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MA NEW ENGLAND DIV APR 79
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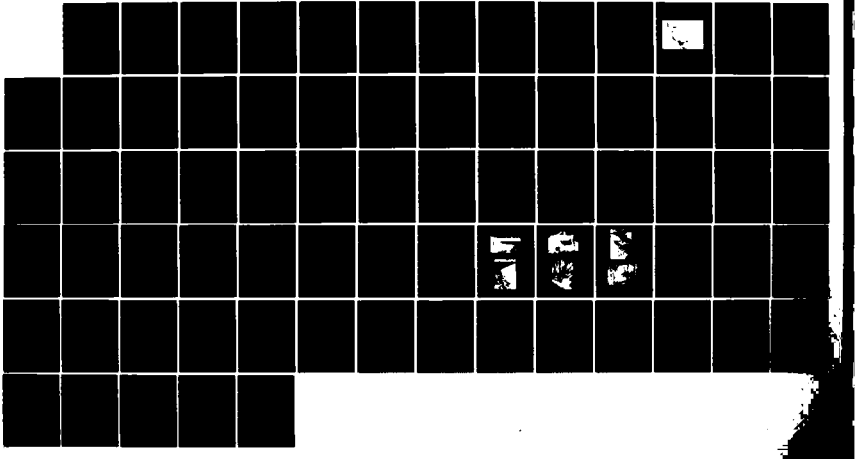
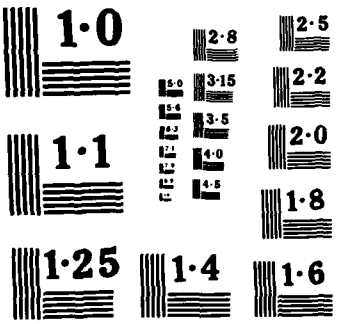
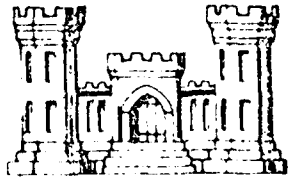




MERRIMACK RIVER BASIN
MEREDITH NEW HAMPSHIRE

MEREDITH RESERVOIR DAM
N.H.00308

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

APRIL 1979

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
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18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Merrimack Rwver Basin
Meredith New Hampshire

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

TCe dam is an earthfill dam about 400 ft. long with a maximu height of 25 ft. The dam is small in size with a significatn hazard potential. The dam is judged to be in fair overall condition. Trees and brush are growing on the dam embankment and the spillway is showing signs of deterioration. It is recommended that a periodic annual technical inspection be implemented.

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MEREDITH RESERVOIR DAM

NH 00308

MEREDITH, NEW HAMPSHIRE

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No:	NH 00308
Name of Dam:	Meredith Reservoir Dam
Town:	Meredith
County and State:	Belknap County, New Hampshire
Stream:	Unnamed
Date of Inspection:	November 13, 1978

BRIEF ASSESSMENT

The Meredith Reservoir Dam is an earthfill dam approximately 400 feet long with a maximum height of 25 feet. The dam is presently used as a pump/storage reservoir for the Town's water supply system. Water is pumped to the reservoir from Lake Waukewan and let down to the supply system only during emergency conditions. The dam has a 0.17 square mile drainage area and a normal impoundment of 15 acre-feet.

Based on a size classification of small and a significant hazard category, in accordance with the "Recommended Guidelines for Safety Inspection of Dams, Department of the Army 1976," the test flood for this dam is one-half the probable maximum flood (1/2 PMF). The routed test flood outflow of 381 CFS overtops the dam by 0.2 feet. The spillway capacity of 318 CFS is 83 percent of the test flood.

The dam is judged to be in fair overall condition. The following conditions were noted as possible future problems:

1. Trees and brush are growing on the dam embankment.
2. The spillway is showing signs of deterioration.
3. A wet area was found at the base of the dam.

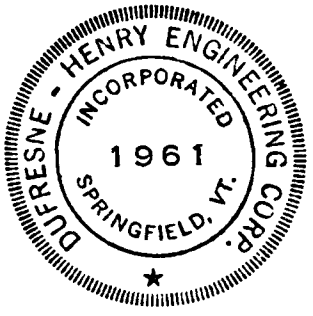
It is recommended that a periodic annual technical inspection program be implemented within one year of the receipt of this report containing the following:

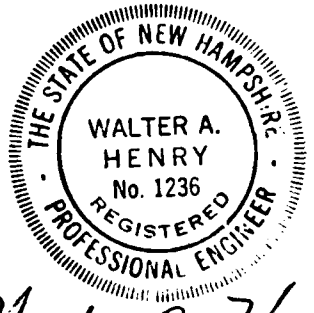
1. Remove trees and brush on a yearly basis.
2. Inspect the downstream slope of the dam for seepage on a yearly basis.
3. Inspect the spillway every two years.

4. Maintain all gates in operational condition.

5. Inspect the upstream embankment at low water conditions.

6. Establish a formal warning system.





Walter A. Henry

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 continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test 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.

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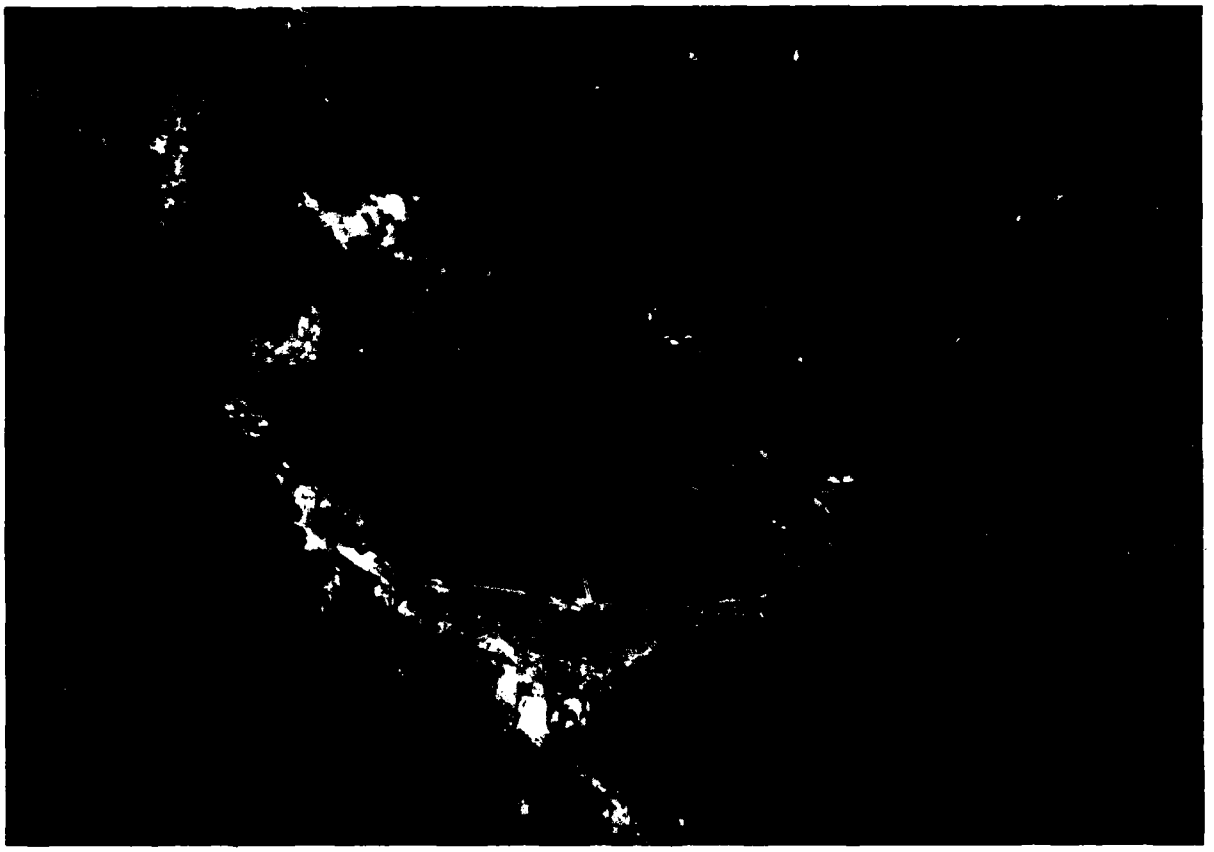
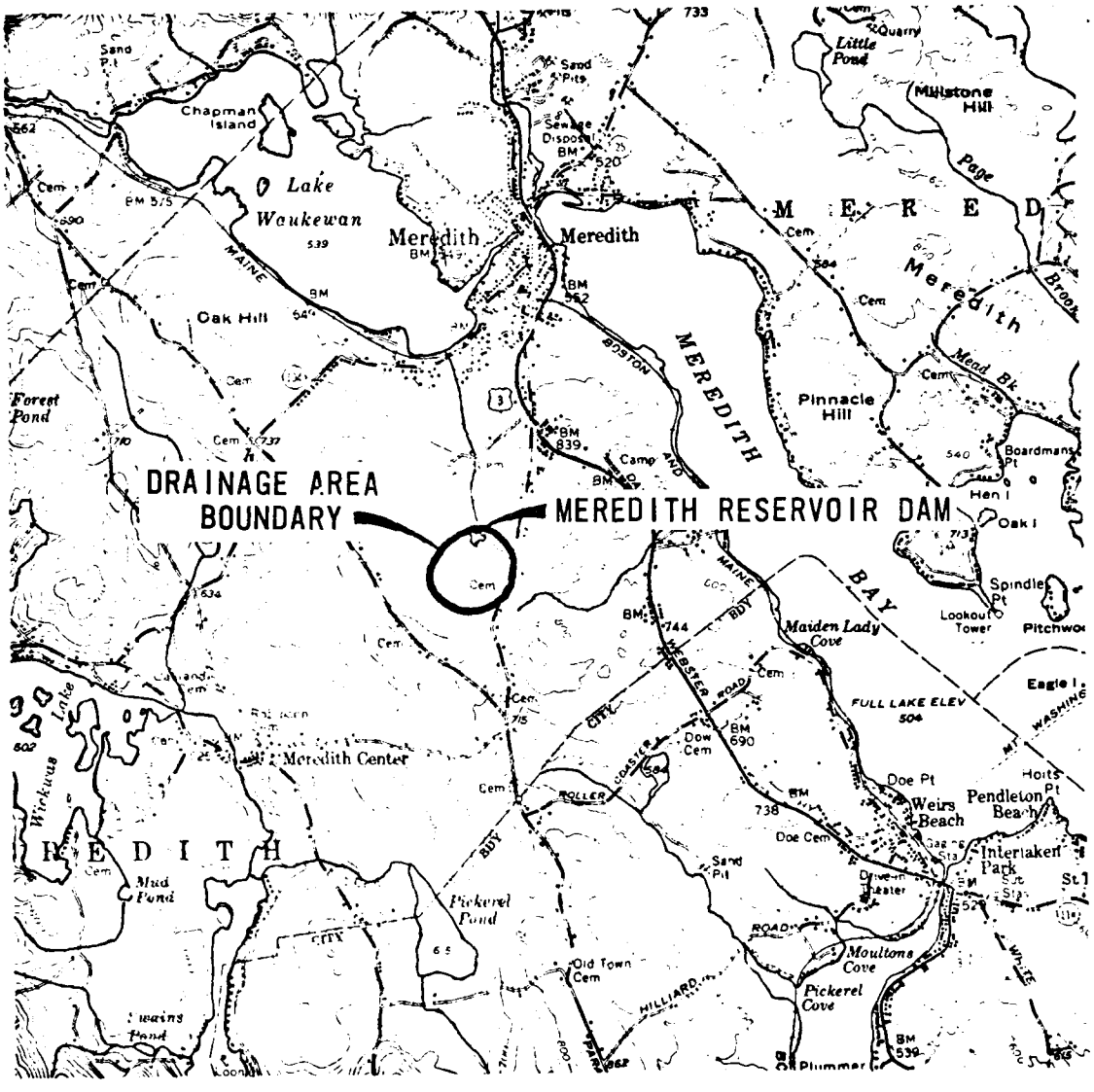


OVERVIEW OF
MEREDITH RESERVOIR DAM
MEREDITH, NEW HAMPSHIRE



SOURCE OF MAP:
U.S. GEOLOGICAL SURVEY
HOLDERNESS & WINNIPESAUKEE
QUADRANGLES
NEW HAMPSHIRE
SERIES V712
1:62500 1956

DUFRESNE-HENRY ENGINEERING CORP. ARCHITECT-ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCATION MAP
MEREDITH RESERVOIR DAM

MEREDITH NEW HAMPSHIRE

CLIENT NO	04-0082		SCALE 1" = 1 MILE
ENGR	JAD		DATE 3-14-79

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
NAME OF DAM: MEREDITH RESERVOIR

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Dufresne-Henry Engineering Corporation has been retained by the New England Division to inspect and report on selected dams in the State of New Hampshire. Authorization and notice to proceed were issued to Dufresne-Henry Engineering Corporation under a letter of November 20, 1978 from Max B. Scheider, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0010 has been assigned by the Corps of Engineers for this work.

b. Purpose

(1) Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by nonfederal interests.

(2) Encourage and prepare the states to initiate quickly effective dam safety programs for nonfederal dams.

(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

The Meredith Reservoir Dam is located in central New Hampshire in the Town of Meredith, Belknap County, and is in the Merrimack-Winnipesaukee basin.

b. Description of Dam and Appurtenances

Meredith Reservoir Dam is an earth fill dam, approximately 400 feet long and has a maximum height of 25 feet. The reservoir was originally actively utilized as a water supply source for

the Town of Meredith. The Town has recently developed alternate supply sources and the reservoir is only used during emergency conditions. A control tower located approximately 30 feet from the upstream face of the dam houses the potable water intake facilities and reservoir drain valve.

The maximum reservoir level is controlled by a concrete and stone spillway structure. A channel has been constructed to convey any overflow around the dam and into the natural streambed. A vehicle service bridge spans the outlet channel approximately 15 feet downstream of the spillway crest.

c. Size Classification

The Meredith Reservoir Dam has a maximum height of 25 feet and a maximum storage volume of 28 acre-feet. The USCE Guidelines place dams with maximum heights between 25 and 40 feet and maximum storage less than 50 acre-feet in the small category. Therefore, the size classification of the Meredith Dam is small.

d. Hazard Classification

A failure of the Meredith Dam Reservoir would route a flood wave into a relatively small natural channel with extensive overbank flow. Approximately 2000 feet downstream the flood wave would encounter a culvert under Reservoir Road and a single family dwelling on the banks of the stream, resulting in considerable damage and possible loss of life. Thus, in accordance with USCE Guidelines, the hazard classification is significant.

e. Ownership

The present owner of the Meredith Reservoir Dam is:

Meredith Fire District
Town of Meredith
Meredith, New Hampshire 03253

f. Operator

The reservoir is operated by the:

Meredith Fire District
Meredith, New Hampshire 03253

Telephone 603-279-4537

g. Purpose

The reservoir is part of the Town of Meredith's water supply system. At the present time the reservoir is used to store water for emergency purposes. Water is pumped from Lake Waukewan, stored in the reservoir and used as needed in emergency situations. Because of the limited drainage area of 0.17 square miles, the yield for water supply is minimal.

h. Design and Construction History

Little information is available concerning the design and construction of the Meredith Reservoir Dam. Previous inspection data indicates an original construction date prior to 1934. Subsequent construction activity disclosed by the inspection includes minor concrete facing of portions of the stone spillway walls and a gunite facing of the control tower foundation. The exact dates of these construction repairs is not known.

i. Normal Operation Procedure

In recent years, a pumping station was constructed along the reservoir transmission line approximately 0.4 miles downstream of the reservoir. The flow from the reservoir is controlled at this location, with the valve at the reservoir control tower remaining open. As mentioned previously, the reservoir is used only in emergency situations.

1.3 Pertinent Data

a. Drainage

The drainage area to the Meredith Reservoir is a relatively small 0.17 square miles and consists of gently rolling hills and open fields. There are no significant channels upstream of the dam. A diversion ditch and pipeline have been constructed upstream of the reservoir in the northeast portion of the drainage basin. From the topography of the area it appears that the purpose of the diversion was to prevent undesirable runoff and possible contamination from reaching the reservoir from an upstream pasture which may have contained manure or fertilizer.

b. Discharge at the Dam Site

(1) Outlet Works

There are two outlets for the Meredith Reservoir, a pipeline connected to the Town's municipal water system and an overflow spillway. The pipeline is actually

both an inlet and an outlet because of the pump-storage operation. The stored water is only utilized under emergency conditions.

The total capacity of the spillway with the water level at the top of the training walls is 418 CFS. The low point in the earth dam, however, is one foot lower than the top of the training walls thus reducing the actual capacity to 318 CFS.

(2) Maximum Known Flood at Dam Site

No records or recollections of any flooding were found during the investigations.

(3) Spillway Capacity

318 CFS.

c. Elevations (Based on an assumed bench mark elevation of 100.0, see plan for T.B.M. location.)

(1) Streambed at Centerline of Dam

75±.

(2) Maximum Tailwater

Not applicable.

(3) Upstream Portal Invert

Not applicable.

(4) Recreation Pool (at time of inspection)

94.5.

(5) Full Flood Control Pool

Not applicable.

(6) Spillway Crest

95.8.

(7) Design Surcharge

Not known.

(8) Top of Dam (Minimum)

99.6.

(9) Test Flood Surcharge

99.8

d. Reservoir

(1) Length of Maximum Pool

400 feet ±

(2) Length of Recreation Pool

400 feet ±

(3) Length of Flood Control Pool

400 feet ±

e. Storage

(1) Recreation Pool

15 acre-feet.

(2) Flood Control Pool

Not applicable.

(3) Test Flood Pool

28 acre-feet.

(4) Spillway Crest Pool

15 acre-feet.

(5) Top of Dam

27.6 acre-feet.

f. Reservoir Surface

(1) Top of Dam

3 acres.

(2) Test Flood Pool

3 acres.

(3) Recreation Pool

3 acres.

(4) Spillway Crest

3 acres.

g. Dam

(1) Type

Earth dam.

(2) Length

400 feet (approximately).

(3) Height

25 feet (maximum).

(4) Top Width

15 feet ±

(5) Side Slopes

Upstream: 1.0H to 1.0V.
Downstream: 1.5H to 1.0V.

(6) Zoning

None known.

(7) Impervious Core

None known.

(8) Cutoff

None known.

(9) Grout Curtain

None known.

h. Diversion and Regulating Tunnel

Not applicable.

i. Spillway

The overflow spillway has a triangular concrete crest with stone training walls and a crest elevation of 95.8. The spillway width is 14.3 feet and maximum height is 4.2 feet.

An earth spillway channel has been constructed downstream of the spillway, routing the overflow to the original channel without endangering the earth portions of the dam. The channel is approximately 20 feet wide by 3 feet deep.

j. Regulating Outlets

The valves located in the valve house at the dam have not been routinely maintained and operated. There was evidence in the form of wrench teeth marks on the operating stems indicating that undue force is necessary to adjust the valves. The present control of water to and from the dam is at the new pumping station 1800 feet downstream of the dam.

SECTION 2 - ENGINEERING DATA

2.1 Design

There is no design data available for this dam.

2.2 Construction

There is no information on the construction other than an approximate construction date prior to 1934.

2.3 Operation

The Meredith Reservoir is currently being operated as a pump storage reservoir. Water is pumped from Lake Waukewan and stored at the reservoir for emergency situations. All operations take place at the new pumping station and there is no physical operation at the dam.

2.4 Evaluation

a. Availability

The design and construction records for this dam are not available.

b. Adequacy

The lack of in-depth engineering data does not allow for a definitive review. Therefore, the adequacy of the evaluation cannot be based on a review of design calculations but on the visual inspection, past performance history and sound hydrologic and hydraulic engineering judgment.

c. Validity

Not applicable.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General

The on-site inspection of the Meredith Reservoir Dam was performed on November 13, 1978. The water level at the time of inspection was approximately 1.3 feet below the spillway crest. No emergency conditions were observed on the day of the inspection.

b. Dam Embankment

The dam embankment is in generally good condition. Some evidence of seepage was found just downstream of the toe at the highest section of the dam. The area was damp with some depressions filled with standing water. A marsh-type vegetation indicates that the area is permanently wet and thus the condition is ground water or seepage related rather than trapped surface runoff.

The top and downstream slope of the dam are covered with grass and brush. There are numerous tree stumps on the downstream slope. Several large trees are located on both sides of the spillway. The root systems of at least one of these trees appears to be in the dam embankment on the downstream slope.

The downstream slope is approximately 1.5H:1V, while the upstream slope is somewhat steeper at 1H:1V. The water level at the time of inspection was approximately 1.3 feet below the spillway crest and therefore a complete visual inspection of the upstream slope could not be performed. The upper portion which could be viewed indicated a uniform riprap facing which was in good condition.

c. Appurtenant Structures

(1) Control Tower and Service Bridge

The control tower is located approximately 30 feet from the upstream dam embankment and is connected to the embankment via a steel girder service bridge. The control tower and service bridge are in good condition with the exception of the bridge abutment at the dam embankment which has settled and cracked (see Photo 9). The control tower concrete foundation received a 6-inch gunite coating in recent years.

The main floor of the control tower houses six hand wheel valve operators and a reservoir level indicator (see Photo 8). The valves are located below the water level and the function of each respective valve could not be determined by a visual inspection. The valve operator shafts showed signs of excessive force applied with a pipe wrench during valve operation. It could not be determined at the time of inspection if the valves were operational. One of the valves is assumed to be a drain valve. The outlet of the drain conduit was located but the size or material of the conduit could not be determined. The drain conduit discharges to a stone masonry culvert which enters the natural channel downstream of the service road (see site plan).

(2) Spillway

The original spillway was constructed with concrete crest and apron, and stone masonry training walls. A steel girder vehicle bridge spans the spillway channel approximately 15 feet downstream of the crest. At some time subsequent to original construction a concrete facing was applied to the upstream ends of the stone masonry training walls.

The concrete sections of the spillway structures are in poor condition. Most of the concrete is either cracked or spalled with major spalling occurring on the left training wall facing. There were no signs of significant leakage through the spillway structure during inspection, but leakage may be present during higher water levels.

The stone masonry training walls were in fair to poor condition with very little of the original mortar remaining. Several stones on the downstream end of the walls have fallen into the channel due to erosion of the channel banks.

A 12-inch clay tile drain outlet was found at the downstream end of the right training wall. The drain was traced to a surface inlet and diversion ditch on the upstream side of the reservoir. It is assumed that the drain was used to divert undesirable runoff around the potable water reservoir. Approximately 1/4-inch of clear flow was flowing at the drain outlet while no water was found at the inlet. The origin of this flow is unknown.

d. Reservoir Area

The reservoir area was found to be in good condition. The banks are covered with grass and small brush. There are no

overhanging trees, floating debris or other sources of possible spillway obstructions.

e. Downstream Channel

The original streambed that constitutes the downstream channel had very little flow at the time of inspection. The channel is a typical stream channel flowing through a heavily wooded area.

The spillway overflow channel is a manmade channel approximately 20 feet wide by 3 feet deep (see Photo 10). The banks of the channel are overgrown with small trees and brush and there is no evidence of any recent flow.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

None.

4.2 Maintenance of Dam

At the present time there is no scheduled maintenance program for the dam. Several trees were removed recently from the area downstream of the dam embankment as required by the Water Resources Board subsequent to their August 15, 1975 inspection.

4.3 Maintenance of Operating Facilities

The operating facilities at the dam are not maintained on a regular basis. The last shutdown of the water supply line at the reservoir occurred 1-1/2 to 2 years ago. All current operations are now performed at the new pumping station downstream of the reservoir.

4.4 Description of Warning System in Effect

None exists for this dam.

4.5 Evaluation

The operation and maintenance appears to be adequate for the dam's present status. Improvements could be made by instituting a routine inspection and maintenance program on an annual or semi-annual basis, as outlined in Section 7.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. General

The Meredith Reservoir is a storage reservoir with an earth embankment dam. The drainage area is relatively small and during hot summer months it is necessary to pump water from Lake Waukewan to maintain water in the reservoir.

b. Design Data

There is no existing design data for this dam relative to hydraulic/hydrologic computations.

c. Experience Data

There are no records of high flow conditions at the site.

d. Visual Observations

The visual inspection of the dam indicated that the overflow spillway had not been utilized in the recent past.

e. Test Flood Analysis

The dam is classified to be small with a significant hazard classification. Since the hazard classification is significant, a test flood of one-half the probable maximum flood was selected as a criterion for this study. The calculation was performed using the HEC-1 computer program which produced a routed test flood outflow of 381 CFS. Input data and results are contained in Appendix D of this report.

The test flood of 381 CFS would overtop the dam by 0.2 feet The spillway capacity of 318 CFS represents 83.5 percent of the HEC-1 test flood.

f. Dam Failure Analysis

A failure of the Meredith Dam would route a significant flood wave into a relatively small stream channel. Assuming a flood wave of two-thirds the height of the dam, a seventeen-foot wave would produce extensive overbank flow and major erosion damage. Approximately 2000 feet downstream, the flood wave would contact Reservoir Road and a single family

residence with extensive erosion to the roadway and the potential for loss of life. A cemetery in this area would also receive erosion damage with possible public health problem .

The flood wave would continue down the natural stream valley for another 1800 feet until reaching a new highway embankment for relocated Route 104. The embankment is approximately 20 to 30 feet high and contains two reinforced concrete culverts. The embankment and culverts would effectively dampen the flood wave and no further damage would result downstream of that point.

SECTION 6 - STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The visual inspection did not disclose any findings indicating stability problems.

b. Design and Construction Data

The design and construction data available do not include information concerning the types of soils in the cross-section of the dam, and thus it is not possible to analyze its stability. There is no design data available to indicate whether a stability or seepage analysis was performed.

c. Operating Records

The operating records available do not include any indication of dam instability.

d. Post-Construction Changes

The records do not contain reference to post-construction changes except for gate house and spillway repairs.

e. Seismic Stability

The dam is located in Seismic Zone 2 and in accordance with recommended Phase I guidelines does not warrant seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS/ REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition

The visual inspection and records indicate that the dam is in fair condition. The following areas of concern for possible future problems were determined during the inspection.

1. Trees and brush are growing on the dam embankment.
2. The spillway is showing signs of deterioration.
3. A wet area was found at the base of the dam.

b. Adequacy of Information

There is practically no data available for this dam and this evaluation is based solely on the visual inspection.

c. Urgency

The recommendations given in Section 7.2 should be carried out within one year of the receipt of this report.

d. Need for Additional Investigations

None.

7.2 Recommendations

The dam is judged to be in fair overall condition. It is recommended that the following items be performed under the guidance of a qualified engineer:

1. Repair the spalled and cracked concrete on the spillway walls and floor.
2. Repair the operating valves in the control tower.
3. Perform an inspection of the upstream dam embankment at low water conditions.

7.3 Remedial Measures

a. Operation and Maintenance Procedures

1. Institute a program of annual periodic technical inspections.

2. The trees and bushes growing on the dam should be removed yearly.

3. The existing tree stumps on the downstream slope should be inspected yearly for indications of seepage in their vicinity.

4. The wet area downstream of the dam should be observed periodically to detect any possible seepage flows.

5. The spillway should be subject to maintenance every two years. This would include repairs to the stone training walls, and patching of any cracked and spalled concrete. The first maintenance should be performed within one year.

6. Establish a formal warning system.

7. Maintain all gates in operational condition.

APPENDIX A

VISUAL INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT MEREDITH RESERVOIR DAM

DATE November 13, 1978

TIME 11:15-2:15

WEATHER Cool-Clear

W.S. ELEV._____U.S.____DN.S.

PARTY:

1. James H. Maynes	D-H	6.	
2. James A. Dohrman	D-H	7.	
3. Vern Clifford	D-H	8.	
4. Gonzalo Castro	GEI	9.	
5. Ken Stern, New Hampshire Water Resources Board		10.	

PROJECT FEATURE	INSPECTED BY	REMARKS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

PERIODIC INSPECTION CHECK LIST

PROJECT MEREDITH RESERVOIR DAM DATE November 13, 1978

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	Not known.
Surface Cracks	None.
Pavement Condition	None.
Movement or Settlement of Crest	Not observable. Traffic ruts.
Lateral Movement	Not observable.
Vertical Alignment	Too irregular to judge.
Horizontal Alignment	Too irregular to judge.
Condition at Abutment and at Concrete Structures	Erosion at discharge end of spillway walls.
Indications of Movement of Structural Items on Slopes	None except for bridge footing.
Trespassing on Slopes	None apparent.
Sloughing or Erosion of Slopes or Abutments	Minimum - downstream.
Rock Slope Protection - Riprap Failures	Good condition.
Unusual Movement or Cracking at or Near Toes	None observed.
Downstream Seepage	Apparent seepage at highest section at downstream toe.
Piping or Boils	None observed.
Foundation Drainage Features	None known.
Toe Drains	None known.
Instrumentation System	None.

PERIODIC INSPECTION CHECK LIST

PROJECT MEREDITH RESERVOIR DAM DATE November 13, 1978

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Good condition - recent concrete work.
Condition of Joints	Existing are good.
Spalling	None observed.
Visible Reinforcing	None observed.
Rusting or Staining of Concrete	None observed.
Any Seepage or Efflorescence	None observed.
Joint Alignment	Good.
Unusual Seepage or Leaks in Gate Chamber	Fall of water - not drained.
Cracks	None observed.
Rusting or Corrosion of Steel	Moderate.
b. Mechanical and Electrical	
Air Vents	None.
Float Wells	None.
Crain Hoist	None.
Elevator	None
Hydraulic System	None.
Service Gate Valves	6 - gates may be operable only with undue force. No regular maintenance program.
Emergency Gates	None.
Lightning Portection System	None.
Emergency Power System	None.
Wiring and Lighting System in Gate Chamber	No power at site.

PERIODIC INSPECTION CHECK LIST

PROJECT MEREDITH RESERVOIR DAM DATE November 13, 1978

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	Under Water
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT MEREDITH RESERVOIR DAM DATE November 13, 1978

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	Break in cover.
Any Seepage or Efflorescence	
Condition at Joints	
Drain Holes	
Channel	Stone masonry culvert.
Loose Rock or Trees Overhanging Channel	
Condition of Discharge Channel	Downstream of road - natural stream.

PERIODIC INSPECTION CHECK LIST

PROJECT MEREDITH RESERVOIR DAM DATE November 13, 1978

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Reservoir.
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	Poor.
Rust or Staining	None.
Spalling	Major.
Any Visible Reinforcing	Some.
Any Seepage or Efflorescence	None.
Drain Holes	None.
c. Discharge Channel	
General Condition	Concrete to bridge; stone under bridge.
Loose Rock Overhanging Channel	Stone masonry wall collapsed.
Trees Overhanging Channel	Small.
Floor of Channel	Riprap.
Other Obstructions	Rock falling in.

PERIODIC INSPECTION CHECK LIST

PROJECT MEREDITH RESERVOIR DAM DATE November 13, 1978

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	None.
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT MEREDITH RESERVOIR DAM DATE November 13, 1978

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	
Bearings	Concrete.
Anchor Bolts	None.
Bridge Seat	None.
Longitudinal Members	Good.
Under Side of Deck	Good.
Secondary Bracing	None.
Deck	Good condition.
Drainage System	Good.
Railings	Good
Expansion Joints	Not applicable.
Paint	Good
b. Abutments and Piers	
General Condition of Concrete	Cracked - 6-inch openings.
Alignment of Abutment	Poor.
Approach to Bridge	Good.
Condition of Seat & Backwall	Will be under water during flood conditions.

PERIODIC INSPECTION CHECK LIST

PROJECT MEREDITH RESERVOIR DAM DATE November 13, 1978

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
RESERVOIR	
Stability of Shoreline	Good.
Sedimentation	None observable - minimal.
Changes in Watershed Runoff Potential	Possible development.
Upstream Hazards	None.
Downstream Hazards	Reservoir Road - low downtown.
Alert Facilities	None.
Hydrometeorlogical Gages	Homemade water level - nonrecording.
Operational & Maintenance Regulations	Nonexistent.
	1. All valves not operated recently.
	2. Headworks not used.
	3. Last shutdown 1-1/2 - 2 years.
	4. Pressure from gate/pump house Lake Waukewan.

APPENDIX B

PROJECT RECORDS AND PLANS

1. Listing of Design, Construction and Maintenance Records:

   None.

2. Copies of Past Inspection Reports:

   a. N.H. Water Resources Board, September 9, 1934.
   b. N.H. Water Control Commission, July 10, 1939.
   c. N.H. Water Control Commission, June 20, 1951.
   d. N.H. Water Resources Board, August 15, 1975

3. Plans:

   a. Site Plan
   b. Details-Sections

NEW HAMPSHIRE WATER RESOURCES BOARD

INVENTORY OF DAMS AND WATER POWER DEVELOPMENTS

DAM

BASIN Merrimack NO. 4 — 507 — I-3770 & 0.2 for 1-4

RIVER Piscataquog MILES FROM MOUTH D.A.SQ.MI. 0.5

TOWN Weare OWNER Weare Water Village Fire District

LOCAL NAME OF DAM

BUILT DESCRIPTION Earth Embankment — Stone Earth Concrete Core Wall

POND AREA-ACRES DRAWDOWN FT. POND CAPACITY-ACRE FT.

HEIGHT-TOP TO BED OF STREAM-FT. 27± MAX. MIN.

OVERALL LENGTH OF DAM-FT. 400± MAX.FLOOD HEIGHT ABOVE CREST-FT.

PERMANENT CREST ELEV.U.S.G.S. LOCAL GAGE

TIDEWATER ELEV.U.S.G.S. LOCAL GAGE

SPILLWAY LENGTHS-FT. 14.32 FREEBOARD-FT. 8.0

FLASHBOARDS-TYPE, HEIGHT ABOVE CREST None

WASTE GATES-NO. WIDTH MAX. OPENING DEPTH SILL BELOW CREST

REMARKS Condition Fair

U.S.G.S. Gage Locations: Lake Nahkeyuan, Lake Nippo, Nippo Dam

POWER DEVELOPMENT

UNITS	NO.	RATED HP	HEAD FEET	C.F.S. FULL GATE	KW	MAKE

USE Domestic

REMARKS Fire Pond

DATE 9/20/60

NEW HAMPSHIRE WATER CONTROL COMMISSION
DATA ON DAMS IN NEW HAMPSHIRE

LOCATION STATE NO. 155.04

Town Meredith ✓ : County Belknap

Stream Reservoir ✓

Basin-Primary Merrimack : Secondary Winnepesaukee ✓

Local Name

Coordinates—Lat. 43° 40' -12200 : Long. 71° 30' + 1650

GENERAL DATA

Drainage area: Controlled Sq. Mi.: Uncontrolled Sq. Mi.: Total 0.54 ✓ Sq. Mi.

Overall length of dam 400 ✓ ft.: Date of Construction

Height: Stream bed to highest elev. 16½ ft.: Max. Structure 21' ft.

Cost—Dam : Reservoir

DESCRIPTION Earth embankment stone Earth concrete on earth ✓

Waste Gates

Type

Number : Size ft. high x ft. wide

Elevation Invert : Total Area sq. ft.

Hoist

Waste Gates Conduit

Number : Materials

Size ft.: Length ft.: Area sq. ft.

Embankment

Type

Height—Max. ft.: Min. ft.

Top—Width : Elev. ft.

Slopes—Upstream on : Downstream on

Length—Right of Spillway : Left of Spillway

Spillway

Materials of Construction

Length—Total 144 ✓ ft.: Net ft.

Height of permanent section—Max. 21' ft.: Min. ft.

Flashboards—Type ? : Height ft.

Elevation—Permanent Crest : Top of Flashboard

Flood Capacity 325 cfs.: cfs/sq. mi.

601

Abutments

Materials:

Freeboard: Max. 41 ✓ ft.: Min. ft.

Headworks to Power Devel.—(See "Data on Power Development")

OWNER Meredith Village Fire District

REMARKS Condition fair fire pond — Water supply
not [illegible] acres [illegible]

C.D.C 7/10/[illegible]

NEW HAMPSHIRE WATER CONTROL COMMISSION

REPORT ON DAM INSPECTION

TOWN Meredith DAM NO. 165 STREAM Beaver Brook

OWNER Town of Meredith ADDRESS Meredith, N.H.

In accordance with Section 20 of Chapter 133, Laws of 1937, the above dam was inspected by me on 6/26/47 accompanied by —

NOTES ON PHYSICAL CONDITION

Abutments Earth fill

Spillway Good

Gates Concrete

Other

CHANGES SINCE LAST INSPECTION

FUTURE INSPECTIONS 1/45

This dam (is) (~~is not~~) a menace because of flood

REMARKS Under county maintenance

Under town of Meredith Highway Dept.

Copy to Owner	Date

Raymond C. Hoover

INSPECTOR

(Assistant Water Comm.)

WATER RESOURCES BOARD

SITE EVALUATION DATA

OWNER: Town of Meredith (water Works) TELEPHONE NO. _____

MAILING ADDRESS: _____

SITE LOCATION (TOWN OR CITY) Meredith

NAME OF STREAM OR WATERBODY: Reservoir

QUADRANGLE: Holderness LOCATION Lt 0.35 Dn 9.27

HEIGHT OF (PROPOSED, EXISTING) DAM 25 LENGTH 100

TYPE OF (PROPOSED, EXISTING) STRUCTURE Earth embankment Conc. spillway with Concrete & Stone Abutments

DRAINAGE AREA 0.54 SM POND AREA 30

AVAILABLE ARTIFICIAL STORAGE: PERMANENT: _____ TEMPORARY: _____ TOTAL 15

EXISTING DEVELOPMENT DOWNSTREAM OF (PROPOSED, EXISTING) STRUCTURE

Homes ½ mi downstream

POTENTIAL DEVELOPMENT DOWNSTREAM OF (PROPOSED, EXISTING) STRUCTURE

Possable Home development

POTENTIAL DAMAGE DOWNSTREAM OF STRUCTURE (EXPLAIN IN DETAIL AND INCLUDE ANY POTENTIAL LOSS OF LIFE ESTIMATE) damage to Roads and some

OTHER COMMENTS: Town Water Supply

CLASS OF STRUCTURE -- ~~NON-MENACE~~: (MENACE) A ~~B~~ C DAM # 165.01

DATE OF INSPECTION: 15 Aug 75

SIGNED _____

SIGNATURE

N. H. WATER RESOURCES BOARD
Concord, N. H. 03301

DAM SAFETY INSPECTION REPORT FORM

Town: Meredith Dam Number: 135.04

Inspected by: J Burnett Date: 15 Aug 1975

Local name of dam or water body: Reservoir

Owner: Town Address:

Owner was/was not interviewed during inspection.

Drainage Area: .54 sq. mi. Stream: No Name

Pond Area: 3 Acre, Storage 15 Ac-Ft. Max. Head 25 Ft.

Foundation: Type Earth, Seepage present at toe - Yes/(No)

Spillway: Type Overflow, Freeboard over perm. crest: 4 ft,

Width 14.3, Flashboard height 0,

Max. Capacity 325 c.f.s.

Embankment: Type Earth, Cover Grass Width 15,

Upstream slope 1½ to 1; Downstream slope 1½ to 1

Abutments: Type Concrete & Stone, Condition: Good, (Fair) Poor

Gates or Pond Drain: Size _____ Capacity _____ Type _____

Lifting apparatus _____ Operational condition _____

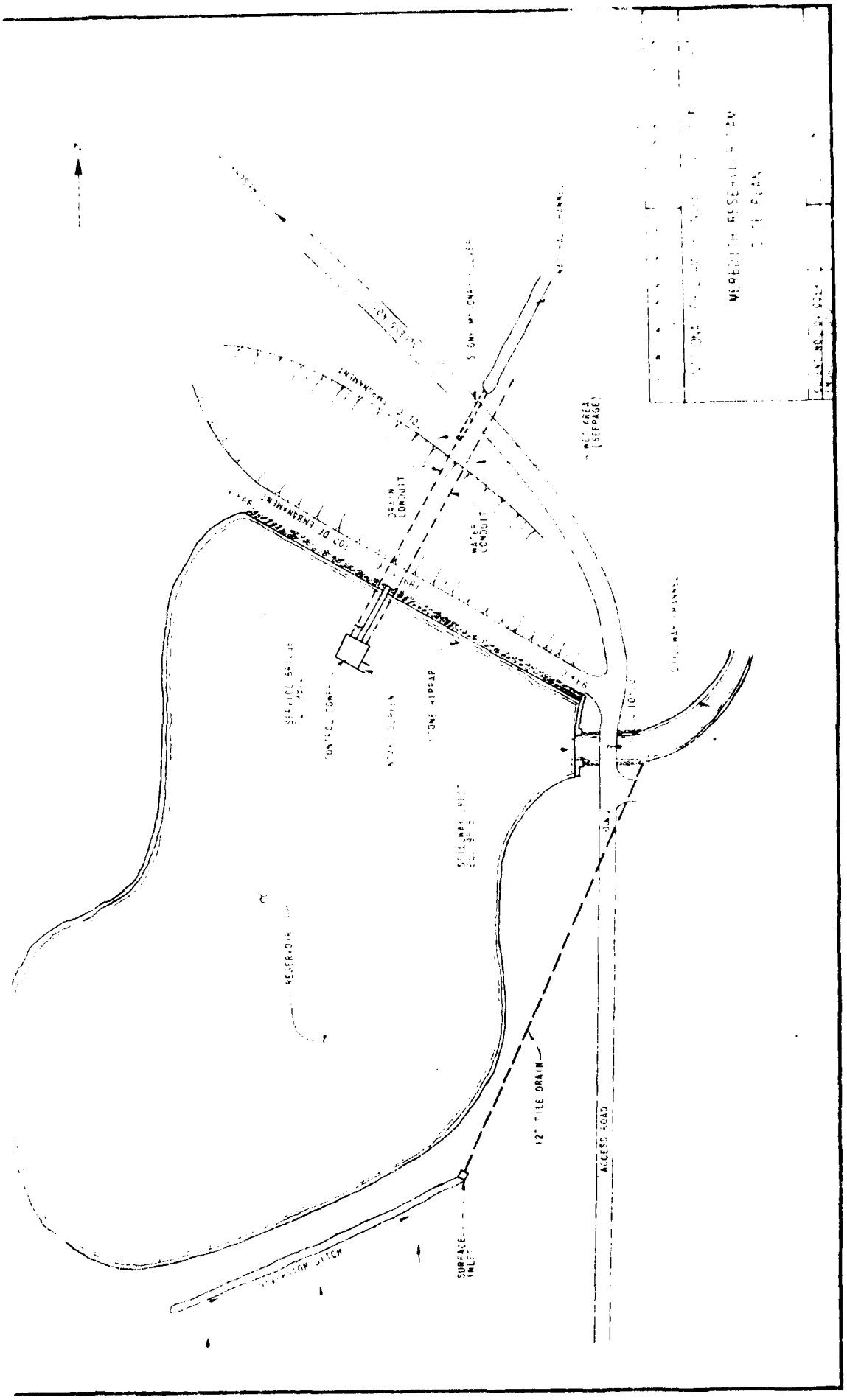
Changes since construction or last inspection: _____

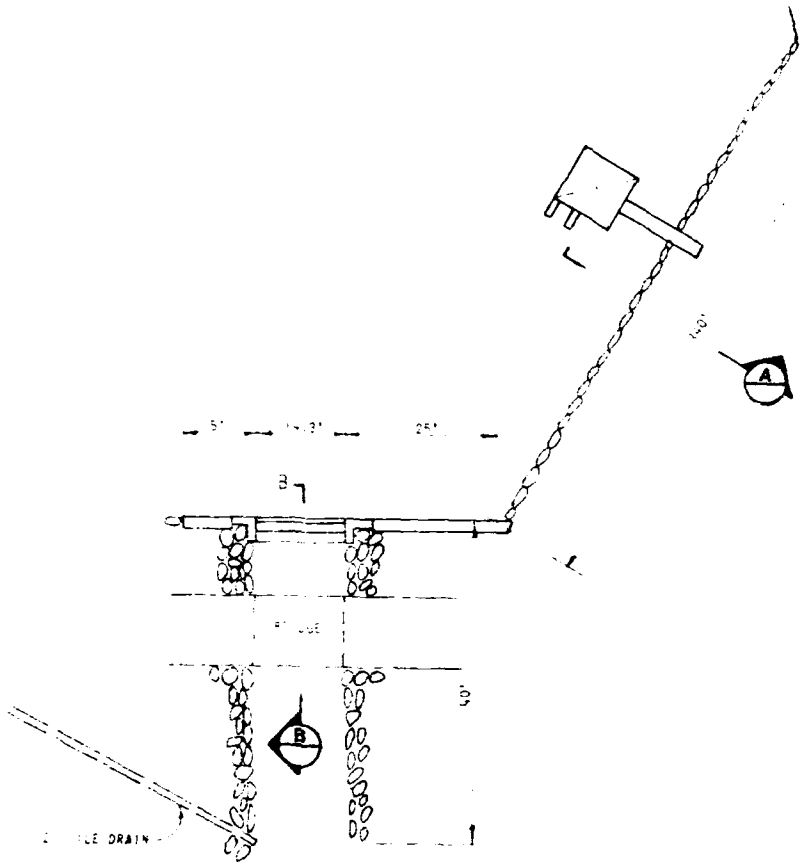
Downstream development: _____

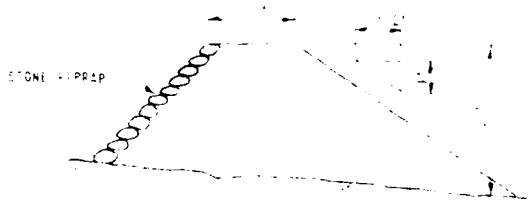
This dam (would)/would not be a menace if it failed.

Suggested reinspection date: _____

Remarks: Concrete in spillway Needs Repair.
Small Trees on Embankment



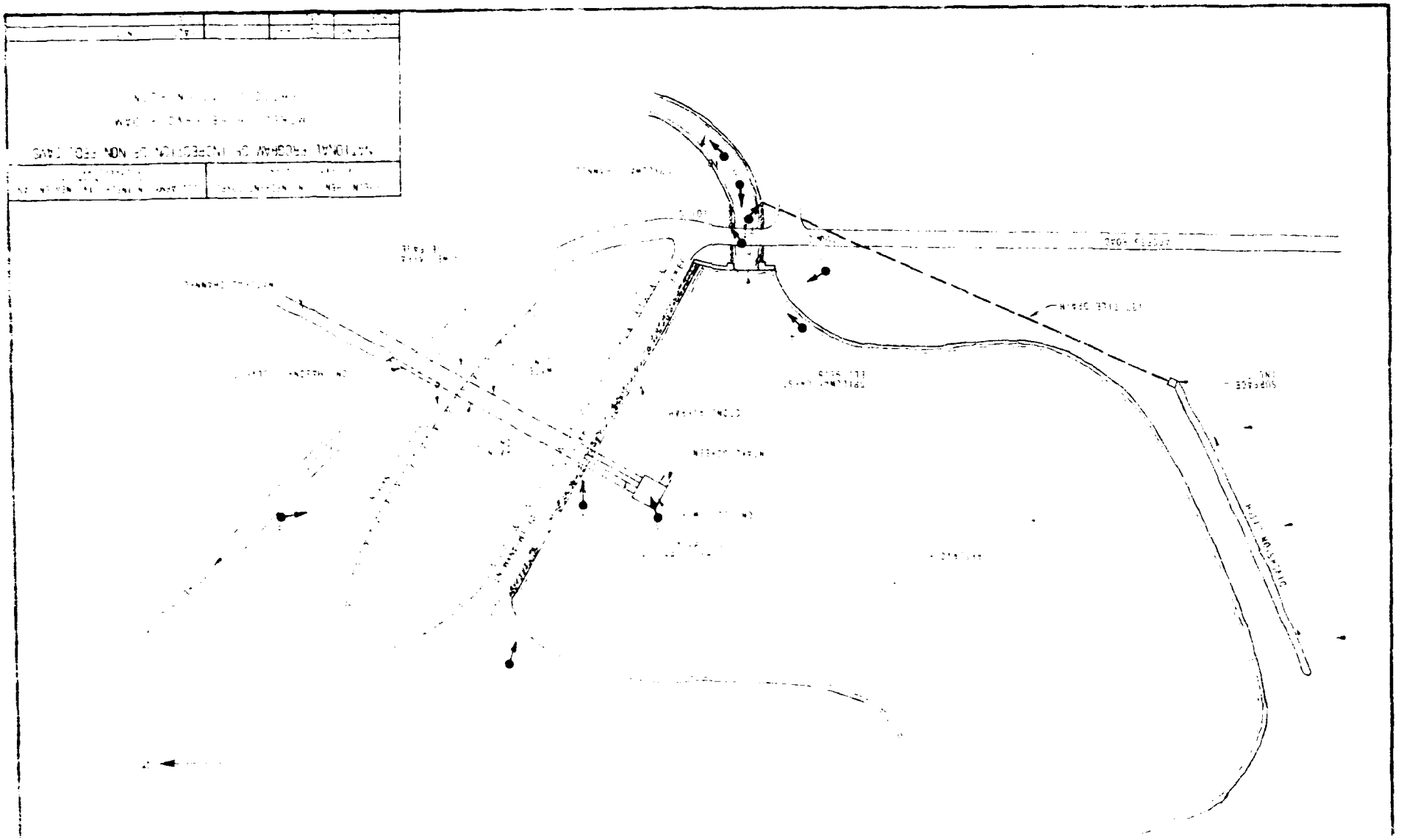




MEREDITH RESERVOIR DAM
DETAILS SECTIONS

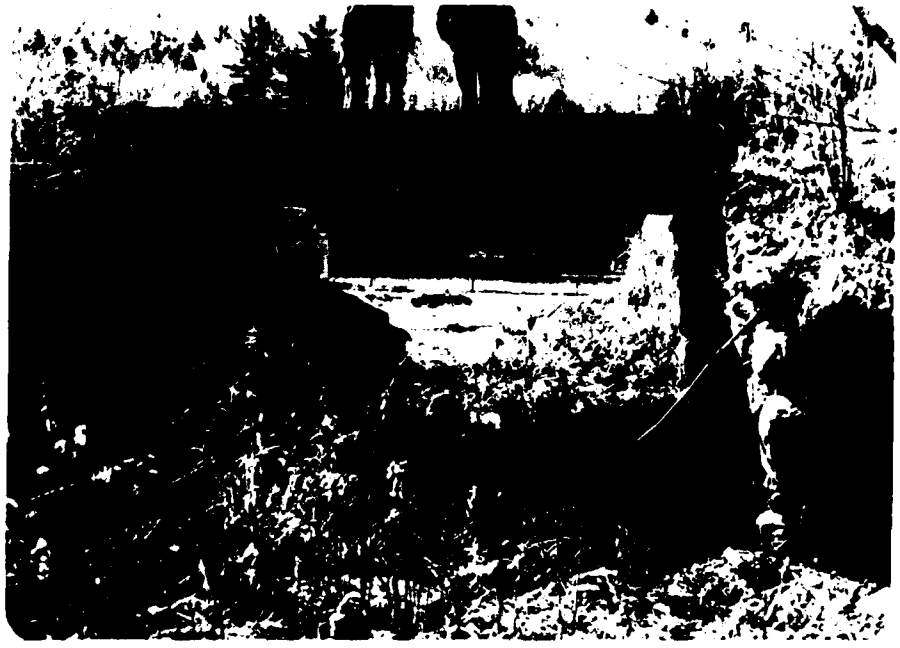
APPENDIX C

PHOTOGRAPHS



#1. VIEW OF EARTH DAM AND CONTROL TOWER

#2. VIEW OF UP-STREAM DAM EMBANKMENT



#5. VIEW OF DOWNSTREAM SPILLWAY CHANNEL

#6. VIEW OF LEFT SPILLWAY TRAINING WALL AND TREES ON EMBANKMENT

#9. VIEW OF CONTROL TOWER BRIDGE ABUTMENT

#10. VIEW OF DOWNSTREAM SPILLWAY CHANNEL

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

DUFRESNE-HENRY ENGINEERING CORPORATION

BY W.H. Leonard
DATE 1/9/79

SUBJECT [illegible] Drainage Area Classification

SHEET NO. 1 OF 2
JOB NO. [illegible]

SCALE 1" = 2500'

PLANIMETER READING:

DOUBLE READING 0.45

(.175)(.986) = .17 SQ MILES

[illegible]

[illegible]

DUFRESNE-HENRY ENGINEERING CORPORATION

BY [illegible] SUBJECT [illegible] SHEET NO. 2 OF [illegible]

DATE 2-2-79 Test [illegible] & [illegible] JOB NO. [illegible]

[illegible] spillway [illegible]

Q = CLH^3/2 (?) L = 14.3 (?)

C values [illegible]

[illegible]

Table 5-3 (?)

h = 0 Q = 0

h = 1 Q = 3.21 (14.3)(1)^3/2 = [illegible] cfs

h = 1.5 Q = 3.?? (14.3)(1.5)^3/2 = [illegible] cfs

h = 2 Q = 3.4 (14.3)(2)^3/2 = 1??.? cfs

h = 2.5 Q = 3.4 (14.3)(2.5)^3/2 = [illegible] cfs

h = 3 Q = 3.4 (14.3)(3.0)^3/2 = [illegible] cfs

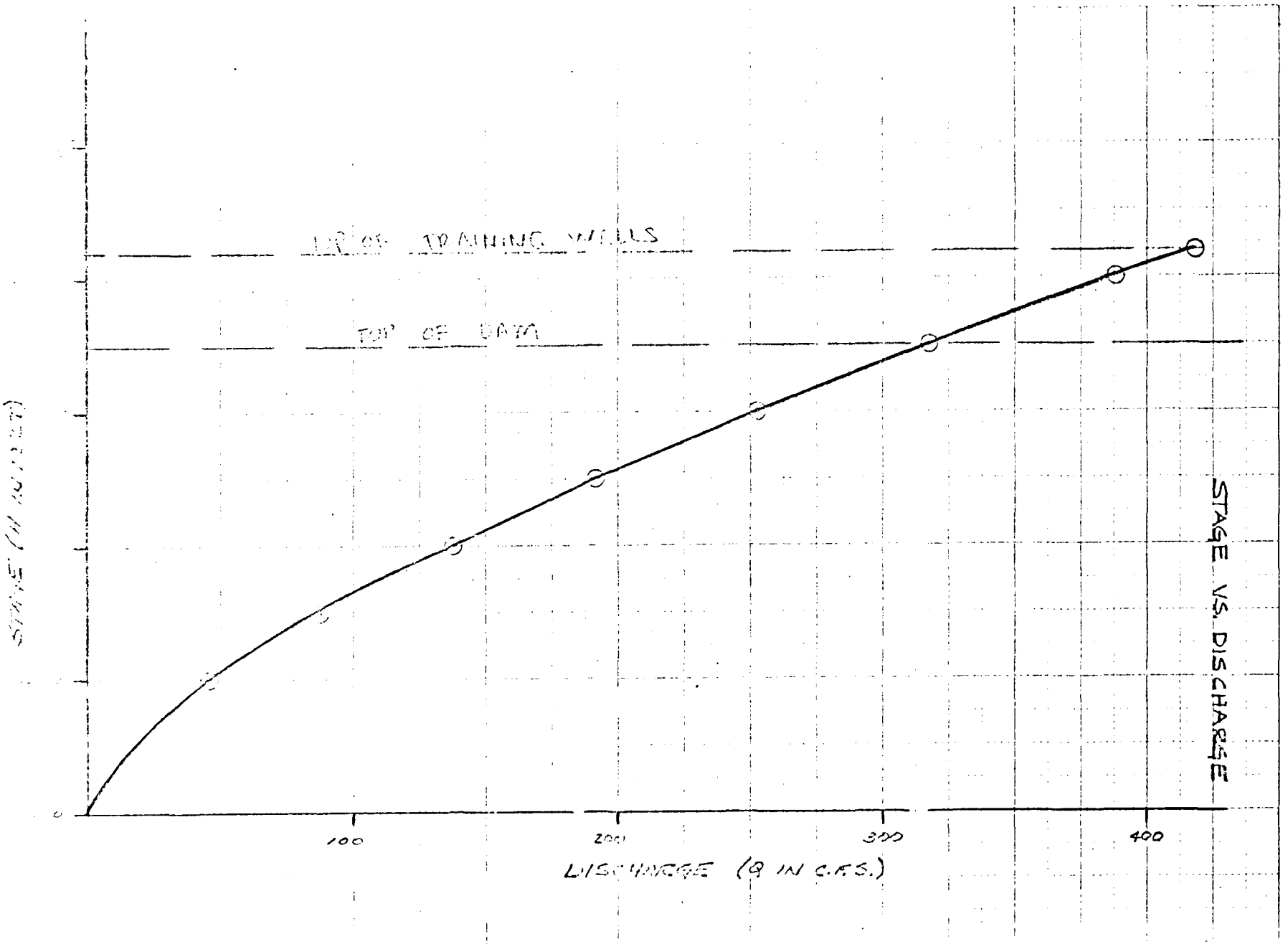
h = 3.? Q = 3.4 (14.3)(3.?)^3/2 = 318.? cfs (?) Top of Dam [illegible] Point)

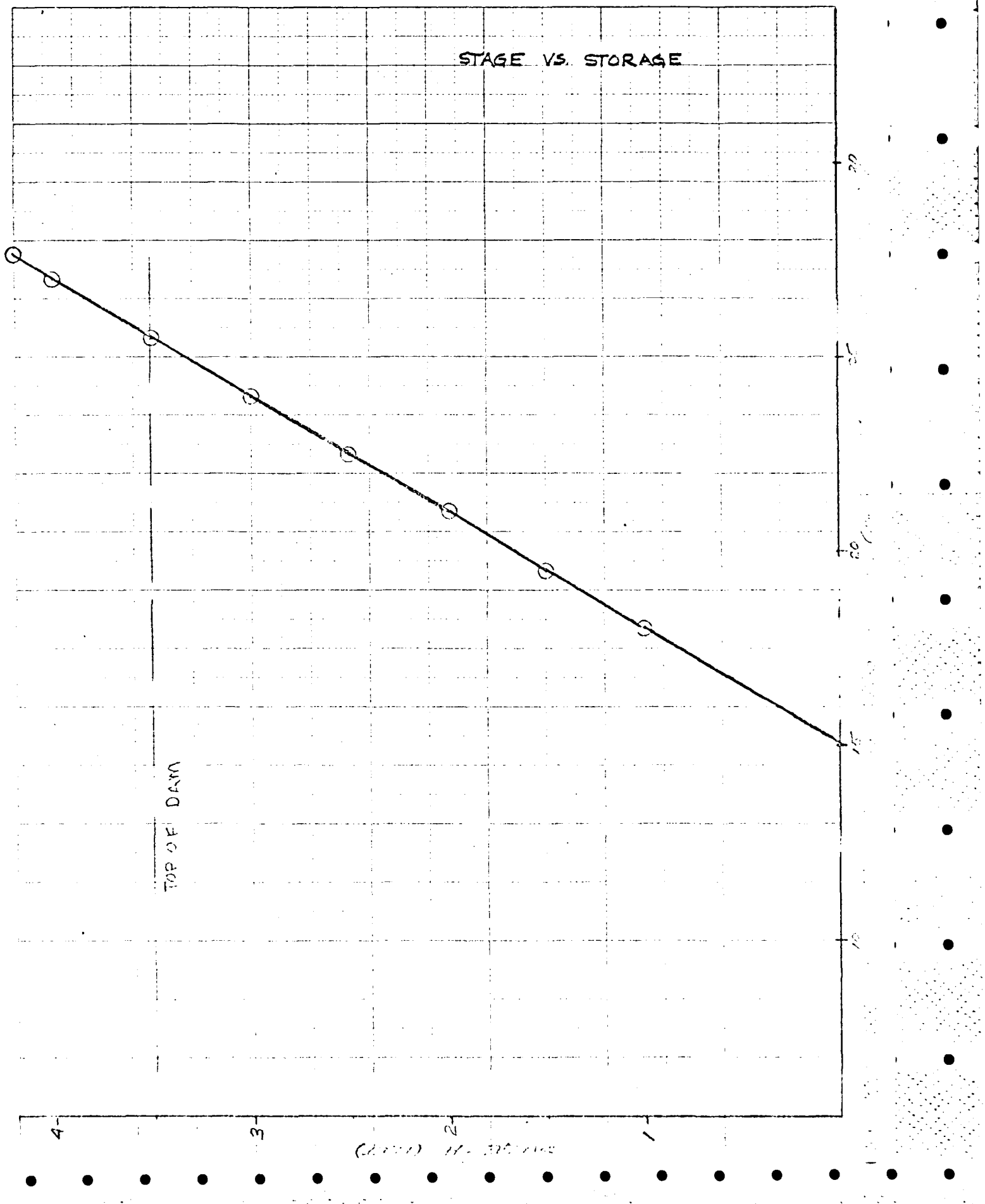
h = 4.? Q = 3.4 (14.3)(4.?)^3/2 = [illegible]

h = [illegible] Q = 3.4 (14.3)([illegible])^3/2 = [illegible]

[illegible]

[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]
1.5	[illegible]	1?.?
[illegible]	[illegible]	[illegible]
2.5	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	1??.?	246


TOP OF TRAINING WALLS
TOP OF DAM
STAGE (IN FEET)
0
100
200
300
400
DISCHARGE (Q IN C.F.S.)
STAGE VS. DISCHARGE


STAGE VS. STORAGE
TOP OF DAM
4
3
2
1

DUFRESNE-HENRY ENGINEERING CORPORATION

BY W.A. LEONARD SUBJECT MERRIMACK RIVER SHEET NO. 5 OF 8
DATE 3-5-79 SOIL CLASSIFICATION JOB NO. 04-0089

PREDOMINANT SOILS FOR THE MERRIMACK RESERVOIR DRAINAGE AREA (TAKEN FROM THE SOIL CONSERVATION SERVICE) ARE

Pmd	PAXTON	30% - C
Rhc	RIDGEBURY	15% - C
Tec	GLOUCHESTER	20% - A

LAND USE -- WOODED
SOILS -- VARIOUS

SOURCE: SOILS MAP NO. 6&7 FROM SCS.

THE USE OF 6&7 USING A 1/2" MACHINED SCALE MODELS WAS 6TH LOWER

WATERSHED OVERALL CLASS = C

DUFRESNE-HENRY ENGINEERING CORPORATION

BY W. A. LEONARD SUBJECT MEADOW RESERVOIR SHEET NO. 6 OF 8
DATE 3-5-79 COMPUTED 2 YEAR JOB NO. 04-0159

AVERAGE SLOPE

ELEV @ 10% 780
ELEV @ 35% 540

$$\frac{840 - 780}{1302}\,(5,280) = 324.12'/\text{MILE}$$

$$T_p = 2.2\left(\frac{L}{S}\right)^{.37} \Rightarrow 2.2\left(\frac{\frac{1324.4}{5280}(5280)}{\sqrt{324.4}}\right)^{.37} = .27$$

100 YEAR FLOOD

100 YEAR 24 HR RAINFALL = 6.0 INCHES

DRAINAGE AREA = (.17) mi² (640) = 108.8 ACRES

(TABLE ES-1027)
S.C.S.

120 cfs

DUFRESNE-HENRY ENGINEERING CORPORATION

BY W.A. LEONARD SUBJECT MEREDITH BOULEVARD SHEET NO. 7 OF 9
DATE 3-5-79 DAM FAILURE ANALYSIS JOB NO. 04-2[illegible]

IF DAM WERE TO FAIL

$h \approx 3'$ ∴ WSEL = 95.8

$y_o = 24'$

$Q = 8/27\ w_b \sqrt{g}\ y_c^{3/2}$

$Q = 8/27\ (.4)(340)\sqrt{32.2}\,(24)^{3/2} =$ 26,995 cfs

UNDER 100 YR FLOOD CONDITIONS (120 cfs)

[illegible] $h = 1.8$

∴ WSEL = 1.8 + 95.8 = 97.6

$Q = 8/27\ w_b \sqrt{g}\ y_c^{3/2}$ $y_o = 23'$

$Q = 8/27\ (.4)(340)\sqrt{32.2}\,(23)^{3/2} =$ 25,[illegible] cfs

UNDER NORMAL DAM CONDITIONS

NORMAL WSEL = [illegible] $h = 0$ $y_o = 21'$

$Q = 8/27\ w_b \sqrt{g}\ y_c^{3/2}$

$Q = 8/27\ (.4)(340)\sqrt{32.2}\,(21)^{3/2} =$ 22,[illegible] cfs

DUFRESNE-HENRY ENGINEERING CORPORATION

BY W.H. LEONARD SUBJECT HYDRAULIC RESPONSE SHEET NO. 8 OF 9
DATE 2-9-79 DAM BREACH ANALYSIS JOB NO. 09-80
USING COMPUTER ½ PMF

FROM HEC-1 COMPUTER OUTPUT

½ P.M.F. = 8381 cfs

FROM STORAGE DISCHARGE CURVE h ≈ 4.0'

WSEL = 95.8 + 4 = 99.8

WATER WOULD OVERTOP BY ≈ 2. FEET

IT [illegible] THESE CONDITIONS

$Q = \frac{8}{27}\sqrt{g}\,b\,h^{3/2}$ $b_o = 425.2'$

$Q = \frac{8}{27}(.6)(32.2)^{1/2}(425.2)(4)^{3/2} =$ [illegible] cfs

[illegible]

MAX h = 4.2' @ TOP OF RAINING WALLS

$Q = 3.1(14.3)(4.2)^{3/2} =$ [illegible]

h = 3.5 AT TOP OF DAM (LOW POINT)

$Q = 3.1(14.3)(3.5)^{3/2} =$ 318.5 cfs

MEREDITH RESERVOIR
MEREDITH, NEW HAMPSHIRE
RESERVOIR STORAGE-OUTFLOW

JOB SPECIFICATION

NO	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
144	0	10	1	0	0	0	2	0	0

JOPER NRT
3 0

SUB-AREA RUNOFF COMPUTATION

WATERSHED RUNOFF

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

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.17	0.0	0.0	1.00	0.500	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	18.00	111.00	122.00	133.00	0.0	0.0	0.0

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	0.47	0.20	0.0	0.0

UNIT HYDROGRAPH DATA

TP= 0.27 CP=0.75 NTA= 0

RECESSION DATA

STRTQ= 5.00 QRCSN= -0.13 RTIOR= 1.50

PRIMARY CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 2.19 AND R= 0.76 INTERVALS

UNIT HYDROGRAPH 5 END-OF-PERIOD ORDINATES, LAG= 0.27 HOURS, CP= 0.75 VOL= 1.00

114.	275.	204.	92.	11.

END-OF-PERIOD FLOW

	TIME	RAIN	EXCS	COMP Q
1	0 10	0.02	0.00	5.
1	0 20	0.02	0.00	5.
1	0 30	0.02	0.00	4.
1	0 40	0.02	0.00	4.
1	0 50	0.02	0.00	4.
1	0 60	0.02	0.00	4.
1	1 10	0.02	0.00	4.
1	1 20	0.02	0.00	4.
1	1 30	0.02	0.00	3.
1	1 40	0.02	0.00	3.
1	1 50	0.02	0.00	3.
1	1 60	0.02	0.00	3.
1	2 10	0.02	0.00	3.
1	2 20	0.02	0.00	3.
1	2 30	0.02	0.00	3.
1	2 40	0.02	0.00	3.
1	2 50	0.02	0.00	3.
1	2 60	0.02	0.00	2.
1	3 10	0.02	0.00	2.
1	3 20	0.02	0.00	2.
1	3 30	0.02	0.00	2.
1	3 40	0.02	0.00	2.
1	3 50	0.02	0.00	2.
1	3 60	0.02	0.00	2.
1	4 10	0.02	0.00	2.
1	4 20	0.02	0.00	2.
1	4 30	0.02	0.00	2.
1	4 40	0.02	0.00	2.
1	4 50	0.02	0.00	2.
1	4 60	0.02	0.00	1.
1	5 10	0.02	0.00	1.
1	5 20	0.02	0.00	1.
1	5 30	0.02	0.00	1.
1	5 40	0.02	0.00	1.
1	5 50	0.02	0.00	1.
1	5 60	0.02	0.00	1.
1	6 10	0.05	0.02	4.
1	6 20	0.05	0.02	9.
1	6 30	0.05	0.02	14.
1	6 40	0.05	0.02	15.
1	6 50	0.05	0.02	15.
1	6 60	0.05	0.02	15.
1	7 10	0.05	0.02	15.
1	7 20	0.05	0.02	15.
1	7 30	0.05	0.02	15.
1	7 40	0.05	0.02	15.
1	7 50	0.05	0.02	15.
1	7 60	0.05	0.02	15.
1	8 10	0.05	0.02	15.
1	8 20	0.05	0.02	15.
1	8 30	0.05	0.02	15.
1	8 40	0.05	0.02	15.
1	8 50	0.05	0.02	15.
1	8 60	0.05	0.02	15.
1	9 10	0.05	0.02	15.
1	9 20	0.05	0.02	15.
1	9 30	0.05	0.02	15.
1	9 40	0.05	0.02	15.
1	9 50	0.05	0.02	15.
1	9 60	0.05	0.02	15.
1	10 10	0.05	0.02	15.
1	10 20	0.05	0.02	15.
1	10 30	0.05	0.02	15.
1	10 40	0.05	0.02	15.
1	10 50	0.05	0.02	15.
1	10 60	0.05	0.02	15.
1	11 10	0.05	0.02	15.
1	11 20	0.05	0.02	15.
1	11 30	0.05	0.02	14.
1	11 40	0.05	0.02	14.
1	11 50	0.05	0.02	14.
1	11 60	0.05	0.02	14.
1	12 10	0.33	0.30	46.
1	12 20	0.33	0.30	122.
1	12 30	0.33	0.30	176.
1	12 40	0.33	0.30	196.
1	12 50	0.33	0.30	197.
1	12 60	0.33	0.30	197.
1	13 10	0.40	0.37	204.
1	13 20	0.40	0.37	222.

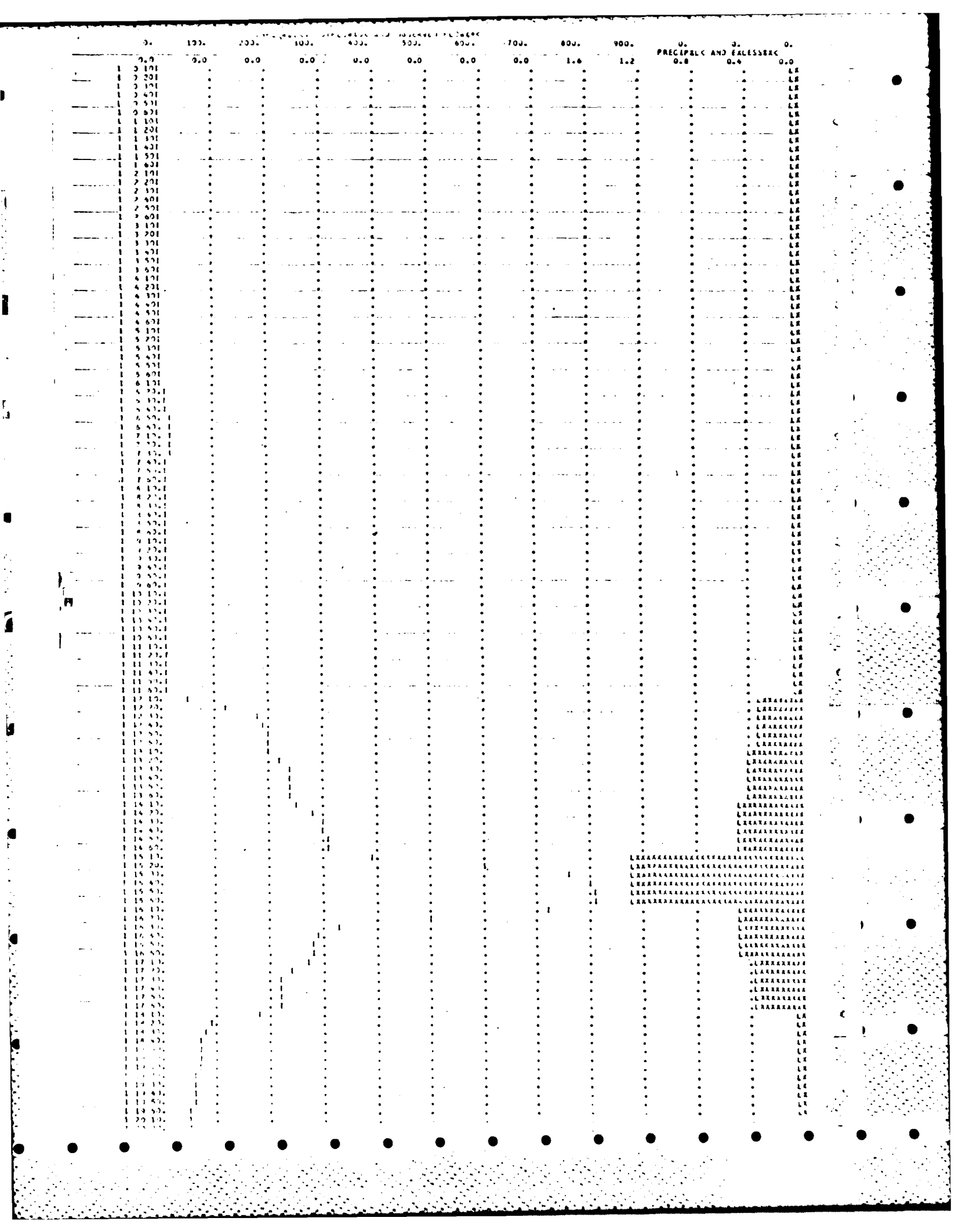
1	15	60	1.27	1.23		807.
1	16	10	0.47	0.43		716.
1	16	20	0.47	0.43		497.
1	16	30	0.47	0.43		334.
1	16	40	0.47	0.43		292.
1	16	50	0.47	0.43		284.
1	16	60	0.47	0.43		284.
1	17	10	0.37	0.33		272.
1	17	20	0.37	0.33		245.
1	17	30	0.37	0.33		224.
1	17	40	0.37	0.33		219.
1	17	50	0.37	0.33		218.
1	17	60	0.37	0.33		218.
1	18	10	0.03	0.00		180.
1	18	20	0.03	0.00		89.
1	18	30	0.03	0.00		78.
1	18	40	0.03	0.00		75.
1	18	50	0.03	0.00		72.
1	18	60	0.03	0.00		69.
1	19	10	0.03	0.00		66.
1	19	20	0.03	0.00		64.
1	19	30	0.03	0.00		61.
1	19	40	0.03	0.00		59.
1	19	50	0.03	0.00		56.
1	19	60	0.03	0.00		54.
1	20	10	0.03	0.00		52.
1	20	20	0.03	0.00		50.
1	20	30	0.03	0.00		48.
1	20	40	0.03	0.00		46.
1	20	50	0.03	0.00		44.
1	20	60	0.03	0.00		42.
1	21	10	0.03	0.00		41.
1	21	20	0.03	0.00		39.
1	21	30	0.03	0.00		38.
1	21	40	0.03	0.00		36.
1	21	50	0.03	0.00		35.
1	21	60	0.03	0.00		33.
1	22	10	0.03	0.00		32.
1	22	20	0.03	0.00		31.
1	22	30	0.03	0.00		29.
1	22	40	0.03	0.00		28.
1	22	50	0.03	0.00		27.
1	22	60	0.03	0.00		26.
1	23	10	0.03	0.00		25.
1	23	20	0.03	0.00		24.
1	23	30	0.03	0.00		23.
1	23	40	0.03	0.00		22.
1	23	50	0.03	0.00		21.
1	23	60	0.03	0.00		20.
		SUM	23.64	19.50		14377.

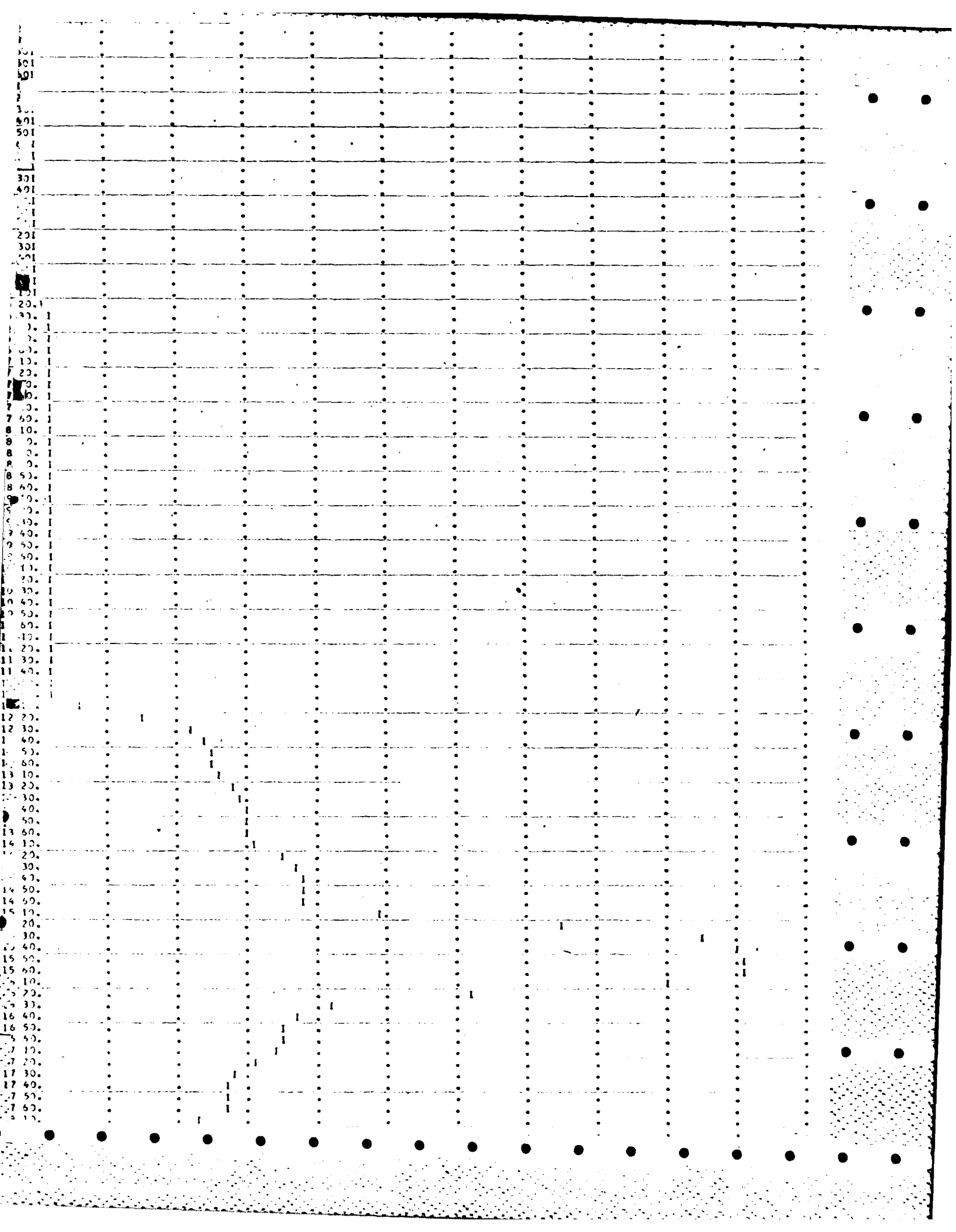
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	807.	336.	100.	100.	14375.
INCHES		18.49	21.85	21.85	21.85
AC-FT		168.	198.	198.	198.

RUNOFF MULTIPLIED BY 0.50

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	2.	2.	2.	2.
8.	8.	8.	8.	8.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	23.	81.	90.	97.	98.	93.	102.	111.
118.	120.	120.	120.	126.	139.	150.	152.	153.	153.
146.	301.	380.	400.	404.	404.	358.	248.	167.	146.
142.	142.	136.	122.	112.	110.	109.	109.	90.	44.
39.	37.	36.	34.	33.	32.	31.	29.	28.	27.
26.	25.	24.	23.	22.	21.	20.	20.	19.	18.
17.	17.	16.	15.	15.	14.	14.	13.	13.	12.
12.	11.	11.	10.						

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	404.	169.	50.	50.	7187.
INCHES		9.25	10.92	10.92	10.92
AC-FT		84.	99.	99.	99.


0.
100.
200.
300.
400.
500.
600.
700.
800.
900.
0.
0.
0.
PRECIPITATION AND EVAPOTRANSPIRATION
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
1.6
1.2
0.8
0.4
0.0



```
23 10.  I
23 20.  I
23 30.  I
23 40.  I
23 50.  I
23 60.  I
```

VVV*

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

HYDROGRAPH ROUTING

MEREDITH RESERVOIR ROUTING

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

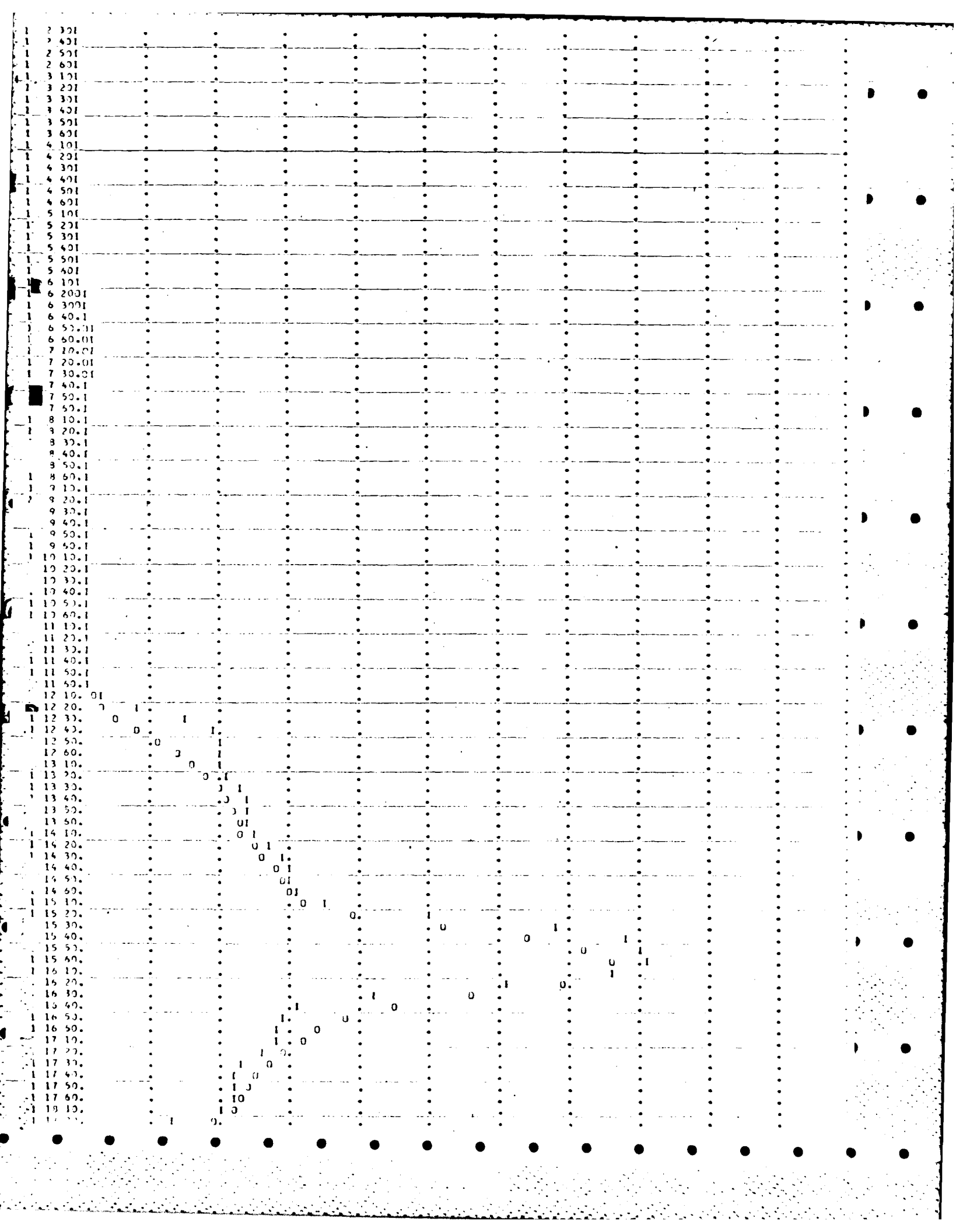
ROUTING DATA

CLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	-1.

STORAGE#	15.	18.	20.	21.	23.	24.	26.	27.	28.	0.
OUTFLOW#	0.	46.	88.	138.	192.	253.	318.	389.	419.	0.

	TIME		EOP STOR	AVG IN	EOP OUT
1	0	10	15.	2.	2.
1	0	20	15.	2.	2.
1	0	30	15.	2.	2.
1	0	40	15.	2.	2.
1	0	50	15.	2.	2.
1	0	60	15.	2.	2.
1	1	10	15.	2.	2.
1	1	20	15.	2.	2.
1	1	30	15.	2.	2.
1	1	40	15.	2.	2.
1	1	50	15.	2.	2.
1	1	60	15.	2.	2.
1	2	10	15.	2.	2.
1	2	20	15.	1.	2.
1	2	30	15.	1.	2.
1	2	40	15.	1.	2.
1	2	50	15.	1.	2.
1	2	60	15.	1.	1.
1	3	10	15.	1.	1.
1	3	20	15.	1.	1.
1	3	30	15.	1.	1.
1	3	40	15.	1.	1.
1	3	50	15.	1.	1.
1	3	60	15.	1.	1.
1	4	10	15.	1.	1.
1	4	20	15.	1.	1.
1	4	30	15.	1.	1.
1	4	40	15.	1.	1.



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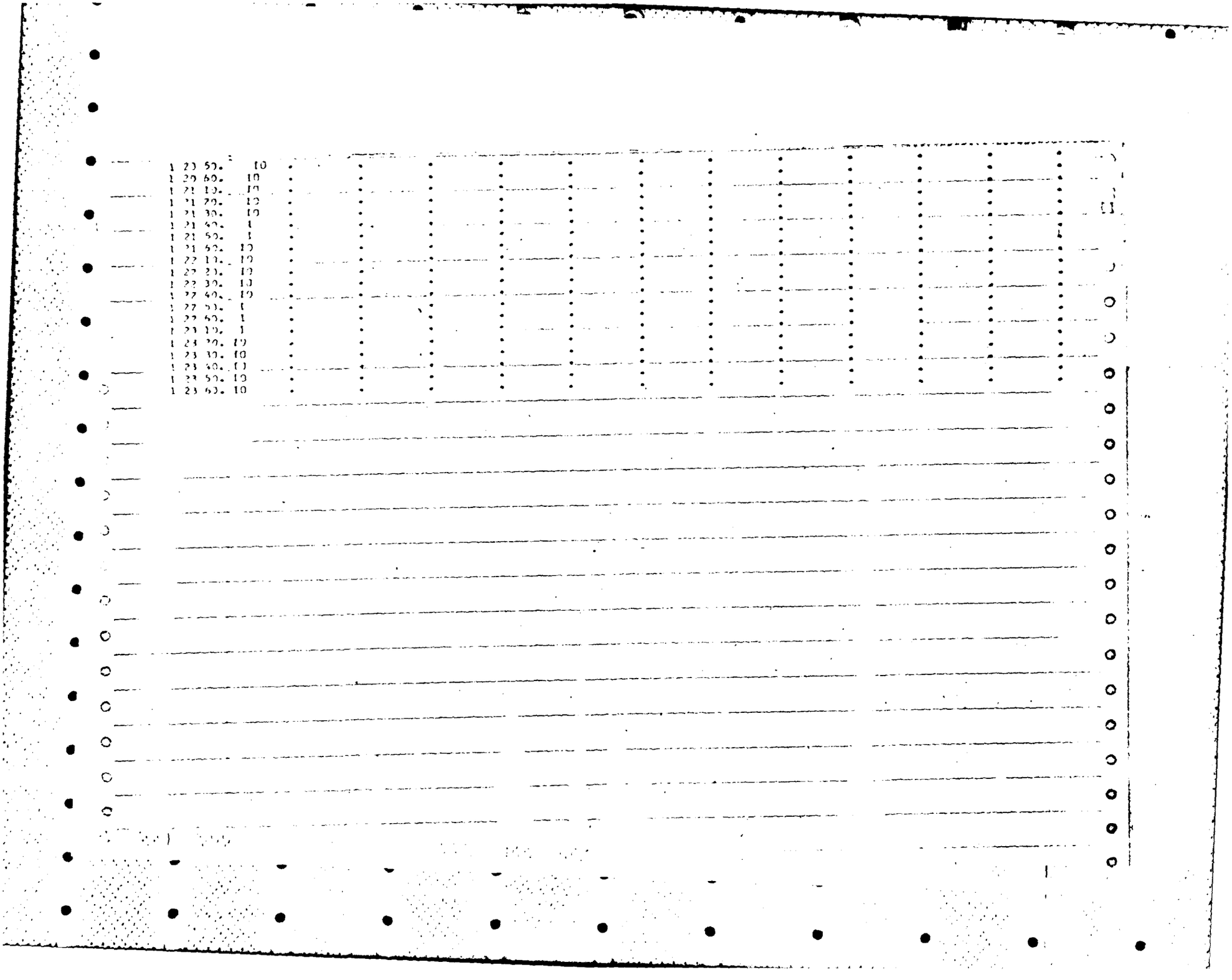
1	9 50	15.	7.	7.
1	9 60	15.	7.	7.
1	10 10	15.	7.	7.
1	10 20	15.	7.	7.
1	10 30	15.	7.	7.
1	10 40	15.	7.	7.
1	10 50	15.	7.	7.
1	10 60	15.	7.	7.
1	11 10	15.	7.	7.
1	11 20	15.	7.	7.
1	11 30	15.	7.	7.
1	11 40	15.	7.	7.
1	11 50	15.	7.	7.
1	11 60	15.	7.	7.
1	12 10	16.	15.	9.
1	12 20	16.	42.	15.
1	12 30	17.	75.	27.
1	12 40	18.	93.	39.
1	12 50	18.	98.	54.
1	12 60	19.	98.	68.
1	13 10	19.	100.	78.
1	13 20	19.	107.	88.
1	13 30	20.	115.	98.
1	13 40	20.	119.	105.
1	13 50	20.	120.	111.
1	13 60	20.	120.	114.
1	14 10	20.	123.	117.
1	14 20	21.	133.	123.
1	14 30	21.	145.	131.
1	14 40	21.	151.	138.
1	14 50	21.	152.	144.
1	14 60	21.	153.	148.
1	15 10	22.	175.	158.
1	15 20	23.	249.	195.
1	15 30	24.	341.	259.
1	15 40	26.	390.	319.
1	15 50	26.	402.	360.
1	15 60	27.	404.	381.
1	16 10	27.	381.	381.
1	16 20	26.	303.	343.
1	16 30	25.	208.	279.
1	16 40	23.	156.	224.
1	16 50	22.	144.	190.
1	16 60	22.	142.	170.
1	17 10	22.	139.	158.
1	17 20	21.	129.	146.
1	17 30	21.	117.	135.
1	17 40	21.	111.	126.
1	17 50	20.	109.	120.
1	17 60	20.	109.	116.
1	18 10	20.	100.	110.
1	18 20	20.	67.	94.
1	18 30	19.	42.	76.
1	18 40	19.	38.	64.
1	18 50	18.	37.	55.
1	18 60	18.	35.	49.
1	19 10	18.	34.	45.
1	19 20	18.	32.	42.
1	19 30	18.	31.	40.
1	19 40	18.	30.	38.
1	19 50	17.	29.	36.
1	19 60	17.	28.	35.
1	20 10	17.	27.	33.
1	20 20	17.	25.	32.
1	20 30	17.	24.	30.
1	20 40	17.	23.	29.
1	20 50	17.	23.	28.
1	20 60	17.	22.	27.
1	21 10	17.	21.	25.
1	21 20	17.	20.	24.
1	21 30	17.	19.	23.
1	21 40	16.	18.	22.
1	21 50	16.	18.	22.
1	21 60	16.	17.	21.
1	22 10	16.	16.	20.
1	22 20	16.	16.	19.
1	22 30	16.	15.	18.
1	22 40	16.	14.	18.
1	22 50	16.	14.	17.
1	22 60	16.	13.	16.
1	23 10	16.	13.	16.
1	23 20	16.	12.	15.
1	23 30	16.	12.	14.
1	23 40	16.	11.	14.
1	23 50	16.	11.	13.
1	23 60	16.	10.	13.
	SUM			7140.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	381.	165.	58.	50.	7140.
INCHES		9.00	10.85	10.85	10.85
AC-FT		82.	99.	98.	98.

OUTLET SUMMARY: AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
[illegible] AI	1	525.	167.	50.	50.	0.17
[illegible] F3	1	361.	165.	50.	50.	0.17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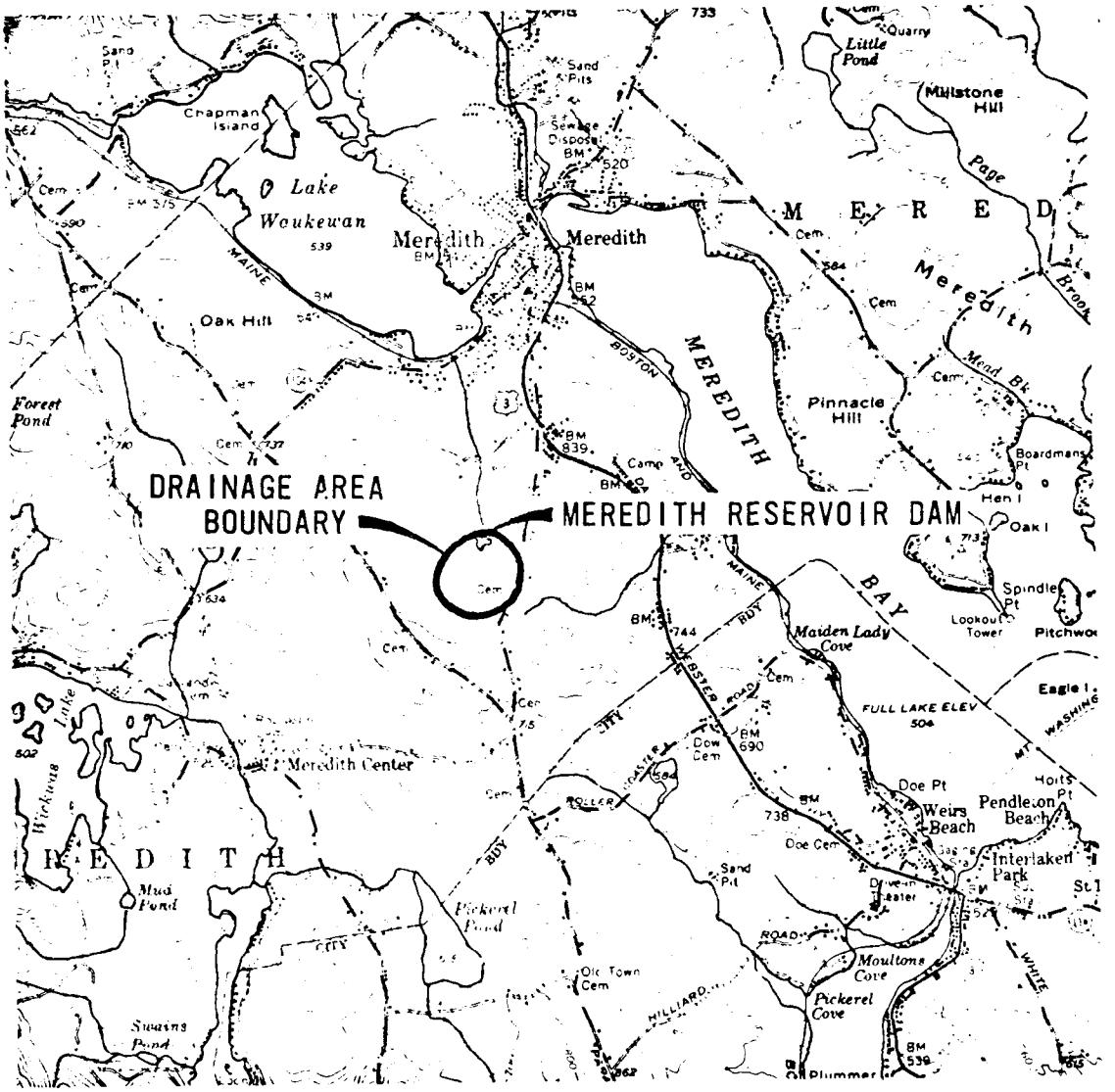
1 20 60. 10
1 21 10. 10
1 21 20. 10
1 21 30. 10
1 21 40. 1
1 21 50. 1
1 21 60. 10
1 22 10. 10
1 22 20. 10
1 22 30. 10
1 22 40. 10
1 22 50. 1
1 22 60. 1
1 23 10. 1
1 23 20. 10
1 23 30. 10
1 23 40. 10
1 23 50. 10
1 23 60. 10



SOURCE OF MAP:
U.S. GEOLOGICAL SURVEY
HOLDERNESS & WINNIPESAUKEE
QUADRANGLES
NEW HAMPSHIRE
SERIES V712
1:62500 1956

DUFRESNE-HENRY ENGINEERING CORP. ARCHITECT-ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCATION MAP
MEREDITH RESERVOIR DAM

MEREDITH NEW HAMPSHIRE

CLIENT NO	04-0082		SCALE 1" = 1 MILE
ENGR	JAD		DATE 3-14-79

APPENDIX E

Information as Contained in the National Inventory of Dams

END

FILMED

8-85

DTIC