUTMENT & SPILLWAY - NO. 4



PRINCIPAL SPILLWAY - NO. 5

PA-00948
Plate C-III

PRINCIPAL SPILLWAY OUTLET - NO. 6

4-INCH VALVE AT DOWNSTREAM TOE - NO. 7

PA-00948
Plate C-IV

DOWNSTREAM CHANNEL - NO. 8

RESERVOIR OVERVIEW - NO. 9

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.

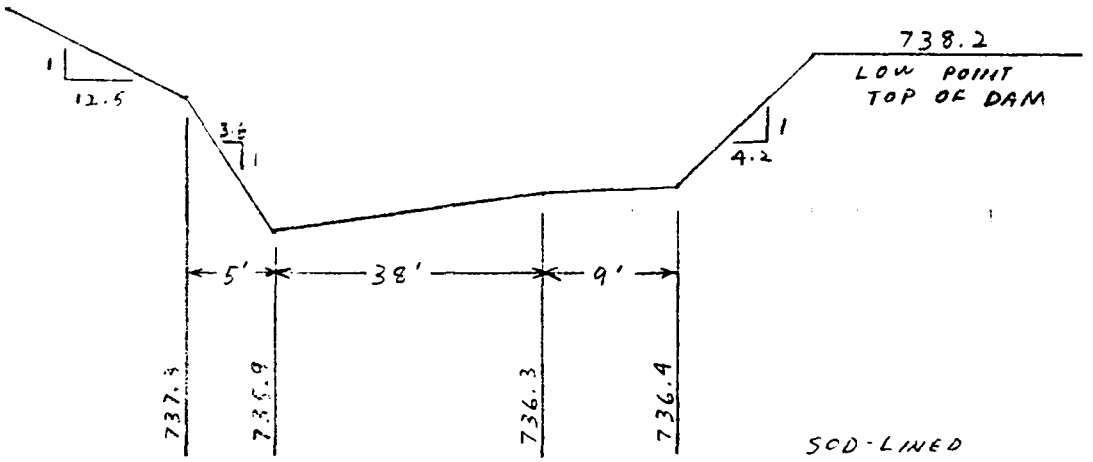
The output data provided by this program permits the comparison of downstream conditions just prior to a breach failure with that after a breach failure and the determination as to whether or not there is a significant increase in the hazard to loss of life as a result of such a failure.

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 BLS DATE 2/10/81 **BERGER ASSOCIATES** SHEET NO. 1 OF 8
CHKD. BY DATE PROJECT D0590
SUBJECT NEGLEY DAM

SPILLWAY RATING (EMERGENCY)



SOD-LINED
BROAD CRESTED WEIR

C = 2.7 (KINGS HDBK.)

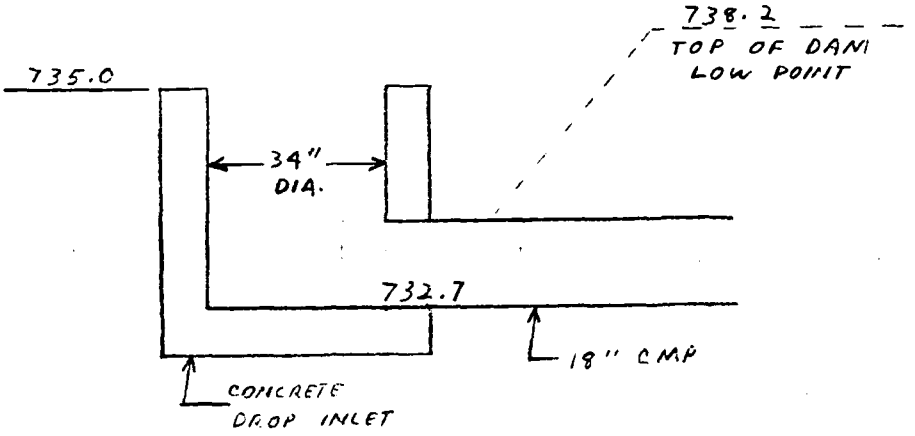
$$Q = CL_1H_1^{3/2} + CL_2H_2^{3/2} + CL_3H_3^{3/2} + CL_4H_4^{3/2} + CL_5H_5^{3/2}$$

$L_1 = (738.2 - 737.3) \times 12.5 = 11.25$
$H_1 = (738.2 - 737.3)/2 = .45$
$H_2 = 738.2 - ((737.3 + 735.9)/2) = 1.6$
$L_2 = 5'$
$H_3 = 738.2 - ((735.9 + 736.3)/2) = 2.1$
$L_3 = 38'$
$H_4 = 738.2 - ((736.3 + 736.4)/2) = 1.85$
$L_4 = 9'$
$H_5 = (738.2 - 736.4)/2 = .9$
$L_5 = (738.2 - 736.4) \times 4.2 = 7.56$

$$Q = 2.7 \times \left((11.25 \times (.45)^{1.5}) + (5 \times (1.6)^{1.5}) + (38 \times (2.1)^{1.5}) + (9 \times (1.85)^{1.5}) + (7.56 \times (.9)^{1.5})\right)$$

$= 427$ CFS

SPILLWAY RATING (PRINCIPAL)



C = 0.6 (KING'S HDBK)

$Q = C A \sqrt{2gH}$

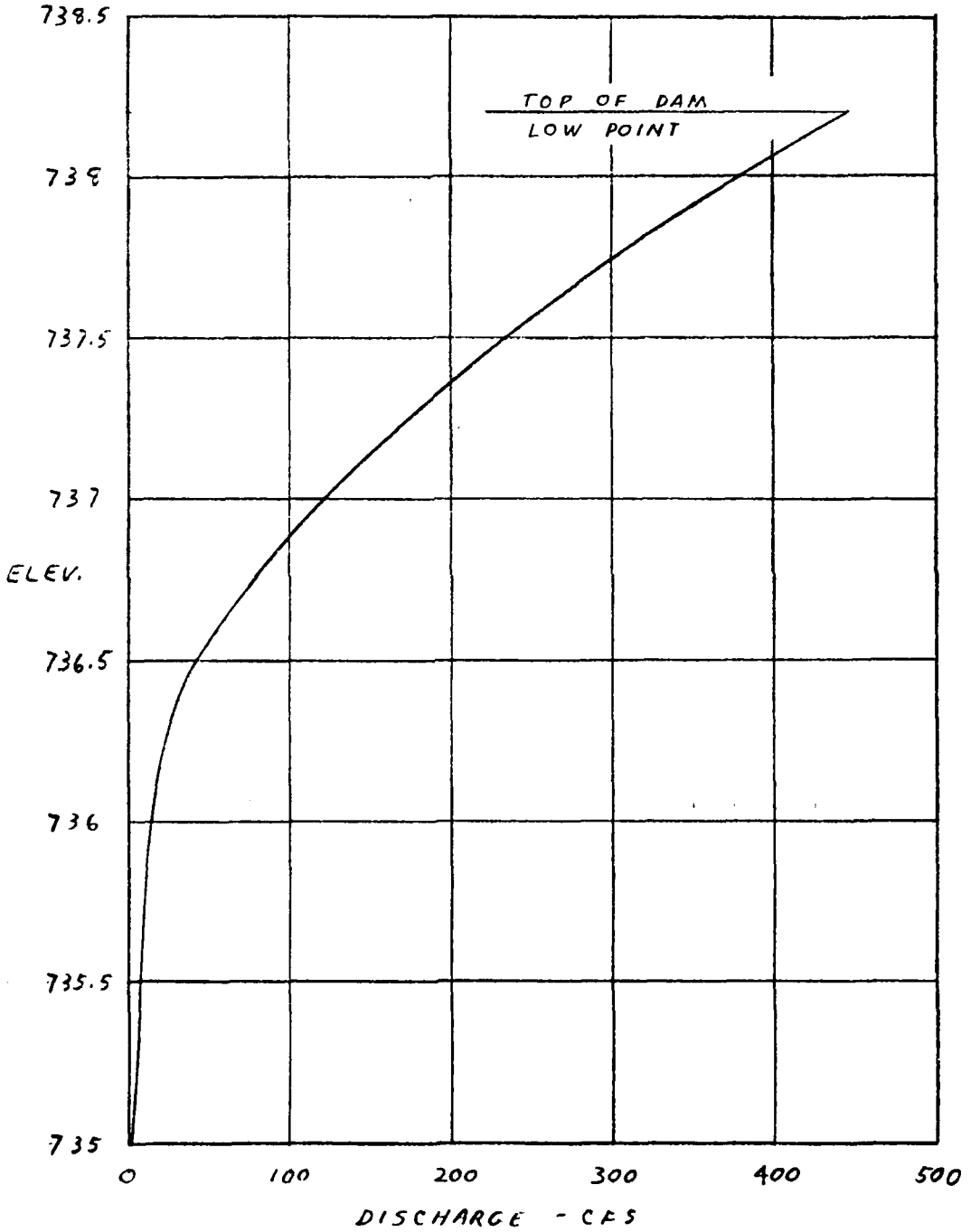
$H = 738.2 - 733.45 = 4.75$

$Q = 0.6 \times \pi \times \frac{(1.5)^2}{4} \times (2 \times 32.2 \times 4.75)^{0.5}$

$= 18.5$ CFS

BY RLS DATE ____ BERGER ASSOCIATES SHEET NO. 3 OF 8
CHKD. BY ____ DATE ____ PROJECT D0590
SUBJECT NEGLEY DAM

DISCHARGE RATING CURVE



BY RLS DATE 2/12/81 **BERGER ASSOCIATES** SHEET NO. 4 OF 8
CHKD. BY DATE PROJECT D0590
SUBJECT NEGLEY DAM

DISCHARGE THROUGH OUTLET WORKS

4" DIAMETER STEEL PIPE

LENGTH = 120' OUTLET INVERT: 719.5

$Q = 1.486 \times A \times R^{2/3} \times S^{1/2} / N$ $N = .015$ (KING'S HDBK.)

AT NORMAL POOL LEVEL 735

$S = (735 - 719.7)/120 = .1275$

$R = (4/12)/4 = .083$

$Q = 1.486 \times (\pi \times (4/12)^2/4) \times (.083)^{2/3} \times (.1275)^{.5}/.015$

$= .59$ SAY .6 CFS

AT LOW POOL LEVEL 725

$S = (725 - 719.7)/120 = .04583$

$Q = 1.486 \times (\pi \times (4/12)^2/4) \times (.083)^{2/3} \times (.04583)^{.5}/.015$

$= .35$ SAY .4 CFS

BY RLS DATE 2/12/81 **BERGER ASSOCIATES** SHEET NO. 5 OF 8
CHKD. BY DATE PROJECT D0590
SUBJECT NEGLEY DAM

EMBANKMENT RATING

$Q = C L H^{3/2}$ $C = 2.7$ (KING'S HDBK)

AT ELEV 738.5

$2.7 \times 50 \times (.25)^{1.5} = 17$
$2.7 \times 50 \times (.1)^{1.5} = 4$ $\Sigma = 21$ CFS

AT ELEV 739

$2.7 \times 50 \times (.75)^{1.5} = 87$
$2.7 \times 50 \times (.6)^{1.5} = 63$
$2.7 \times 50 \times (.25)^{1.5} = 17$ $\Sigma = 167$ CFS

AT ELEV 739.5

$2.7 \times 50 \times (1.25)^{1.5} = 189$
$2.7 \times 50 \times (1.1)^{1.5} = 156$
$2.7 \times 50 \times (.75)^{1.5} = 87$
$2.7 \times 150 \times (.35)^{1.5} = 84$
$2.7 \times 50 \times (.3)^{1.5} = 22$
$2.7 \times 50 \times (.45)^{1.5} = 41$
$2.7 \times 50 \times (.5)^{1.5} = 48$
$2.7 \times 21 \times (.25)^{1.5} = 7$ $\Sigma = 634$ CFS

MAXIMUM KNOWN FLOOD AT DAM SITE

THERE ARE NO RECORDS OF POOL LEVELS FOR THIS DAM. BASED ON THE RECORDS OF THE GAGING STATION FOR BIXLER RUN AT NEARBY LOYSVILLE, PA. (D.A. = 15 SQ. MI.) THE MAXIMUM DISCHARGE AT THE GAGE OCCURRED IN JUNE 1978 WHEN A DISCHARGE OF 6700 CFS WAS OBSERVED. THE MAXIMUM INFLOW TO NEGLEY DAM IS ESTIMATED TO BE:

$$Q = \left(\frac{0.40}{15}\right)^{0.8} \times 6700$$

$$= 369 \text{ CFS}$$

DESIGN FLOOD

SIZE CLASSIFICATION
MAXIMUM STORAGE = 51 ACRE-FEET
MAXIMUM HEIGHT = 18 FEET
SIZE CLASSIFICATION IS "SMALL"

HAZARD CLASSIFICATION
WAREHOUSE IS LOCATED JUST DOWNSTREAM OF THE DAM
USE "SIGNIFICANT"

RECOMMENDED SPILLWAY DESIGN FLOOD
THE ABOVE CLASSIFICATIONS INDICATE USE OF AN SDF IN THE RANGE OF THE 100 YEAR FLOOD TO ONE-HALF THE PROBABLE MAXIMUM FLOOD.

100 YEAR FLOOD

REF: "HYDROLOGIC STUDY, TROPICAL STORM AGNES", U.S. ARMY, CORPS OF ENGINEERS, NAD, 1975.

NEGLEY DAM DRAINAGE AREA = 0.40 SQ. MI.

(FIG. 21) $C_m = 1.9$

$LOG(Q_m) = C_m + 0.75\ LOG(D.A.)$

$= 1.9 + 0.75\ LOG(.4) = 1.602$

(FIG. 22) $C_s = .36$

$S = C_s - 0.05\ LOG(D.A.)$

$= .36 - 0.05\ LOG(.4) = .38$

(FIG. 23) SKEW = .45

STANDARD DEVIATE = 2.6506

$LOG(Q(P)) = LOG(Q_m) + K(P,g) \times S$

$LOG(Q_1) = 1.602 + (2.6506) \times .38$

$= 2.609$

$Q_1 = 407$ CFS

BY RLS DATE 5/28/81 **BERGER ASSOCIATES** SHEET NO. 8 OF 8
CHKD. BY DATE PROJECT D0590
SUBJECT NEGLEY DAM

100 YR FLOOD

REF: WATER RESOURCES BULLETIN NO. 13, "FLOODS IN PENNSYLVANIA", PENNA. DEPT. OF ENVIRONMENTAL RESOURCES AND U.S. GEOLOGICAL SURVEY

DRAINAGE AREA = .40 SQ. MI.

(PLAINS 1 AND 4) MODEL = 6B

$Q_T = C A^X$

C = 259

X = 1.050

$Q_{100} = 259 \times (.4)^{1.05}$

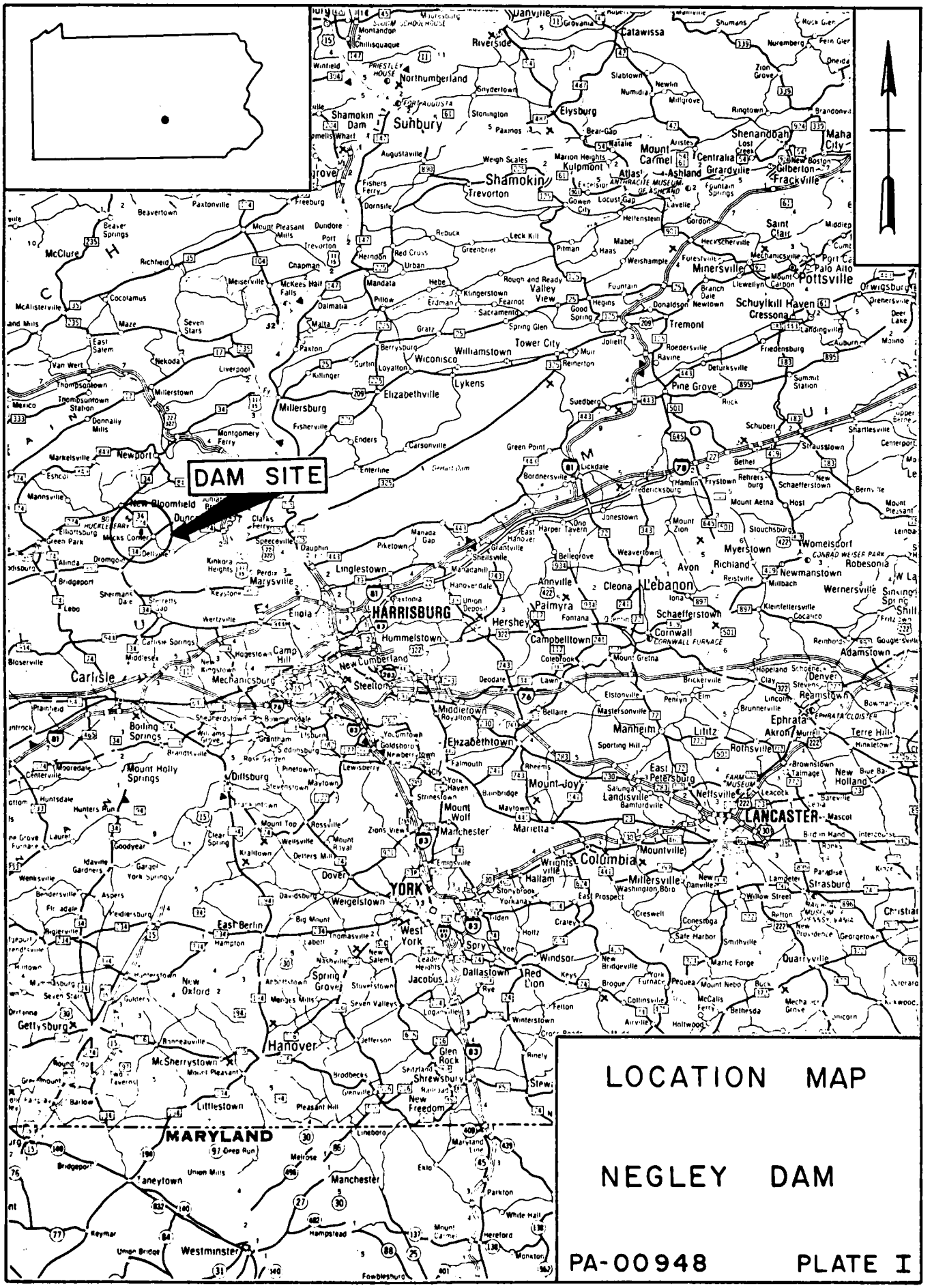
= 99 CFS

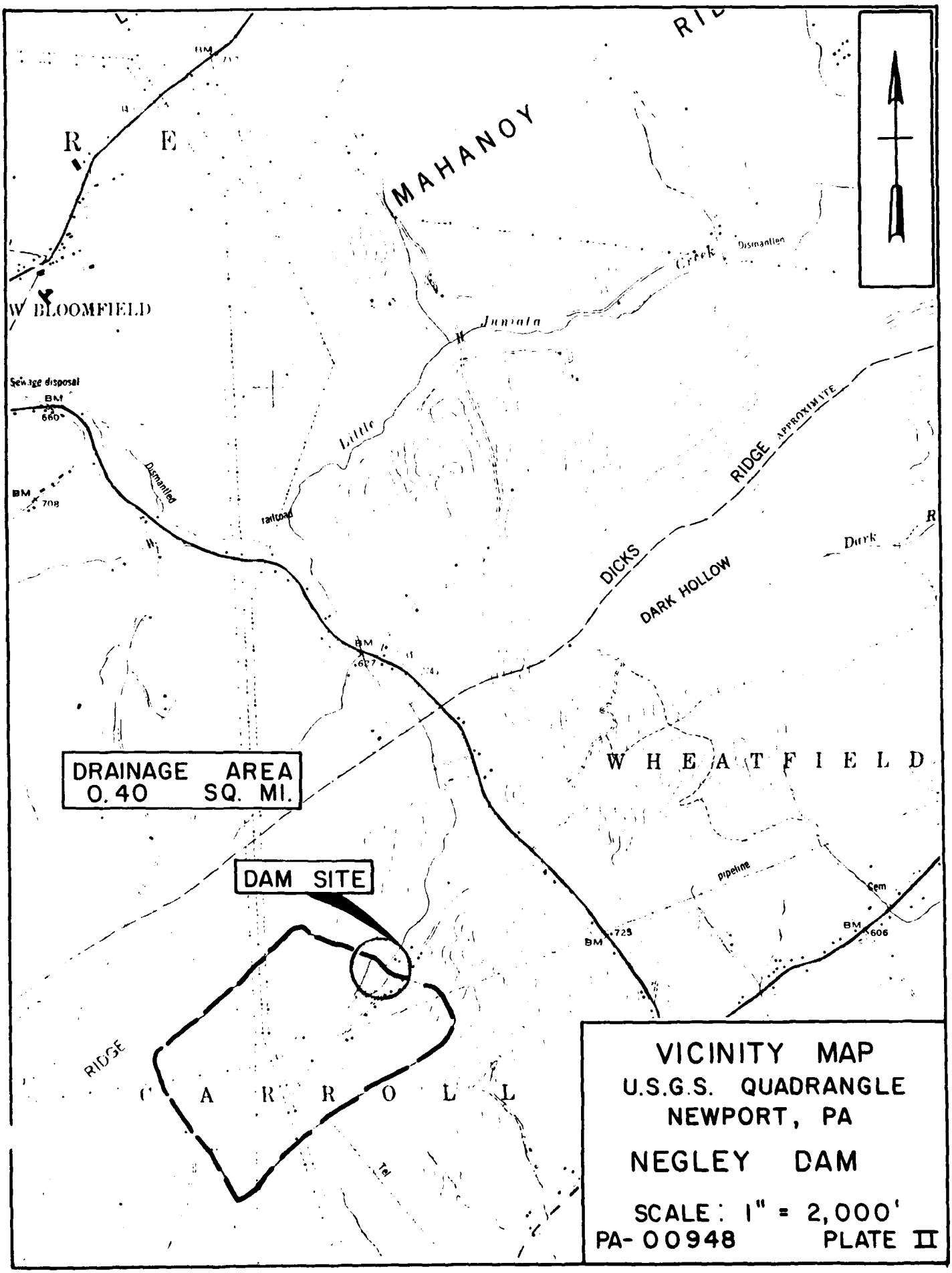
APPROXIMATE 100 YEAR DISCHARGE

(407 + 99)/2 = 253 CFS

APPENDIX E

PLATES


DAM SITE
LOCATION MAP
NEGLEY DAM
PA-00948
PLATE I
HARRISBURG
YORK
LANCASTER
LEBANON
MARYLAND
Northumberland
Sunbury
Shamokin
Mount Carmel
Pottsville
Tremont
Pine Grove
Lykens
Millersburg
Elizabethville
Williamstown
Tower City
Hummelstown
Carlisle
New Cumberland
Mechanicsburg
Camp Hill
Enola
Marysville
Linglestown
Dauphin
Newport
New Bloomfield
Duncannon
Elizabethtown
Middletown
Mount Joy
Manheim
Lititz
Ephrata
Columbia
Marietta
Mount Wolf
Manchester
Dillsburg
Mount Holly Springs
Boiling Springs
Shippensburg
Chambersburg
Gettysburg
Hanover
McSherrystown
New Oxford
East Berlin
Dover
Weigelstown
Red Lion
Dallastown
Windsor
Spry
West York
Glen Rock
Shrewsbury
New Freedom
Littlestown
Taneytown
Westminster
Manchester
Hampstead
Union Bridge
Union Mills
Keymar
Bridgeport
Lewisberry
Mount Top
Wellsville
Mount Royal
Goldsboro
Newberrytown
Falmouth
Bainbridge
Maytown
Strinestown
Yocumtown
Rossville
Clear Spring
Kralltown
Detters Mill
Emigsville
Yorkana
Stonybrook
Hallam
Wrightsville
Millersville
Washington Boro
East Prospect
Creswell
Conestoga
Safe Harbor
Smithville
Marticville
Quarryville
Willow Street
Lampeter
Strasburg
Paradise
Leacock
Neffsville
Landisville
Bamburdville
Rheems
Elizabethtown
Mount Gretna
Cornwall
Lebanon
Annville
Palmyra
Hershey
Schaefferstown
Campbelltown
Colebrook
Cleona
Avon
Myerstown
Womelsdorf
Robesonia
Newmanstown
Richland
Millbach
Reistville
Jonestown
Bellegrove
Weavertown
Mount Aetna
Frystown
Hamlin
Bethel
Rehrersburg
Schaefferstown
Strausstown
Shartlesville
Centerport
Bernville
Host
Mount Pleasant
Stouchsburg
Deturksville
Summit Station
Pine Grove
Suedberg
Green Point
Bordnersville
Lickdale
Fredericksburg
Schuylkill Haven
Cressona
Minersville
Palo Alto
Pottsville
Frackville
Gilberton
Ashland
Girardville
Shenandoah
Mahanoy City
Mount Carmel
Centralia
Kulpmont
Marion Heights
Atlas
Locust Gap
Gowen City
Shamokin
Trevorton
Elysburg
Ringtown
Zion Grove
Numidia
Slabtown
Catawissa
Riverside
Danville
Milton
Lewisburg
Selinsgrove
Sunbury
Shamokin Dam
Montandon
Chillisquaque
Winfield
Watsontown
Milton
Muncy
Williamsport
Lock Haven
Clearfield
Altoona
Bedford
Chambersburg
Carlisle
Harrisburg
Lancaster
Reading
Pottsville
Wilkes-Barre
Scranton
Hazleton
Allentown
Bethlehem
Easton
Stroudsburg
Milford
Honesdale
Susquehanna
Binghamton
Elmira
Corning
Wellsboro
Coudersport
Bradford
Kane
Warren
Oil City
Franklin
Meadville
Erie
Titusville
Oil City
Pittsburgh
Greensburg
Uniontown
Connellsville
Somerset
Johnstown
Ebensburg
Indiana
Kittanning
New Castle
Beaver
Aliquippa
Ambridge
Sewickley
McKeesport
Monongahela
Washington
Waynesburg
Carmichaels
Brownsville
Fayette City
Belle Vernon
Monessen
Charleroi
Donora
Canonsburg
Washington
Meadville
Titusville
Oil City
Franklin
Kane
Warren
Bradford
Coudersport
Wellsboro
Mansfield
Towanda
Troy
Sayre
Athens
Tioga
Elmira
Corning
Binghamton
Susquehanna
Honesdale
Milford
Stroudsburg
Easton
Bethlehem
Allentown
Hazleton
Wilkes-Barre
Scranton
Pittston
Wyoming
Kingston
Nanticoke
Shickshinny
Berwick
Bloomsburg
Danville
Milton
Lewisburg
Selinsgrove
Sunbury
Northumberland
Riverside
Catawissa
Danville
Bloomsburg
Berwick
Nanticoke
Shickshinny
Wyoming
Kingston
Pittston
Scranton
Wilkes-Barre
Hazleton
Allentown
Bethlehem
Easton
Stroudsburg
Milford
Honesdale
Susquehanna
Binghamton
Elmira
Corning
Wellsboro
Coudersport
Bradford
Kane
Warren
Oil City
Franklin
Meadville
Erie
Titusville
Oil City
Pittsburgh
Greensburg
Uniontown
Connellsville
Somerset
Johnstown
Ebensburg
Indiana
Kittanning
New Castle
Beaver
Aliquippa
Ambridge
Sewickley
McKeesport
Monongahela
Washington
Waynesburg
Carmichaels
Brownsville
Fayette City
Belle Vernon
Monessen
Charleroi
Donora
Canonsburg
Washington
Meadville
Titusville
Oil City
Franklin
Kane
Warren
Bradford
Coudersport
Wellsboro
Mansfield
Towanda
Troy
Sayre
Athens
Tioga
Elmira
Corning
Binghamton
Susquehanna
Honesdale
Milford
Stroudsburg
Easton
Bethlehem
Allentown
Hazleton
Wilkes-Barre
Scranton
Pittston
Wyoming
Kingston
Nanticoke
Shickshinny
Berwick
Bloomsburg
Danville
Milton
Lewisburg
Selinsgrove
Sunbury
Northumberland
Riverside
Catawissa



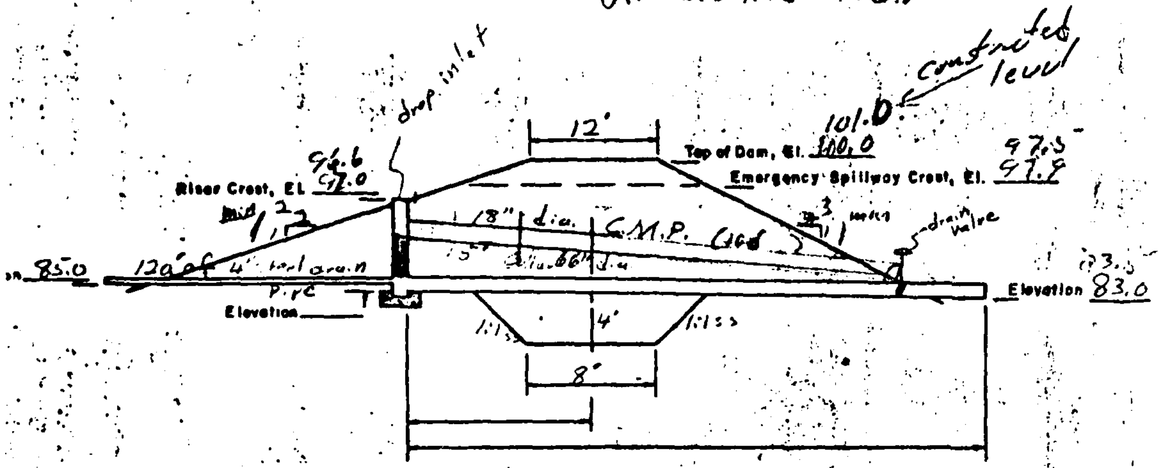
VICINITY MAP
U.S.G.S. QUADRANGLE
NEWPORT, PA

NEGLEY DAM

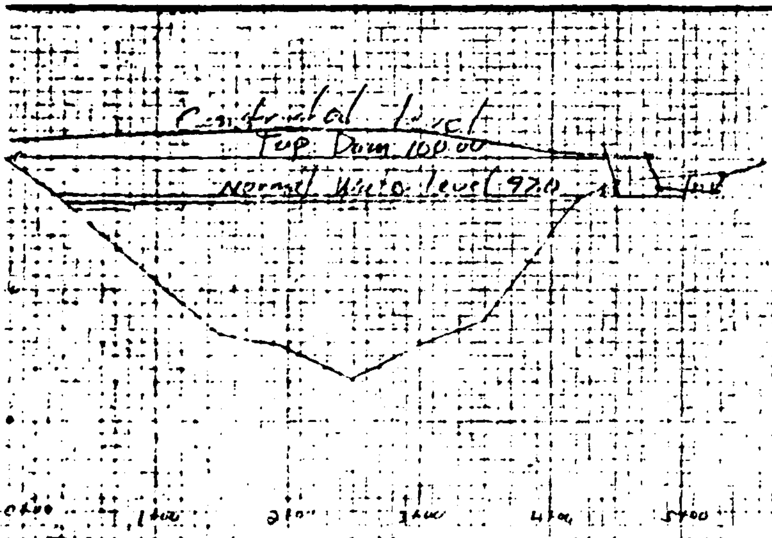
SCALE: 1" = 2,000'

PA-00948 PLATE II

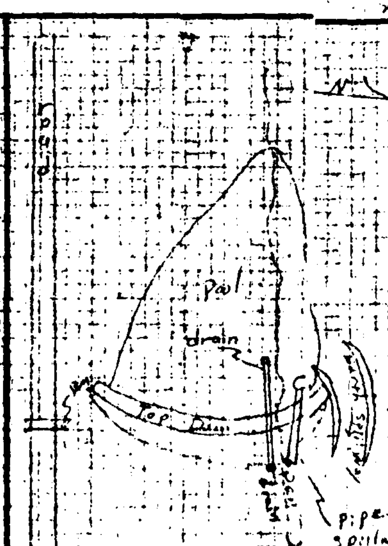
Completed 10-23-73
Jim Bistline - tech.



1 = Constructed



PROFILE ALONG ℄ DAM



PLAN VIEW

QUANTITIES

	Planned	Installed
18" dia. Corrugated metal pipe	100'	100'
Steel Cutoff collars each 66" X 66"	2	2
Concrete drop inlet tank 30" X 30"	1	1
Trash Guard	1	1
4" steel drain pipe	120'	120
4" gate valve	1	1
Earth Fill	8600 cu.yd.	

BM AND SPILLWAY DESIGN DATA

B.M. 100.00 = top of Culvert

Normal Waterlevel 97.0

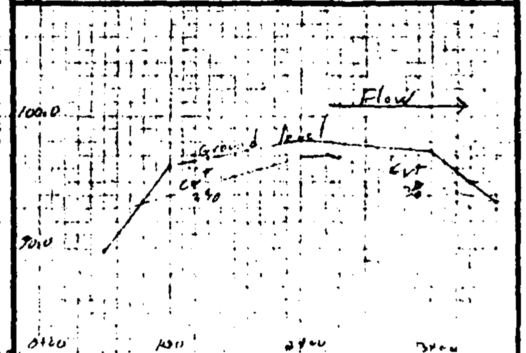
Bottom spillway 97.9

Full spillway 99.0

25 yr. storm runoff = 1.1' deep and 50' wide 3:1 S.S.

D.E.R. C curve 2.1' deep 50' wide

Top settled Dam 100.0



PROFILE ALONG ℄ EMERGENCY SPILLWAY

Wilbur Negley
RD
New Bloomfield, Pa. 17068

U. S. D. A. SOIL CONSERVATION SERVICE
New Bloomfield Work Unit

DATA SHEET FOR DAM

Designed Bistline Date 5-24-73
Design Approval Walter S. Politz, AE Date 6/14/73
Checked Reviewed Walter S. Politz, AE Date 7/19/73

PA-00948
PLATE III

APPENDIX F

GEOLOGIC REPORT

GEOLOGIC REPORT

BEDROCK - DAM AND RESERVOIR

The majority of the dam lies on the Onondaga Formation with portions of the reservoir overlying the Shamokin Member of the Marcellus Formation. The Onondaga Formation is a dark gray thin to thick bedded argillaceous limestone in the upper part grading downward into a calcareous shale. This formation weathers to an olive-gray which is a unique characteristic of this rock type in this quadrangle.

STRUCTURE

There is an apparent high angle fault striking N-E along the SE corner of the reservoir area. The upthrown side is to the north and the downthrown side is to the south. Joints are common with the most abundant having a strike between N45°E and N62°E and dipping between 65 and 85°NE.

OVERBURDEN

The overburden in this area consists of primarily residual soils.

AQUIFER CHARACTERISTICS

The joint and bedding planes provide a medium magnitude secondary porosity with a good potential for groundwater. The possibility of subsurface seepage exists, but the extent depends on the localized lithology.

DISCUSSION

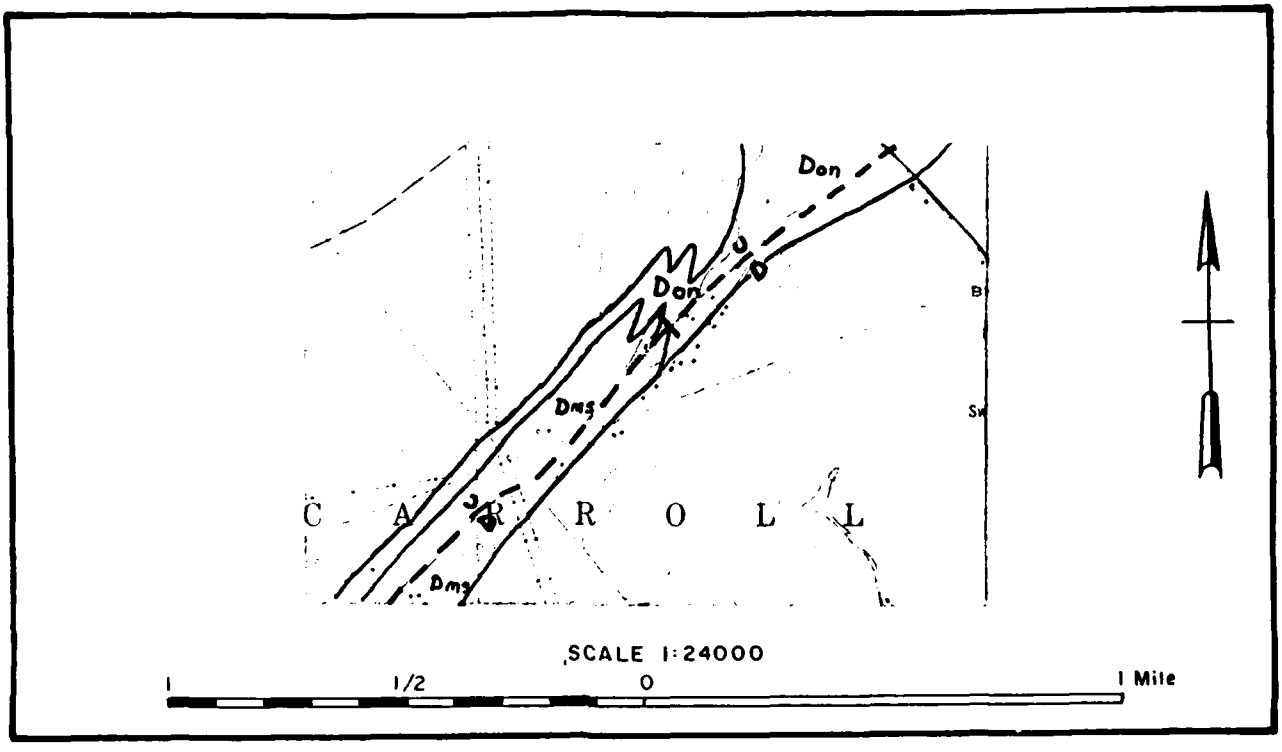
There are no construction plans available for this dam. The Onondaga Formation does provide a good foundation base, however; as with all limestone formations, sinkholes may be evident.

SOURCES OF INFORMATION

1. Dyson, J.L., 1963. New Bloomfield 15' Quadrangle: Pennsylvania Geological Survey A-137ab.

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

GEOLOGIC MAP - NEGLEY DAM



LEGEND

Don — Onondaga Formation

Dms — Marcellus Formation

U/D — Apparent High Angle Fault