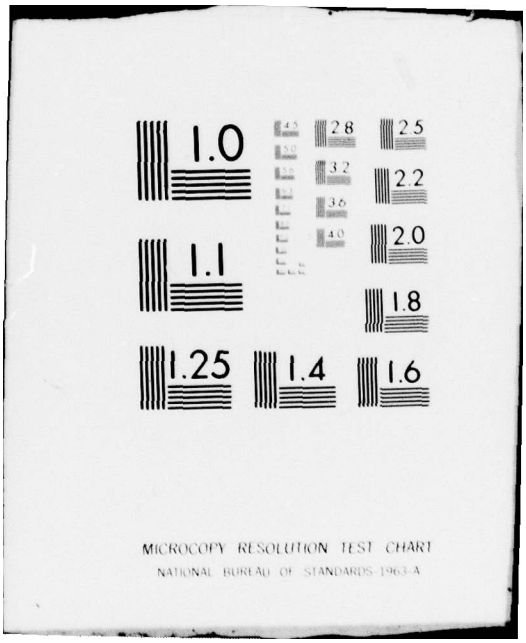
AD-A078 883 GANNETT FLEMING CORDDRY AND CARPENTER INC HARRISBURG PA F/G 13/13
NATIONAL DAM INSPECTION PROGRAM. LAKE NESSMUK DAM (NDI ID NUMBE--ETC(U)
AUG 79 F FUTCHKO DACW31-79-C-0015
UNCLASSIFIED NL

| OF |
AD
A 078883



END
DATE
FILMED
1-80
DDC


1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

AD A078883

Distribution Unlimited
Approved for Public Release
Contract No. DACW31-79-C-0015

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DDC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

(6) National Dam Inspection Program
Lake Nessmuk Dam (NDI ID PA-00032,
DER ID 59-66, SCS ID PA-601),
SUSQUEHANNA RIVER BASIN,
MORRIS BRANCH, MARSH CREEK, TIOGA COUNTY,
PENNSYLVANIA. Phase I Inspection
Report,

(1)

LAKE NESSMUK DAM

NDI ID No. PA-00032
DER ID No. 59-66
SCS ID No. PA-601

DDC
RECEIVED
JAN 7 1980
E

PENNSYLVANIA FISH COMMISSION

(10) Frederick/Futchko

PHASE I INSEPCTION REPORT

NATIONAL DAM INSPECTION PROGRAM

(15) DACW31-79-C-0015

(12) 81

Prepared by

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
Consulting Engineers
P.O. Box 1963
Harrisburg, Pennsylvania 17105

For

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

(11) AUGUST 1979

This document has been approved for public release and sale; its distribution is unlimited.

411004

JOB

PREFACE

This report is 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.

SUSQUEHANNA RIVER BASIN

MORRIS BRANCH, MARSH CREEK, TIOGA COUNTY

PENNSYLVANIA

LAKE NESSMUK DAM

NDI ID No. PA-00032
DER ID No. 59-66
SCS ID No. PA-601

PENNSYLVANIA FISH COMMISSION

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

AUGUST 1979

CONTENTS

Decsription	Page
SECTION 1 - Project Information	1
SECTION 2 - Engineering Data	8
SECTION 3 - Visual Inspection	10
SECTION 4 - Operational Procedures	12
SECTION 5 - Hydrology and Hydraulics . . .	13
SECTION 6 - Structural Stability	16
SECTION 7 - Assessment, Recommendations, and Proposed Remedial Measures. .	18

Accession For
NTIS GRA&I
DDC TAB
Unannounced
Justification
By
Distribution/
Availability Codes
Dist Avail and/or special
A23

PLATES

Plate	Title
1	Location Map.
2	Plan and Typical Section.
3	Alignment Plan.
4	Profiles.
5	Drain Plan.
6	Main Spillway and Outlet Works.
7	Cut-off Trench.
8	Main Spillway Riser.

APPENDICES

Appendix	Title
A	Checklist - Engineering Data.
B	Checklist - Visual Inspection.
C	Hydrology and Hydraulics.
D	Photographs.
E	Geology.

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION

AND

RECOMMENDED ACTION

Name of Dam:	Lake Nessmuk NDI ID No. PA-00032/DER ID NO. 59-66 SCS ID NO. PA-601
Owner:	Pennsylvania Fish Commission
State Located:	Pennsylvania
County Located:	Tioga
Stream:	Morris Branch, Marsh Creek
Date of Inspection:	25 July 1979
Inspection Team:	Gannett Fleming Corddry and Carpenter, Inc. Consulting Engineers P.O. Box 1963 Harrisburg, Pennsylvania 17105

Based on visual inspection, available records, calculations and past operational performance, Lake Nessmuk Dam is judged to be in good condition. The existing spillway can pass the Probable Maximum Flood (PMF) without overtopping of the dam. The spillway capacity is rated as adequate.

There is a slope stability analysis for the embankment, and it indicates that the embankment has adequate factors of safety. There is no evidence of problems threatening the embankment.

The visual inspection revealed that it is uncertain that the gate is operational.

The following measure is recommended to be undertaken by the Owner without delay:

(1) Either repair the outlet works gate or adopt an operating policy such that the gate is maintained annually and operated every other year to ensure its operation in case of emergency. The gate should be operated as soon as possible.

In addition, it is recommended that the Owner modify his operational procedures as follows:

(1) Develop a detailed emergency operation and warning system for Lake Nessmuk Dam.

(2) When warnings of a storm of major proportions are given by the National Weather Service, the Owner should activate his emergency operation and warning system procedures.

Submitted by:



GANNETT FLEMING CORDDRY
AND CARPENTER, INC.

Frederick Futchko

FREDERICK FUTCHKO
Project Manager, Dam Section

Date: 17 September 1979

Approved by:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF
ENGINEERS

James W Peck

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 25 Sep 79

LAKE NESSMUK DAM



Overview

VI

SUSQUEHANNA RIVER BASIN

MORRIS BRANCH, MARSH CREEK, TIOGA COUNTY

PENNSYLVANIA

LAKE NESSMUK DAM

NDI ID No. PA-00032
DER ID No. 59-66
SCS ID No. PA-601
PENNSYLVANIA FISH COMMISSION

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

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 inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Lake Nessmuk Dam consists of a zoned, earthfill embankment that is 870 feet long and is 50 feet high at maximum section. The main spillway is a drop spillway located near the center of the embankment. It consists of a concrete riser that

connects to a 30-inch diameter reinforced concrete pipe (RCP) under the embankment. The top of the riser is 9.3 feet below the design top of dam elevation. A trashrack is provided at the riser. The outlet works is located at the main spillway. It consists of an 18-inch diameter RCP extending upstream from the main spillway riser. An 18-inch sluice gate is provided at the downstream end of the pipe, which outlets into the bottom of the riser.

The auxiliary spillway is at the left abutment of the dam. It is a grass-lined excavation in earth. At the control section, the auxiliary spillway has an earthen crest that is 150 feet long and 5.2 feet below the design top elevation of the dam and 4.1 feet above the top of the main spillway riser. The various features of the dam are shown on the Plates at the end of the report and on the Photographs in Appendix D.

b. Location. The dam is located on the Morris Branch of Marsh Creek, approximately 1.0 mile South of Wellsboro, Pennsylvania. Lake Nessmuk Dam is shown on the 1971 photorevision to USGS Quadrangle, Antrim, Pennsylvania, with coordinates N41°44'00" -W77°17'35", in Tioga County, Pennsylvania. The location map is shown on Plate 1.

c. Size Classification. Intermediate (50 feet high, 1,042 acre-feet).

d. Hazard Classification. High hazard. Downstream conditions indicate that a high hazard classification is warranted for Lake Nessmuk Dam (Paragraph 5.1c).

e. Ownership. Pennsylvania Fish Commission, Harrisburg, Pennsylvania.

f. Purpose of Dam. Recreation and flood control.

g. Design and Construction History. Lake Nessmuk Dam was planned under an agreement between the Pennsylvania Fish Commission (Owner), the Soil Conservation Service of the U.S. Department of Agriculture (SCS), the Tioga County Commissioners(TCC) and the Borough of Wellsboro (Borough). Under this agreement, the Owner acquired title to the land, the SCS designed the dam, the TCC supervised construction, and

the Borough maintains the dam and surrounding park. Construction funding was shared between the various agencies involved. The dam was designed between 1964 and 1965 by the SCS. The permit to construct the dam was issued in 1965, and the construction was started in 1967. The Contractor was Roger Gerhart, of Lititz, Pennsylvania. Construction was supervised by Raymond P. Tipple, Contracting Officer for the TCC; Floyd Graham, Jerome Ogden, and Harold Kemmerer, Resident Inspectors for the SCS; and Frederick Schuerz, Chief Inspector for the SCS. The dam was completed in 1968.

h. Normal Operational Procedure. The reservoir is normally maintained at the main spillway crest level. The outlet works gate is normally closed.

1.3 Pertinent Data.

a.	Drainage Area. (square miles)	1.63
b.	Discharge at Damsite. (cfs)	
	Maximum known flood at damsite (June 1972)	100
	Outlet works at normal pool elevation	46
	Spillway capacity.	
	Main spillway with pool at auxiliary spillway crest	133
	Auxiliary spillway with pool at top of dam	4,900
c.	Elevation. (feet above msl)	
	Top of dam	1470.2
	Maximum pool	1470.2
	Normal pool (main spillway crest)	1460.9
	Upstream invert outlet works	1426.0
	Downstream invert outlet works	1425.5
	Streambed at toe of dam	1420.5
d.	Reservoir Length. (miles)	
	Normal pool	0.52
	Maximum pool	0.57

e.	Storage. (acre-feet)	
	Normal pool	782
	Maximum pool	1,042
f.	Reservoir Surface (acres)	
	Normal Pool	59.5
	Maximum pool	70.0
g.	Dam.	
	Type	Zoned Earthfill
	Length (feet)	870
	Height (feet)	50
	Topwidth (feet)	17
	Side Slopes	
	Upstream	1V on 3H. There is a 10-foot berm at El. 1461.9
	Downstream	1V on 2.5H There is a 10-foot berm at El. 1444.0
	Zoning	Impervious core to within 8.2 feet of top of dam. A zone of less impervious fill is upstream and

g.	Dam. (continued)	
		downstream around core. A foundation drain is provided near the toe.
	Cutoff	Impervious fill in cutoff trench.
	Grout Curtain	None
h.	Diversion and Regulating Tunnel	None
i.	Spillways.	
	Main (Principal or Service) Spillway	Drop Spillway
	Type	Vertical rectangular riser 5.5 feet by 6 feet with rounded crest. A wall extends along the downstream side of the riser and a trash-rack is provided along the three sides of the crest. The riser connects to a conduit.

i. Spillways. (continued)

Length of Weir (feet)	
Riser	Two at 5 One at 5.5
Crest Elevation	
Top of riser	1460.9
Upstream Channel	Reservoir.
Conduit	
Type	Reinforced concrete pipe, 2.5 feet in diameter, on concrete cradle.
Length (feet)	167.3
Elevation	
Upstream invert at riser	1425.0
Downstream invert	1420.5
Downstream Channel	Impact basin at natural stream.
Auxiliary (Emergency) Spillway	
Type	Grass-lined earthen cut with 1V on 3H side slopes.
Length of Weir (feet)	150 at earthen control section
Crest Elevation	1465.0

i.	Spillways. (continued)	
	Upstream Channel	Grass-lined channel to reservoir.
	Downstream Channel	Grass-lined channel extending to overbank.
j.	Regulating Outlets.	
	Type	Reinforced concrete pipe, 18-inch diameter, extending to main spillway riser.
	Length (feet).	96
	Closure	18-inch, unseating head, sluice gate in riser at downstream end of 18-inch diameter pipe.
	Access	Operator on trashrack at main spillway riser.

SECTION 2

ENGINEERING DATA

2.1 Design.

a. Data Available. Almost complete design data are available. A summary of the available data is in Appendix A and Appendix C.

b. Design Features. The dam and appurtenances are described in Paragraph 1.2a. The design features are shown on the Plates at the end of the report and on the Photographs in Appendix D. The embankment is shown on Plates 2, 3, 4, and 5, and on Photographs A and B. A plan of the subdrainage system is shown on Plate 5. The cut-off trench is shown on Plate 7. The soils at the site are susceptible to piping, as noted in Appendix E. The SCS incorporated special features, such as two-stage filters, to reduce the piping potential.

The main spillway is shown on Plates 6 and 8 and on Photograph C. The impact basin is shown on Plate 6 and Photograph D. The auxiliary spillway is shown on Plates 2 and 3 and on Photographs E and F.

c. Design Considerations. Although the main spillway design has been used successfully by the SCS for many years, it appears that the entrance to the conduit could possibly develop cavitation during certain flow conditions. Other design considerations are discussed in Sections 5 and 6.

2.2 Construction.

a. Data Available. Construction data available consist of the construction specifications, construction photographs, and reports both from the resident inspector and from the periodic construction inspections by the Commonwealth. The only adverse item noted in these reports was some cracks, believed to be surface cracks, on the embankment. An inspector from the Commonwealth noted that seeding would probably eliminate them.

b. Construction Considerations. The available information indicates that the dam is well constructed.

2.3 Operation. There are no formal records of operation. Based on information from the Owner and the SCS, all structures have performed satisfactorily, except for the outlet works gate, as noted hereafter.

2.4 Evaluation.

a. Availability. Engineering data were provided by the Bureau of Dams and Waterway Management, Department of Environmental Resources, Commonwealth of Pennsylvania (PennDER), and by the SCS. For information during the visual inspection, the SCS made available the District Conservationist, a Civil Engineer, and a Technician, and the Borough made available the Director of Parks and Recreation and maintenance personnel. The Owner made available all his pertinent information. For additional information, he also provided a Senior Project Engineer and the State Maintenance Supervisor. The SCS also researched their files for additional information upon request of the inspection team.

b. Adequacy. The type and amount of design data and other engineering data are good. The assessment is based on the combination of design data, visual inspection, and performance history.

c. Validity. There is no reason to question the validity of the available data.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General. The overall appearance of the dam is good with a few deficiencies as noted herein. The locations of deficiencies are shown in Appendix B on Plate B-1. Survey data acquired during this inspection are presented in Appendix B. On the day of the inspection, the pool was at spillway crest.

b. Embankment. The embankment is in good condition. The downstream slope is covered with thick 2 to 3-foot high crownvetch. The upstream slope is protected by riprap to about 2.8 feet above the main spillway crest. The remainder of the embankment is covered with grass. A few small areas are almost bare. They are probably the result of being mowed too closely. The gradation of the riprap is somewhat uneven. The survey performed for this inspection revealed that the top of the embankment is above its design elevation and that the lines and grades are essentially in accordance with the design drawings. No seepage was observed on or downstream from the embankment.

c. Appurtenant Structures. The main spillway riser is in good condition with no observed deficiencies. The main spillway conduit is in good condition. The junction of the riser and the conduit is in good condition. At the conduit joints, each edge facing upstream has minor spalling. As shown on Plate 6, Joints J-10 and J-11 are separated about 3/4 to 1 inch. Joint J-4 is separated about 1-1/4 inches. At the junction of the conduit and the impact basin, the caulking in the joint is slightly deteriorated. The impact basin is in good condition with no observed deficiencies. There is a minor amount of brush on the stream banks downstream of the impact basin. The outfall of the foundation drain at the left side of the impact basin was discharging at a rate of 0.5 gpm. The right outfall was trickling.

The auxiliary spillway is in good condition. The grass cover is in good condition. At the right bank, a dike extends downstream from the axis of the dam to train water away from the toe of the embankment. The dike is protected by riprap. The riprap is in good condition with only one small shrub growing in the riprap. The survey performed for the inspection revealed that the crest of the auxiliary spillway is 0.1 to 0.3 foot above its design grade except for 3 feet at the left side, where it is up to 1.3 feet above its design grade.

The outlet works gate is in fair condition. The SCS Representative stated that it had not been operated since the dam was completed. He offered to operate the gate. He stated that he was confident that the gate was operational but that, if it were to be raised and then lowered, the gate would leak severely until the wedges were reset. Resetting the wedges is beyond the capabilities of the maintenance personnel. The Owner and the SCS Representative were concerned that the pool could not be maintained with a leaking gate. The inspection team did not insist on viewing its operation.

d. Reservoir Area. The reservoir has generally gentle grassed slopes. The watershed is mostly wooded, rolling hills with some farm fields. There is minor rural development in the watershed, especially near the reservoir.

e. Downstream Channel. The stream extends for 1.0 mile to Wellsboro and then beyond to its confluence with Marsh Creek. In Wellsboro alone there are at least 50 dwellings and the commercial district in the floodplain. The access road to the dam is a public road extending parallel to the reservoir along the right bank.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedure. The reservoir is maintained at the main spillway crest, Elevation 1460.9, with excess inflow discharging over the spillway and into Morris Branch of Marsh Creek. An 18-inch diameter pipe discharges water from the reservoir. Since the outlet works pipe is intended only for drawing down the reservoir, the gate on the Lake Nessmuk Dam water discharge line is usually closed.

4.2 Maintenance of Dam. The dam is visited weekly during the winter and daily during other seasons by a caretaker who observes the condition of the dam. The caretaker is responsible for reporting any changes or deficiencies to the SCS. The Borough, with the assistance of the SCS, makes a formal inspection of the dam each year, and the records are filed. Maintenance deficiencies are corrected shortly after the inspection. Informal inspections are also made when the SCS representative is on the site for other reasons. Mowing and brush cutting on the embankment are accomplished frequently.

4.3 Maintenance of Operating Facilities. The gate on the outlet works pipe is not operated annually because of the problem noted in Section 3. Although it is usual SCS procedure to operate gates annually, the gate is not operated because of the expense of resetting the wedges.

4.4 Warning Systems in Effect. The SCS Representative and the caretaker stated that there was no formal emergency operation and warning plan. The Owner has developed a preliminary downstream warning plan. The dam is monitored continuously by a member of the Local Fire Company during periods of heavy precipitation. Contact is maintained during these periods with the Local Civil Defense Organization. The Borough follows this policy for all nearby dams.

4.5 Evaluation of Operational Adequacy. Maintenance of the dam is good. The operational adequacy of the gate is uncertain. The procedures used to inspect the dam are good, as is the correction of maintenance deficiencies. The Owner is aware of the need for a formal emergency operation and warning system, as he has developed them for other dams belonging to the Fish Commission.

SECTION 5

HYDROLOGY AND HYDRAULICS

5.1 Evaluation of Features.

a. Design Data. The hydrology and hydraulics of the design of the dam were based on standard SCS criteria. The elevation of the main spillway crest was determined by sedimentation and recreation requirements. The crest of the auxiliary spillway was set by routing the 100-year 1-hour storm. The design high water was determined by routing a storm equal to 1.25 times the 100-year 6-hour storm. The routing of this storm was not used for sizing any of the structures. The top of dam elevation and auxiliary spillway size were determined by routing the "Freeboard" storm, which is equal to twice the design high water storm (2.5 times the 100-year, 6-hour storm). The "Freeboard" storm is discussed in Paragraph 5.1d.

b. Experience Data. The maximum known flood ate the damsite occurred during Tropical Storm Agnes in June, 1972, when water was 8 inches below the auxiliary spillway crest. Using the design discharge ratings, the outflow is estimated at 100 cfs.

c. Visual Observations.

(1) General. The visual inspection of Lake Nessmuk Dam, which is described in Section 3, resulted in a number of observations relevant to hydrology and hydraulics. These observations are evaluated herein for the various features.

(2) Embankment. Terminating the riprap below the top of the dam is not a universally used design criteria, but it is a standard SCS design criteria. Any potential erosion hazard is considered to be offset by the good maintenance at the dam. Any erosion on the upper parts of the embankment would be detected and repaired immediately after it occurred. This would make the erosion hazard negligible.

(3) Appurtenant Structures. The gate for the outlet works is located upstream of the impervious core and is sufficiently far upstream to be considered an upstream closure facility. It appears that at least part of the auxiliary spillway crest is slightly above the design elevation. As the flood routing for the "Freeboard" storm was accomplished using the design top elevation of the embankment and since the embankment is above the design elevation, the existing auxiliary spillway capacity is not significantly reduced from the design condition. The brush downstream of the impact basin is not thick enough to significantly raise tailwater. The maintenance personnel indicated that the brush was scheduled to be cut.

(4) Reservoir Area. No conditions were observed in the reservoir area or watershed that might present significant hazard to the dam. The assessment of the dam is based on existing conditions, and the effects of future development are not considered.

(5) Downstream Conditions. No conditions were observed immediately downstream from the dam that would create significant hazard to the dam. If the dam were to fail, a hazard to dwellings both in Wellsboro and further downstream would exist. Because of the possibility of flooding dwellings, a high hazard classification is warranted for Lake Nessmuk Dam. The SCS designed the dam assuming that it was a Class C structure. This is essentially equivalent to a high hazard classification. The Owner stated that he considered the dam to be high hazard, with "too many structures to count" in the floodplain. Access to Lake Nessmuk Dam is excellent.

d. Overtopping Potential.

(1) Spillway Design Flood. According to the criteria established by the Office of the Chief of Engineers (OCE) for the size (Intermediate) and hazard potential (High) of Lake Nessmuk Dam, the Spillway Design Flood (SDF) is the Probable Maximum Flood (PMF).

(2) Design Storm. The SCS "Freeboard" storm, which was used to determine the size of the auxiliary spillway and the top elevation of the dam, was not developed from PMF methods. However, the total rainfall of 20.8 inches is equivalent to a PMF rainfall for this

area. The assumed losses of 3.4 inches are slightly higher than those established by criteria for the Susquehanna Basin. The unit hydrograph used by the SCS is conservative. The computed peak inflow of 7,355 cfs is equivalent to a PMF peak inflow. The storm is an acceptable estimate of the PMF.

(3) Design Storm Routing. The design storm routing computations are in Appendix C. It should be noted that the SCS assumed the main spillway to be functional up to the top elevation of the dam. As there is a potential of debris blocking the trashrack, it is uncertain that the main spillway could discharge at this capacity. However, the main spillway capacity is minimal when compared to the auxiliary spillway capacity, and any reduction would have a negligible effect on the PMF routing.

(4) Spillway Adequacy. The criteria used to rate the spillway adequacy of a dam are described in Appendix C. Since Lake Nessmuk Dam can pass the PMF, the spillway capacity is rated as adequate.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations.

(1) General. The visual inspection of Lake Nessmuk Dam, which is described in Section 3, resulted in a number of observations relevant to structural stability. These observations are evaluated herein for various features.

(2) Embankment. None of the observations noted in Section 3 are sufficiently serious to be considered a deficiency. The flow from the foundation drain outfalls is not considered a deficiency as it is minimal and indicates that the drains are functioning properly and that the impervious core and impervious cutoff are effective.

(3) Appurtenant Structures. There are no deficiencies at the main spillway riser. The spalling in the conduit is sufficiently minor that it is of no concern. A review of the data in the SCS files indicates that the as-built conduit can withstand a joint separation of at least 3 inches. The observed joint separations are therefore of no concern. The potential leaks from the outlet works gate are not a hazard to the dam, but the leaks could adversely affect normal operation. In view of the expense of replacing the gate, operating the gate at a reduced schedule appears to be warranted. When the gate is operated, and if it is opened sufficiently to slightly lower the pool, an opportunity is provided to inspect the conduit after the gate is closed.

b. Design and Construction Data. A stability analysis for the embankment was performed by the SCS during design. The stability analysis resulted in a minimum factor of safety of 1.45 on the upstream slope for the sudden drawdown condition and 1.50 on the downstream slope for the steady seepage condition. The design shear strength was determined from a triaxial

test of the consolidated-undrained condition. These factors of safety are considered to be adequate. A summary is included in Appendix A. After the analysis was completed, the downstream slope was flattened to 1V on 2.5H because it was felt that the soil conditions at the site might raise the phreatic surface in the embankment. A flattened slope improves the embankment stability.

c. Operating Records. There are no formal records of operation. There is no record of stability problems having occurred over the operational history of the dam.

d. Postconstruction Changes. There have been no postconstruction changes to Lake Nessmuk Dam.

e. Seismic Stability. Lake Nessmuk Dam is located in Seismic Zone 1. Normally it can be considered that if a dam in this zone has adequate factors of safety under static loading conditions, it can be assumed safe for any expected earthquake loading. Since the factors of safety are adequate, the dam is assumed to be stable for any expected earthquake loading.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety.

(1) Based on visual inspection, available records, calculations, and past operational performance, Lake Nessmuk Dam is judged to be in good condition. The spillway can pass the PMF without overtopping of the dam. The spillway capacity is rated as adequate.

(2) There is a stability analysis for the embankment, and it indicates that the embankment has adequate factors of safety. There is no evidence of problems threatening the embankment.

(3) The visual inspection revealed only one deficiency, which was the uncertain operational adequacy of the gate on the outlet works.

b. Adequacy of Information. The information available is such that an assessment of the condition of the dam can be inferred from the combination of visual inspection, past performance, and computations performed prior to and as part of this study.

c. Urgency. The recommendations in Paragraph 7.2 should be implemented without delay.

d. Necessity for Further Investigations. Accomplishment of the remedial measures outlined in Paragraph 7.2, will not require further investigations by the Owner.

7.2 Recommendations and Remedial Measures.

a. The following measure is recommended to be undertaken by the Owner without delay:

(1) Either repair the outlet works gate or adopt an operating policy such that the gate is maintained annually and operated every other year to ensure its operation in case of emergency. The gate should be operated as soon as possible.

b. In addition, it is recommended that the Owner modify his operational procedures as follows:

(1) Develop a detailed emergency operation and warning system for Lake Nessmuk Dam.

(2) When warnings of a storm of major proportions are given by the National Weather Service, the Owner should activate his emergency operation and warning system procedures.

SUSQUEHANNA RIVER BASIN

MORRIS BRANCH MARSH CREEK, TIOGA COUNTY

PENNSYLVANIA

LAKE NESSMUK DAM

NDI ID No. PA-00032
DER ID No. 59-66
SCS ID No. PA-601

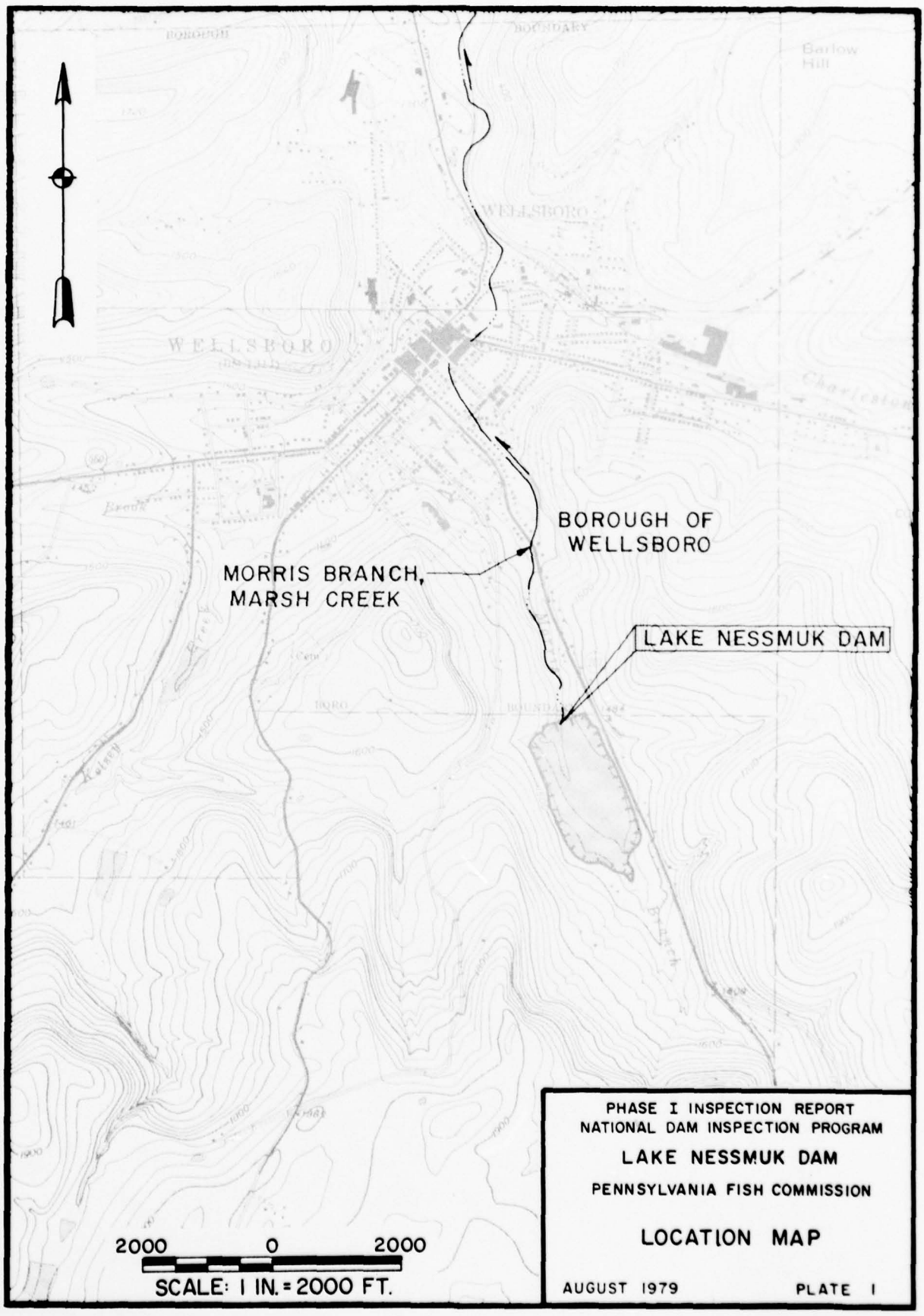
PENNSYLVANIA FISH COMMISSION

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

AUGUST 1979

PLATES



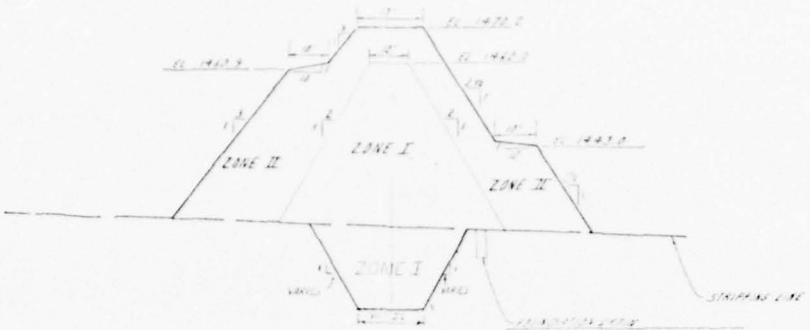
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

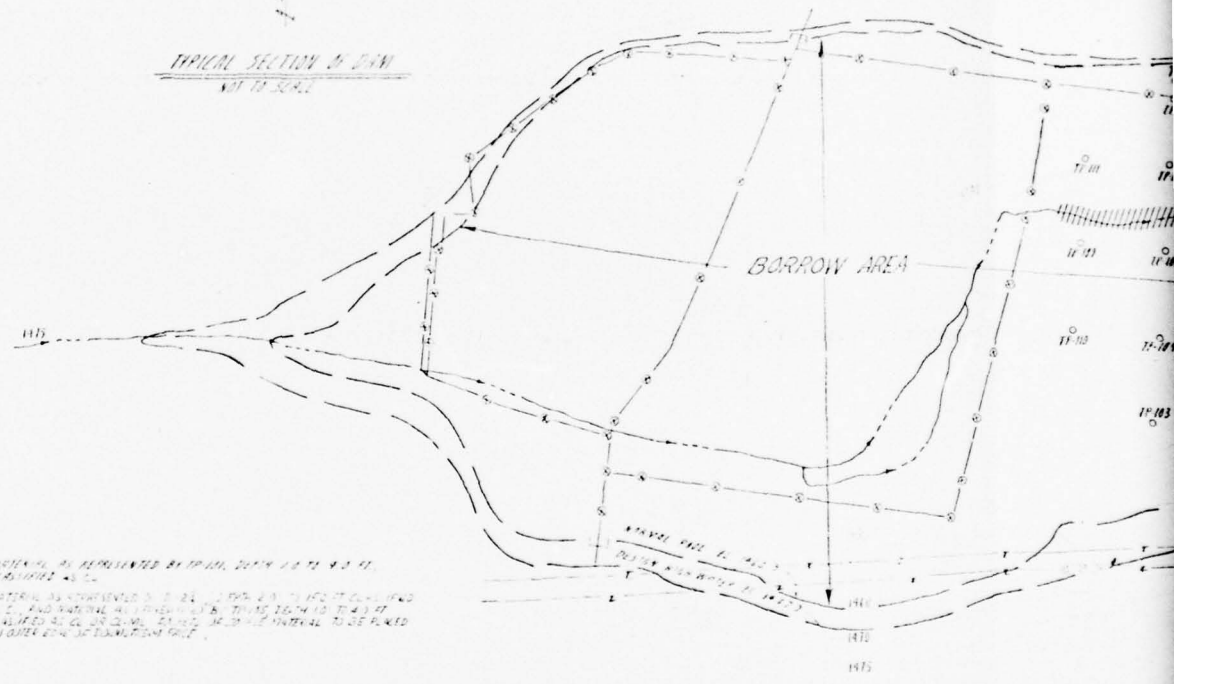
PENNSYLVANIA FISH COMMISSION

LOCATION MAP

AUGUST 1979 PLATE 1



TYPICAL SECTION AT STA 3+00
NOT TO SCALE



EARTH FILL

ZONE I — MATERIAL AS REPRESENTED BY TP 101, 102 & 104 @ 0 TO 9.0 FT. CLASSIFIED AS CL.

ZONE II — MATERIAL AS REPRESENTED BY TP 103, 105 & 201 @ 0 TO 9.0 FT. CLASSIFIED AS CL OR CL-ML. EXCESS OF THIS MATERIAL TO BE PLACED ON OUTER EDGE OF EMBANKMENT FILL.

COMPACTION SHALL BE CLASS A. THE FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY OBTAINED IN COMPACTION TESTS OF THE FILL MATERIALS, PERFORMED BY METHOD A ASTM D698.

MAXIMUM LAYER THICKNESS IS 9" (BEFORE COMPACTION)
MAXIMUM SIZE OF ROCK FRAGMENTS IS 6".

RESULTS OF MOISTURE-DENSITY TESTS (ASTM D-698, METHOD A) ON SAMPLES FROM INDICATED LOCATIONS

- TP 101 - COMPACTION WAS AT LEAST 95% OPTIMUM DENSITY WITH MOISTURE CONTENT IN THE RANGE OF 13.0 to 20.0%. OPTIMUM DENSITY WAS 104.5 PCF AT 17.3% MOISTURE CONTENT.
- TP 105 - COMPACTION WAS AT LEAST 95% OPTIMUM DENSITY WITH MOISTURE CONTENT IN THE RANGE OF 11.0 TO 15.0%. OPTIMUM DENSITY WAS 118.5 PCF AT 12.8% MOISTURE CONTENT.
- TP 202 - COMPACTION WAS AT LEAST 95% OPTIMUM DENSITY WITH MOISTURE CONTENT IN THE RANGE OF 8.2 TO 14.2%. OPTIMUM DENSITY WAS 113.0 PCF AT 12.0% MOISTURE CONTENT.

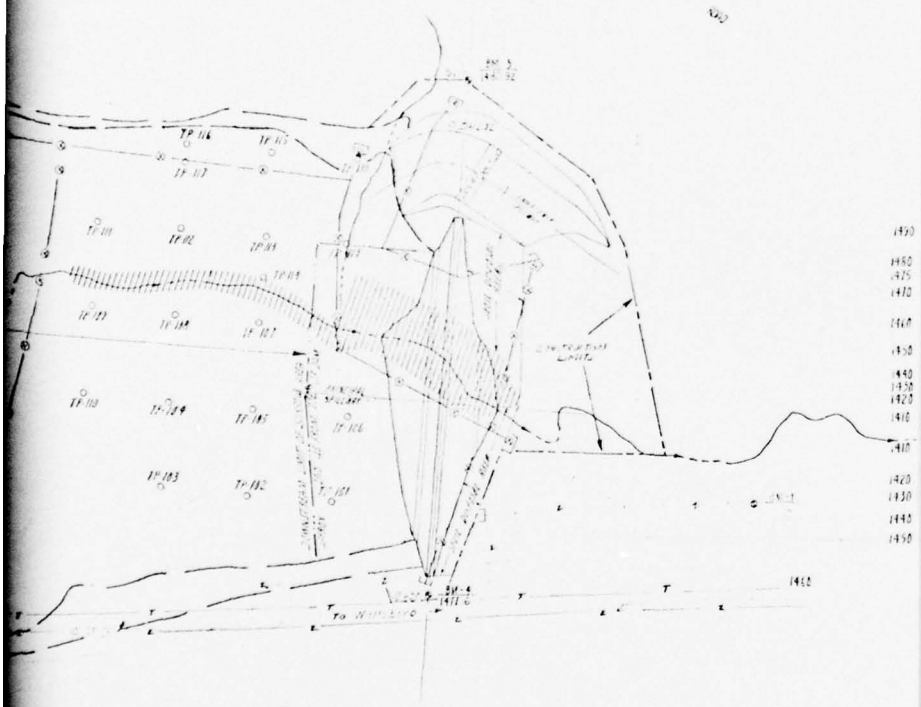
THE FINAL COMPACTED FILL SHALL BE IN THE MOISTURE RANGE ABOVE FOR THE TYPE OF MATERIAL USED.

See Sheets 12, 13 and 14 for Logs of Drill Holes and Test Pits.

AREA TO BE CLEARED AND GRUBBED 3.5 ACRES

AREA TO BE CLEARED 1.3 ACRES

FENCE REMOVED 2,100 LIN. FT.



LEGEND

- X — X — EXISTING FENCE
- [— X — X —] EXISTING FENCE SECTION TO BE REMOVED (CONSTRUCTION SPEC 3)
- — ② — ② — POWER LINE
- — ① — ① — TELEPHONE LINE
- ○ T.P. TEST PIT

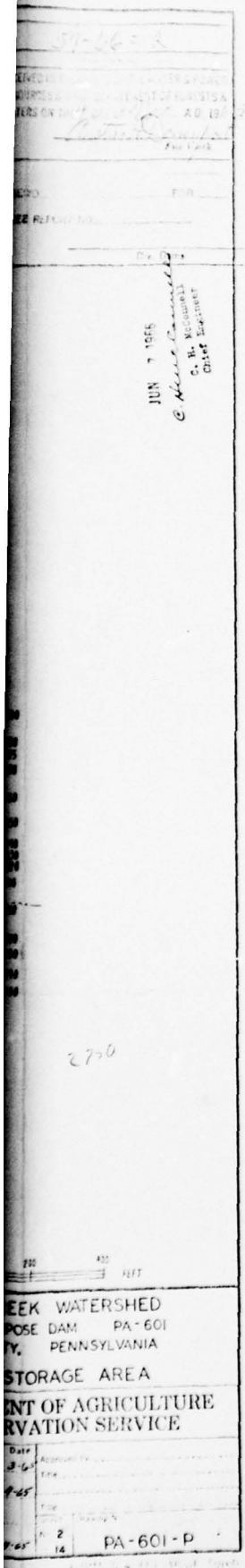
SCALE 0 100

MARSH CREE
MULTIPLE PURPO
TIOGA COUNTY,

PLAN OF ST

U. S. DEPARTMEN
SOIL CONSERV

Designed Leopold E. Thomas 3
Drawn C. CRISE 4-6
Traced
Checked James M. Robbins Engr. 4-6



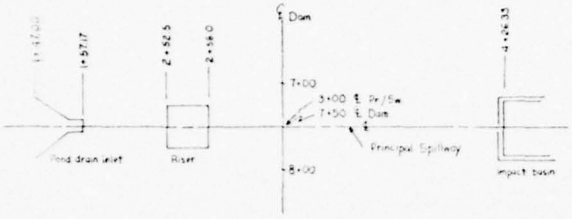
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

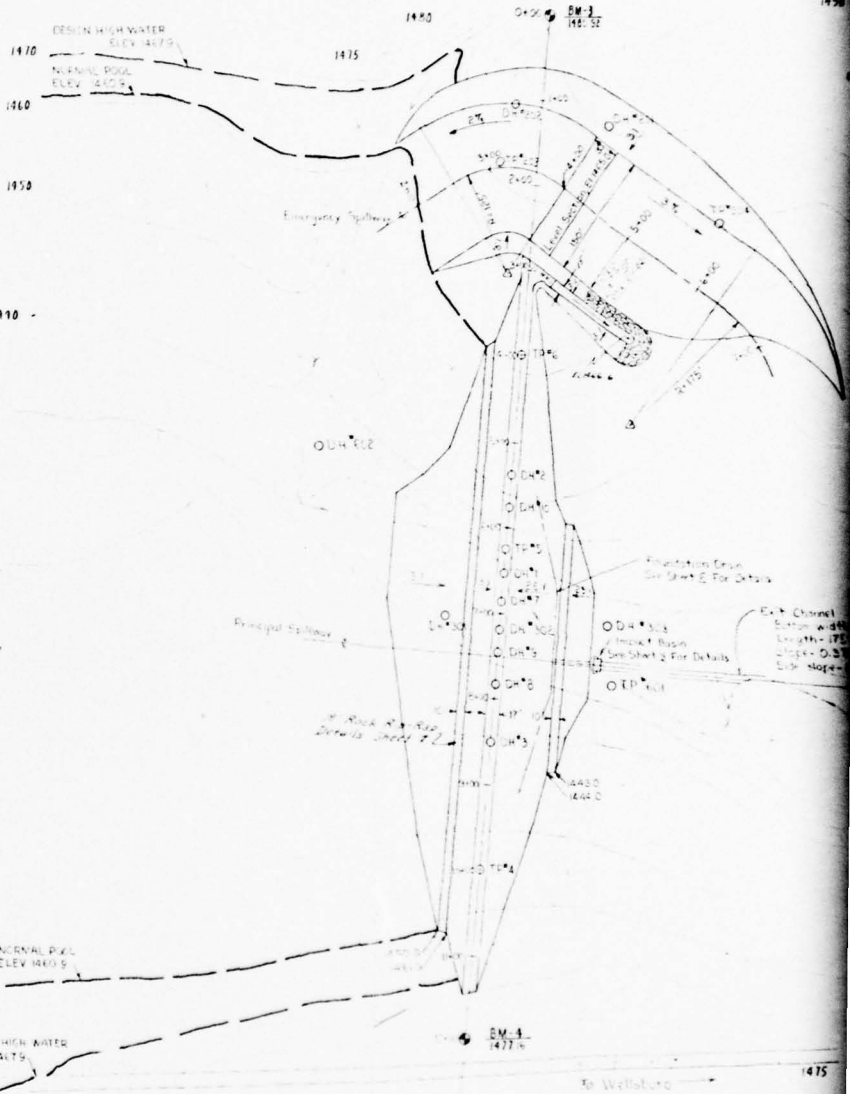
PENNSYLVANIA FISH COMMISSION

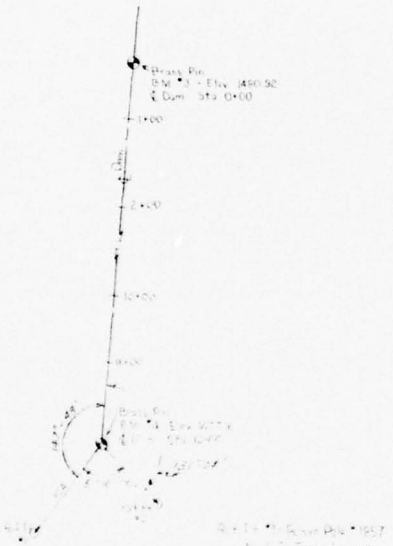
PLAN AND TYPICAL SECTION

AUGUST 1979 PLATE 2



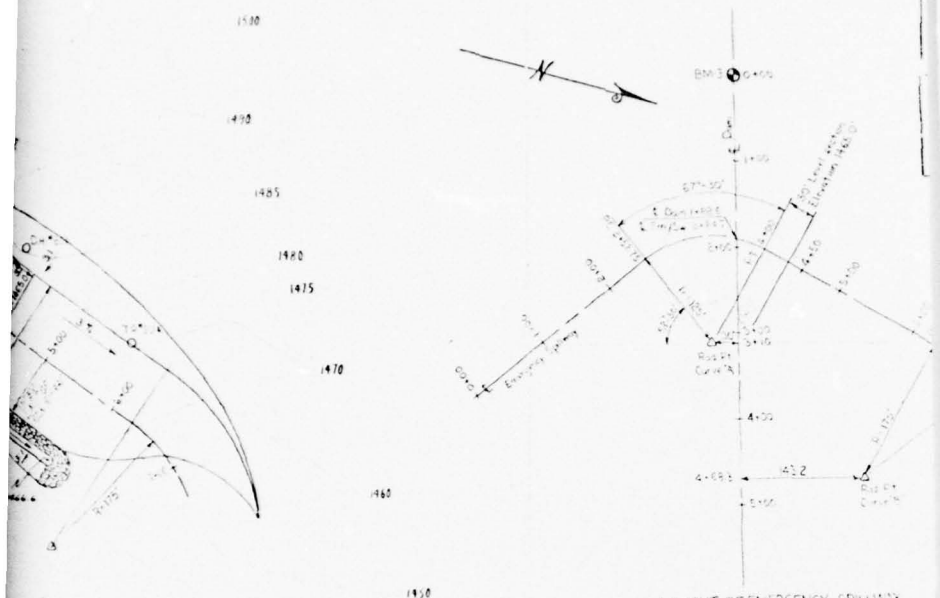
Layout of Principal Spillway
Not to Scale





LAYOUT OF BASIC REFERENCE POINTS FOR BM-4
Not to Scale



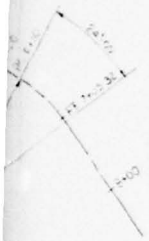

1490
1485
1480
1475
1470
1460
1450
1440
1430
1420
1410
1400
N
BM3
6+65
1+00
2+00
3+00
4+00
5+00
6+00
Exist. Channel
Elevation 1480
Proj. Channel
Elevation 1470
Exist. Channel
Elevation 1460
Proj. Channel
Elevation 1450
Proj. Channel
Elevation 1440
Proj. Channel
Elevation 1430
Proj. Channel
Elevation 1420
Proj. Channel
Elevation 1410
Proj. Channel
Elevation 1400
Exist. Channel
Elevation 1490
Proj. Channel
Elevation 1480
Proj. Channel
Elevation 1470
Proj. Channel
Elevation 1460
Proj. Channel
Elevation 1450
Proj. Channel
Elevation 1440
Proj. Channel
Elevation 1430
Proj. Channel
Elevation 1420
Proj. Channel
Elevation 1410
Proj. Channel
Elevation 1400
67°-30'
Exist. Channel
Elevation 1490
Proj. Channel
Elevation 1480
Proj. Channel
Elevation 1470
Proj. Channel
Elevation 1460
Proj. Channel
Elevation 1450
Proj. Channel
Elevation 1440
Proj. Channel
Elevation 1430
Proj. Channel
Elevation 1420
Proj. Channel
Elevation 1410
Proj. Channel
Elevation 1400

59-66-3

RECEIVED IN THE OFFICE OF THE SECRETARY OF FISHERIES & FISH
PRESIDING BOARD OF THE DEPARTMENT OF FORESTS
WATERS ON THIS 1st DAY OF June A.D. 1965
Chester A. Darnell
Pres. Pro Tem

RECD ____ FOR ____
SEE REPORT NO. ____
Div. Chief

JUN 7 1965
C. H. McDowell
Chief Engineer



VE DATA

I = 67°30'
R = 165'
T = 83.92'
C = 139.99'
Lc = 147.25'
M = 21.07'
E = 25.93'
PC = 2+52.75
PT = 4+00

URVE DATA

I = 24°00'
R = 170'
T = 37.20'
C = 72.77'
Lc = 73.50'
M = 9.92'
E = 3.92'
PC = 6+50
PT = 7+03.50

50 100 200
FEET

CREEK WATERSHED
IRPOSE DAM PA-601
UNTY, PENNSYLVANIA
N OF DAMSITE
MENT OF AGRICULTURE
SERVATION SERVICE

9-65

3
4

PA-601-P

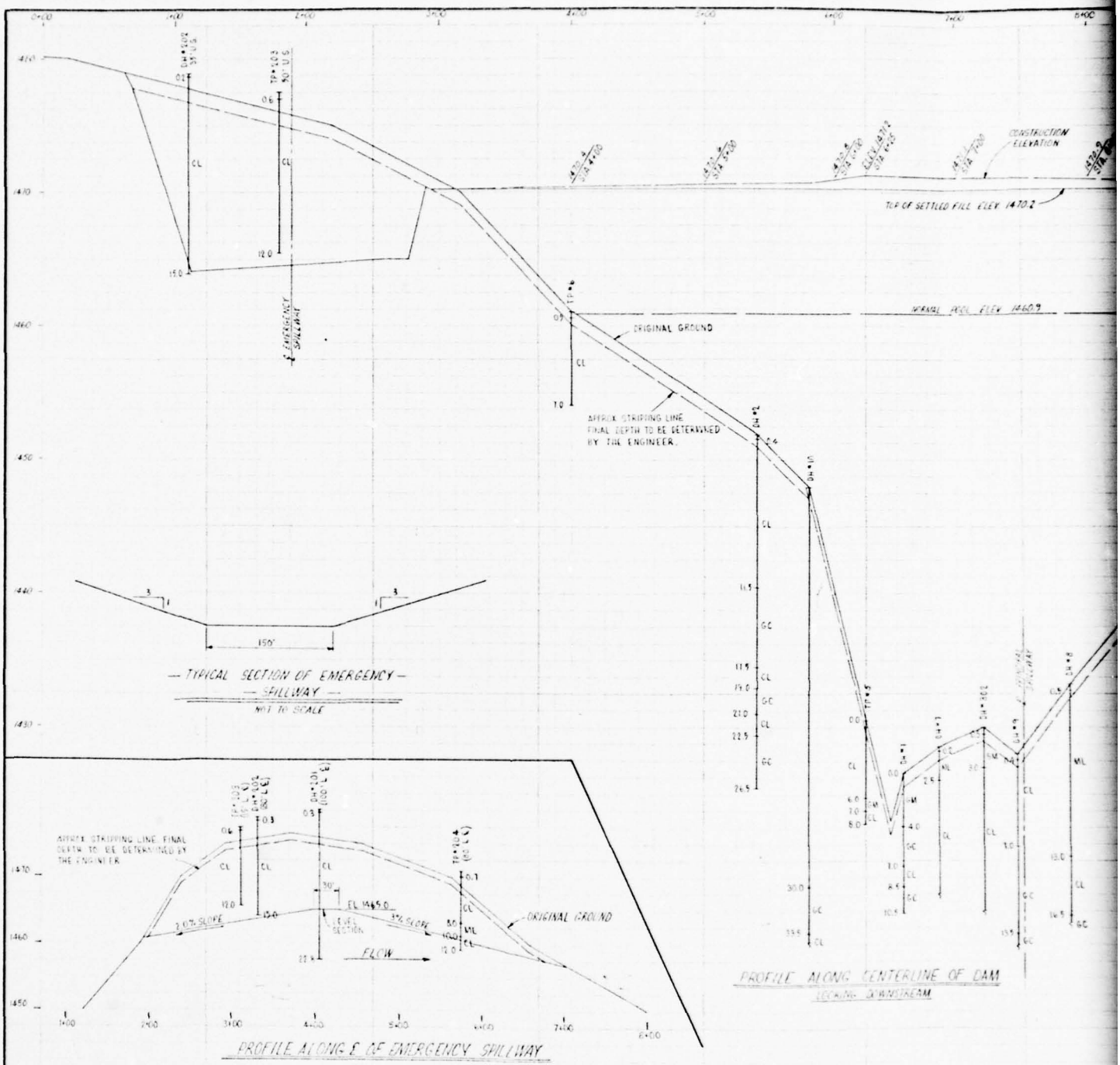
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

PENNSYLVANIA FISH COMMISSION

ALIGNMENT PLAN

AUGUST 1979 PLATE 3

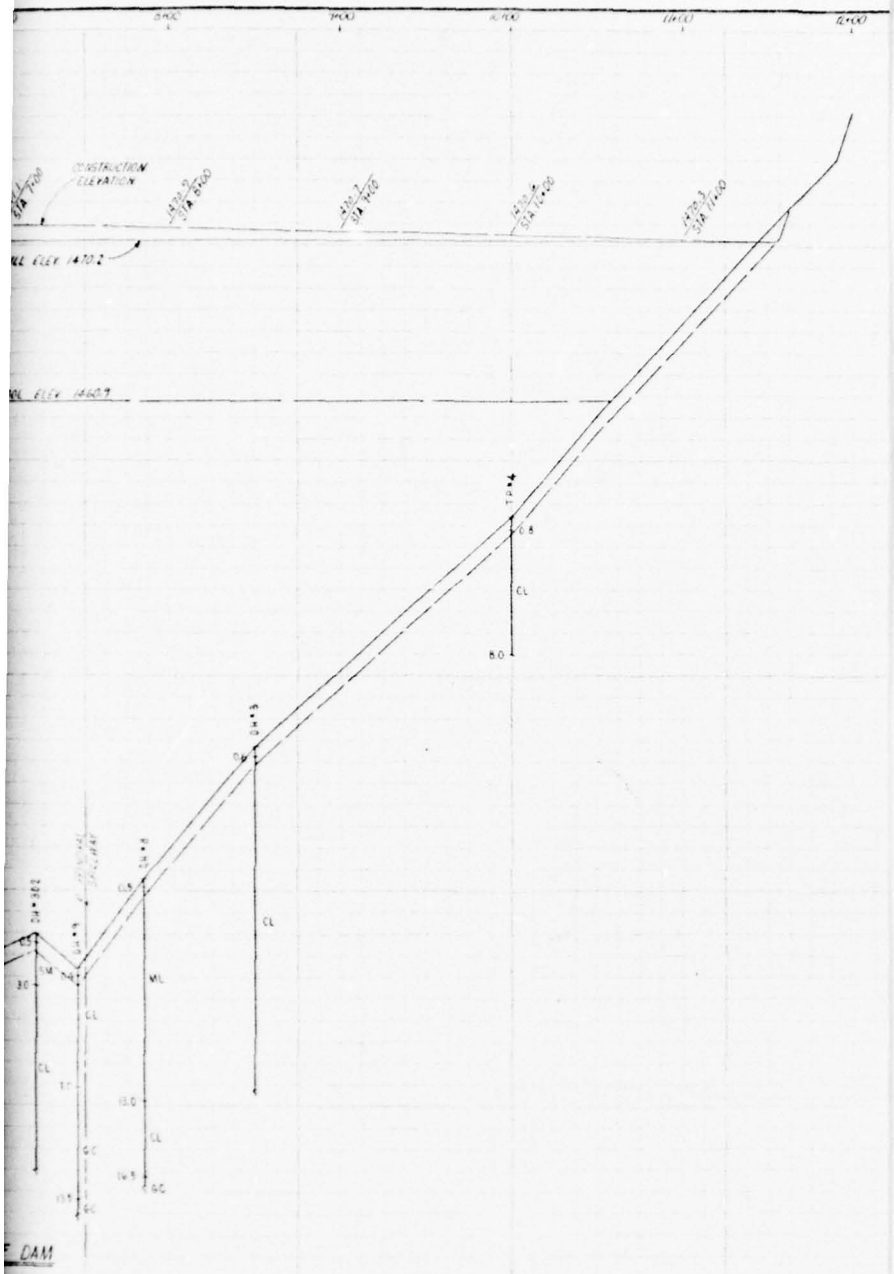


— TYPICAL SECTION OF EMERGENCY —
— SPILLWAY —
NOT TO SCALE

PROFILE ALONG CENTERLINE OF DAM
LOOKING DOWNSTREAM

PROFILE ALONG ℄ OF EMERGENCY SPILLWAY

SEE SHEETS 1A, 1B AND 1C FOR
LOGS OF DRILL HOLES AND TEST PITS



MARSH CR
MULTIPLE PURP
TIOGA COUNT
PROFILES OF DAM &
U.S. DEPARTME
SOIL CONSE
R.A. STALTER

59-66-4

RECEIVED IN THE OFFICE OF THE WATER POWER RESOURCES BOARD / DEPARTMENT OF FORESTS & WATERS ON THE 4th DAY OF Nov A.D. 1965

Chester H. Desmond
Fly Cle

REC'D FOR

SEE REPORT NO.

Div. Dams

JUN 7 1966

C. Alger Chamberlain
Chief Engineer

EEK WATERSHED
POSE DAM PA-601
TY, PENNSYLVANIA
& EMERGENCY SPILLWAY
ENT OF AGRICULTURE
RVATION SERVICE

PA-601-P

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

PENNSYLVANIA FISH COMMISSION

PROFILES

AUGUST 1979 PLATE 4

6" DIA FILTER DRAIN PIPE (PERFORATED)

1 - 4' SECTION
1 - 6' 8" SECTION
1 - 12' SECTION
4 - 20' SECTIONS
1 - 30° ELBOW (6" X 6")
2 - 30° ELBOWS (6" X 2½")
1 - 90° ELBOW (6" X 2½")
1 - METAL END CAP
1 - SMALL RIVERAL GUARD (SEE SHEET 11)

116' 2" TOTAL (USE STANDARD COUPLING BANDS)

6" DIA FILTER DRAIN PIPE (PERFORATED)

1 - 8' SECTION
1 - 6' 8" SECTION
1 - 12' SECTION
3 - 18' SECTIONS
1 - 90° ELBOW (6" X 6")
2 - 90° ELBOWS (6" X 2½")
1 - 90° ELBOW (6" X 2½")
1 - METAL END CAP
1 - SMALL RIVERAL GUARD (SEE SHEET 11)

52' 2" TOTAL (USE STANDARD COUPLING BANDS)

FOUNDATION DRAIN TRENCH

℄ DAM

MATERIAL SPEC 10
CONSTRUCTION SPEC 12

NOTE ALL FILTER DRAIN PIPE TO BE USED IN STEEL CLASS II, SHAPE 1, COATING TYPE A, 16 GAUGE

PLAN VIEW OF FOUNDATION DRAIN

SCALE IN FEET

DRAIN FILL

SECTION E-E

ORIGINAL GROUND

AVERA STRIPPING LINE
ELEVATION TO BE DETERMINED BY THE ENGINEER
(TO BE FIXED FOR AS EXCAVATION)

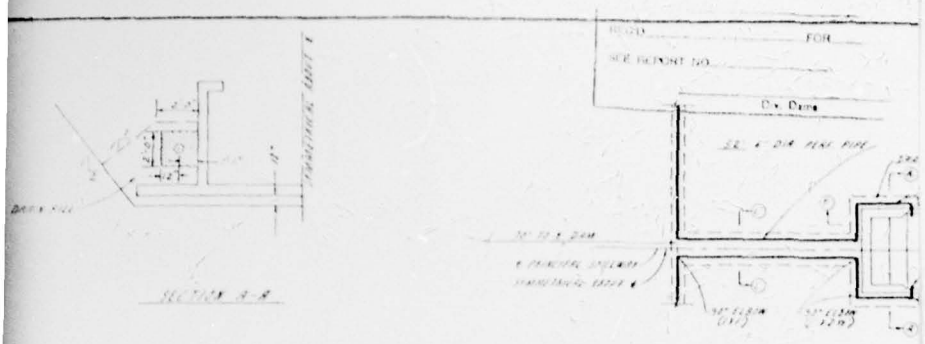
24" FILTER DRAIN PIPE
30 FEET SLOPE (EFFECT)

34" FILTER DRAIN PIPE
30 FEET SLOPE (EFFECT)

AVERA BOTTOM OF FOUNDATION DRAIN TRENCH LINE AND GRADE TO BE DETERMINED BY THE ENGINEER AT TIME OF EXCAVATION

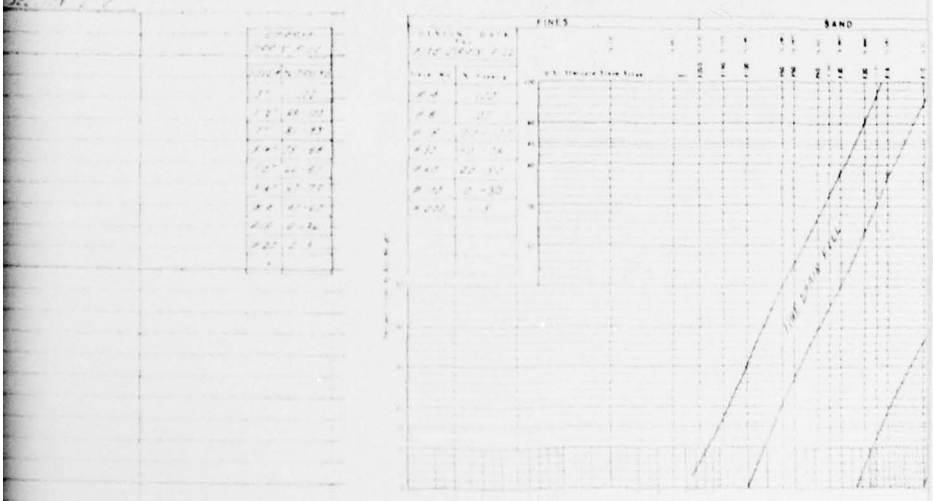
1450
1440
1430
1420
1410
1400

PROFILE OF FOUNDATION DRAIN
(LOOKING DOWNSTREAM)



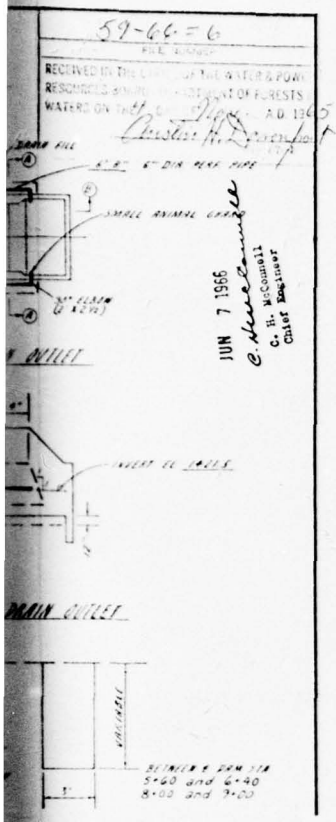


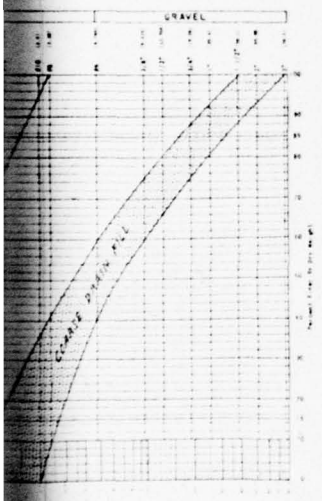






MARSH C
MULTIPLE PU
TIOGA COU
FOUNDATIO
U.S. DEPARTM
SOIL CONS
C CRISE





(SPEC 109)

CREEK WATERSHED
PURPOSE DAM PA-601
COUNTY, PENNSYLVANIA
ATION DRAIN DETAILS
TMENT OF AGRICULTURE
NSERVATION SERVICE
3-65
8-65
PA-601-P

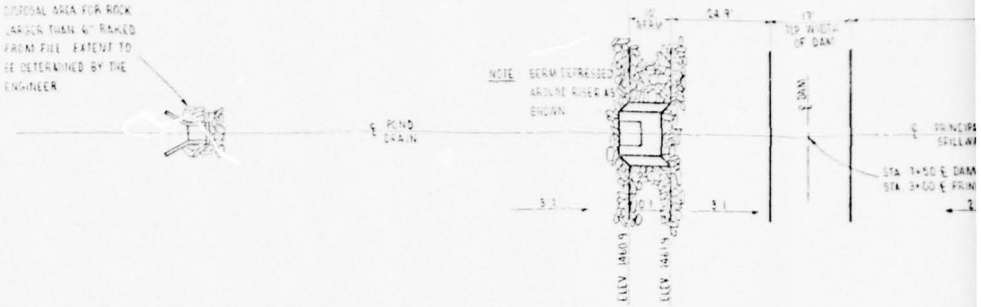
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

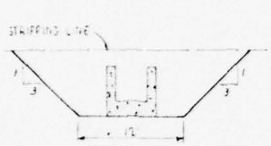
PENNSYLVANIA FISH COMMISSION

DRAIN PLAN

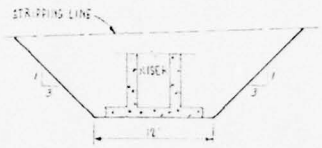
AUGUST 1979 PLATE 5



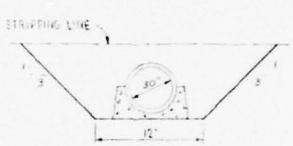
PLAN VIEW
NOT TO SCALE



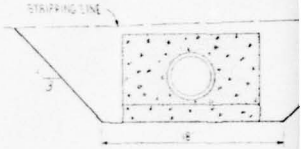
POND DRAIN INLET
NOT TO SCALE



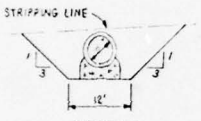
RISER
NOT TO SCALE



CRADLE
NOT TO SCALE



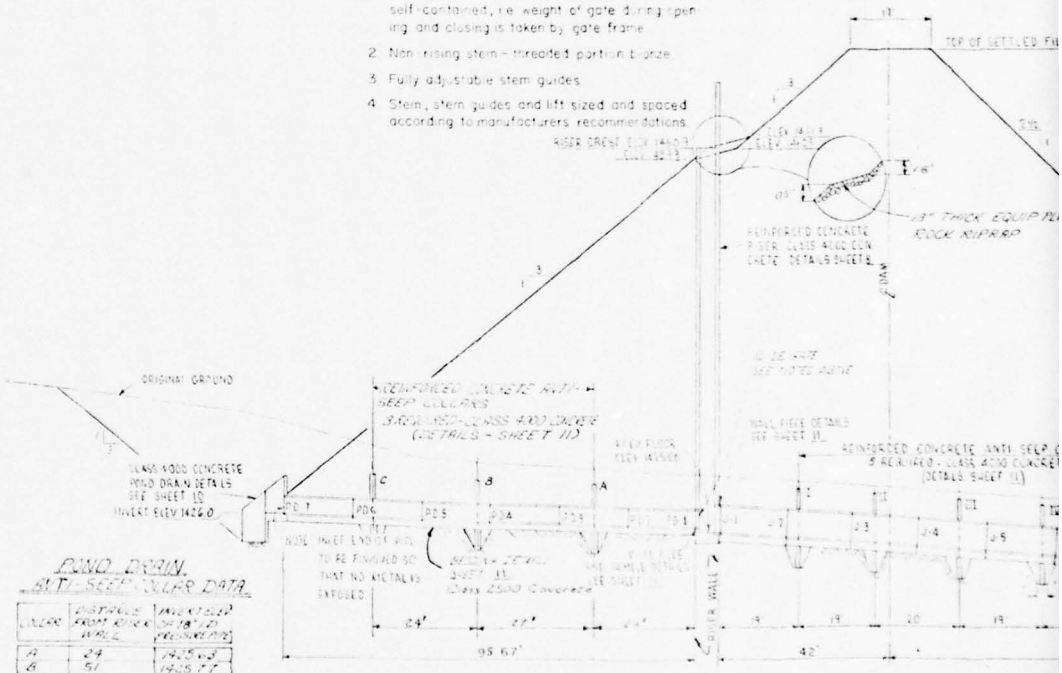
ANTI-SEEP COLLARS
NOT TO SCALE



BEDDING

SLIDE GATE NOTES

1. Slide gate - 8" dia., flat back, 10-40 minimum self-contained, i.e. weight of gate during opening and closing is taken by gate frame
2. Non-rising stem - threaded portion bronze
3. Fully adjustable stem guides
4. Stem, stem guides and lift sized and spaced according to manufacturers recommendations



POND DRAIN PIPE JOINT DATA

JOINT	DISTANCE FROM RISER WALL	INVERT ELEV OF 30" I.D. REINFORCED CONCRETE PIPE
PD 1	0	1425.50
PD 2	16.0	1426.58
PD 3	36.0	1426.67
PD 4	56.0	1426.75
PD 5	64.0	1426.83
PD 6	76.0	1426.92
PD 7	96.0	1427.00

POND DRAIN ANTI-SEEP COLLAR DATA

COLLAR	DISTANCE FROM RISER WALL	INVERT ELEV OF 30" I.D. REINFORCED CONCRETE PRESSURE PIPE
A	24	1425.58
B	51	1425.77
C	75	1425.89

PRINCIPAL SPILLWAY PIPE JOINT DATA

JOINT	DISTANCE FROM RISER WALL	INVERT ELEV OF 30" I.D. REINFORCED CONCRETE PIPE
1	14.0	1424.67
2	34.0	1424.75
3	54.0	1424.83
4	74.0	1424.92
5	94.0	1425.00
6	114.0	1425.08
7	134.0	1425.17
8	154.0	1425.25
9	174.0	1425.33
10	194.0	1425.42
11	214.0	1425.50
12	234.0	1425.58

PRINCIPAL SPILLWAY ANTI-SEEP COLLAR DATA

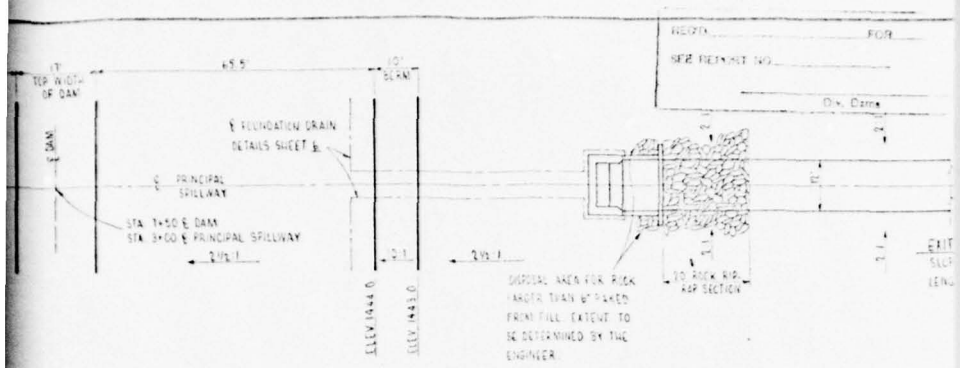
COLLAR	DISTANCE FROM RISER WALL	INVERT ELEV OF 30" I.D. REINFORCED CONCRETE PRESSURE PIPE
I	14.0	1424.67
II	34.0	1424.75
III	54.0	1424.83
IV	74.0	1424.92
V	94.0	1425.00

NOTE DIMENSIONS OF PIPE ARE BASED ON NOMINAL I.D. AND DO NOT INCLUDE CREEP

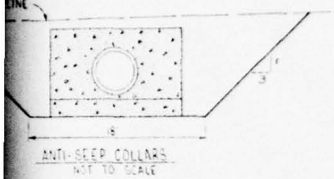
30" INSIDE DIA REINFORCED CONCRETE PRESSURE PIPE
1:1 - 16 SECTIONS
1 - 10.22 WALL PIECE FOR 12' WALL

PRESSURE HEAD = 45'
LOAD - 16,000 LBS PER LIN FT FOR EMBED OF 0.25
MIN. 3 EDGE BEARING STRENGTH FOR:
0.01" CRACK NON-PRESTRESSED PIPE - 1,000 LBS PER LIN FT
0.01" CRACK PRESTRESSED PIPE - 1,350 LBS PER LIN FT

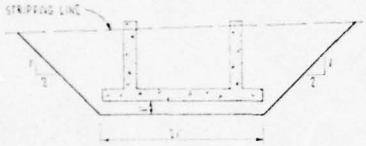
PROFILE ALONG ℄ OF PRINCIPAL
NOT TO SCALE



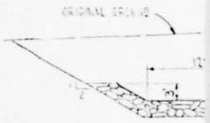
PLAN VIEW
NOT TO SCALE



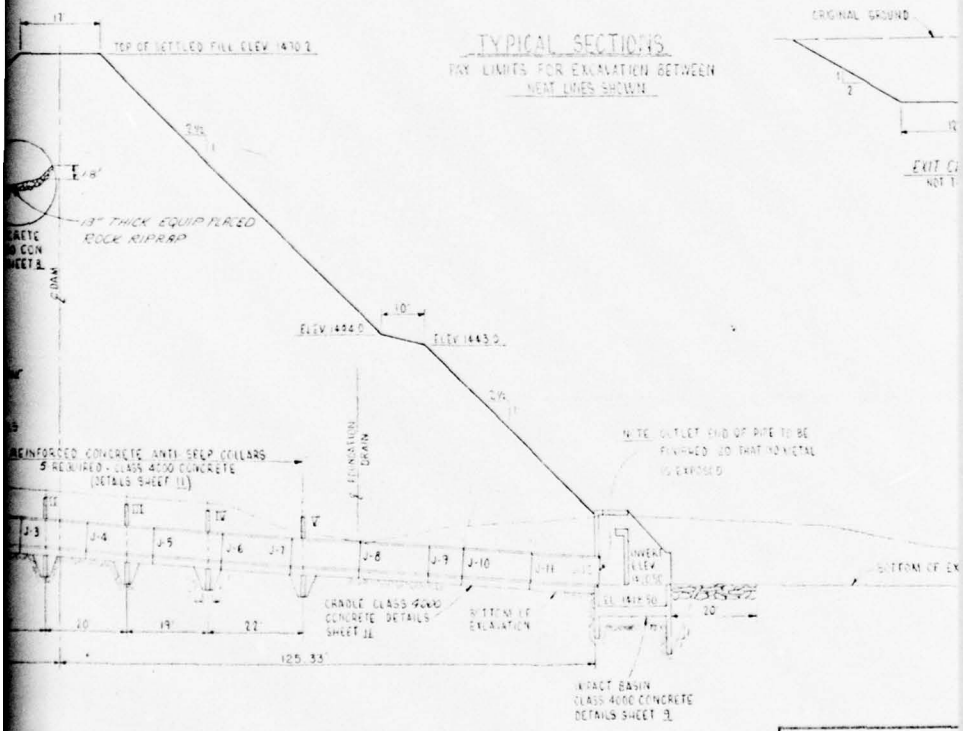
ANTI-SEEP COLLARS
NOT TO SCALE



INPUT BASIN
NOT TO SCALE



TYPICAL SECTIONS
PAY LIMITS FOR EXCAVATION BETWEEN NEAT LINES SHOWN



ALONG ℄ OF PRINCIPAL SPILLWAY
NOT TO SCALE

30" INSIDE DIA REINFORCED CONCRETE PRESSURE PIPE
M-M SECTIONS
F-F SECTION
WALL PIECE FOR 10' WALL

PRESSURE HEAD = 30'
LOAD - 32,611 LBS PER LIN FT BASED ON OD OF 36
MIN 3 EDGE BEARING STRENGTH PER
1.01 EACH NON PRESTRESSED PIPE - 2,271 LBS PER LIN FT
1.20 EACH PRESTRESSED PIPE - 2,497 LBS PER LIN FT

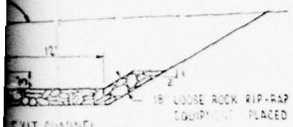
MARSH
MULTIPLE P
TIOGA CO
PLAN-PROFILE
U. S. DEPARTM
SOIL CONS
Lloyd & Thom
R A STALTER
Alfred A Snyde

59-66-7

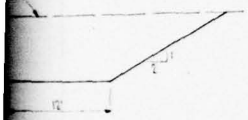
JUN 7 1965

C. H. McConnell
Chief Engineer

EXIT CHANNEL
SLOPE = 0.03 FT/FT
LENGTH = 135' (APPROX.)



EXIT CHANNEL
ROCK RIP-RAP SECTION)
NOT TO SCALE



EXIT CHANNEL
NOT TO SCALE

OAT OF EXIT CHANNEL

RSH CREEK WATERSHED
IPLE PURPOSE DAM PA-601
GA COUNTY, PENNSYLVANIA
FILE OF PRINCIPAL SPILLWAY
PARTMENT OF AGRICULTURE
CONSERVATION SERVICE

8-65

PA-601-P

SCS-333C (9-64)

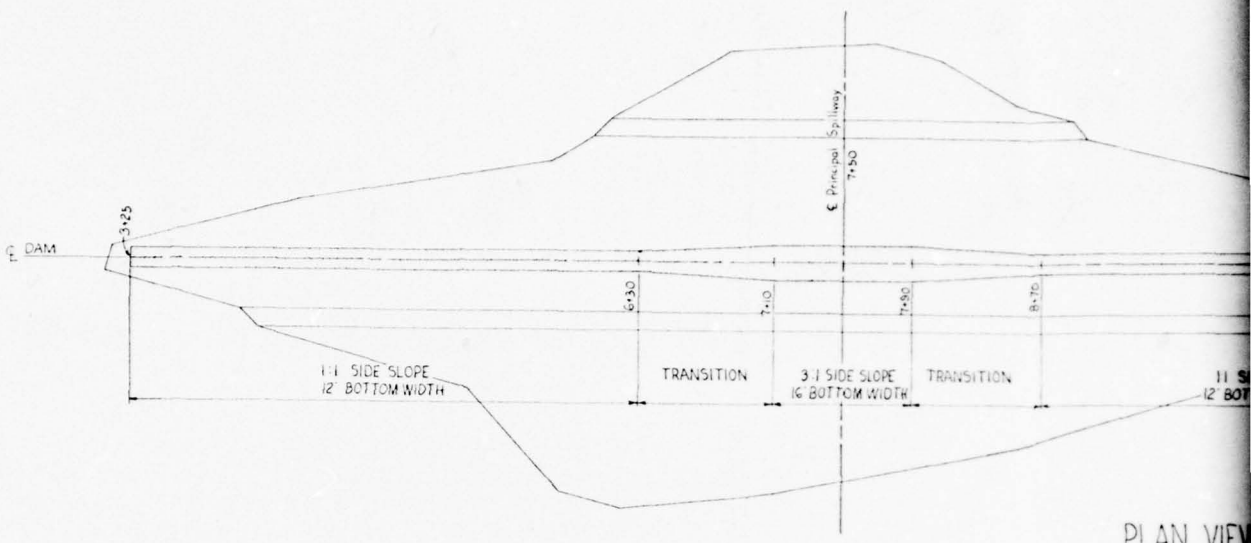
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

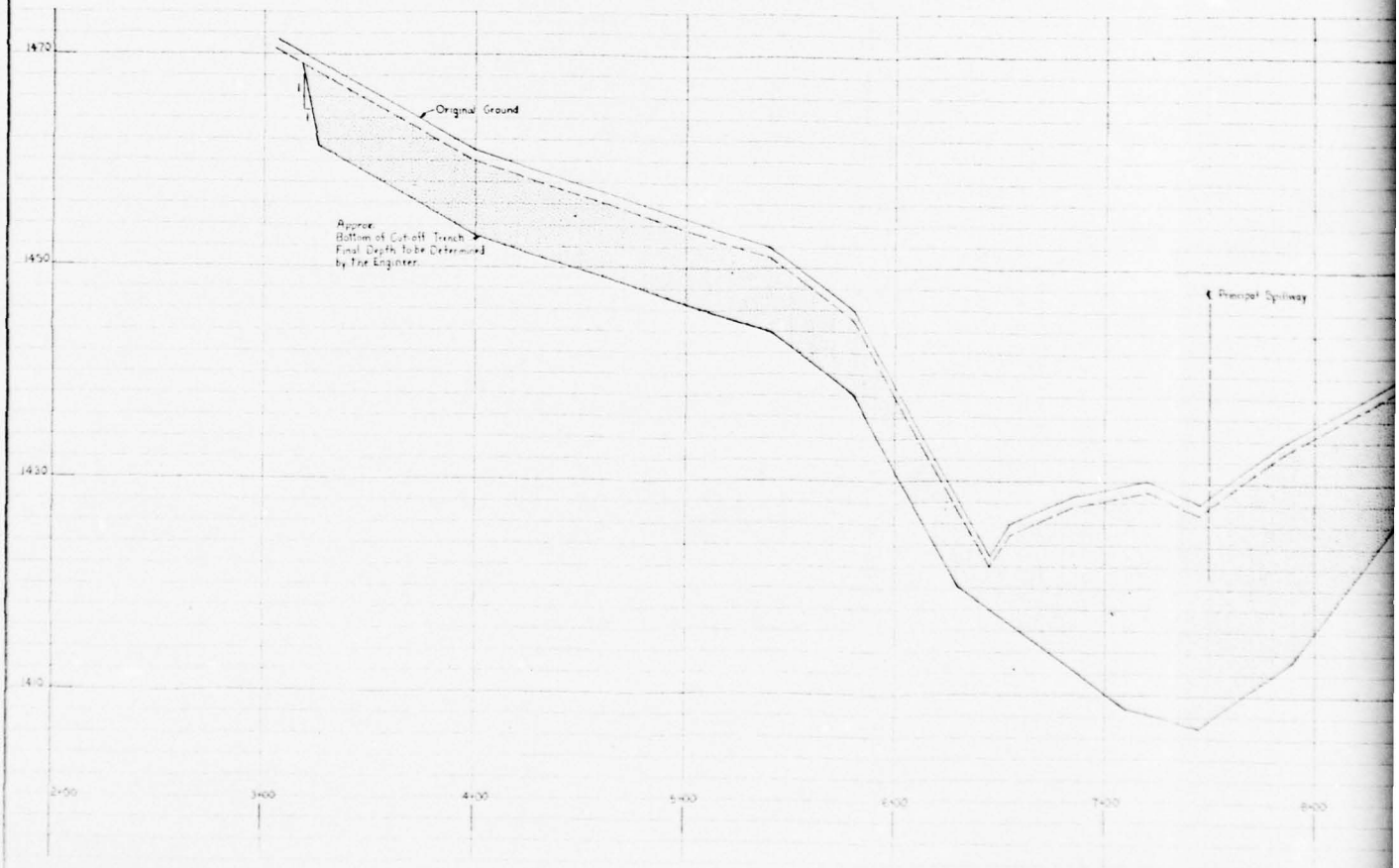
PENNSYLVANIA FISH COMMISSION

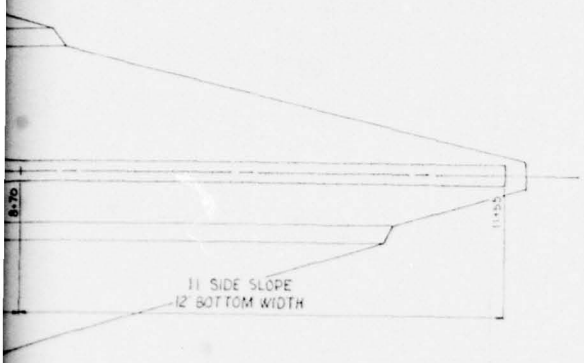
MAIN SPILLWAY
AND OUTLET WORKS

AUGUST 1979 PLATE 6


℄ DAM
3+25
℄ Principal Spillway
7+50
6+30
7+10
7+90
8+76
1:1 SIDE SLOPE
12' BOTTOM WIDTH
TRANSITION
3:1 SIDE SLOPE
16 BOTTOM WIDTH
TRANSITION

PLAN VIEW


1470
1450
1430
1410
Original Ground
Approx.
Bottom of Cut-off Trench
Final Depth to be Determined
by the Engineer
℄ Principal Spillway
2+00
3+00
4+00
5+00
6+00
7+00
8+00

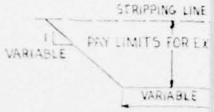


PLAN VIEW OF CUT-OFF TRENCH

0 10 20 50 100
SCALE



BETWEEN STATION
AND STATIONS 8+

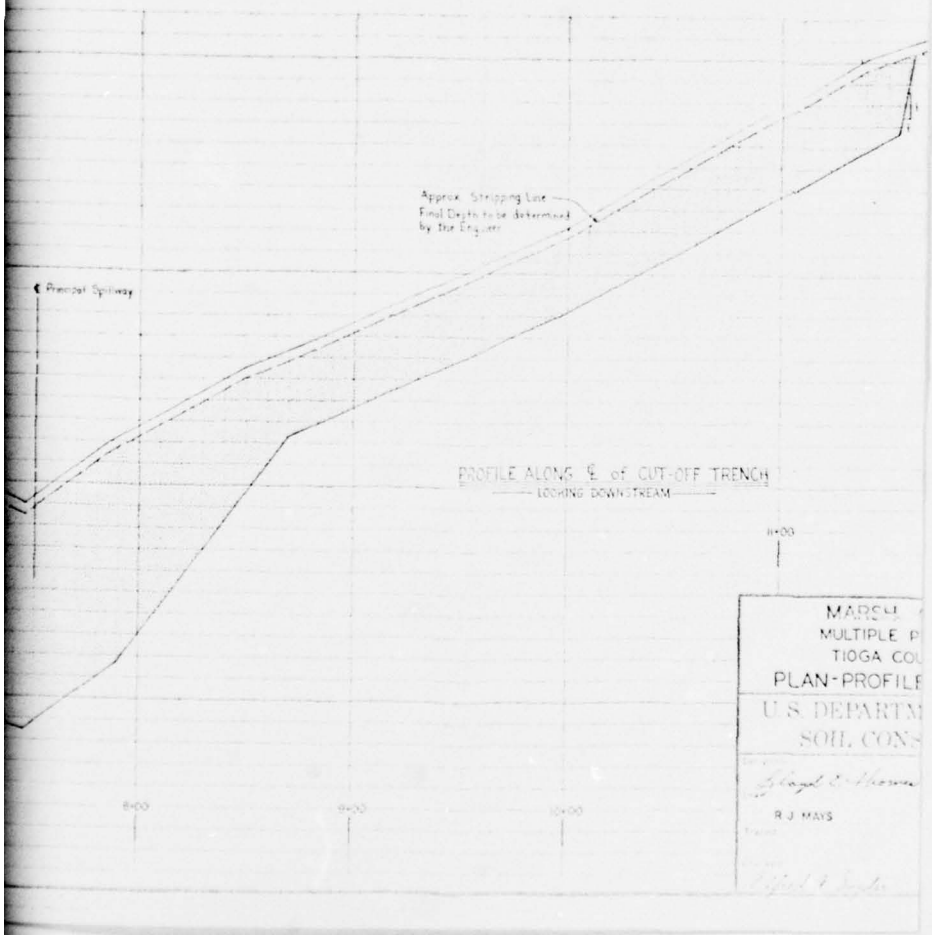


TRANSITION SECTIO
STATIONS 6+30 to 7
STATIONS 7+80 to 8



BETWEEN STATIONS

TYPICAL SEC
CUT-OFF T



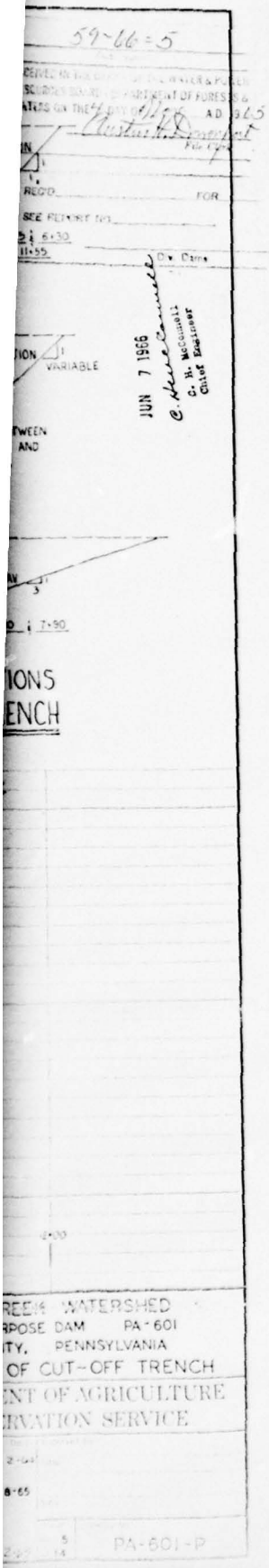
PROFILE ALONG ℄ of CUT-OFF TRENCH
LOOKING DOWNSTREAM

11+00

8+00 9+00 10+00

MARSH
MULTIPLE P
TIOGA CO
PLAN-PROFILE
U.S. DEPARTM
SOIL CONS

R.J. MAYS



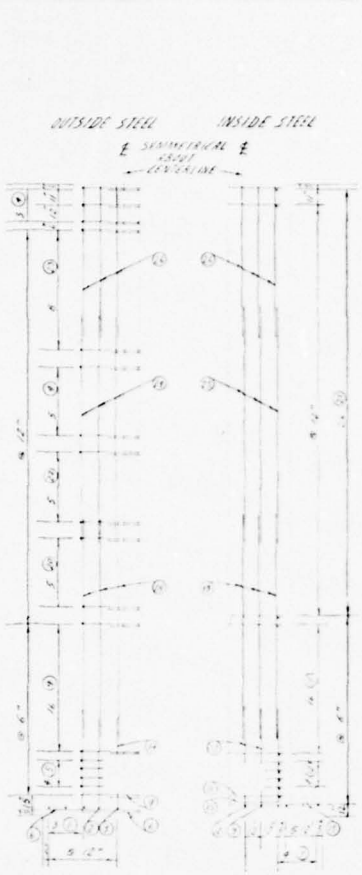
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

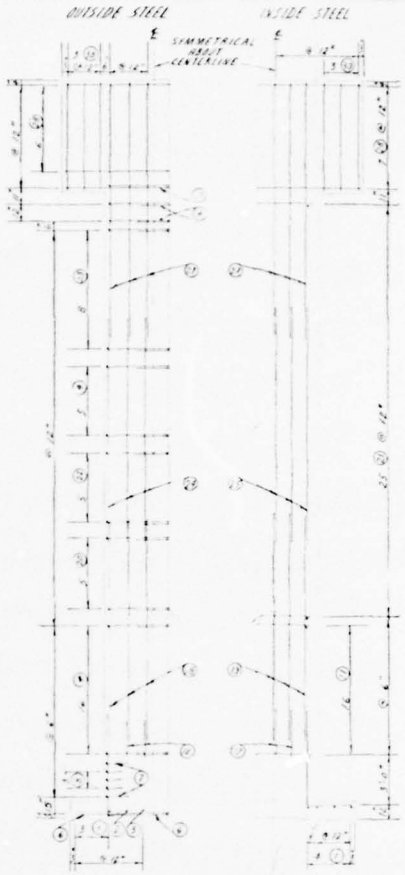
PENNSYLVANIA FISH COMMISSION

CUT-OFF TRENCH

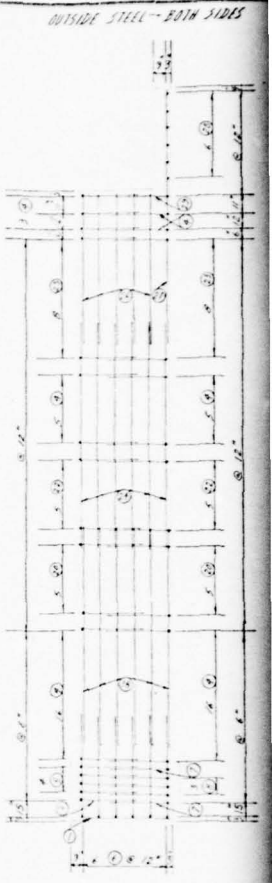
AUGUST 1979 PLATE 7



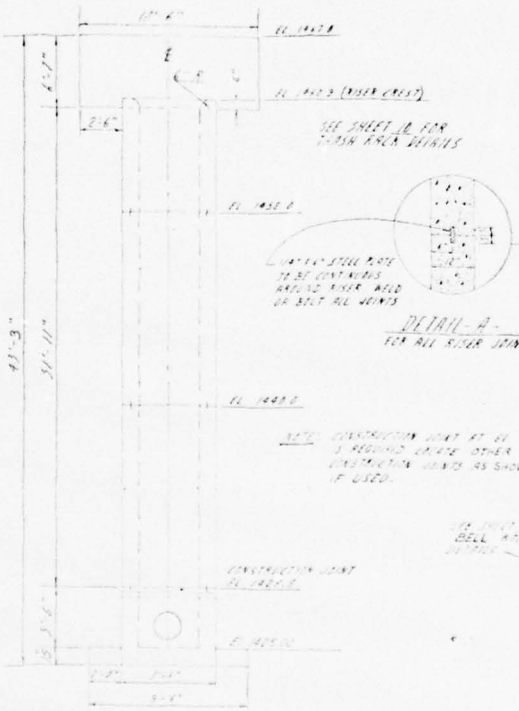
FRONT WALL



REAR WALL

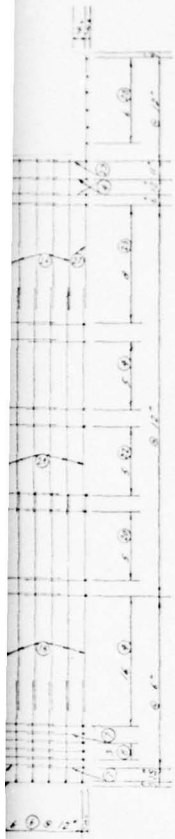


SIDE WALL





E STEEL — BOTH SIDES

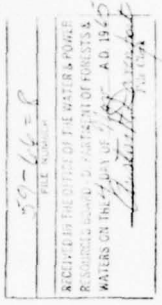


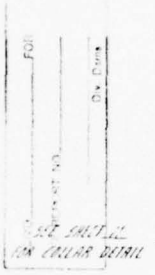
SIDE WALL

INSIDE STEEL — BOTH SIDES



SIDE WALL





STEEL S

MARK	LOCATION	BARS	SIZE	LENG
1	RISER	19	4	5'-0
2		2	5	10'-7
3		2	5	6'-1
4		34	5	6'-8
5		8	5	4'-7
6		12	7	15'-8
7		4	5	4'-7
8		6	5	9'-4
9		2	5	9'-3
10		1	5	9'-2
11		15	4	9'-2
12		8	4	5'-5
13		2	5	7'-11
14		2	4	2'-4
15		8	5	11'-1
16		4	4	2'-4
17		10	5	3'-2
18		20	4	12'-5
19		14	5	13'-2
20		20	7	7'-6
21		103	5	9'-4
22		20	6	7'-6
23		32	4	4'-9
24		20	4	13'-2
25		16	5	13'-2
26		25	5	8'-9
27		11	5	13'-2
28		13	5	10'-7
29		2	5	10'-7
30		12	5	6'-7
31	[illegible]	90	4	3'-6
32		50	4	3'-6
33		25	4	10'-6
34		30	4	1'-6
35		30	4	2'-6
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	4	1'-0
38		30	4	6'-0
39		12	4	1'-3
40		12	4	1'-6

(1)

BAR

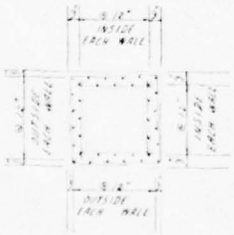
STEEL SUMMARY

RISER AND ANTI-VOR

NO. 4 BARS	839.00 FT.
NO. 5 BARS	266.00 FT.
NO. 6 BARS	146.00 FT.
NO. 7 BARS	349.00 FT.
TOTAL	

CONCRETE (CU.

CLASS 4000 (3 E. CE



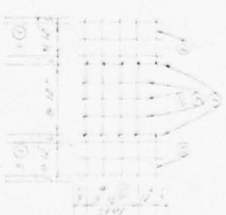
SECTION SHOWING BAR SPACING



POND DRAIN OPENING



BOTTOM FACE



END FACE

BOTTOM SLAB

See Sheet 11 for General

NOT TO SCALE

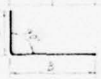
MARSH CREEK
MULTIPLE PURPOSE
TIOGA COUNTY,
STRUCTURA

U. S. DEPARTMENT
SOIL CONSERV

E. RIEMER 11-62
E. CHASE 8-65

SCHEDULE

TYPE	A	B	TOTAL FEET
1			13.33
2	5'-0"	5'-9"	21.50
2	5'-0"	1'-6"	12.10
2	3'-4"	3'-9"	648.28
2	3'-4"	1'-5"	14.67
2	7'-0"	6'-8"	164.00
2	3'-4"	1'-5"	15.33
2	3'-4"	1'-0"	26.08
2	3'-4"	2'-9"	8.02
2	3'-4"	2'-6"	9.08
1			312.50
1			6.08
2	5'-5"	2'-6"	15.83
1			9.67
2	6'-6"	5'-5"	35.33
1			10.88
1			31.67
1			255.08
1			210.67
2	3'-9"	3'-9"	156.08
1			423.17
2	3'-4"	3'-6"	144.08
2	3'-0"	3'-0"	202.67
1			265.08
1			218.67
1			216.67
1			151.25
1			139.08
2	3'-6"	3'-6"	24.67
1			73.08
1			290.08
1			156.67
1			312.50
1			43.08
1			25.08
			[illegible]
1			44.08
1			190.08
1			15.08
1			20.08



(2)

...TIFFS

...TERIES

...(EP COLLAR)

15820 LBS

6965 LBS

2108 LBS

4982 LBS

47 93 LBS

...ANTITIES

...00 YDS. (RIVER ONLY)

JUN 7 1965

C. H. McDonald
Chief Engineer

...Notes.

...K WATERSHED
...E DAM PA-601
... PENNSYLVANIA
...AL DETAILS

...T OF AGRICULTURE
...VATION SERVICE

PA-601-P

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

PENNSYLVANIA FISH COMMISSION

MAIN SPILLWAY RISER

AUGUST 1979 PLATE 8

SUSQUEHANNA RIVER BASIN

MORRIS BRANCH MARSH CREEK, TIOGA COUNTY

PENNSYLVANIA

LAKE NESSMUK DAM

NDI ID No. PA-00032
DER ID No. 59-66
SCS ID No. PA-601

PENNSYLVANIA FISH COMMISSION

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

AUGUST 1979

APPENDIX A

CHECKLIST - ENGINEERING DATA

CHECKLIST

ENGINEERING DATA

DESIGN, CONSTRUCTION, AND OPERATION
PHASE I

NAME OF DAM: LAKE NESCONUK

NDI ID NO.: PA-00169 DER ID NO.: 59-66

SCS ID.NO. PA-601.

ITEM	REMARKS
AS-BUILT DRAWINGS	AVAILABLE IN SCS FILES
REGIONAL VICINITY MAP	SEE PLATE 1
CONSTRUCTION HISTORY	BUILT 1967-1968
TYPICAL SECTIONS OF DAM	SEE PLATE 2
OUTLETS: Plan Details Constraints Discharge Ratings	SEE PLATE 6 NO RATINGS AVAILABLE

ENGINEERING DATA

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	NONE
DESIGN REPORTS	AVAILABLE IN SCS FILES
GEOLOGY REPORTS	AVAILABLE IN SCS FILES
DESIGN COMPUTATIONS: Hydrology and Hydraulics Dam Stability Seepage Studies	ALL EXCEPT SEEPAGE STUDY AVAILABLE. See END OF APPENDIX A AND APPENDIX C.
MATERIALS INVESTIGATIONS: Boring Records Laboratory Field	ALL AVAILABLE IN SCS FILES
POSTCONSTRUCTION SURVEYS OF DAM	NONE

ENGINEERING DATA

ITEM	REMARKS
BORROW SOURCES	FROM SITE AS NOTED ON DRAWINGS
MONITORING SYSTEMS	NONE
MODIFICATIONS	NONE
HIGH POOL RECORDS	NO FORMAL RECORDS. HIGHEST POOL REPORTED: 8" below AUX. SPILLWAY CREST, TROPICAL STORM AGNES
POSTCONSTRUCTION ENGINEERING STUDIES AND REPORTS	NONE
PRIOR ACCIDENTS OR FAILURE OF DAM: Description Reports	NONE

ENGINEERING DATA

ITEM	REMARKS
MAINTENANCE AND OPERATION RECORDS	NONE
SPILLWAY: Plan Sections Details	See PLATE 6 AND 8
OPERATING EQUIPMENT: Plans Details	AVAILABLE IN SCS FILES
PREVIOUS INSPECTIONS Dates Deficiencies	1970 - GATE LEAKING 1971 - NO deficiencies 1972 - Debris at main spillway 1974 - No deficiencies 1977 - No deficiencies 1978 - No deficiencies, notes gate was not operated.

10-58

Maximum Section

SOIL MECHANICS LABORATORY

SUMMARY - SLOPE STABILITY ANALYSIS

State PENNSYLVANIA Project MARSH CREEK SITE #PA601

Date 12-11-64 Analysis Made By A.W.L. Checked By G.N.G.

Method of Analysis SWEDISH CIRCLE

Location of Material							Emb 95% Std Cl.		Emb 95% Std Cl.	
Sample No.							95W1066		65W1067	
γ_d							114.4		103.6	
γ_m							128.0		121.8	
γ_s							134.0		127.0	
γ_b							71.5		64.5	
Condition	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.
ϕ								22.5°		16.0°
Tan ϕ								0.414		0.287
K										
C								350		900

UPSTREAM SLOPE

Trial	Slope	Conditions	Fs
1	3:1	Full drawdown - 10' berm @ elev. 1460.9 - Arc cut from opp. sh'ldr thru Emb. (22.5°-350) only	1.45
1A	3:1	Same as #1 except Emb (16.0°-900) only	2.2
2	3:1	Full drawdown - 10' berm @ elev. 1410.9 Arc cut from opp sh'ldr thru Emb (22.5°-350) only	1.50
3	3:1	Full drawdown - 10' berm @ elev. 1460.9 Arc cut from opp. sh'ldr thru Emb (22.5°-350) only	1.56

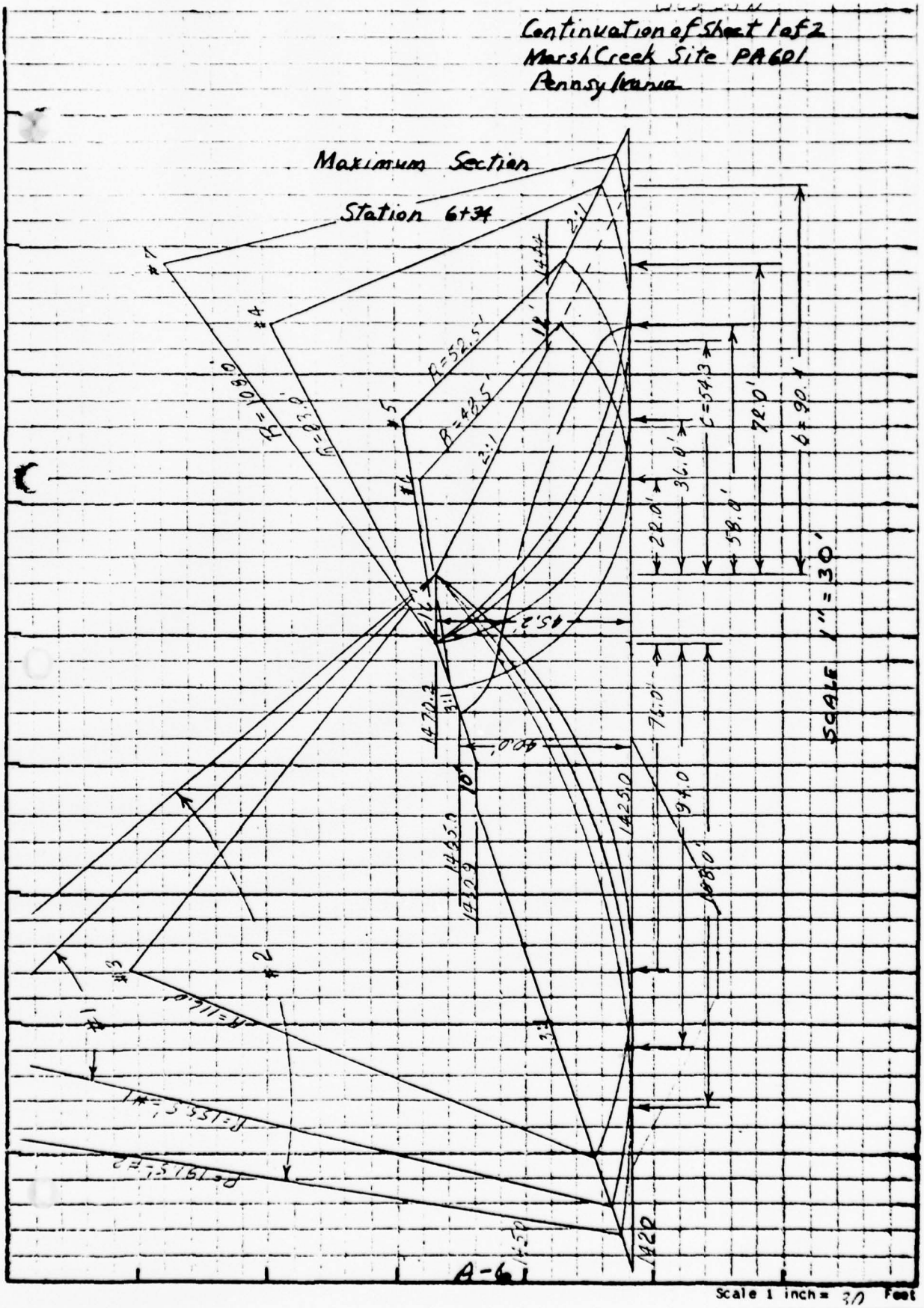
DOWNSTREAM SLOPE

Trial	Slope	Conditions	Fs
4	2:1	Drain @ 0.6 - No berm - Arc cut from opp. sh'ldr thru. Emb (22.5°-350) only	1.32
4A	2:1	Same as #4 except Emb (16.0°-900) only	1.89
4B	2:1	Same as #4 except 12' berm @ elev. 1444	1.50
5	2:1	Drain @ 0.6 - No berm - Arc cut From opp. sh'ldr thru Emb (22.5°-350) only	1.47
6	2:1	Drain @ 0.6 - No berm - Arc cut from opp. sh'ldr thru Emb (22.5°-350) only	1.80
7	2:1	Drain @ 0.6 - 12 berm @ elev 1444 - Arc cut from opp. sh'ldr thru emb of (22.5°-350) only.	1.54

A-5

To be used to report to field offices data used for slope stability analyses and the results of the analyses. The right side of the form will be used for a sketch of the embankment on which the analyses have been made.

GPO : 1959 O - 605000


Continuation of Sheet 1 of 2
Marsh Creek Site PA601
Pennsylvania
Maximum Section
Station 6+34
SCALE 1" = 30'
Scale 1 inch = 30 Feet
A-6

SUSQUEHANNA RIVER BASIN

MORRIS BRANCH MARSH CREEK, TIOGA COUNTY

PENNSYLVANIA

LAKE NESSMUK DAM

NDI ID No. PA-00032
DER ID No. 59-66
SCS ID No. PA-601

PENNSYLVANIA FISH COMMISSION

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

AUGUST 1979

APPENDIX B

CHECKLIST - VISUAL INSPECTION

CHECKLIST

VISUAL INSPECTION

PHASE I

Name of Dam: LAKE NESSMUK County: TIOGA State: PENNSYLVANIA

NDI ID No.: PA-00169 DER ID No.: 59-66

Type of Dam: ZONED EARTHFILL Hazard Category: HIGH

Date(s) Inspection: 26&27 JULY 1979 Weather: HAZY-SEE BELOW Temperature: 75°F

SOIL: VERY MOIST - INSPECTION INTERRUPTED BY THUNDERSHOWER

SCS ID. NO: PA-601

Pool Elevation at Time of Inspection: _____ msl/Tailwater at Time of Inspection: _____ msl

Inspection Personnel:

E. JON GRINDALL (PFC) HOWARD RUTLEDGE (SCS) D. EBERSOLE (GFCC)

DAN O'NEILL (PFC) JOHN ZAGINAYLO (SCS) _____

RON WOODHEAD (BOROUGH) D. WOLF (GFCC) _____

A. WHITMAN (GFCC) Recorder

B-1

EMBANKMENT

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	NONE	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	NONE	
SLOUGHING OR EROSION: Embankment Slopes Abutment Slopes	MINOR SCALPING OF GRASS COVER, PROBABLY BY MOWING. NO EROSION EVIDENT.	
CREST ALIGNMENT: Vertical Horizontal	VERTICAL - SEE SURVEY SHEETS FOLLOWING INSPECTION FORMS HORIZONTAL - NO DEFICIENCIES	
RIPRAP FAILURES	RIPRAP IN GOOD CONDITION, IT EXTENDS APPROXIMATELY 2.8 FEET ABOVE MAIN SPILLWAY CREST	SOME AREAS ON THE UPSTREAM SLOPE RIPRAP ARE POORLY GRADED, BUT NOT SERIOUSLY.

B-2

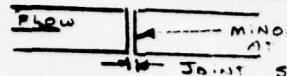
EMBANKMENT

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT WITH: Abutment Spillway Other Features	No deficiencies	
ANY NOTICEABLE SEEPAGE	None observed	
STAFF GAGE AND RECORDER	None at site	
DRAINS	At impact basin Left drain - 0.5 gpm flow Right drain - small trickle	
Vegetation	Grass - except as noted under erosion - good Downstream slope is covered with 2' to 3' high crown vetch.	High grass growing through riprap on upstream slope, being cut on day of inspection. Grass at dam was newly mowed.

OUTLET WORKS

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	 JOINT SEPARATION: 1/4" TO 1/2" EXCEPT 2 AT DOWNSTREAM END OPEN 3/4" TO 1" AND 4TH FROM	NO EVIDENCE OF CAVITATION AT RISER. UPSTREAM END OPEN 1 1/4"
INTAKE STRUCTURE	SUBMERGED	
OUTLET STRUCTURE	IMPACT BASIN - GOOD CONDITION.	
OUTLET CHANNEL	RIPRAP - GOOD CONDITION MINOR BRUSH ON CHANNEL BANKS.	BRUSH NOT A DEFICIENCY. BOROUGH MAINTENANCE PERSONNEL INDICATED IT WOULD BE CUT SHORTLY.
EMERGENCY GATE	SCS PERSONNEL REPORTED THAT GATE HAD NOT BEEN OPENED SINCE CONSTRUCTION. THEY WERE CONFIDENT THAT THE GATE WAS OPERABLE, BUT DID NOT WISH	IT TO BE OPENED BECAUSE THE GATE DOES NOT SEAT CORRECTLY, WHICH RESULTS IN LEAKAGE AND POSSIBLE SLOW POOL DRAWDOWN. STOPPING LEAK REQUIRES ADJUSTING WEDGES.

MAIN
~~UNGATED~~ SPILLWAY

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	No deficiencies	
APPROACH CHANNEL	Reservoir	
DISCHARGE CHANNEL	Conduit: see outlet works	
BRIDGE AND PIERS	None	Trash device at crest.

B-5

AUXILIARY/~~GATED~~ SPILLWAY

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	NONE - GRASSED LEVEL SECTION	GOOD CONDITION
APPROACH CHANNEL	GRASSED SLOPE TO RESERVOIR	GOOD CONDITION
DISCHARGE CHANNEL	MINOR BRUSH IN RIPRAP AT RIGHT BANK	NO DEFICIENCIES
BRIDGE AND PIERS	NONE	
GATES AND OPERATION EQUIPMENT	NONE	

INSTRUMENTATION

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	NONE AT SITE	
OBSERVATION WELLS	NONE AT SITE	
WEIRS	NONE AT SITE	
PIEZOMETERS	NONE AT SITE	
OTHER	N/A	

DOWNSTREAM CHANNEL

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION: Obstructions Debris Other	No obstructions or significant debris. Minor brush on banks.	Brush cutting in progress
SLOPES	Steep stream banks Gentle slope overbanks	
APPROXIMATE NUMBER OF HOMES AND POPULATION	Greatly in excess of 50 dwellings, also commercial district	Stream flows through Borough of Wellsboro in small vertical-side channel

RESERVOIR AND WATERSHED

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	GENTLE TO STEEP	
SEDIMENTATION	NO OBSERVED OR REPORTED PROBLEMS	
WATERSHED DESCRIPTION	ROLLING HILLS EITHER WOODED OR FARM FIELDS. VERY MINOR DEVELOPMENT	

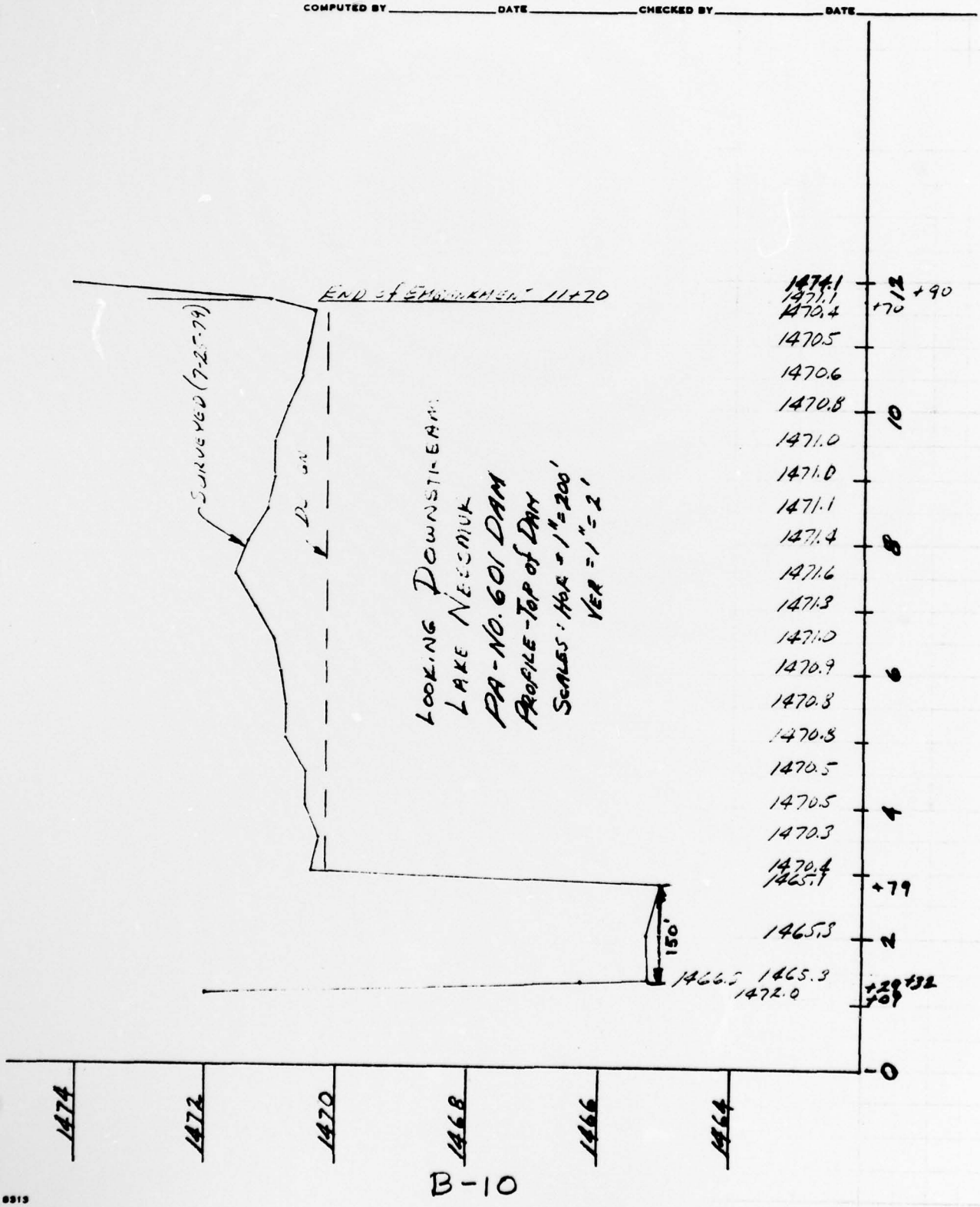
GANNETT FLEMING CORDDRY
AND CARPENTER, INC.
HARRISBURG, PA.

SUBJECT PA-601 DAM FILE NO.

SHEET NO. OF SHEETS

FOR

COMPUTED BY DATE CHECKED BY DATE

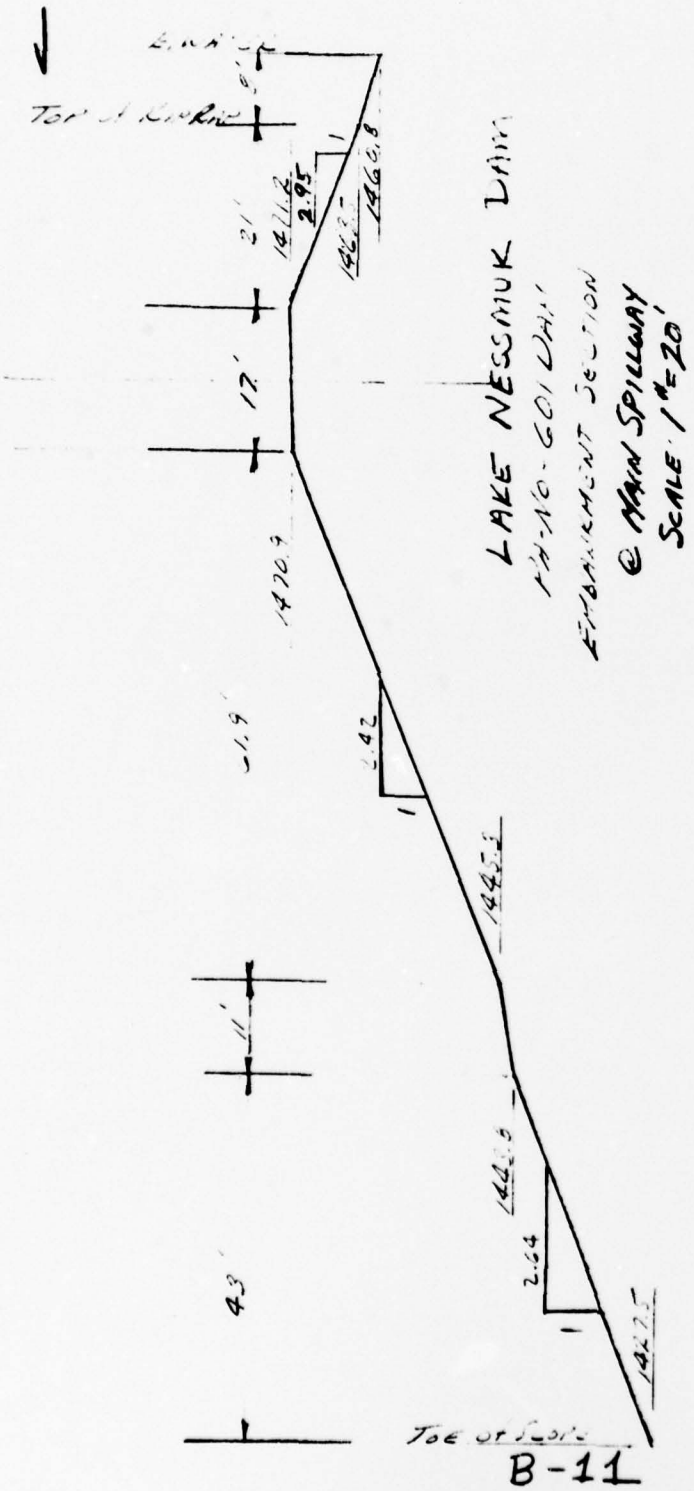


B-10

8513

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
HARRISBURG, PA.

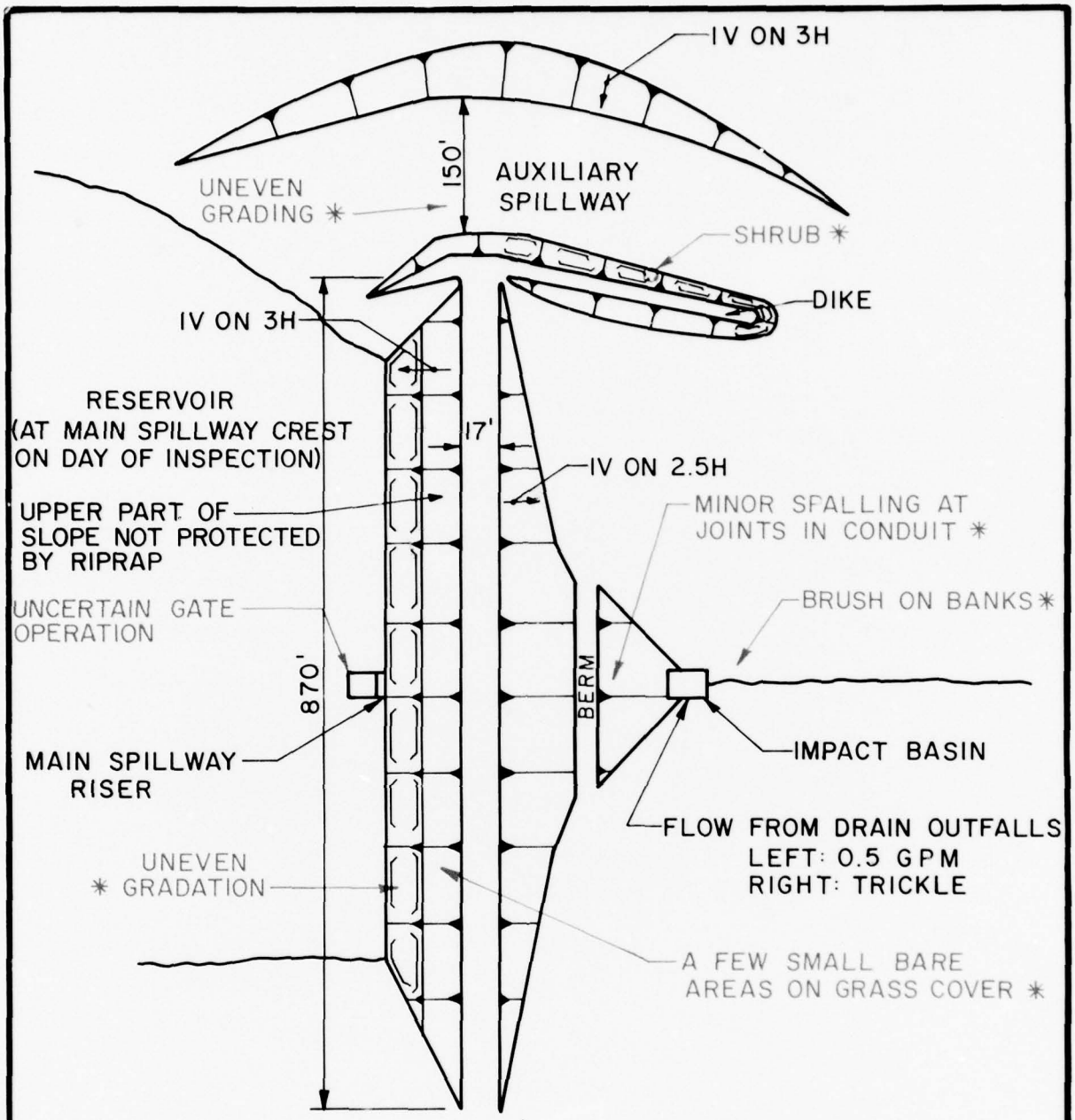
SUBJECT Flood Duty FILE NO.
SHEET NO. OF SHEETS
FOR
COMPUTED BY DATE CHECKED BY DATE



LAKE NESSMUK DAM
PRIMARY GOVERNMENT SECTION
@ MAIN SPILLWAY
SCALE: 1"=20'

B-11

6515



NOT TO SCALE

NOTE: ITEMS MARKED * ARE VERY MINOR AND ARE NOT CONSIDERED DEFICIENCIES.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

PENNSYLVANIA FISH COMMISSION

RESULTS OF VISUAL INSPECTION

AUGUST 1979 PLATE B-1

SUSQUEHANNA RIVER BASIN

MORRIS BRANCH MARSH CREEK, TIOGA COUNTY

PENNSYLVANIA

LAKE NESSMUK DAM

NDI ID No. PA-00032
DER ID No. 59-66
SCS ID No. PA-601

PENNSYLVANIA FISH COMMISSION

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

AUGUST 1979

APPENDIX C

HYDROLOGY AND HYDRAULICS

APPENDIX C

HYDROLOGY AND HYDRAULICS

In the recommended Guidelines for Safety Inspection of Dams, the Department of the Army, Office of the Chief of Engineers (OCE), established criteria for rating the capacity of spillways. The recommended Spillway Design Flood (SDF) for the size (small, intermediate, or large) and hazard potential (low, significant, or high) classification of a dam is selected in accordance with the criteria. The SDF for those dams in the high hazard category varies between one-half of the Probable Maximum Flood (PMF) and the PMF. If the dam and spillway are not capable of passing the SDF without overtopping failure, the spillway capacity is rated as inadequate. If the dam and spillway are capable of passing one-half of the PMF without overtopping failure, or if the dam is not in the high hazard category, the spillway capacity is not rated as seriously inadequate. A spillway capacity is rated as seriously inadequate if all of the following conditions exist:

(a) There is a high hazard to loss of life from large flows downstream of the dam.

(b) Dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure.

(c) The dam and spillway are not capable of passing one-half of the PMF without overtopping failure.

1/13/59 FREEBOARD HYDROGRAPH No. 15

HYDROGRAPH COMPUTATION FORM

Watershed MARSH CREEK State PA

Structure Site or Sub-area #2 MORRIS CREEK

Storm Distribution Curve B Hydrograph Family 1

D.A. 1.63 sq. mi., Pt. Rainfall 8.9 to 2.2 inches, Aerial Rainfall x.94 to 20.8 inches

R. O. Condition II, R. O. Curve No. 76, Storm Duration or Freq. 6 hr

T_c = 1.09 hrs., Q = 17.44 inches, T_p = 0.686 T_c = .71, T_o = 5.6 hr.

$\frac{T_o}{T_p}$ Computed = 7.90 $\frac{T_o}{T_p}$ used: 6 Revised T_p = .93 hr.

$q_p = \frac{484 A}{\text{Rev. } T_p}$ = 848 c.f.s. $q_p \times Q$ = 14,800 c.f.s.

T (column) = $\frac{t}{T_p} \times$ Rev. T_p q (column) = $\frac{q_c}{q_p}$ (q_p Q)

Check: Q = $\frac{(\quad)(\Sigma q)}{645 A}$

Table 3.21-7 (sheet of)

Line No.	$\frac{t}{t_p}$	$\frac{q_c}{q_p}$	T hours	q c.f.s.	Line No.	$\frac{t}{t_p}$	$\frac{q_c}{q_p}$	T hours	q c.f.s.
1	0		0	0	21		.005	8.18	74
2	0.44	.003	.41	44	22		.003	8.59	44
3	X	.013	.82	192	23		.002	9.00	30
4	↓	.041	1.23	607	24		.001	9.41	15
5		.084	1.64	1240	25				
6		.176	2.05	2605	26		Q = (.092)(45630) = 17.76"		
7		.386	2.46	5710	27		645(1.63)		
8		.497	2.86	7355	28				
9		.430	3.27	6360	29		%E = $\frac{17.76-17.44}{17.44}$ = 1.3%		
10		.335	3.68	4960	30				
11		.258	4.09	3820	31				
12		.202	4.50	2990	32				
13		.164	4.91	2420	33				
14		.139	5.32	2060	34				
15		.124	5.73	1830	35				
16		.100	6.14	1480	36				
17		.060	6.55	890	37				
18		.033	6.96	490	38				
19		.018	7.37	266	39				
20		.009	7.77	133	40				

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
HARRISBURG, PA.

SUBJECT SCS FREEBOARD STORM FILE NO. SHEET NO. OF SHEETS
FOR LOYALSOCK MUK
COMPUTED BY AHH DATE CHECKED BY DATE

SCS DATH - FREEBOARD STORM (6HR)

RAINFALL = 20.8"
RUNOFF = 17.44"
Q PEAK INFLOW = 7355 CFS

PMF DATA:

SUSQUEHANNA BASIN

DISTRIBUTION		
6 HR	118%	INDEX RAINFALL =
12 HR	127	22.15"
24 HR	136	
48 HR	142	ADJUSTMENT = 99%±
72 HR	145	

(FROM HYDROMET 40)
REVISED INDEX = 22.15 x .99 x .8 = 17.54"
Hop Brook Notch

TOTAL 6HR RAINFALL 1.18 x 17.54" = 20.70"
AS SMALL (e.g. 1.63 mi²) WATERSHEDS ARE ONLY SENSITIVE TO INTENSE (e.g. PEAK) RAINFALL PERIODS, THE SCS 6-HR RAINFALL IS SUFFICIENTLY CLOSE TO THE PMF.
SINCE THE INITIAL ABSTRACTION OF 1.0" IS ASSUMED TO HAVE BEEN ABSORBED BY THE EARLY PART OF THE PMF; FOR THE 6 HR PEAK: RUNOFF = 20.70" - 6 x .05 INCHES/HOUR = 20.40" THIS IS SLIGHTLY GREATER THAN THE SCS RUNOFF OF 17.4". HOWEVER, THE PEAK FLOW IS CONSERVATIVE BECAUSE THE UNIT HYDROGRAPH IS CONSERVATIVE.

8513

SCS-347 5-67
Thruster Computations

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

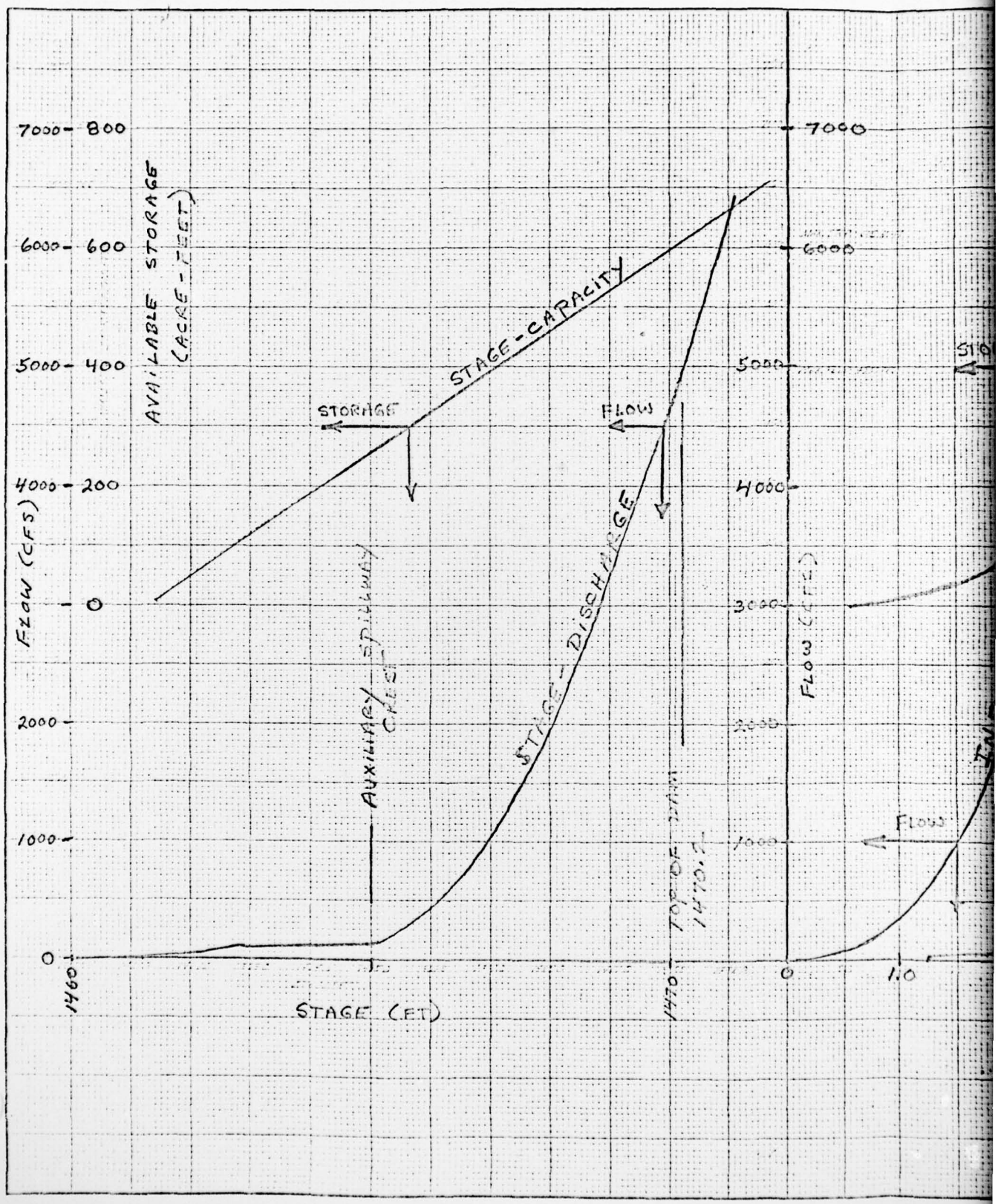
MARSH CREEK W/S PA-601

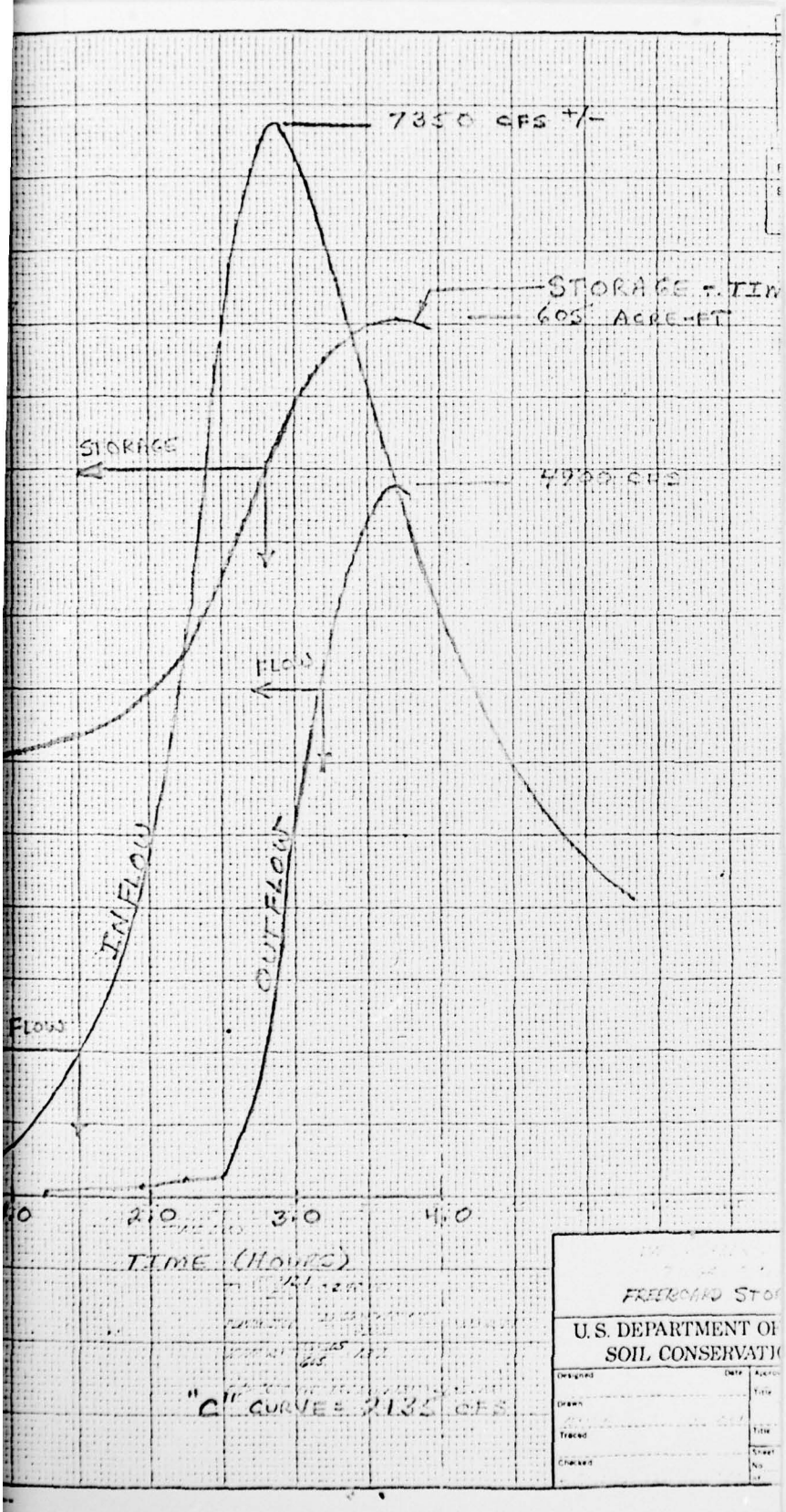
STAGE DISCHARGE COMPUTATIONS

Stage	H_w	$H^{3/2}$	$Q_w = 36.7 H^{3/2}$	H_p (Spillway = 1425.0)	$H^{1/2}$	$Q_p = 21.07 H^{1/2}$	q ES-124 Sh 3/7 $L = 200$	H_p	d_c	$Zd_c = 2d_c$	$b+Z$ $=150+$
1460.9	0	0	0	35.9	5.99	126					
1461.5	0.6	0.46	18	—	—						
1462.0	1.1	1.16	45	37.0	6.08	128					
1462.5	1.6	2.04	79	—	—						
1463.0	2.1	3.04	118	38.0	6.16	130					
1463.5	2.6	4.19	162	38.5	6.20	131					
1465.0				40.0	6.32	133	0	0	0	0	150.
1466.8				41.8	6.46	136	5	1.76	0.92	1.84	151.
1467.7				42.7	6.53	138	10	2.65	1.46	2.92	152.
1468.4				43.4	6.58	139	15	3.39	1.91	3.82	153.
1469.0				44.0	6.63	140	20	4.04	2.32	4.64	154.
1470.1				45.1	6.72	142	30	5.14	3.04	6.08	156.
1471.1				46.1	6.79	143	40	6.14	3.70	7.40	157.
1461.3	0.4	0.25	10								
1461.2	0.3	0.16	6								

...2de / ...r2de	Q_E	$Q_E + Q_P$	Q_{net} (Q_{base}=8)			
			—			
			10			
			37			
			71			
			110			
			123			
0.00	0	133	125			
1.84	759	895	887			
2.92	1529	1667	1659			
3.82	2307	2446	2438			
4.64	3093	3233	3225			
6.08	4682	4824	4816			
7.40	6294	6439	6431			
			2			
			—			

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
LAKE NESSMUK DAM
PENNSYLVANIA FISH COMMISSION
HYDRAULIC COMPUTATIONS
AUGUST 1979 PLATE C-1


7000
6000
5000
4000
2000
1000
0
800
600
400
200
0
AVAILABLE STORAGE (ACRE-FEET)
FLOW (CFS)
STAGE-CAPACITY
STORAGE
FLOW
STAGE-DISCHARGE
AUXILIARY SPILLWAY CREST
TOP OF DAM
1460
STAGE (FT)
7000
6000
5000
4000
3000
1000
0
1.0
FLOW (CFS)
FLOW


7350 CFS +/-
STORAGE
INFLOW
OUTFLOW
FLOW
3.0
4.0
TIME (HOURS)
"C" CURVE = 2135 CFS
U.S. DEPARTMENT OF
SOIL CONSERVATION

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

PENNSYLVANIA FISH COMMISSION

FREEBOARD STORM ROUTING

AUGUST 1979 PLATE C-2

ROUTING

AGRICULTURE
N SERVICE

PA-601

SUSQUEHANNA RIVER BASIN

MORRIS BRANCH MARSH CREEK, TIOGA COUNTY

PENNSYLVANIA

LAKE NESSMUK DAM

NDI ID NO. PA-00032
DER ID NO. 59-66
SCS ID NO. PA-601

PENNSYLVANIA FISH COMMISSION

PHASE I INSPECTION REPORT

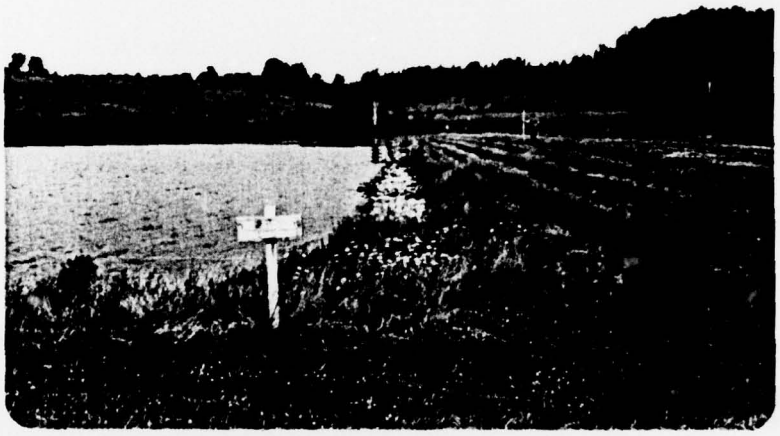
NATIONAL DAM INSPECTION PROGRAM

AUGUST 1979

APPENDIX D

PHOTOGRAPHS

LAKE NESSMUK DAM



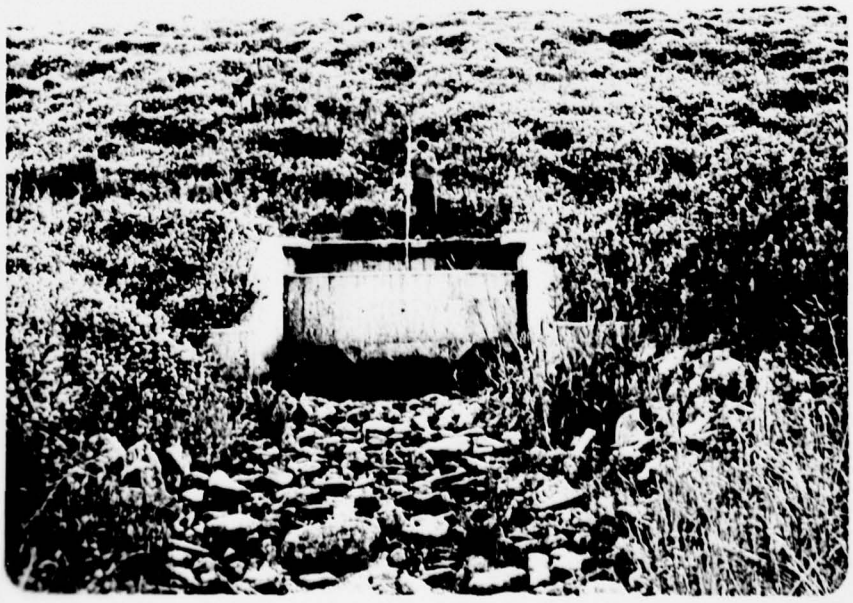
A. Upstream Slope



B. Downstream Slope



C. Main Spillway



D. Impact Basin



E. Auxiliary Spillway Approach Channel



F. Auxiliary Spillway Exit Channel

SUSQUEHANNA RIVER BASIN

MORRIS BRANCH MARSH CREEK, TIOGA COUNTY

PENNSYLVANIA

LAKE NESSMUK DAM

NDI ID No. PA-00032
DER ID No. 59-66
SCS ID No. PA-601

PENNSYLVANIA FISH COMMISSION

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

AUGUST 1979

APPENDIX E

GEOLOGY

LAKE NESSMUK DAM

APPENDIX E

GEOLOGY

1. General Geology. The damsite and reservoir are located in Tioga County. With the exception of the southwest corner the entire county was glaciated during the Wisconsin glacial advance. Glacial features such as lakes, marshes, moraines, and terraces are almost lacking in the uplands of Tioga County. However, in the valleys, abundant evidence of glaciation has been preserved. Particularly in the valleys of the Tioga and Cowanesque Rivers and along Marsh Creek, Crooked Creek, and Upper Pine Creek. Drainage from glacial lakes in these valleys resulted in what is called the Pine Creek Gorge.

The rock formations exposed in Tioga County range in age from the Chemung Formation of Upper Devonian age to the Allegheny Formation of Pennsylvanian age. The oldest rocks crop out in three broad anticlinal folds in the north, central, and southern parts of the county. The youngest rocks are exposed in the Blossburg Coal Basin. Most of the plateau remnants are capped by the Pocono Formation, with smaller remnants of the Pottsville Formation. The intermediate slopes are underlain by the Cattaraugus and Oswayo Formations.

The geologic structure of Tioga County displays a series of well-defined folds with marked continuity trending east-northeast. Evidence of doming is observed on the Sabinsville, Wellsboro, and Towanda anticlines. In all the domed areas the south limb is appreciably steeper than the north limb. The regional plunge of the folds is to the southwest and generally they decrease in amplitude with distance from the Allegheny Front. Surface evidence of faulting is observed on the south flank of the Sabinsville Anticline in Tioga Township, on the Wellsboro Anticline southeast of Wellsboro, and on the Towanda Anticline in Union Township. Subsurface faults have been noted during drilling some deep wells in the area.

2. Site Geology. The dam is founded on Chemung Siltstone of Devonian age. Glacial till overlies the siltstone and is essentially a sandy, gravelly clay. Alluvial and colluvial deposits were found in the floodplain near the centerline. The Chemung formation is composed of fine-grained sandstone and siltstone with interbedded shale. Bedding is well developed. This formation is moderately to slightly resistant to weathering. Gentle slopes of medium relief in this area are typical of the dissected plateau in which this dam is located.

The dam is founded on overburden. Excerpts from the design analysis concerning the foundation are presented hereafter.

Form SCS-376C
Sheet 1 of 1
For In-Service Use Only

10-59

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

State Penna. County Tioga Watershed Marsh Creek Subwatershed Morris

Site number PA-601 Site group I Structure class C Investigated by [signature] (signature and title) Date: Oct. 23, 1961

INTERPRETATIONS AND CONCLUSIONS

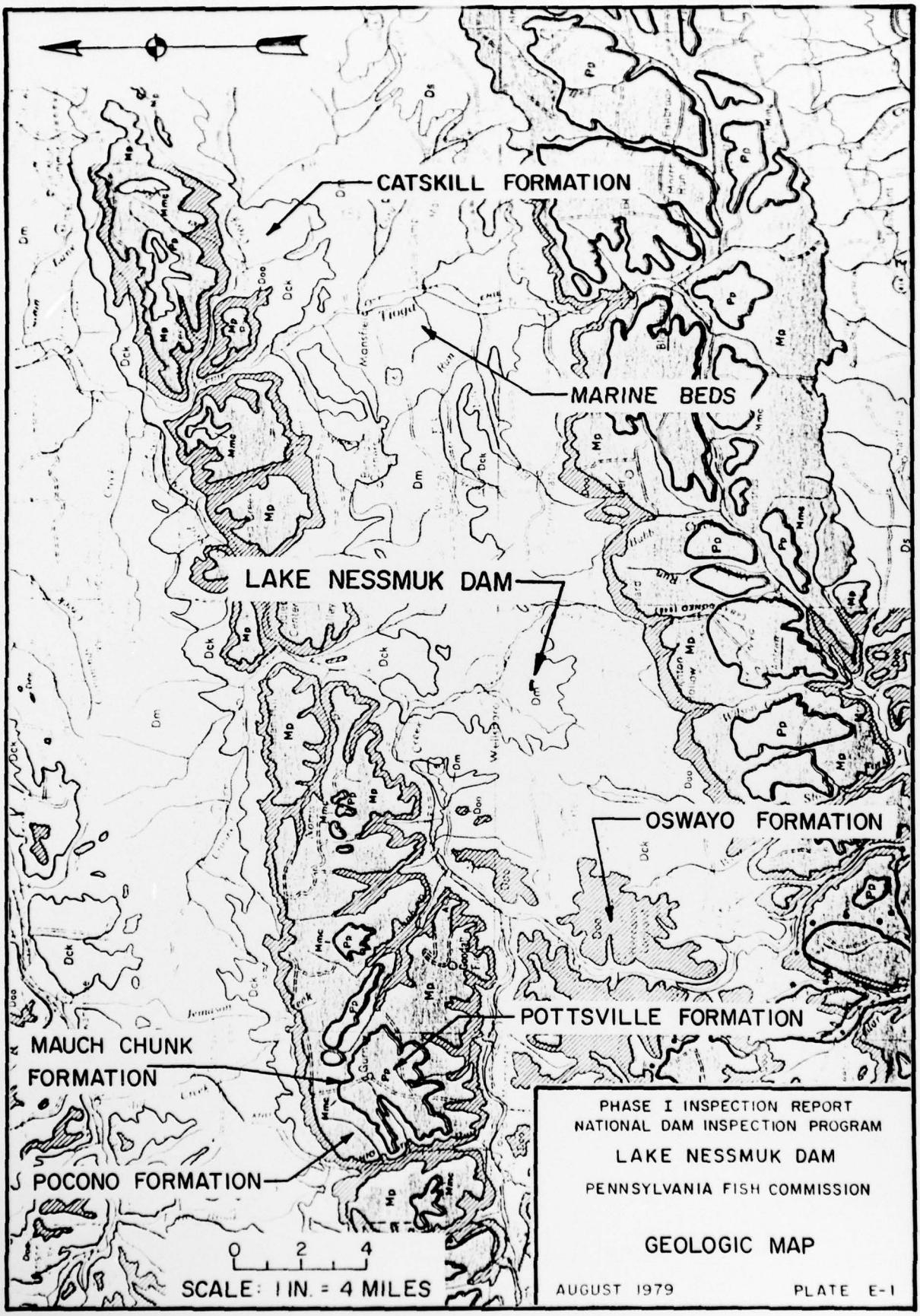
High permeability of the foundation is the major problem anticipated in the design and construction of this multipurpose development. The coefficients of permeability determined by carefully controlled field tests are extremely high for till of the character seen in the samples. However, sample recovery was generally less than 70% of the drive length and often much less. It is assumed that lenses of clean gravel exist and were either pushed aside by the sampler or else fell from the sampler on withdrawal.

These coefficients are assumed to represent horizontal, or nearly horizontal, permeabilities along piping planes within the till. If this is true, a direct route for water from the pool to these planes exists through the deep pervious alluvium in the pool area. In other words, vertical permeability of the till has little influence on seepage losses because the pervious zones of till directly contact the pervious alluvium. Further piping would develop from this rapid seepage beneath the proposed structure unless a positive cutoff is installed. Filter drains could control piping, but not water loss.

Consideration should be given to differential consolidation between areas of deep alluvium and areas of shallow alluvium within the lower foundation and principal spillway locations.

No rock excavation will be encountered any place on the site, but wet excavation should be expected if a deep cutoff is used.

Borrow material is adequately available from the pool area within 900 feet of the centerline and from the emergency spillway excavation. This soil will be stable and impervious when compacted in the fill.



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE NESSMUK DAM

PENNSYLVANIA FISH COMMISSION

GEOLOGIC MAP

AUGUST 1979 PLATE E-1