NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
PEAT SWAMP RESERVOIR... (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV AUG 78
UNCLASSIFIED
AT SWAMP RESERVOIR DAM
CT 00088

PHASE I INSPECTION REPORT
TIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
EW ENGLAND DIVISION, CORPS OF ENGINEERS
ALTHAM, MASS. 02154

AUGUST 1978
LOWER HOUSATONIC RIVER BASIN
SEYMOUR, CONNECTICUT

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AUGUST 1978
**Title:** Peat Swamp Reservoir Dam  
**Type of Report:** Inspection Report  
**Performing Org. Report Number:**  
**Performing Organization Name and Address:** U.S. Army Corps of Engineers New England Division  
**Controlling Office Name and Address:** Dept. of the Army, Corps of Engineers New England Division, NEDED 424 Trapeolo Road, Waltham, MA. 02254  
**Date:** August 1978  
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**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.

**Key Words:** Dams, Inspection, Dam Safety, Lower Housatonic River Basin Seymour, Conn. Peat Swamp Reservoir Dam

**Abstract:** The dam consists of two types of embankments. The right portion, 202 ft. in length, consists of a concrete core wall with up and downstream berms. The crest is 20 ft. in width and side slopes are 2 horizontal to 1 vertical both up and downstream. The left portion, 318 ft. in length, consists of concrete and rubble masonry core with up and downstream berms. The dam is judged to be in good condition. Based upon the size and hazard classification in accordance with Corps guidelines the test flood will be equal to the Probable Maximum Flood.
The dam consists of two types of embankments. The right portion, 202 feet in length, consists of a concrete core wall with up and downstream berms. The crest is 20 feet in width and side slopes are 2 horizontal to 1 vertical both up and downstream. The left portion, 318 feet in length, consists of concrete and rubble masonry core with up and downstream berms. The crest is 10 feet in width and side slopes are 2 horizontal to 1 vertical both up and downstream. The concrete ogee weir is 19 feet in length and is located adjacent to the left abutment. The spilling channel curves right and water flows into a culvert drop inlet for approximately 100 feet and exits into an aeration pond. In addition to normal runoff, from the forested undeveloped drainage area, there are four diversions from nearby brooks, which feed the reservoir. There is one 8 inch low level intake which exits directly into the drop inlet and one 12 inch feed to the aeration pond. There are two more reservoirs downstream in the two miles between Peat Swamp Reservoir and the City of Ansonia.

Based upon the visual inspection at the site, review of available information and the past performance of the dam, the dam is judged to be in good condition. But the inspection did reveal numerous areas requiring minor maintenance. Refer to Section 7 for more detail.
Based upon the size (intermediate) and hazard (high) classification in accordance with Corps guidelines the test flood will be equal to the Probable Maximum Flood. The spillway capacity is 600 cubic feet per second, which is in excess of 90% of the Test Flood. Peak inflow to the reservoir is 1600 cubic feet per second. Peak outflow (test flood) is 640 cubic feet per second with the dam being overtopped 0.10 feet. The spillway will pass nearly 90% of the Test Flood.

The peak failure outflow, if the dam breached, would be 43,500 cubic feet per second. The average stage one and one half miles downstream to Quilllan Reservoir would be 15.0 feet for a reach outflow of 36,000 cubic feet per second. Quilllan Reservoir Dam would be overtopped by 8.0 feet and probably breach. Even without breaching Quilllan Reservoir, the 15 foot wave would sweep down the Beaver Brook Valley through residential Ansonia, 500 feet below Quillian Reservoir causing the potential for excessive economic loss and loss of life.

In as much as the spillway will pass nearly 90% of the Test Flood we do not feel that more refined hydrologic studies are necessary. However, minor construction activity can minimize further deterioration of portions of the downstream face of the dam and its adjacent embankment. Also, the outlet valve locations should be shifted to the upstream face of the dam. An operation and maintenance plan should be instituted as described in Section 7.

The above recommendations should be instituted within one year of the owner's receipt of this Phase I Inspection Report.

Peter M. Heynen, P.E.
Project Manager
Cahn Engineers, Inc.

William O. Doll, P.E.
Chief Engineer
Cahn Engineers, Inc.
This Phase I Inspection Report on Peat Swamp Reservoir Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

CHARLES G. TIERSCHE, Chairman
Chief, Foundation and Materials Branch
Engineering Division

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

SAUL C. COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division
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 inspection. 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 evolutionarily in nature. It would be incorrect to assume that the present 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 there of. 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.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Brief Assessment</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii</td>
<td>i,iii</td>
</tr>
<tr>
<td>Review Board Signature Page</td>
<td>iii</td>
</tr>
<tr>
<td>Preface</td>
<td>iv</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>v-vii</td>
</tr>
<tr>
<td>Overview Photo</td>
<td>viii</td>
</tr>
<tr>
<td>Site Location Plan</td>
<td>Plate No. 1</td>
</tr>
<tr>
<td>Drainage Area Map</td>
<td>Plate No. 2</td>
</tr>
</tbody>
</table>

## SECTION 1: PROJECT INFORMATION

1.1 General
   a. Authority
   b. Purpose of Inspection Program
   c. Scope of Inspection Program

1.2 Description of Project
   a. Description of Dam and Appurtenances
   b. Location
   c. Size Classification
   d. Hazard Classification
   e. Ownership
   f. Purpose of Dam
   g. Design and Construction History
   h. Normal Operational Procedures

1.3 Pertinent Data
   a. Drainage Areas
   b. Discharge at Damsite
   c. Elevations
   d. Reservoir
   e. Storage
   f. Reservoir Surface
   g. Dam
   h. Diversion and Regulatory Tunnel
   i. Spillway
   j. Regulatory Outlets

## SECTION 2: ENGINEERING DATA

2.1 Design
   a. Available Data
   b. Design Features
   c. Design Data
2.2 Construction ................................................. 6
   a. Available Data
   b. Construction Considerations
2.3 Operation .................................................. 6
2.4 Evaluation .................................................. 6
   a. Availability
   b. Adequacy
   c. Validity

SECTION 3: VISUAL INSPECTION

3.1 Findings .................................................... 7
   a. General
   b. Dam
   c. Appurtenant Structures
   d. Reservoir Area
   e. Downstream Channel

3.2 Evaluation .................................................. 8

SECTION 4: OPERATIONAL PROCEDURES

4.1 Regulatory Procedures .................................... 9
4.2 Maintenance of Dam ....................................... 9
4.3 Maintenance of Operating Facilities ................... 9
4.4 Description of any Warning System
   In Effect .................................................. 9
4.5 Evaluation .................................................. 9

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features ................................. 10
   a. Design Data
   b. Experience Data
   c. Visual Observations
   d. Overtopping Potential
   e. Spillway Adequacy
   f. Downstream Flooding

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability ................. 11
   a. Visual Observations
   b. Design and Construction Data
   c. Operating Records
   d. Post Construction Changes
   e. Seismic Stability
SECTION 7: ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment .......................... 13
   a. Assessment
   b. Adequacy of Information
   c. Urgency
   d. Additional Investigations

7.2 Recommendation/Remedial Measures ........ 13
   a. Facilities
   b. Operation and Maintenance Procedures
APPENDIX

SECTION A: VISUAL OBSERVATIONS A-1 to A-10

SECTION B: EXISTING DATA* B-1 to B-2

Data and Correspondence

Drawings

"Plan Showing Proposed Addition to the Peat Swamp Dam of the Ansonia Water Company, Town of Seymour, Connecticut" Charles H. Nichols - Civil Engineer March 8, 1909

"Ansonia Water Company - Heightening Peat Swamp Dam, Profile and General Plan", Town of Seymour, Connecticut May, 1916

"The Ansonia Water Company-Contour Map of Peat Swamp Reservoir" Town of Seymour, Connecticut 1925

"Ansonia Water Company - General Plan and Profile for Raising Peat Swamp Dam" Town of Seymour, Connecticut Albert B. Hill - Engineer Revised to "As-Built" July 23, 1926

"Ansonia Water Company - Detail Plans for Raising Peat Swamp Dam", Town of Seymour, Connecticut Albert B. Hill - Engineer Revised to "As-Built" July 23, 1926

SECTION C: DETAIL PHOTOGRAPHS C-1 to C-2

SECTION D: HYDRAULIC/HYDROLOGIC COMPUTATIONS D-1 to D-23
SECTION E: INVENTORY OF DAMS IN THE UNITED STATES

Peat Swamp Reservoir Dam
Inventory No. CT 00088
Report Date: December 10, 1973

*See Special Note Appendix Section B - Availability of Data
DRAINAGE AREA
0.52 SQ. MI.

PEAT SWAMP RESERVOIR DAM

INITIAL IMPACT AREA

SECONDARY IMPACT AREA

ANSONIA-DERBY WATER CO.

RESIDENTIAL DEVELOPMENT

PLATE NO. 2

PEAT SWAMP RESERVOIR DAM

BEAVER BROOK, SEYMOUR, CONNECTICUT

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

DATE 5/24/78
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. Cahn Engineers, Inc. has been retained by the New England Division to inspect and report on selected dams in the southwestern portion of the State of Connecticut. Authorization and notice to proceed were issued to Cahn Engineers, Inc. under a letter of April 26, 1978 from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0310 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program — The purposes of the program are to:

   (1) Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-Federal interests.

   (2) Encourage and prepare the States to quickly initiate effective dam inspection programs for non-Federal dams.

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

c. Scope of Inspection Program — The scope of this Phase I Inspection report includes:

   (1) Gathering, reviewing and presenting all available data as can be obtained from the owners, previous owners, the state and other associated parties.
(2) A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

(3) Computation concerning the hydraulics and hydrology of the facility and its relationship to the calculated flood through the existing spillway.

(4) An assessment of the condition of the facility and corrective measures required.

It should be noted that the report does not pass judgement on the safety or stability of the dam other than on a visual basis. The intent of the inspection program is to alert concerned parties of apparent necessary corrective action requirements or further investigation recommendations.

1.2 Description of Project

a. Description of Dam and Appurtenances - The dam consists of two types of embankments. The right portion, 202 feet in length, consists of a concrete corewall with up and downstream berms. The crest is 20 feet in width and side slopes are 2 horizontal to 1 vertical both up and downstream. The left portion, 318 feet in length, consists of concrete and rubble masonry core with up and downstream berms. The crest is 10 feet in width and side slopes are 2 horizontal to 1 vertical both up and downstream. The concrete ogee weir is 19 feet in length and is located adjacent to the left abutment. The spillway channel curves right and water flows into a culvert drop inlet for approximately 100 feet and exits into an aeration pond. In addition to normal runoff, from the forested undeveloped drainage area, there are four diversions from nearby brooks, which feed the reservoir. There is one 8 inch low level intake which exits directly into the drop inlet and one 12 inch feed to the aeration pond. In the 1½ miles downstream from the dam to Ansonia there are two more reservoirs.

b. Location - The dam is located on Beaver Brook in a rural area in the Town of Seymour, County of New Haven, State of Connecticut. The dam is shown on the Ansonia U.S.G.S. Quadrangle Map having coordinates of longitude W73° 03'35" and latitude of N41° 22'12".
c. **Size Classification** - Intermediate (Height 42.0'), (Storage 1990 Ac. Ft.).

d. **Hazard Classification** - High (Category 1, Residential Ansonia located 2 miles downstream). There is a potential for loss of life and property in the event the dam is breached. Utilizing the April 1978 "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow from the dam would be 43,500 cfs (Appendix D-10). The average stage one and one half miles downstream to Quillinan Reservoir would be 15' for a reach outflow of 36,000 cfs (Appendix D-12). Quillinan Reservoir dam would be overtopped by 8' and probably breach. Even without breaching Quillinan Reservoir, the 15 foot wave would sweep down the Beaver Brook Valley through residential Ansonia 500 feet below Quillinan Reservoir, causing severe damage to life and property.

e. **Ownership** - Ansonia-Derby Water Company
   230 Beaver Street
   Ansonia, Connecticut 06401
   Mr. Fred Elliott (203) 735-1888

f. **Purpose of Dam** - Public water supply.

g. **Design and Construction History** - The following information is believed to be accurate based on available plans and correspondence.

   Prior to 1895 there may have been two periods of dam construction. The first period dam is known to exist immediately upstream and at the toe of the present dam. The second period dam consisted of masonry rubble with earth embankment on each side with a central spillway.

   During the period between 1895 and 1916, several proposals were submitted to the Ansonia Water Company for raising the second period dam. The 1916 "As Built" drawing for the Ansonia Water Company indicates that the raising consisted of adding a concrete wall and buttresses on top of the rubble wall and extending the dam by construction of 180 feet of concrete corewall and earth embankments. The spillway was relocated to the left of the dam. The engineer and contractor are unknown.

   In 1925 the dam was raised again with the addition of concrete to the main dam and the corewall. The spillway was also raised but its location and channel remained the
same. This work was done for the Ansonia Water Company and engineered by Albert B. Hill. The contractor is unknown. There is no evidence of additional construction after 1925 other than normal maintenance. The Ansonia Water Company is presently known as the Ansonia-Derby Water Company.

h. Normal Operational Procedures - Valves are operated as needed during the summer months to supply water to downstream reservoirs when the flow no longer tops the spillway.

1.3 Pertinent Data

a. Drainage Area - 0.52 square miles.

b. Discharge at Damsite - Maximum Flood Not Known
Total Spillway Capacity at Top of Dam Elevation - 600 cfs.

c. Elevation - (Ft. above MSL, U.S.G.S. Datum)

| Top of Dam:            | 347 |
| Spillway Crest:        | 343 |
| Streambed @ Center Line of Dam: | 305 |
| 8" Low Level Intake:   | 306 |
| 12" Feed to Aeration Pond: | Unknown |

d. Reservoir - Length of Normal Pool: 3000 ft
Length of Pool Elevation 347: 3000+ ft

e. Storage - Normal Pool: 1660 acre ft
Top of Dam Pool: 1990 acre ft

f. Reservoir Surface - Normal Pool: 82.1 acres
Top of Dam Pool: 82.1 + acres

g. Dam - Type:
Concrete and rubble masonry core. Earth embankment up and downstream.

<table>
<thead>
<tr>
<th>Length:</th>
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<tbody>
<tr>
<td>Dam:</td>
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<tr>
<td>Corewall:</td>
</tr>
<tr>
<td>Height:</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>318 ft.</td>
</tr>
<tr>
<td>202 ft.</td>
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<td>42'</td>
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Top Width: 10' Minimum - Dam  
20' Maximum - Corewall  

Sideslope: 2H to 1V upstream.  
2H to 1V downstream.  

Impervious Core: Concrete and masonry rubble.  

Cutoff: Foundation on rock both dam and corewall.  

h. **Diversion and Regulatory Tunnel** - Not Applicable  
i. **Spillway - Type:** Concrete ogee weir.  
   Length of Weir: 19 feet  
   Crest Elevation: 343  
   Upstream Channel: 2H to 1V earth.  
   Downstream Channel: 8H to 1V concrete and asphalt.  

j. **Regulatory Outlets - 8" Low Level intake**  
   12" Feed to aeration pond  

The 8" low level intake and 12" feed to the aeration pond are both mechanically operated. They are both located in the downstream side of the dam. See Plate #3 for their locations.
SECTION 2: ENGINEERING DATA

2.1 Design

a. Available Data - The available data consists of drawings and correspondence provided by the State of Connecticut and the owner.

b. Design Features - The maps and drawings indicate the design features stated previously herein.

c. Design Data - There were no engineering values, assumptions, test results or calculations available for the original construction or later raisings.

2.2 Construction

a. Available Data - "As Built" drawings were available and are included in the Appendix Section 2 for the 1916 and 1925 raisings. No other construction estimates or reports were available.

b. Construction Considerations - No construction consideration information was available.

2.3 Operation - Daily lake level readings have been taken on this dam since 1951. The maximum recorded water over the spillway was 7 inches during January 26 to 28, 1952. The operator, who has been with the dam for 23 years, has not seen the dam spillway capacity exceeded.

2.4 Evaluation

a. Availability - Existing data was provided by the State of Connecticut and the owner. The owner made the operations available for visual inspection.

b. Adequacy - Due to the limited amount of detailed engineering data available (except for the plans, all records were lost in the 1955 flood), the final assessment of this investigation must be based primarily on visual inspection, performance history, hydraulic computations of spillway capacity and approximate hydrologic computations.

c. Validity - The drawings and correspondence portray the dam substantially as observed during the field inspection.
SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General - The general appearance of the dam is good. Close inspection reveals many areas requiring minor maintenance.

b. Dam - The dam is composed of two sections, a corewall earth embankment on the right and a concrete rubble masonry dam with downstream and upstream earth berms on the left.

b.1 Corewall Embankment Dam Section

Upstream Slope - The upstream slope was completely submerged, since the reservoir was slightly over the spillway crest and only the upper part of the upstream face of the corewall was visible. Thus the condition of the earth upstream slope could not be inspected.

Crest - The crest of the dam consists of the top of the core wall, 4 ft wide, and the top of the downstream earth embankment, 16 ft. wide. There are no cracks and no erosion or footpaths in the earth section.

Downstream Slope - The portion of the downstream slope from the crest of the edge of the road is grassed and does not show any sloughing, erosion or wet spots. There are several small trees and bushes growing in the slope. Below the road the slope is heavily wooded, and it is difficult to observe. In this wooded area at the toe of the slope, there is a seep discharging along what appears to be an old stream channel. The water appears clean, and there is no evidence of silt deposition in the area immediately downstream of the seep. Some of the flow travels underground through the gravelly bottom of the old stream bed, and thus flow estimates cannot reliably be made.

b.2 Concrete/Rubble Masonry Dam Section with Earth Berms

Upstream Berm - The upstream berm could not be inspected because it was under water.

Downstream Berm - The downstream berm is generally in good condition with no sloughing or wet spots noted. There are a few holes made by burrowing animals on the slope and against the concrete wall at the edges of the concrete buttresses. A leak in the concrete wall at the...
construction joint between the original dam and the 1925 top section was observed at the first two arched sections to the right of the spillway. The leak falls on the crest and seeps into the downstream berm. As a result, the ground is soft at the crest of the downstream berm. There are no visible wet areas on the berm slope or downstream of it. There is, however, a 4-in. pipe, which discharges a small flow into the culvert drop inlet and which may be a toe drain for the section of the downstream berm between the drop inlet and the spillway. The water discharged by the 4-in. pipe is clear except for yellowish-colored algae which apparently grows in the pipe.

c. Appurtenant Structures and Downstream Channel -
   The spillway channel is in good condition. Low concrete walls are also in good condition. There are a few obstructions on the bottom of the channel consisting of a couple of tree branches and some grass growing at the inside of the curve of the channel where flow velocities are small. The spillway channel discharges into a drop inlet for the culvert that connects with the aeration pool farther downstream. The drop inlet has stone walls which are in good condition.

d. Reservoir Area - The area surrounding the reservoir is undeveloped and heavily forested. No erosion or sedimentation problems are known to exist.

3.2 Evaluation

Based on the visual inspection the dam appears in good condition. A seep exists at the downstream toe of the corewall-embankment dam section, but the water is clear, even though the flow is significant. A seep which does not carry solids in suspension is not necessarily an unsafe condition. Turbidity of the water and/or large changes in flow volume can, however, indicate erosion and loss of soil. The seep is in an area which is heavily wooded, and thus it is not easy for maintenance personnel to periodically inspect it for quantity and turbidity.

The spillway channel contained little debris and obstructions on the bottom, and it is important that it be maintained in this manner because the culvert drop inlet is small and can be clogged very easily. However, if it did clog, or overflow during high spillway flows, it would just wash out the access road below the dam.
SECTION 4: OPERATIONAL PROCEDURES

4.1 Regulating Procedures

No regulating procedures exist for this dam other than those necessary for maintaining adequate public water supply. These procedures include brook diversions into the reservoir and providing water to downstream reservoirs, as needed.

4.2 Maintenance of Dam

The dam is visited daily for the water level readings and maintenance when needed is reported. During the growing season the grass is cut regularly; periodically brush is cut on the downstream face.

4.3 Maintenance of Operating Facilities

The maintenance of the operating facilities is on an as needed basis. The valves are generally operated at least twice a year, once in the spring and again in the fall. The valves are greased at least once a year.

4.4 Description of Any Warning System in Effect

No formal warning system is in effect. The dam operator reports emergency situations directly to his supervisor. Depending on the situation the supervisor notifies his engineer or the State Police and the Seymour Police Departments.

4.5 Evaluation

Maintenance procedures should be continued on a regular basis.
SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data - No computations could be found for the original dam construction or later raisings.

b. Experience Data - Water generally flows over the spillway from late fall to early summer. The maximum water level over the spillway between 1951 and present was recorded to be 7 inches during January 26 to 28, 1952. The water level for both August and October 1955 were lower.

c. Visual Observations - On the date of inspection the spillway was clear and unobstructed. The spillway is not spanned by a bridge so that the possibility of debris collection is minimal. The spillway empties into a drop inlet at the toe of the dam which could easily clog with debris. As a result of any blockage the access road would be washed out.

d. Overtopping Potential - The recommended spillway design flood for this high hazard intermediate size dam is the Probable Maximum Flood (PMF). Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges" March 1978, peak inflow to the reservoir is 1600 cfs (Appendix D-1); peak outflow (Test Flood) is 640 cfs with the dam overtopped 0.10' (Appendix D-7). Based upon the size and hazard classification in accordance with Corps guidelines the test flood will be equal to the PMF.

Since the watershed area (0.52 square miles) of Peat Swamp is smaller than two square miles, it may be appropriate to consider higher intensity short duration storms. One such calculation is shown in Appendix D-16.

e. Spillway Adequacy - The spillway will pass in excess of 90 percent of the Test Flood at elevation 347 (top of dam).
SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

(1) There are holes at contact of earth embankment and base of concrete dam possibly caused by seepage at the contact between top of old rubble wall and base of concrete raising.

(2) There are indications of vertical settlement/movement at the two monoliths adjacent to and to the right of the spillway. This is indicated at the spillway wing walls where they abut the above monoliths. The relative movement varies between 1/4 and 1/2 inches.

(3) Spillway structure shows no signs of stability problems.

(4) Significant seepage at junction between 1916 and 1925 raisings most notable immediately to the right of the spillway.

b. Design and Construction Data - The design and construction data available are not sufficient to formally evaluate the stability of the dam. In particular, there is no information available concerning the zonation, if any, of the earth sections nor the foundation material for the corewall or for the rubble masonry wall with concrete buttresses. The drawings indicate that the corewall and the rubble masonry wall with buttresses were placed in an excavation to rock.

Long term stability could be affected by continued deterioration at the horizontal construction joints due to seepage and freeze-thaw action.

c. Operating Records - There is no evidence that any stability problems have occurred during the operational history.

d. Post Construction Changes - No other post construction changes were evidenced other than the 1916 and 1925 raisings. All previous comments refer to the dam after 1925.
e. **Seismic Stability** - This dam is in Seismic Zone 1 and hence does not have to be evaluated for seismic stability, according to the USCE Recommended Guidelines.
SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition - Based upon the visual inspection at the site, review of available information and the past performance of the dam, the dam is judged to be in good condition. However, the inspection did reveal numerous areas requiring minor maintenance.

Based upon our hydraulic computations, the spillway capacity is 600 cubic feet per second. Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges" dated March 1978, peak inflow to the reservoir is 1600 cubic feet per second. The Test Flood is 640 cubic feet per second with the dam being overtopped 0.10 feet.

The spillway will pass in excess of 90% of the Test Flood.

b. Adequacy of Information - The information available is not sufficient to analyze the stability of the dam. Thus the assessment of the dam presented in this report was entirely based on a review of available information and a visual inspection. Such an inspection cannot disclose all possible potential problems that the dam may develop in the future.

c. Urgency - The recommendations and remedial measures presented in Sections 7.2 and 7.3 should be implemented within one year of the owner's receipt of this Phase I Inspection Report.

d. Need for Additional Information - There is a need for additional information as described in Section 7.2.

7.2 Recommendations

1. A study of the exact location, extent and nature of downstream concrete face deterioration should be made. The same type of study should be made for the embankment.

2. The spalled areas of the dam and spillway both on the top and vertical exposed faces should be repaired.

3. All vertical and horizontal construction joints should be repaired and sealed to minimize leakage. The seepage taking place through the construction joints in the
concrete wall between the 1925 addition and the 1916 addition and in the vicinity of the spillway can eventually cause instability of the downstream berm if the volume of the flow were to increase. The horizontal construction joint should be sealed.

4. The embankment holes should be repaired.

5. The dam outlet valves should be shifted to housing on the upstream face of the dam.

7.3 Remedial Measures

a. Alternatives - This study has identified no practical alternatives to the recommendations.

b. Operation and Maintenance Procedures - An operation and maintenance plan should be instituted to include the following:

(1) The area near the existing seep at the toe of the corewall embankment section of the dam should be cleared of trees and bushes for easy inspection.

(2) The seep should be visually examined for quantity and for presence of suspended solids at least twice a year and after unusually high reservoir levels or heavy rainstorms. Photographs taken during the inspections will facilitate comparison with previous conditions. Any evidence of suspended solids in the water or a sudden change in volume of flow not related to a proportional change in reservoir elevation should be considered as an indication of a possible unsafe condition.

(3) Settlement and/or horizontal movement of the monoliths adjacent to the spillway should be monitored horizontally and vertically for a period of one year to establish that no movement is occurring and semi-annually thereafter.

(4) Round the clock surveillance should be provided by the owner during periods of unusually heavy precipitation. The owner should develop a formal system with local officials for warning downstream residents in case of emergency.
APPENDIX

SECTION A: VISUAL OBSERVATIONS
## VISUAL INSPECTION CHECK LIST

### PARTY ORGANIZATION

**PROJECT** Peat Swamp  
**DATE:** May 24, 1978  
**TIME:** 8:30 a.m.  
**WEATHER** Rain - 60°F  
**W.S. ELEV.** 343.2  
**U.S.** 306 DN.S

### PARTY:

<table>
<thead>
<tr>
<th></th>
<th>INITIALS</th>
<th>DISCIPLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mike Horton</td>
<td>MH</td>
</tr>
<tr>
<td>2.</td>
<td>Hector Moreno</td>
<td>HM</td>
</tr>
<tr>
<td>3.</td>
<td>Gonzalo Castro</td>
<td>GC</td>
</tr>
<tr>
<td>4.</td>
<td>Dean Thomasson</td>
<td>DT</td>
</tr>
</tbody>
</table>

### PROJECT FEATURE

<table>
<thead>
<tr>
<th></th>
<th>INSPECTED BY</th>
<th>REMARKS</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Concrete Core and Earth Embankment</td>
<td>DT/MH/GC</td>
</tr>
<tr>
<td>2.</td>
<td>Concrete/Rubble Wall with Earth Berms</td>
<td>DT/GC/MH</td>
</tr>
<tr>
<td>3.</td>
<td>Spillway</td>
<td>DT/MH/GC</td>
</tr>
<tr>
<td>4.</td>
<td>Outlet Works - Transition and Conduit</td>
<td>DT</td>
</tr>
<tr>
<td>5.</td>
<td>Reservoir</td>
<td>DT</td>
</tr>
<tr>
<td>6.</td>
<td>Operation and Maintenance</td>
<td>DT</td>
</tr>
<tr>
<td>7.</td>
<td>Safety and Performance Instrumentation</td>
<td>DT</td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# PERIODIC INSPECTION CHECK LIST

**PROJECT** Peat Swamp  
**DATE** May 24, 1978

**PROJECT FEATURE** Concrete Core and Earth Dam Embankment

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>BY</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crest Elevation</td>
<td>DT</td>
<td>343</td>
</tr>
<tr>
<td>Current Pool Elevation</td>
<td>DT</td>
<td>343.2</td>
</tr>
<tr>
<td>Maximum Impoundment to Date</td>
<td>DT</td>
<td>Seven (7) inches over spillway.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>January 26 to 28, 1952.</td>
</tr>
<tr>
<td>General Condition of Concrete Surfaces</td>
<td>MH</td>
<td>Good.</td>
</tr>
<tr>
<td>Condition of Joints</td>
<td>MH</td>
<td>Good.</td>
</tr>
<tr>
<td>Spalling</td>
<td>MH</td>
<td>Yes - Top surface at construction joints.</td>
</tr>
<tr>
<td>Visible Reinforcing</td>
<td>MH</td>
<td>No.</td>
</tr>
<tr>
<td>Rusting or Staining of Concrete</td>
<td>MH</td>
<td>No.</td>
</tr>
<tr>
<td>Any Seepage or Efflorescence</td>
<td>MH</td>
<td>No.</td>
</tr>
<tr>
<td>Joint Alignment</td>
<td>MH</td>
<td>Good.</td>
</tr>
<tr>
<td>Cracking</td>
<td>MH</td>
<td>No.</td>
</tr>
<tr>
<td>Rusting or Corrosion of Steel</td>
<td>MH</td>
<td>No.</td>
</tr>
<tr>
<td>Erosion or Cavitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alignment of Monoliths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbering of Monoliths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Settlement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition of Structure Foundation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure Additions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Settlement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AREA EVALUATED</td>
<td>GC</td>
<td>CONDITION</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>----</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>Earth Fill</td>
<td></td>
<td>None observed.</td>
</tr>
<tr>
<td>Surface Cracks</td>
<td>GC</td>
<td>None observed.</td>
</tr>
<tr>
<td>Lateral Movement</td>
<td>GC</td>
<td>None apparent.</td>
</tr>
<tr>
<td>Vertical Alignment</td>
<td>GC</td>
<td>Appears satisfactory.</td>
</tr>
<tr>
<td>Horizontal Alignment</td>
<td>GC</td>
<td>Appears satisfactory.</td>
</tr>
<tr>
<td>Condition at Abutment and at Concrete Structures</td>
<td>GC</td>
<td>Good.</td>
</tr>
<tr>
<td>Indications of Movement of Structural Items on Slopes</td>
<td>GC</td>
<td>No structural items on D.S. slope.</td>
</tr>
<tr>
<td>Trespassing on Slopes</td>
<td>GC</td>
<td>None significant.</td>
</tr>
<tr>
<td>Sloughing or Erosion of Slopes or Abutments</td>
<td>GC</td>
<td>None apparent.</td>
</tr>
<tr>
<td>Rock Slope Protection - Riprap Failures</td>
<td>GC</td>
<td>U.S. slope under water, not visible.</td>
</tr>
<tr>
<td>Unusual Movement or Cracking at or near Toes</td>
<td>GC</td>
<td>None observed.</td>
</tr>
<tr>
<td>Unusual Embankment or Downstream Seepage</td>
<td>GC</td>
<td>One seep at D.S. toe at maximum cross section, water is clear.</td>
</tr>
<tr>
<td>Piping or Boils</td>
<td>GC</td>
<td>None apparent.</td>
</tr>
<tr>
<td>Foundation Drainage Features</td>
<td>GC</td>
<td>None observed or shown in drawings.</td>
</tr>
<tr>
<td>Toe Drains</td>
<td>GC</td>
<td>None observed or shown in drawings.</td>
</tr>
<tr>
<td>Instrumentation System</td>
<td>GC</td>
<td>None known.</td>
</tr>
<tr>
<td>Condition at Joint in Concrete Section</td>
<td>DT</td>
<td>Good.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>GC</td>
<td>Grass mostly on upper part of D.S. slope and heavily wooded below road.</td>
</tr>
<tr>
<td>AREA EVALUATED</td>
<td>BY</td>
<td>CONDITION</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>----</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Crest Elevation</td>
<td>DT</td>
<td>343</td>
</tr>
<tr>
<td>Current Pool Elevation</td>
<td>DT</td>
<td>343.2</td>
</tr>
<tr>
<td>Maximum Impoundment to Date</td>
<td>DT</td>
<td>Seven (7) inches over spillway.</td>
</tr>
<tr>
<td>Surface Cracks</td>
<td>GC</td>
<td>None on D.S. earth berm.</td>
</tr>
<tr>
<td>Pavement Condition</td>
<td>GC</td>
<td>N/A.</td>
</tr>
<tr>
<td>Movement or Settlement of Crest</td>
<td>GC</td>
<td>None apparent for D.S. earth berm.</td>
</tr>
<tr>
<td>Lateral Movement</td>
<td>GC</td>
<td>None apparent.</td>
</tr>
<tr>
<td>Vertical Alignment</td>
<td>GC</td>
<td>Appears satisfactory.</td>
</tr>
<tr>
<td>Horizontal Alignment</td>
<td>GC</td>
<td>Appears satisfactory.</td>
</tr>
<tr>
<td>Condition at AbutnetiL and at Masonry Structures</td>
<td>GC</td>
<td>Good.</td>
</tr>
<tr>
<td>Indications of Movement of Structural Items on Slopes</td>
<td>GC</td>
<td>No structural items on D.S. slope.</td>
</tr>
<tr>
<td>Trespassing of Slopes</td>
<td>GC</td>
<td>Holes by burrowing animals on D.S. slope.</td>
</tr>
<tr>
<td>Sloughing or Erosion of Slopes or Abutments</td>
<td>GC</td>
<td>None observed.</td>
</tr>
<tr>
<td>Rock Slope Protection - Riprap Failures</td>
<td>GC</td>
<td>U.S. berm under water, not visible.</td>
</tr>
<tr>
<td>Unusual Movement or Cracking at or near Toes</td>
<td>GC</td>
<td>None observed.</td>
</tr>
<tr>
<td>Unusual Embankment or Downstream Seepage</td>
<td>GC</td>
<td>No seepage through earth berm observed.</td>
</tr>
<tr>
<td>Piping or Boils</td>
<td>GC</td>
<td>None observed.</td>
</tr>
<tr>
<td>Foundation Drainage Features</td>
<td>GC</td>
<td>None apparent.</td>
</tr>
<tr>
<td>Toe Drains</td>
<td>GC</td>
<td>Possibly for earth berm to the left of culvert drop inlet.</td>
</tr>
</tbody>
</table>
**PERIODIC INSPECTION CHECK LIST**  
**Page 2 of 2**

**PROJECT** Peat Swamp  
**DATE** May 24, 1978

**PROJECT FEATURE** Concrete/Rubble Wall with Earth Berms

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>BY</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumentation Systems</td>
<td>GC</td>
<td>None known.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>GC</td>
<td>Grass on D.S. earth berm.</td>
</tr>
<tr>
<td>General Condition of Concrete Surfaces</td>
<td>MH</td>
<td>Top of dam spalled.</td>
</tr>
<tr>
<td>Condition of Joints (Describe Location)</td>
<td>MH</td>
<td>Longitudinal joints spalled.</td>
</tr>
<tr>
<td>Spalling</td>
<td>MH</td>
<td>Yes.</td>
</tr>
<tr>
<td>Visible Reinforcing</td>
<td>MH</td>
<td>No.</td>
</tr>
<tr>
<td>Rusting or Staining of Concrete</td>
<td>MH</td>
<td>Yes.</td>
</tr>
<tr>
<td>Any Seepage or Efflorescence</td>
<td>MH</td>
<td>Yes at vertical longitudinal joint and horizontal construction joint for three (3) bays right of spillway</td>
</tr>
<tr>
<td>Joint Alignment</td>
<td>MH</td>
<td>Good.</td>
</tr>
<tr>
<td>Cracking</td>
<td>MH</td>
<td>Top surface.</td>
</tr>
<tr>
<td>Rusting or Corrosion of Steel</td>
<td>MH</td>
<td>No.</td>
</tr>
<tr>
<td>Erosion or Cavitation</td>
<td>DT</td>
<td>At contact between rubble and concrete.</td>
</tr>
<tr>
<td>Alignment of Monoliths</td>
<td>MH</td>
<td>Movement at four (4) foot sections adjacent to spillway.</td>
</tr>
<tr>
<td>Numbering of Monoliths</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Differential Settlement</td>
<td>MH</td>
<td>Yes at sections adjacent to spillway.</td>
</tr>
<tr>
<td>Condition of Structure Foundation</td>
<td>MH</td>
<td>1925 seven (7) foot vertical extensions both dam and spillway.</td>
</tr>
<tr>
<td>Structure Additions</td>
<td>MH</td>
<td>Top of dam patched.</td>
</tr>
</tbody>
</table>
PERIODIC INSPECTION CHECK LIST

PROJECT  Peat Swamp  DATE  May 24, 1978

PROJECT FEATURE  Spillway - Approach, Channel, Weir, Discharge Channel

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>BY</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Approach Channel</td>
<td>DT</td>
<td>Not visible if any - water over spillway.</td>
</tr>
<tr>
<td>General Condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loose Rock Overhanging Channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trees Overhanging Channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor of Approach Channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Weir and Training or Sidewalls</td>
<td>MH</td>
<td>Spillway joints are spalled interrupting flow.</td>
</tr>
<tr>
<td>General Condition of Concrete</td>
<td>MH</td>
<td>Not visible - water over spillway.</td>
</tr>
<tr>
<td>Rust or Staining</td>
<td>MH</td>
<td>Yes at horizontal construction joints.</td>
</tr>
<tr>
<td>Spalling</td>
<td>MH</td>
<td>No.</td>
</tr>
<tr>
<td>Any Visible Reinforcing</td>
<td>MH</td>
<td></td>
</tr>
<tr>
<td>Any Seepage or Efflorescence</td>
<td>MH</td>
<td>Water over spillway obscuring seepage if occurring.</td>
</tr>
<tr>
<td>Drain Holes</td>
<td>GC</td>
<td>None observed.</td>
</tr>
<tr>
<td>c. Discharge Channel</td>
<td>GC</td>
<td>Good.</td>
</tr>
<tr>
<td>General Condition</td>
<td>GC</td>
<td>None.</td>
</tr>
<tr>
<td>Loose Rock Overhanging Channel</td>
<td>GC</td>
<td>None.</td>
</tr>
<tr>
<td>Trees Overhanging Channel</td>
<td>GC</td>
<td>Good condition.</td>
</tr>
<tr>
<td>Floor of Channel</td>
<td>GC</td>
<td>A few wood pieces, some grass.</td>
</tr>
<tr>
<td>Other Obstructions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PERIODIC INSPECTION CHECK LIST

PROJECT Peat Swamp

DATE May 24, 1978

PROJECT FEATURE Outlet Works - Transition and Conduit

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>BY</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Condition of Concrete</td>
<td>DT</td>
<td>Outlets all buried. Valves controlled at manholes. Owner did not demonstrate the blowoff - condition of piping not visible.</td>
</tr>
<tr>
<td>Rust or Staining on Concrete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erosion or Cavitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cracking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alignment of Monoliths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alignment of Joints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbering of Monoliths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cast Iron Conduits</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-
# PERIODIC INSPECTION CHECK LIST

**PROJECT** Peat Swamp  
**DATE** May 25, 1978  
**PROJECT FEATURE** Reservoir

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>BY</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoreline</td>
<td>DT</td>
<td>Forested and undeveloped Perimeter driven daily to check on trespassing.</td>
</tr>
<tr>
<td>Sedimentation</td>
<td>DT</td>
<td>No problem.</td>
</tr>
<tr>
<td>Potential Upstream Hazard Areas</td>
<td>DT</td>
<td>None known.</td>
</tr>
<tr>
<td>Watershed Alteration - Runoff</td>
<td>DT</td>
<td>None at this time.</td>
</tr>
<tr>
<td>Potential</td>
<td></td>
<td></td>
</tr>
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</table>

* * *
PERIODIC INSPECTION CHECK LIST

PROJECT Peat Swamp

DATE May 25, 1978

PROJECT FEATURE Operation and Maintenance

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>BY</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Reservoir Regulation Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Conditions</td>
<td>DT</td>
<td>Dam is visited daily for water level readings.</td>
</tr>
<tr>
<td>Emergency Plans</td>
<td>DT</td>
<td>Report emergencies directly to supervisor.*</td>
</tr>
<tr>
<td>Warning System</td>
<td>DT</td>
<td></td>
</tr>
<tr>
<td>b. Maintenance (Type) (Regularity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dam</td>
<td>DT</td>
<td>Maintenance when needed is reported to supervisor. Valves greased and checked at least once a year.</td>
</tr>
<tr>
<td>Spillway</td>
<td>DT</td>
<td></td>
</tr>
<tr>
<td>Outlet Works</td>
<td>DT</td>
<td></td>
</tr>
</tbody>
</table>
PERIODIC INSPECTION CHECK LIST

PROJECT Peat Swamp DATE May 25, 1978

PROJECT FEATURE Safety and Performance Instrumentation

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>BY</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headwater and Tailwater Gages</td>
<td>DT</td>
<td>Yes - water level gauge only.</td>
</tr>
<tr>
<td>Horizontal and Vertical Alignment Instrumentation (Concrete Structures)</td>
<td>DT</td>
<td>None.</td>
</tr>
<tr>
<td>Horizontal and Vertical Movement, Consolidation, and Pore-Water Pressure Instrumentation (Embankment Structures)</td>
<td>DT</td>
<td>None.</td>
</tr>
<tr>
<td>Uplift Instrumentation</td>
<td>DT</td>
<td>None.</td>
</tr>
<tr>
<td>Drainage System Instrumentation</td>
<td>DT</td>
<td>None.</td>
</tr>
<tr>
<td>Seismic Instrumentation</td>
<td>DT</td>
<td>None.</td>
</tr>
</tbody>
</table>
SPECIAL NOTE

SECTION B

AVAILABILITY OF DATA

The plans listed in the Table of Contents, Appendix Section B, are included in the master copy of this report, which is on file at the office of the Army Corps of Engineers, New England Division, in Waltham, Massachusetts.
<table>
<thead>
<tr>
<th><strong>No.</strong></th>
<th><strong>WATER RESOURCES COMMISSION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUPERVISION OF DAMS</strong></td>
<td><strong>INVENTORY DATA</strong></td>
</tr>
<tr>
<td><strong>Long 73.3</strong></td>
<td><strong>Lat 41.22</strong></td>
</tr>
<tr>
<td><strong>Date 12 MAY 1964</strong></td>
<td><strong>Name of Dam or Pond</strong> PEAT SWAMP RESERVOIR (Beaver Lake)**</td>
</tr>
<tr>
<td><strong>Code No. H 11.8 N 16 by 2.8</strong></td>
<td><strong>Nearest Street Location</strong> MAYLE STREET</td>
</tr>
<tr>
<td><strong>Town</strong> SEYMOUR</td>
<td><strong>U.S.G.S. Quad.</strong> ANSONIA</td>
</tr>
<tr>
<td><strong>Name of Stream</strong> BEAVER BROOK</td>
<td><strong>Owner</strong> THE ANSONIA WATER COMPANY</td>
</tr>
<tr>
<td><strong>Address</strong> 354 MAIN STREET</td>
<td><strong>1/73</strong></td>
</tr>
<tr>
<td></td>
<td><strong>ANSONIA</strong></td>
</tr>
<tr>
<td><strong>1969</strong></td>
<td><strong>Pond Used For</strong> WATER SUPPLY</td>
</tr>
<tr>
<td><strong>Dimensions of Pond:</strong></td>
<td><strong>Width 600 FEET</strong></td>
</tr>
<tr>
<td><strong>Total Length of Dam</strong> 500 FEET</td>
<td><strong>Length of Spillway</strong> 25 FEET</td>
</tr>
<tr>
<td><strong>Location of Spillway</strong> SOUTH-EAST END OF DAM</td>
<td><strong>Height of Pond Above Stream Bed</strong> 40 FEET</td>
</tr>
<tr>
<td><strong>Height of Embankment Above Spillway</strong> 5 FEET</td>
<td><strong>Type of Spillway Construction</strong> CONCRETE</td>
</tr>
<tr>
<td><strong>Type of Dike Construction</strong> CONCRETE &amp; LARTH</td>
<td><strong>Downstream Conditions</strong> RIMMON ROAD, CITY OF ANSONIA</td>
</tr>
<tr>
<td><strong>Summary of File Data</strong></td>
<td><strong>Remarks</strong></td>
</tr>
<tr>
<td><strong>Would Failure Cause Damage?</strong> <strong>YES</strong></td>
<td></td>
</tr>
</tbody>
</table>
PHOTO NO. 1 - General view of dam, spillway and left abutment.

PHOTO NO. 2 - General view of slope of downstream berm of dam section consisting of concrete/rubble wall with earth berms.

US ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

CAMI ENGINEERS INC. WALLINGFORD, CONN ARCHITECT ENGINEER

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

PEAT SWAMP RESERVOIR DAM BEAVER BROOK SEYMOUR, CT

CH. 1507468
DATE 5/24/78 PAGE 1-1
PHOTO NO. 3 - View of spillway. Length of weir is 19 feet.

PHOTO NO. 4 - Cavity next to concrete buttress from spillway.
APPENDIX

SECTION D: HYDRAULIC/HYDROLOGIC COMPUTATIONS
Preliminary guidance for estimating maximum probable discharges in Phase I Dam Safety Investigations

New England Division
Corps of Engineers

March 1978
## Maximum Probable Flood Inflows

### NED Reservoirs

<table>
<thead>
<tr>
<th>Project</th>
<th>Q (cfs)</th>
<th>D.A. (sq. mi.)</th>
<th>MPF cfs/sq. mi.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hall Meadow Brook</td>
<td>26,600</td>
<td>17.2</td>
<td>1,546</td>
</tr>
<tr>
<td>2. East Branch</td>
<td>15,500</td>
<td>9.25</td>
<td>1,675</td>
</tr>
<tr>
<td>3. Thomaston</td>
<td>158,000</td>
<td>97.2</td>
<td>1,625</td>
</tr>
<tr>
<td>4. Northfield Brook</td>
<td>9,000</td>
<td>5.7</td>
<td>1,580</td>
</tr>
<tr>
<td>5. Black Rock</td>
<td>35,000</td>
<td>20.4</td>
<td>1,715</td>
</tr>
<tr>
<td>6. Hancock Brook</td>
<td>20,700</td>
<td>12.0</td>
<td>1,725</td>
</tr>
<tr>
<td>7. Hop Brook</td>
<td>26,400</td>
<td>16.4</td>
<td>1,610</td>
</tr>
<tr>
<td>8. Tully</td>
<td>47,000</td>
<td>50.0</td>
<td>940</td>
</tr>
<tr>
<td>9. Barre Falls</td>
<td>61,000</td>
<td>55.0</td>
<td>1,109</td>
</tr>
<tr>
<td>10. Conant Brook</td>
<td>11,900</td>
<td>7.8</td>
<td>1,525</td>
</tr>
<tr>
<td>11. Knightville</td>
<td>160,000</td>
<td>162.0</td>
<td>987</td>
</tr>
<tr>
<td>12. Littleville</td>
<td>98,000</td>
<td>52.3</td>
<td>1,870</td>
</tr>
<tr>
<td>13. Colebrook River</td>
<td>165,000</td>
<td>118.0</td>
<td>1,400</td>
</tr>
<tr>
<td>14. Mad River</td>
<td>30,000</td>
<td>18.2</td>
<td>1,650</td>
</tr>
<tr>
<td>15. Sucker Brook</td>
<td>6,500</td>
<td>3.43</td>
<td>1,895</td>
</tr>
<tr>
<td>16. Union Village</td>
<td>110,000</td>
<td>126.0</td>
<td>873</td>
</tr>
<tr>
<td>17. North Hartland</td>
<td>199,000</td>
<td>220.0</td>
<td>904</td>
</tr>
<tr>
<td>18. North Springfield</td>
<td>157,000</td>
<td>158.0</td>
<td>994</td>
</tr>
<tr>
<td>19. Ball Mountain</td>
<td>190,000</td>
<td>172.0</td>
<td>1,105</td>
</tr>
<tr>
<td>20. Townshend</td>
<td>228,000</td>
<td>106.0 (278 total)</td>
<td>820</td>
</tr>
<tr>
<td>21. Surry Mountain</td>
<td>63,000</td>
<td>100.0</td>
<td>630</td>
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<tr>
<td>22. Otter Brook</td>
<td>45,000</td>
<td>47.0</td>
<td>957</td>
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<tr>
<td>23. Birch Hill</td>
<td>88,500</td>
<td>175.0</td>
<td>505</td>
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<tr>
<td>24. East Brimfield</td>
<td>73,900</td>
<td>67.5</td>
<td>1,095</td>
</tr>
<tr>
<td>25. Westville</td>
<td>38,400</td>
<td>99.5 (32 net)</td>
<td>1,200</td>
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<tr>
<td>26. West Thompson</td>
<td>85,000</td>
<td>173.5 (74 net)</td>
<td>1,150</td>
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<td>27. Hodges Village</td>
<td>35,600</td>
<td>31.1</td>
<td>1,145</td>
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<tr>
<td>28. Buffumville</td>
<td>36,500</td>
<td>26.5</td>
<td>1,377</td>
</tr>
<tr>
<td>29. Mansfield Hollow</td>
<td>125,000</td>
<td>159.0</td>
<td>786</td>
</tr>
<tr>
<td>30. West Hill</td>
<td>26,000</td>
<td>28.0</td>
<td>928</td>
</tr>
<tr>
<td>31. Franklin Falls</td>
<td>210,000</td>
<td>1000.0</td>
<td>210</td>
</tr>
<tr>
<td>32. Blackwater</td>
<td>66,500</td>
<td>128.0</td>
<td>520</td>
</tr>
<tr>
<td>33. Hopkinton</td>
<td>135,000</td>
<td>426.0</td>
<td>316</td>
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<tr>
<td>34. Everett</td>
<td>68,000</td>
<td>64.0</td>
<td>1,062</td>
</tr>
<tr>
<td>35. MacDowell</td>
<td>36,300</td>
<td>44.0</td>
<td>825</td>
</tr>
</tbody>
</table>
### Maximum Probable Flows

Based on twice the Standard Project Flood (Flat and Coastal Areas)

<table>
<thead>
<tr>
<th>River</th>
<th>SPF (cfs)</th>
<th>D.A. (sq. mi.)</th>
<th>MPF (cfs/sq. mi.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavtuxet River</td>
<td>19,000</td>
<td>200</td>
<td>190</td>
</tr>
<tr>
<td>Mill River (R.I.)</td>
<td>8,500</td>
<td>34</td>
<td>500</td>
</tr>
<tr>
<td>Peters River (R.I.)</td>
<td>3,200</td>
<td>13</td>
<td>490</td>
</tr>
<tr>
<td>Kettle Brook</td>
<td>8,000</td>
<td>30</td>
<td>530</td>
</tr>
<tr>
<td>Sudbury River</td>
<td>11,700</td>
<td>86</td>
<td>270</td>
</tr>
<tr>
<td>Indian Brook (Hopk.)</td>
<td>1,000</td>
<td>5.9</td>
<td>340</td>
</tr>
<tr>
<td>Charles River</td>
<td>6,000</td>
<td>184</td>
<td>65</td>
</tr>
<tr>
<td>Blackstone River</td>
<td>43,000</td>
<td>416</td>
<td>200</td>
</tr>
<tr>
<td>Quinebaug River</td>
<td>55,000</td>
<td>331</td>
<td>330</td>
</tr>
</tbody>
</table>
ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES

STEP 1: Determine Peak Inflow (Qp1) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Qp1".
   b. Determine Volume of Surcharge (STOR1) in Inches of Runoff.
   c. Maximum Probable Flood Runoff in New England equals Approx. 19", Therefore:

   \[ Qp2 = Qp1 \times (1 - \frac{STOR1}{19}) \]

STEP 3: a. Determine Surcharge Height and "STOR2" To Pass "Qp2"
   b. Average "STOR1" and "STOR2" and Determine Average Surcharge and Resulting Peak Outflow "Qp3".
"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW \( Q_{p1} \).

\[
Q_{p1} = \frac{b}{27} W_b \sqrt{g} Y_0^{3/2}
\]

\( W_b = \) BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

\( Y_0 = \) TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW \( Q_{p2} \) USING FOLLOWING ITERATION.

A. APPLY \( Q_{p1} \) TO STAGE RATING, DETERMINE STAGE AND ACCOMPANYING VOLUME \( (V_1) \) IN REACH IN AC-FT. (NOTE: IF \( V_1 \) EXCEEDS 1/2 OF \( S \), SELECT SHORTER REACH.)

B. DETERMINE TRIAL \( Q_{p2} \).

\[
Q_{p2}(\text{TRIAL}) = Q_{p1} (1 - \frac{V_1}{S})
\]

C. COMPUTE \( V_2 \) USING \( Q_{p2} \) (TRIAL).

D. AVERAGE \( V_1 \) AND \( V_2 \) AND COMPUTE \( Q_{p2} \).

\[
Q_{p2} = Q_{p1} (1 - \frac{V_1}{S})
\]

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978
HYDROLOGIC HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR ANSONIA CT

(1) MAXIMUM PROBABLE FLOOD PEAK FLOOD RATE

(a) WATERSHED CLASSIFIED AS "MOUNTAINOUS" TYPE.

THE MPF GUIDE CURVES FURNISHED BY THE

ACE, NEW ENGLAND DIV. OFFICE ARE USED FOR THE

DETERMINATION OF MPF.

(b) WATERSHED AREA: DA = 0.52 sq. mi (AS MEASURED

BY CE)

(c) FROM GUIDE CURVE (EXTRAPOLATION)

MPF = 3,100 cfs/sq. mi

(d) MPF = PEAK INFLOW

Q = 3,100 x 0.52 = 1,600 cfs

(2) SPILLWAY DESIGN FLOOD (SDF)

(a) CLASSIFICATION OF DAM ACCORDING TO ACE

RECOMMENDED GUIDELINES

(b) SIZE: (IMPOUNDMENT) - (SEE D.SHEN COMPS. 5/30/78 P1)

STORAGE (MAX) = 1,990 kcf

<interm>

HEIGHT = 3' FT (BY CE FROM ANSONIA

WARREN NABS OF 1925)

HENCE, THE DAM IS CLASSIFIED AS OF "INTERMEDIATE"

SIZE
HYDROLOGIC/HYDRAULIC INSPECTION

PEAK SWAMP RESERVOIR ANSONIA, CT

(2) (cont'd) - SPILLWAY DESIGN FLOOD (SDF)

(iii) HAZARD POTENTIAL:

THE DAM IS LOCATED UPSTREAM OF AT 31B, MIDDLE V QUILLINAN RESERVOIRS, AND ANSONIA URBAN AREA. THEREFORE, ITS HAZARD POTENTIAL IS RATED "HIGH".

(vii) SDF

ACCORDING TO ACE RECOMMENDED GUIDELINES FOR A DAM OF INTERMEDIATE SIZE WITH A HIGH HAZARD POTENTIAL THE SPILLWAY DESIGN FLOOD SHALL BE THE MAXIMUM PROBABLE FLOOD

\[ SDF = MPF = 1,600 \text{ CFS} \]

(3) EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES.

(a) PEAK INFLOW (SDF=MPF)

\[ Q_p = 1,600 \text{ CFS} \]

(b) SURCHARGE HEIGHT TO PASS Qp

SPILLWAY DATA:
FROM ANSONIA WATER CO. GENERAL PLAN & PROFILE, DATED MARCH 1925:

LENGTH OF SPILLWAY CRESTM 19'

VERTICAL 1/5 FACE; ROUNDED (OGEE TYPE) SPILLWAY;
D/5 FACE SLOPE 1:1. US HEIGHT OF SPILLWAY CRESTM TO GROUND, P > 15'.
HYDROLOGIC / HYDRAULIC INSPECTION
PEAT SWAMP RESERVOIR ANSONIA CT

(b) Surchage Height to Pass Qp1

Therefore, for the expected high head over the spillway,
Assume C = 3.95

\[ c_L = 3.95 \times 1.9 \approx 7.5 \]

\[ Q = 75 \times H^{3/2} \]

\[ H = (Q/c_L)^{2/3} \]

\[ C \times Qp1 = 1,600 \text{ CFS} \]

\[ H_1 \approx 7.7' \]

Maximum freeboard from spillway crest to top of dam is 4'. Therefore, the dam is overtopped.
Spillway capacity, \( H = 4' \), \( Q = 600 \text{ CFS} \)

(c) Find surcharge height \( H_1 \)

Depth of water above top of the dam, \( H_1 = 4' \)

Length of main dam: 1309.5'
With vertical w/d and d/s faces
Top width 9'

Assume \( C = 2.64 \)

\( Q = 817(H_1 - 4)^{3/2} \)
HYDROSIC / HYDRAULIC INSPECTION
PEAT SWAMP RESERVOIR ANSONIA, CT

(13) (cont'd) - EFFECT OF SURCHARGE STORAGE ON MAXIMUM
POSSIBLE DISCHARGES

(c) FIND SURCHARGE HEIGHT H_i,

LENGTH OF EMBANKMENT SECTION WITH CORE WALL
1202' (ANSORIA WATER CO

WIDTH OF EMBANKMENT AND DRAINING 120'
WITH A D/S SLOPE OF V:H = 1:2 AND A H/S
SLOPE OF V:H = 1:2, 3' BELOW THE TOP OF THE
EMBANKMENT
ASSUME C = 2.60, CL = 525
Q = 525 (H_i - 4)^{3/2}

OVERBANK SPILLAGE
A BEAM IN THE EASTERN END RISES 3'
IN A DISTANCE OF 40'
Assume equivalent length of eastern overbank spillage

\[ L_e = \frac{2}{3} \left( \frac{40}{3} \right) (H_i - 4) \]

Assume C = 2.60, CL = (2.6) \left( \frac{2}{3} \right) \left( \frac{40}{3} \right) (H_i - 4)
Q = 2.3 (H_i - 4)^{3/2}

A BEAM IN THE WESTERN END RISES 3' IN A
DISTANCE OF 50'
Assume equivalent length of western overbank spillage

\[ L_w = \frac{2}{3} \left( \frac{50}{3} \right) (H_i - 4) \]
HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR ANSONIA CT

(3) (CONT'D) EFFECT OF SUBMERGE STORAGE ON M.P.D.'S

(c) FIND SURCHARGE HEIGHT $H_1$

Assume

$$C = 2.6$$
$$Q = \frac{2.6}{50} \left( \frac{1}{3} \right)(H_1 - 4')$$
$$Q = 2.9 (H_1 - 4')^{3/2}$$

Hence, the spillway/dam rating equation is approximate as:

$$Q = 75 H_1^{3/2} + 1342(H_1 - 4')^{3/2}$$
$$+ 52(H_1 - 4')^{3/2}$$

for $H_1 > 4'$

$H_1$ is the surcharge above the spillway crest.
HYDROLOGIC/HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR, ANSONIA, CT

(1) (cont'd): EFFECT OF SURCHARGE STORAGE ON NPS's

(c) FIND TRUE SURCHARGE HEIGHT H,

\[ H = 4.72 \text{ ft} \]

Hence, the surcharge height above the spillway crest is 4.72 ft and 3.72 ft above the top of the dam.

(4) VOLUME OF SURCHARGE

Max. W.L. in record = 7

Assume normal pool elevation 0.25 ft above the spillway crest.

Area of pool at flowline = 82.1 ac

For \( Q_p = 1.600 \text{ cfs} \) and \( H = 4.72 \text{ ft} \)

Vol. of surcharge.

\[ 82.1 \cdot (4.72 - 0.25) = 367 \text{ ac-ft} \]

\[ DA = 0.52 \text{ sq. mi.} \]

\[ S_1 = \frac{367}{0.52 \cdot 53.3} = 13.2'' \]
HYDROLOGIC / HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR, ANSONIA, CT

(3) (cont'd) EFFECT OF SURCHARGE VOL. ON M.P.D.'S

(4) PEAK OUTFLOW FOR SURCHARGE 5 ft

(See Guidelines for assuming a triangular hydrograph and M.P.F. runoff of 719 ft)

\[
\begin{align*}
Q_p^2 &= Q_p^i \left(1 - \frac{5}{19}\right) \\
Q_p^2 &= 1.600 \left(1 - \frac{13}{19}\right) \\
Q_p^2 &= 490 \text{ CFS} < \text{Spillway capacity to top of dam.}
\end{align*}
\]

For \( Q_p^2 \) = 490 CFS

\( H_2 = 3.5 \) ft

And \( S_2 = 0.6'' \) Save = 11.6''

(5) RESULTING PEAK OUTFLOW

\[
\begin{align*}
Q_p^3 &= 1.600 \left(1 - \frac{11.6}{19}\right) \\
Q_p^3 &= 640 \text{ CFS} \\
H_3 &= 4.1 \text{ ft}
\end{align*}
\]

(9) SUMMARY:

PEAK INFLOW \( Q_p^i = \text{M.P.F.} = 1.600 \text{ CFS} \)

PEAK OUTFLOW \( Q_p^3 = 640 \text{ CFS} \)

Average Surcharge Above the Spillway Crest is 4.1 ft (Just over tip of dam)
HYDROLOGIC / HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR ANSONIA, CT

DOWNSTREAM DAM FAILURE HAZARD

(1) ESTIMATE OF DOWNSTREAM DAM FAILURE HYDROGRAPH
(See ACE "RULE OF THUMB" GUIDELINE FOR ESTIMATING THE HYDROGRAPHS")

ESTIMATE OF RESERVOIR STORAGE AT TIME OF FAILURE
(See D. Shen's Comp. 5/23/1978)

(2) MAXIMUM STORAGE CAPACITY (Ref. Ansonia Water Co. Draw. 1925)
CAPACITY AT FLOWLINE (ELEV. 343) = 540 ACRE-FT = 1660 ACRE-FT
ADDITIONAL CAPACITY TO TOP OF DAM (ELEV. 347)
= 82.1 x 4 = 330 ACRE-FT

Vr: MAX. STORAGE CAPACITY = 1990 ACRE-FT

V AREA OF POND AT FLOWLINE = 82.1 ACRE
(V.I.S. INVENTORY OF DAMS SHOWS STORED 07/1970 ACRE-FT)

(4) HEIGHT OF DAM ABOVE LOWEST GROUND 0'/5 ELEV (ELEV 316)
Y = 347 - 316 = 31 FT

(4a) ESTIMATED VOLUME OF STORAGE AT TIME OF FAILURE
(TO SURCHARGE OF 4.1 FT ABOVE THE SPILLWAY CREST, OR ELEV. 347.1 JUST ABOVE TOP OF DAM ELEV. 347)

USE CAPACITY AT FLOWLINE = 1660 ACRE-FT

AREA OF POND AT FLOWLINE = 82.1 ACRE
HYDROLOGIC / HYDRAULIC INSPECTION
PEAT SWAMP RESERVOIR ANSONIA, CT
DOWNSTREAM DAM FAILURE HAZARD

1. ESTIMATE OF DOWNSTREAM DAM FAILURE HYDROGRAPH
2. ESTIMATE OF RESERVOIR STORAGE AT TIME OF FAILURE
3. ESTIMATE VOLUME OF STORAGE AT TIME OF FAILURE

\[ S = 1660 + 82.1(4.1) = 2,000 \text{ ac-ft} \]
\[ S = 1,000 \text{ ac-ft} \]

4. PEAK FAILURE OUTFLOW \( Q_p \)
5. BREACH WIDTH

ESTIMATE OF BREACH WIDTH FROM ANSONIA WATER CO. GENERAL PLAN AND PROFILE OF MARCH, 1925.

APPROX. LENGTH OF DAM AT MID-HEIGHT \( L \approx 390 \text{ ft} \)
\[ W = 0.4 \times 390 = 156' \]
TAKE \( W_0 = 150' \)

(6) TOTAL HEIGHT AT FAILURE
\[ y_0 = 347.1 - 3.16 = 311' \]

APPROX. DEPTH OF WATER AT IMMEDIATE IMPACT REGION
(IMMEDIATE SURROUNDING DAM SITE)
\[ y = 0.44 y_0 = 137' \]
HYDROLOGIC/HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR ANSONIA, CT

DOWNSTREAM DAM FAILURE HAZARD

(1) (Cont'd) Estimate of Downstream Dam Failure Hydrograph

(b) Peak Failure Outflow (QP)

(xiii) Peak Failure Outflow

\[ Q_P = 0.05 \sqrt{V \times H \times 0.15} = 43,500 \text{ cfs} \]

(c) Typical D/S Cross-Section Rating Curves

(FROM TOPOGRAPHIC MAP OF ANSONIA, CONN 1964, REFERENCE 1972)

Assuming (1) \( n = 0.050 \) MANING'S ROUGHNESS COEFF.

(3) \( s = 0.029 \) (VERTICAL DROP OF 200' IN 4' A DISTANCE OF 7000')

\[ \sqrt{s} = 0.169 \] AVERAGED SLOPE
SPILLWAY RELATION CURVE

\[ Q = 75 \cdot H^{3/2} + 1512 (H - 1)^{3/2} + 22.1 (H - 1)^{1/2} \]

<table>
<thead>
<tr>
<th>H (ft)</th>
<th>Q (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>75</td>
</tr>
<tr>
<td>2.0</td>
<td>212</td>
</tr>
<tr>
<td>3.0</td>
<td>390</td>
</tr>
<tr>
<td>4.0</td>
<td>600</td>
</tr>
<tr>
<td>4.4</td>
<td>665</td>
</tr>
<tr>
<td>4.5</td>
<td>1200</td>
</tr>
<tr>
<td>5.0</td>
<td>2233</td>
</tr>
<tr>
<td>6.0</td>
<td>5192</td>
</tr>
<tr>
<td>7.0</td>
<td>9173</td>
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</tbody>
</table>

Q = Flow (cfs)
HYDROLOGIC/HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR ANSONIA, CT.

DOWNSTREAM DAM FAILURE HAZARD

1. (CON'T.) ESTIMATE OF D/S DAM FAILURE HYDROGRAPH

(C) TYPICAL D/S CROSS-SECTION AND RATING CURVE.

\[ \text{Vol. of Storage } \frac{\text{CFT}}{1000} \text{ vs. Reach} \]

(d) REACH OUTFLOW (Qp2)

1. \( Q_{p1} = 43,500 \text{ CFS} \) STAGE 16.0' FROM RATING CURVE.

VOLUME IN REACH: \( \frac{1}{2} \times 63 \times 7 \times 320 \text{AC-FT} < \frac{1}{2} \text{AK} \)

\( \left( \frac{c}{2} = 1000 \text{AC-FT} \right) \)

NOTE: REACH DISTANCE \( 2700 \text{ FT} \) FROM PEAT SWAMP RESV. TO POINT TO W/S END OF QUILLIMAN RESV.
HYDRAULIC / HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR  ANSONIA CT

DOWNSTREAM DAM FAILURE HAZARD

1. (Contd.) ESTIMATE OF DIS DAM FAILURE HYDROGRAP

(a) REACH OUTFLOW ($Q_p$)

(i) $Q_p = Q_1 (1 - V_1) = 43.50 (1 - \frac{376}{2000}) = 35.500\text{ cfs}$

(ii) $Q_p = 35,500 \text{ cfs}$, stage $= 14.8'$

$V_2 = \frac{1}{2} \times 46 = 320 \text{ ac-ft}$

(iii) AVE. VOLUME IN REACH $(V_1 + V_2) = 345 \text{ ac-ft}$

(iv) $Q_p = 43.500 (1 - \frac{345}{2000}) = 36,000 \text{ cfs}$

Stage $= 15$ ft

$h_p$, $h$ STAGE ARE UPSTREAM OF QUILLIMAN RESERVOIR.

(b) ESTIMATE EFFECT OF QUILLIMAN RESERVOIR ON $Q_p$

(i) $Q_p = $ INFLOW FLOOD TO RESERVOIR

$Q_p = 36,000 \text{ cfs}$

(ii) SURCHARGE ABOVE TOP OF DAM (SPILLWAY CAPACITY IS NEGLECTIBLE - FIELD OBSERVATION, THEREFORE, ASSUME DAM OVERFLOWED)

Assume $C = 3.0$

LENGTH OF DAM AND SIDE SPILLWAY $L = 560$ ft ($\text{TRM. 115 (G'S ANSONIA QUAD. SHEET)}$

$C_L = 1500$

$C = 1500 \times \frac{3}{2}$

$H = \left(\frac{C_L}{1500}\right)^{2/3}$

D-18
HYDROLOGIC / HYDRAULIC INSPECTION
PEAT SWAMP RESERVOIR, ANSIMIA CT
DOWNSTREAM DAM FAILURE ANALYSIS

1. (CONT'D) ESTIMATE OF D/S DAM FAILURE HYDROGRAPH

(a) ESTIMATE EFFECT OF QUILLIMAN RESERVOIR ON Qp

(b) SURCHARGE ABOVE TOP OF DAM

\[ Q_p = 36,000 \text{ cfs} \]
\[ H_p = 8.3' \]

ELEV. OF TOP OF DAM = ± 135' (FROM USGS QUAD SHEET)

\[ ELEV. OF SURCHARGE = ± 143.3' \]

(c) SURFACE AREA OF QUILLIMAN RESERVOIR

\[ 11 \text{ ac} \] (FROM USGS QUAD SHEET)

VOLUME OF SURCHARGE ABOVE TOP OF DAM

\[ V_p = 11 \times 8.3 = 91 \text{ ac-ft} \]

\[ V_p = 91 \text{ ac-ft} < 5/2 \text{ c.u.} \]

(u) PEAK FLOOD OUTFLOWS: TRIAL 6/3

\[ Q_p = Q_p (1 - \frac{H_p}{5}) = 36,000 (1 - \frac{8.3}{5}) \]

\[ Q_p = 34,400 \text{ cfs} \]
\[ H_p = 8.1' \]
\[ V_p = 89 \text{ ac-ft} \]
HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR, ANSONIA, CT

DECREASED DAM FAILURE HAZARD

(1) (cont'd) ESTIMATE OF D/S DAM FAILURE HYDRAULIC

(2) ESTIMATE EFFECT OF QUILLINAN RESERVOIR on QP2

(3) PEAK FLOOD OUTFLOW QP3

\[ Q_{P3} = Q_{P2} (1 + \frac{W_{2}}{s}) = 56,000 \times (1 + \frac{200}{200}) = 34,400 \text{ cfs} \]

\[ H_3 = 8.1' \text{ above Quillinan Reservoir} \]

This dam probably will also fail under this surcharge.

SUMMARY:

- PEAK FAILURE OUTFLOW: \[ Q_{P1} = 43,500 \text{ cfs} \]
- OUTFLOW UPSTREAM OF QUILLINAN RESERVOIR:
- PEAK REACH OUTFLOW: \[ Q_{P2} = 36,000 \text{ cfs} \]
- AVG. STAGE: \[ H_2 = 15' \]
- PEAK OUTFLOW AT QUILLINAN RESERVOIR:
  \[ Q_{P3} = 34,400 \text{ cfs} \]
  \[ H_3 = 8.1' \text{ (approx.) above Quillinan Reservoir}} \]

Note: Because middle reservoir (just D/S from Peat Swamps) is relatively small, the effect of elevation and breaking of QP3 on this reservoir has been neglected.
HYDROLOGIC / HYDRAULIC INVESTIGATION

Peat Swamp Reservoir, Ansonia, Ct.

1A) HPP ESTIMATE FROM HIGH INTENSITY RAINFALL PERIOD OF A SHORT DURATION STORM IN A SMALL WATERSHED

This parallel computation is made considering that for small drainage areas use by extrapolation of the HPP guide curves furnished by the ACE New England Division, may give peak run off of lesser magnitude than those which could occur.

Assume for Peat Swamp a time of concentration of about 30 minutes, in the high intensity rainfall period of a 6-HR rainfall, for estimating the max probable runoff.

2) 6-HR PFP at Peat Swamp: $PFP = 24.5" (100,000 ft.3/sec)

(from USD "Design of Small Dams"-Fig. 1, p.29 based on Hydro-Meteorological Report No. 33 - US. Geologic Bureau/US Corps of Engineers)

b) Assume most intense 30 min period rainfall is 40% of the total 6-HR rainfall (USKE 43%, USBE/SCS 57%).

$PFP$ for 30 min period $= 9.8" \quad (c = 17.6"/hr.)$

c) Assume PFP for this dia. is 70% of the above PFP or,

$PFP = 13.7"/ac \times 0.70 = 9.60"/ac$

*Note: This corresponds to use of rational method with C = 0.70 to 0.76
HYDROLOGIC/HYDRAULIC INSPECTION

PEAT SWAMP RESERVOIR, ARONIA, CT.

2A) THE DAM IS CLASSIFIED OF INTERMEDIATE SIZE WITH HIGH HYDROLOGIC POTENTIAL.

: SDF RECOMMENDED BY GUIDELINES = PHF = 4600 CF/S (PEAK IN 2000)

3A) EFFECT OF SURCHARGE STORAGE ON MAX. PROBABLE DISCHARGE

a) For $Q_1 = 4600$ CF/S (See Design Comps 5/24/78 p. 5 for spillway)

$H_1 = 5.83', \text{say } 5.8'$ (dam overtopped by $\pm 0.5'$)

b) Volume of Surcharge @ $H_1 = 5.8'\,$

$V_1 = 52.1(5.83 - 0.25) = 158 \text{ AC} \cdot \text{FT}$

$S_1 = \frac{459}{0.52 \times 53.3} = 16.5 ' > 15.8 ' \text{ (see below)}$

c) Assuming the KQ FLOOD KO IN NEW ENGLAND (see guideline)

is approx. equal to 19", and the R.O. in G-HL to be 83% of

the 24 Hr KQ, or 15.8", the PEAK OUTFLOW will be estimated

(see guidelines) as follows:

$S_1 = 16.5 ' > 15.8 ' \text{ (tot. R.O.)} \quad \text{Assume } S_{R.O.} = \frac{16.5}{2} = 8.3'\,$

$Q_p = 4600 \left(1 - \frac{9.3}{15.8}\right) = 2200 \text{ CF/S}$

$H_3 = 5.0' \text{ (above spillway crest)}$

DAM OVERTOPPED $\pm 1$ FT.
NOTE:

These computations have been performed based upon a dam breach with a surcharged water surface elevation. In accordance with normal corps procedures, computations are performed based upon a water surface elevation at the top of the dam. A dam breach with the water surface at the top of the dam and without heavy downstream channel flow could be more critical than a dam breach with a surcharge. The difference, in this case, is not substantial.
APPENDIX

SECTION E: INVENTORY OF DAMS
IN THE UNITED STATES
### INVENTORY OF DAMS IN THE UNITED STATES

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<thead>
<tr>
<th>STATE</th>
<th>COUNTY</th>
<th>NAME</th>
<th>LATITUDE NORTH</th>
<th>LONGITUDE WEST</th>
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<th>MAX. LENGTH</th>
<th>MAX. WIDTH</th>
<th>MAX. CAPACITY</th>
<th>MAX. VOLUME</th>
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**REMARKS**

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<th>MAXIMUM DISCHARGE</th>
<th>VOLUME OF DAM</th>
<th>POWER CAPACITY</th>
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**OWNER**

ANSONIA-JERSEY WATER CO

**ENGINEERING BY**

**CONSTRUCTION BY**

**REGULATORY AGENCY**

**DESIGN**

**CONSTRUCTION**

**OPERATION**

**MAINTENANCE**

**INSPECTION BY**

DEPT ENV PMO 22 MAR 73 PA 571 SL CT 25-11 ST OF CT

**REMARKS**