

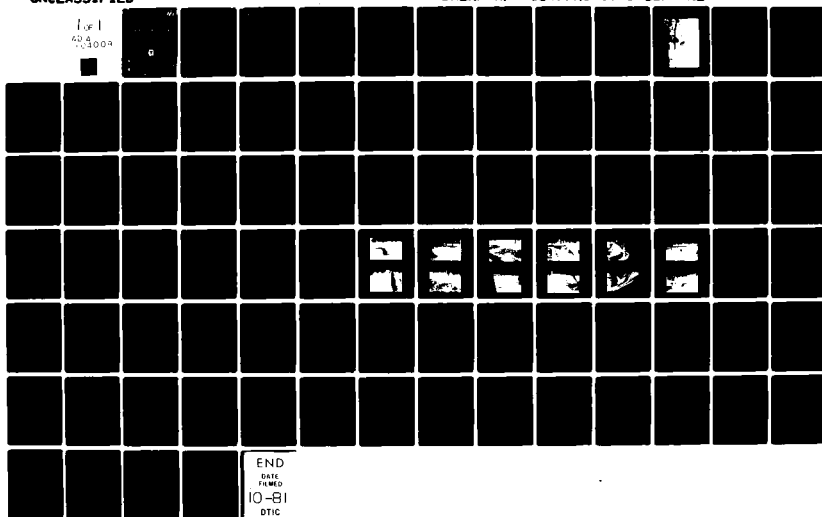
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NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION TRENTON --ETC F/6 13/13
NATIONAL DAM SAFETY PROGRAM, JACKSONS POND DAM (NJ00771), ARTHUR--ETC(U)
AUG 81 W A GUINAN DACW61-79-C-0011

UNCLASSIFIED

DAEN/NAP-53842/NJ00771-81/ NL

For I
AD-A104 009



AD A104009

ARTHURKILL RIVER BASIN
RAHWAY RIVER, UNION COUNTY
NEW JERSEY

JACKSONS POND DAM NJ 00771

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



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DEPARTMENT OF THE ARMY

Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

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AUGUST 1981

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 17 DAEN/NAP-53842/NJ00771-81/08	2. GOVT ACCESSION NO. AD-A104 009	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report National Dam Safety Program Jacksons Pond Dam, NJ00771 Union County, NJ		5. TYPE OF REPORT & PERIOD COVERED FINAL Rpt.
7. AUTHOR(s) Guinan, Warren, P.E. 17 <i>Warren Guinan</i>		6. CONTRACT OR GRANT NUMBER(s) DACW61-79-C-0011
9. PERFORMING ORGANIZATION NAME AND ADDRESS Anderson-Nichols 150 Causeway St. Boston, MA 02114		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS NJ Department of Environmental Protection Division of Water Resources P.O. Box CN029 Trenton, NJ 08625		12. REPORT DATE 11 August, 1981
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) U.S. Army Engineer District, Philadelphia Custom House, 2d & Chestnut Streets Philadelphia, PA 19106 17 <i>85</i>		13. NUMBER OF PAGES 50
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		15. SECURITY CLASS. (of this report) Unclassified
17. DISTRIBUTION STATEMENT (of the abstract) National Dam Safety Program. Jacksons Pond Dam (NJ 00771), Arthurkill River Basin, Rahway River, Union County, New Jersey. Phase I Inspection Report.		
18. SUPPLEMENTARY NOTES Copies are obtainable from National Technical Information Service, Springfield, Virginia 22151.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dams Embankments Visual Inspection Structural Analysis National Dam Safety Program Jacksons Pond Dam, NJ Spillways Erosion		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.		



IN REPLY REFER TO

NAPEN-N

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE-2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

31 AUG 1981

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Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Jacksons Pond Dam in Union County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Jacksons Pond Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to 13 percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood). To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Within three months of the consultant's findings remedial measures to ensure spillway adequacy should be initiated.

b. Within one year from the date of approval of this report the owner should engage a qualified professional consultant to perform the following:

(1) Design and oversee procedures for the removal of trees and their root systems from the crest, downstream slope and downstream toe of the dam.

(2) Oversee removal of vegetation on upstream slope along the left side of the dam, and oversee the construction of erosion protection.

(3) Design and oversee repair of erosion on downstream slope and establish grassy vegetation on the embankment.

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NAPEN-N

Honorable Brendan T. Byrne

(4) Evaluate the potential for erosion and undermining of the downstream toe on the right side of the dam caused by water discharging over the spillway crest which comes in contact with the embankment.

(5) Design and oversee repairs to all the deteriorated concrete at the left spillway abutment.

(6) Design and oversee repair of leaks in downstream masonry wall face.

c. Within six months from the date of approval of this report the owner should start a program of periodically checking the condition of the dam.

d. Within one year from the date of approval of this report the following remedial actions should be initiated:

(1) Repair or replace broken stoplogs.

(2) Clean and paint rusted steel.

e. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam, within one year from the date of approval of this report.

f. An emergency action plan and warning system should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam within six months from the date of approval of this report.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Rinaldo of the Twelfth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

NAPEN-N

Honorable Brendan T. Byrne

An important aspect of the Dam Inspection Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,



ROGER L. BALDWIN
Lieutenant Colonel, Corps of Engineers
Commander and District Engineer

Incl
As stated

Copies furnished:

Mr. Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

Mr. John O'Dowd, Acting Chief
Bureau of Flood Plain Regulation
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

JACKSONS POND DAM (NJ00771)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 20 April 1981 by Anderson-Nichols and Co., Inc. under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Jacksons Pond Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to 13 percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood). To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Within three months of the consultant's findings remedial measures to ensure spillway adequacy should be initiated.

b. Within one year from the date of approval of this report the owner should engage a qualified professional consultant to perform the following:

(1) Design and oversee procedures for the removal of trees and their root systems from the crest, downstream slope and downstream toe of the dam.

(2) Oversee removal of vegetation on upstream slope along the left side of the dam, and oversee the construction of erosion protection.

(3) Design and oversee repair of erosion on downstream slope and establish grassy vegetation on the embankment.

(4) Evaluate the potential for erosion and undermining of the downstream toe on the right side of the dam caused by water discharging over the spillway crest which comes in contact with the embankment.

(5) Design and oversee repairs to all the deteriorated concrete at the left spillway abutment.

(6) Design and oversee repair of leaks in downstream masonry wall face.

c. Within six months from the date of approval of this report the owner should start a program of periodically checking the condition of the dam.

d. Within one year from the date of approval of this report the following remedial actions should be initiated:

(1) Repair or replace broken stoplogs.

(2) Clean and paint rusted steel.

e. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam, within one year from the date of approval of this report.

f. An emergency action plan and warning system should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam within six months from the date of approval of this report.

APPROVED:



ROGER L. BALDWIN
Lieutenant Colonel, Corps of Engineers
Commander and District Engineer

DATE:

31 Aug 81

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Jackson Pond
Identification No.:	Fed ID No. NJ00771
State Located:	New Jersey
County Located:	Union
Stream:	Rahway River
River Basin:	Arthurkill
Date of Inspection:	April 20, 1981

ASSESSMENT OF GENERAL CONDITIONS

Jackson Pond Dam is about 54 years old and is in fair condition. The 276-foot dam has an earth embankment at either end of a 97-foot concrete broad crested spillway with 1-foot flashboards. Originally built with six bays of stoplogs totalling 18 feet, one bay was replaced with a reinforced concrete wall containing a 30-inch diameter orifice and fitted with a slide gate and stem. The dam has a structural height of 14.9 feet, it is small in size, and is classified significant hazard. Two large trees (one is 22 inches in diameter) are growing at the right abutment. Smaller trees are growing close to the downstream toe on the left side. Heavy pedestrian traffic has denuded much of the grass cover and erosion on the embankments is fairly extensive, especially along the right training wall of the spillway. The steel structural members in the stoplog structure are rusted. Cracks have developed in the concrete spillway training walls near the top of the walls. A large diagonal tension spall of concrete at the left downstream end of the spillway in the left side core wall cover has occurred and water has eroded the downstream embankment leaving a vertical escarpment. The wooden stoplogs are deteriorated and three bays have broken upper stoplogs. The spillway without flashboards will pass about 12 percent of the spillway design flood of one-half PMF (20,756 cfs) inflow hydrograph and is considered inadequate.

It is recommended that the owner retain the services of a professional engineer, qualified in the design and inspection of dams, to accomplish the following tasks in the near future: Evaluate further the adequacy of the spillway capacity and design and oversee construction of additional capacity, if found necessary; design and oversee procedures for the removal of trees and their root systems from the crest, downstream slope and downstream toe of the dam; remove vegetation on upstream slope along the left side of the dam and oversee the construction of erosion protection; design and oversee repair of erosion on downstream slope and establish grassy vegetation on the embankment; evaluate the potential for erosion and undermining of the downstream toe on the right side of the dam caused by water discharging over the spillway crest which comes in contact with the embankment; design and oversee repairs to all

the deteriorated left spillway abutment; and design and oversee repairs to leaks in downstream masonry wall face.

It is further recommended that the owner undertake the following as a part of operating and maintenance procedures beginning soon: Start a program of periodically checking the condition of the dam. In the near future: develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam; repair or replace broken stoplogs; and clean and paint rusted steel.

ANDERSON-NICHOLS & COMPANY, INC.

Warren A. Guinan
Warren A. Guinan, P.E.
Project Manager
New Jersey 16848



OVERVIEW PHOTO
JACKSON POND

April 20, 1981

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. 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 reasonable possible storm runoff), or fractions thereof. 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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JACKSON POND DAM FED ID NO. NJ00771

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY INSPECTION PROGRAM
JACKSON POND DAM
FED ID NO. #NJ00771

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. Authority to perform the Phase I Safety Inspection of Jackson Pond Dam was received from the State of New Jersey, Department of Environmental Protection, Division of Water Resources by letter dated 12 December 1980 under Basic Contract No. FPM-39 and Contract No. A01093 dated 10 October 1979. This Authority was given pursuant to the National Dam Inspection Act, Public Law 92-367 and by agreement between the State and the U.S. Army Engineers District, Philadelphia. The inspection discussed herein was performed by Anderson-Nichols & Company, Inc.

b. Purpose: The purpose of the Phase I Investigation is to develop an assessment of the general conditions with respect to the safety of Jackson Pond Dam and appurtenances. Conclusions are based upon available data and visual inspection. The results of this study are used to determine any need for emergency measures and to conclude if additional studies, investigations, and analyses are necessary and warranted.

1.2 Project Description

a. Description of Dam and Appurtenances. Jackson Pond Dam is a 276-foot long capped, stone masonry dam with an earthfill embankment and a concrete spillway. The hydraulic height is 12.1 feet and the structural height is 14.9 feet. Along the right side of the dam the crest is partially grass covered. The remainder of the surface is bare of vegetation except for two large trees (up to 22 inches in diameter). The upstream face is vertical and covered with brush and small trees and considerable erosion has developed near the left spillway wingwall where the surface is bare of vegetation. The 97-foot long spillway is a broad-crested, concrete overflow with flashboards, located near the center of the dam. A 15-foot long stoplog section is located to the left of the spillway and consists of 6" x 12" timbers placed in five 3' x 3' bays. A concrete core wall extends eastward from the spillway into the left abutment of the dam.

A low-level outlet is installed in the sixth bay of the stoplog section adjacent to the left spillway abutment wall. The outlet is a 30-inch diameter orifice formed integrally with the reinforced wall filling the bay. It is fitted with a slide gate and stem.

b. Location. The dam is located in Clark Township, New Jersey on the Rahway River. The dam is at 40° 37.7' north latitude and 74° 17.2' west longitude on the Roselle, N.J. Quadrangle. The dam can be reached by taking the Garden State Parkway north to Exit 136, turning right on Stiles Street, then turning right on Valley Road, about 0.5 miles from the interchange. Jackson Pond Dam is located about 150 feet upstream of Valley Road on Rahway River. A location map has been included as Figure 2.

c. Size Classification. Jackson Pond Dam is classified as being small in size on the basis of storage at the dam crest of 182 acre-feet, which is less than 1000 acre-feet but more than 50 acre-feet, and on the basis of its structural height of 14.9 feet, which is less than 40 feet, in accordance with criteria given in the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification. The spillway at Jackson Pond Dam will not pass the SDF of one-half of the PMF. Valley Road Bridge is located immediately downstream of the dam. The bridge has been closed in the past because of flood waters and the potential is present for appreciable property damage to the surrounding area; but few, if any, lives would be lost. Therefore it is recommended that Jackson Pond Dam be reclassified as significant hazard.

e. Ownership. The dam is owned by the City of Rahway. Information may be obtained by writing Mr. George Hulnik, City of Rahway, 1045 Westfield Avenue, Rahway, New Jersey 07065.

f. Purpose. The purpose of construction of Jackson Pond Dam was to provide water power for a downstream mill.

g. Design and Construction History. No information regarding the original plan or design of the dam was available.

h. Normal Operational Procedure. No operational procedures were disclosed for the dam.

i. Site Geology. No site specific geologic information (such as borings) was available at the time the dam was inspected. Information derived from the Geologic Map of New Jersey (Kummel and Lewis, 1912) and the Glacial Drift Map of New Jersey (Salisbury, Kummel, Peet and Whitson, 1902) indicates that overburden within the immediate site area consist of ice contact deposits overlying bedrock.

The depth to bedrock at the dam site is unknown, and outcrops were not observed during the dam inspection. From the reports previously mentioned, bedrock in the area consists of red shale and sandstone of Triassic age.

1.3 Pertinent Data

a. Drainage Area

40 square miles

b. Discharge at Damsite (cfs)

Maximum flood at damsite - 5420 (Aug. 2, 1973 for USGS Gage No. 01395000, DA 40.9 square miles)

Total ungated spillway capacity at maximum pool elevation (at top of dam) - 2366 (without flashboards)

c. Elevation (ft. above NGVD)

Top of dam - 27.9

Test flood (1/2 PMF) - 35.5

Recreation pool (at time of inspection) - 25.2 (with flashboards)

Spillway crest - 24.1 (without flashboards) 25.1 (with flashboards)

Streambed at centerline of spillway - 15.8

Maximum tailwater - 22 (estimated) (based on downstream gage)

d. Reservoir (length in feet)

Length of maximum pool - 2000 (estimated)

Spillway crest - 700

e. Storage (acre-feet)

Spillway crest - 72 (without flashboards)
90 (with flashboards)

Test Flood (1/2 PMF) - 712

Top of dam - 182

f. Reservoir Surface (acres)

Top of dam - 42 (estimated)

Spillway crest - 15

g. Dam

Type - Concrete spillway tied to earthen embankments, run-of-river dam

Length - 276 feet

Height - 12.1 feet (hydraulic)

- 14.9 feet (structural)

Top width - ranges from 12 to 25 feet

Side slopes - upstream right side concrete vertical, left side 8H:1V, downstream left side concrete vertical, right side 1H:1V

Zoning - unknown

Impervious core - unknown right side; concrete core wall (surface evidence) left side

Cutoff - unknown

Grout curtain - unknown

h. Spillway

Type - Concrete, broad-crested overflow with 1 foot flashboards

Length of weir - 97 feet

Crest elevation - 24.1' NGVD (without flashboards)
25.1' NGVD (with flashboards)

Low level outlet - 30-inch concrete outlet
(see Section 1.2 j.)

U/S Channel - Jackson Pond

D/S Channel - Rahway River

i. Stoplog Section

Type - 6" x 12" timbers

Length - 15 feet (5 bays, 3 feet each)

Crest elevation - 25.9' NGVD (with stoplogs)
17.8' NGVD (without stoplogs)

U/S Channel - Jackson Pond

D/S Channel - Rahway River

j. Regulating Outlets

Type - One 30-inch diameter orifice

Length (estimated) 20 feet

Location - between stoplog spillway and overflow
spillway

SECTION 2 ENGINEERING DATA

2.1 Design

No original plans, hydraulic or hydrologic data for Jackson Pond Dam were found. However, plans (#626) for repair of the dam, dated June 6, 1972, were made available by the Union County Park Commission (Sheet 4 of 4 only).

2.2 Construction

No recorded data concerning the original construction of the Jackson Pond Dam were found.

2.3 Operation

No written operational data were found.

2.4 Evaluation

a. Availability. A search of the New Jersey Department of Environmental Protection files and with the Union County Park Commission files revealed no written information.

b. Adequacy. Data obtained in the visual inspection and the repair plans are deemed adequate to complete this Phase 1 Inspection Report

SECTION 3 VISUAL INSPECTION

3.1 Findings

a. Dam. Along the right side of the dam, the crest of the dam is partially covered with grass. The remainder of the surface is bare of vegetation except for two large trees; the larger is 22 inches in diameter. The upstream slope has some brush and weeds and has undergone considerable erosion caused by pedestrian traffic both on the slope and adjacent to the spillway wingwall. The toe of the downstream slope is in contact with water in the discharge channel.

On the left, the concrete core wall is exposed on the surface of the dam crest. The upstream slope is covered with brush and small trees and considerable erosion has developed near the left spillway wingwall where the surface is bare of vegetation. Erosion has occurred on the downstream slope which has resulted in the development of a vertical escarpment near the intersection with the core wall. A large section of the slope is bare of vegetation near the discharge channel. One large tree is growing within 20 feet of the downstream toe adjacent to the discharge channel.

One large piece of concrete has spalled from the intersection of the core wall and spillway section at the left side of the dam. Concrete appears to have been placed at the toe of the slope just downstream from the spalled concrete.

During the surveying work in February 1981 with no flow over the spillway, several leaks in the downstream masonry wall and surface erosion on the downstream apron were noted.

b. Appurtenant Structures.

Stoplog Section. The structural steel, vertical members are rusted as is the top horizontal steel beam. The wood stoplogs are deteriorated and the top stoplogs in three bays are broken. Some leakage at the sill of the stoplogs was noted.

Outlet Gate. A section of stoplog has been diameter orifice replaced with a reinforced concrete wall with a 30-inch diameter orifice controlled by a slide gate; minor leakage was noted. The operating stem and supports appeared to be operable.

c. Reservoir Area. The watershed above the lake is gently sloping, slightly wooded, and contains numerous homes. Low lying swamps exist along the left side of the reservoir. Slopes on the shore of the lake appear to be stable. Significant sedimentation was observed in the middle of the reservoir upstream from the spillway crest.

d. Downstream Channel. Considerable erosion has occurred on the right and left banks of the channel downstream from spillway for a distance of approximately 100 to 150 feet. Trees are growing on the banks of the channel downstream of the spillway. The Valley Road Bridge cross the channel about 150 feet downstream.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures

No formal operating procedures were revealed.

4.2 Maintenance of Dam

No formal maintenance procedures for the dam were found.

4.3 Maintenance of Operating Facilities

No formal maintenance procedures for the operating facilities were discovered.

4.4 Warning System

No description of any warning system was found.

4.5 Evaluation of Operational Adequacy

Because of the lack of operation and maintenance procedures, the remedial measures described in Section 7.2 should be implemented as described.

SECTION 5 HYDROLOGIC/HYDRAULIC

5.1 Evaluation of Features

a. Design Data. Because no original hydrologic or hydraulic design data were revealed, an evaluation of such data could not be performed.

b. Experience Data. No written experience data were found. A Union County engineer, contacted by phone, reported that the dam was not overtopped during the August 2, 1973 flood.

c. Visual Inspection. As noted in other sections, in three bays the top stoplogs are broken. The gated orifice appears to be operational. Some leakage was noted under the lowest stoplogs. The flashboards were all intact. The large diagonal tension cracked spill at the left corner of the overflow spillway can lead to undermining if not repaired.

d. Jackson Pond Dam Overtopping Potential. The hydraulic/hydrologic evaluation for Jackson Pond Dam is based on a selected Spillway Design Flood (SDF) equal to one-half the Probable Maximum Flood (PMF) in accordance with the range of test floods given in the evaluation guidelines, for dams classified as significant hazard and small in size. The PMF was determined by application of a 24-hour Probable Maximum Precipitation of 23 inches to the Clark Unit hydrograph. Hydrologic computations are given in Appendix 3. The routed half-PMF peak discharge for the subject drainage area is 20,756 cfs.

Water will rise to a depth of 3.8 feet above the spillway crest before overtopping the low point on the dam embankment crest. This assumes that the flashboards, currently in place, will be washed out under 1/2 PMF conditions. Under this head the spillway capacity is 2366 cfs.

Flood routing calculations indicate that Jackson Pond Dam will be overtopped for 23 hours to a maximum depth of 7.6 feet under half-PMF conditions. It is estimated that the spillway can pass about 12 percent of the half-PMF inflow hydrograph without overtopping the dam; thus, the spillway is considered inadequate.

e. Drawdown Capacity. During average flow conditions of 47 cfs, Jackson Pond Dam could be drawn down to elevation 18.8' NGVD in about 14 hours by opening the gate on the low level outlet and by removing stoplogs with a crane. This is considered adequate under emergency conditions. It is estimated that one-foot of water would remain in the reservoir.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. The lack of vegetation on the crest and on the downstream slope of the embankment makes these areas highly susceptible to erosion if the dam should be overtopped. Trees growing on the crest, downstream slope and in the area of the downstream toe of the dam may cause seepage if they blow over and pull out their roots, or if they die or are cut and their roots rot. The extensive vegetation and poor condition of the upstream slope along the left side of the dam makes the slope susceptible to erosion.

6.2 Design and Construction Data. No design or construction data pertinent to the structural stability of the dam are available.

6.3 Operating Records. No operating records pertinent to the structural stability of the dam were available.

6.4 Post-Construction Changes. The plan of 1972 shows the only known post-construction change. At this time, the stays, sluice gate, and required concrete were added. The plan also shows that the contractor was to remove silt upstream of the new sluice as required for installation of the sluice gate. A Union County Engineer, contacted by phone, reported that the embankment behind the spillway wingwall was reconstructed with riprap because soil had washed away during the 1971 flood.

6.5 Seismic Stability - This dam is in Seismic Zone 1. According to the Recommended Guidelines, dams located in Seismic Zone 1 "may be assumed to present no hazard from earthquake, provided static stability conditions are satisfactory and conventional safety margins exist". None of the visual observations made during the inspection are indicative of unstable slopes. However, because no data are available concerning the engineering properties of the embankment and foundation materials for this dam or the condition at the base of the core wall, it is not possible to make an engineering evaluation of the stability of the slopes or the factor of safety under static conditions.

SECTION 7
ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. Jackson Pond Dam is about 54 years old and is in fair condition.

b. Adequacy of Information. The information available is such that the assessment of the dam must be based primarily on the results of the visual inspection.

c. Urgency. The recommendations made in 7.2.a and 7.2.b should be implemented by the owner as prescribed.

d. Necessity for Additional Data/Evaluation. The information available from the visual inspection is adequate to identify the potential problems which are listed in 7.2.a. These problems require the attention of a professional engineer who will have to make additional engineering studies to design or specify remedial measures to rectify the problems. If left unattended, the problems could lead to failure of the dam.

7.2 Recommendation/Remedial Measures

a. Recommendations. The owner should retain a professional engineer qualified in the design and construction of dams to accomplish the following in the near future:

- (1) Evaluate further the adequacy of the spillway capacity and design and oversee construction of additional capacity, if found necessary.
- (2) Design and oversee procedures for the removal of trees and their root systems from the crest, downstream slope and downstream toe of the dam.
- (3) Remove vegetation on upstream slope along the left side of the dam and oversee the construction of erosion protection.
- (4) Design and oversee repair of erosion on downstream slope and establish grassy vegetation on the embankment.
- (5) Evaluate the potential for erosion and undermining of the downstream toe on the right side of the dam caused by water discharging over the spillway crest which comes in contact with the embankment.

(6) Design and oversee repairs to all the deteriorated concrete at the left spillway abutment.

(7) Design and oversee repair to leaks in downstream concrete wall face.

b. Operating and Maintenance Procedures. The owner should accomplish the following soon:

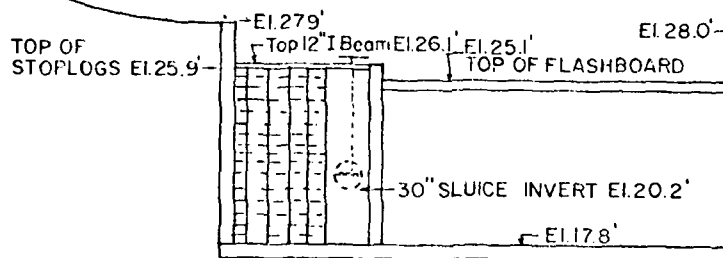
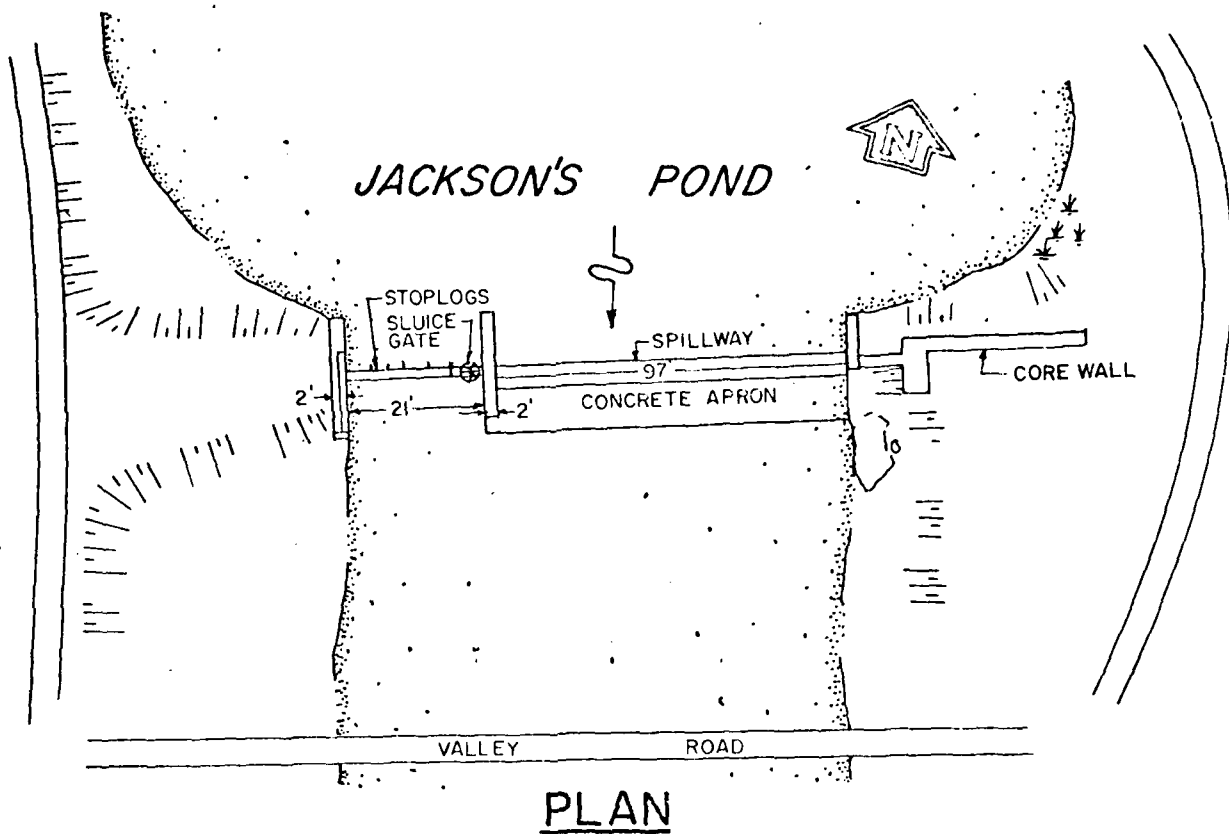
Start a program of periodically checking the condition of the dam.

In the near future:

(1) Develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

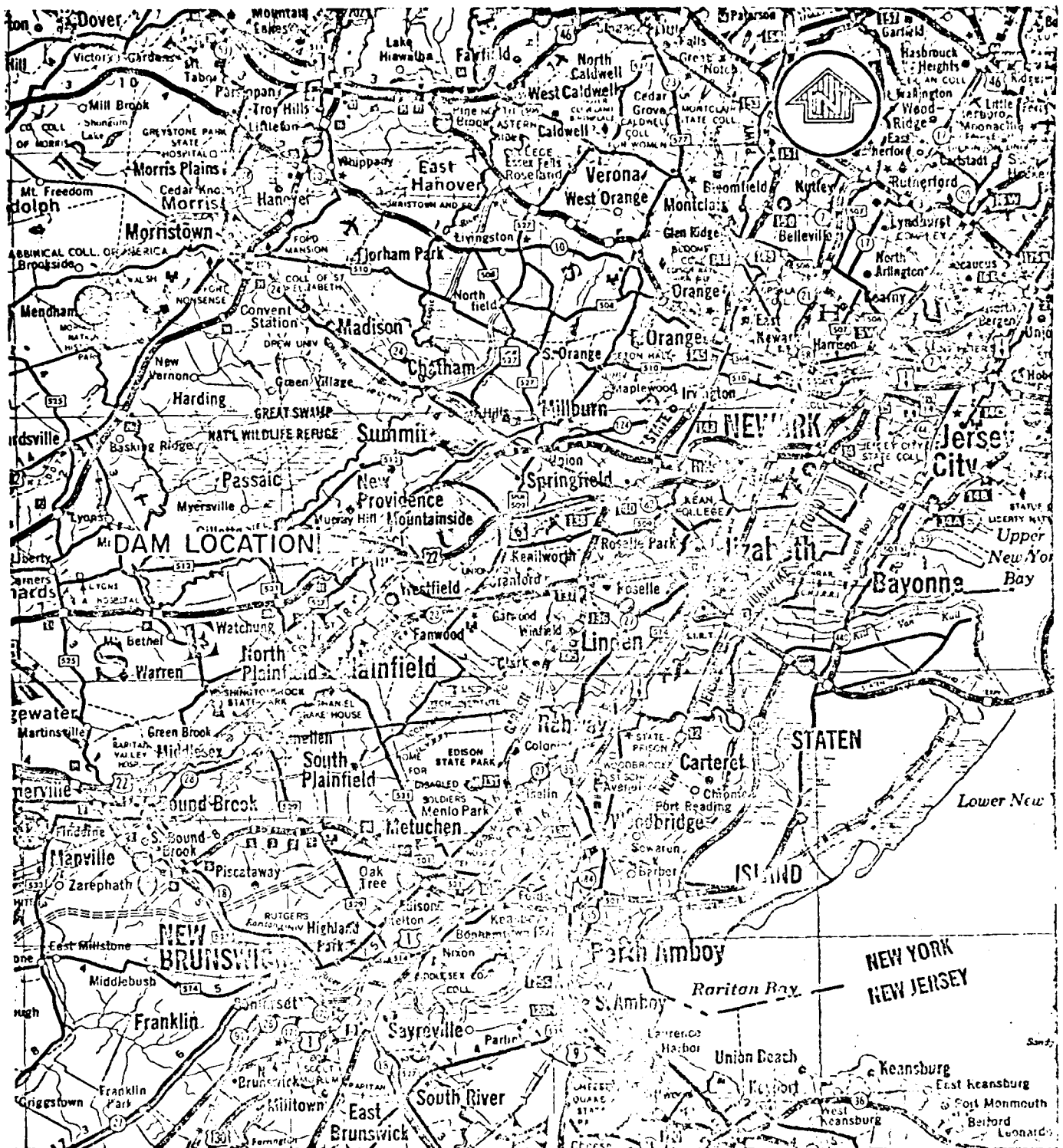
(2) Repair or replace broken stoplogs.

(3) Clean and paint rusted steel.



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BOSTON		CORPS OF ENGINEERS	
MASSACHUSETTS		PHILADELPHIA, PA	
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS			
JACKSON'S POND DAM			
RAHWAY RIVER		NEW JERSEY	
		SCALE: NOT TO SCALE	
		DATE: JULY 1981	

FIGURE-1



Anderson-Nichols & Co., Inc.

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MASSACHUSETTS

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

JACKSONS POND DAM LOCATION MAP

RAHWAY RIVER

NEW JERSEY

SCALE: 1" = 4 Miles Approx

DATE: JUNE 1981

FIGURE 2

MAP BASED ON STATE OF NEW JERSEY
OFFICIAL MAP & GUIDE.

APPENDIX 1

CHECK LIST

VISUAL INSPECTION

JACKSON POND DAM

Check List
Visual Inspection
Phase 1

Name Dam Jackson Pond Dam County Union State NJ(00771) Coordinators NJDEP
 Date(s) Inspection 2/19/81 4/20/81 Weather Sunny, Warm Clear Temperature 45°
 Pool Elevation at Time of Inspection 25.1 ft NGVD Tailwater at Time of Inspection 20 ft NGVD
 Surveyed spillway crest

Inspection Personnel:

K. Stuart

D. Deane

J. Moyle, NJDEP

S. Gilman

W. Guinan, R. Murdock

K. Stuart, R. Murdock Recorder

G. Hulnik, City of Rahway, was present on February 19

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEEPAGE OR LEAKAGE	Some leakage under stoplog section; Some leakage also noted on downstream masonry face of spillway during February inspection.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Erosion evident at junction with both right and left embankment sections	
DRAINS	N/A	
WATER PASSAGES	N/A	
FOUNDATION	Water flowing over spillway, foundation details not visible	

CONCRETE/MASONRY DAMS

See Ungated Spillway - Also

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Not able to inspect because of water flowing over dam. d/s concrete apron is surface eroded	Inspect during no flow conditions over spillway
STRUCTURAL CRACKING	None observed	
VERTICAL AND HORIZONTAL ALIGNMENT	None observed	
MONOLITH JOINTS	None observed	
CONSTRUCTION JOINTS	Good	

VISUAL EXAMINATION OF	EMBANKMENT (Sections as of concrete face)	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS		None observed	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE		None observed	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES		Erosion extensive downstream of concrete face on left side of dam. On right side, slope bare, one 22-inch diameter tree near crest.	Repair erosion and provide adequate erosion protection Remove tree near crest.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST		Good	
RIPRAP FAILURES		No riprap present	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
RAILINGS	None	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Erosion previously noted on page 1-4.	
ANY NOTICEABLE SEEPAGE	None	
STAFF GAGE AND RECORDER	None	
DRAINS	None	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	95 ft long w/3 ft wide by 1 ft thick concrete cap over stone masonry. No indication of movement. Horizontal & vertical alignment good. 1 ft high by 2 inches thick wooden flashboards held in place by iron pins at 2-ft intervals. Boards and trash on cap and flashboard crest. Spillway face is dry cut stone masonry. Owner rep. said flashboards replaced 3 years ago. Masonry face leaking. Downstream face of left spillway abutment wall is badly eroded.	Repair masonry and left spillway abutment
APPROACH CHANNEL	Wide and unobstructed	
DISCHARGE CHANNEL	Wide and unobstructed. Concrete apron extends from toe of spillway for about 10 feet. First two slabs on left side are missing. Approx. 10 ft section. Surface and d/s edge is surface eroded.	Replace slabs
EDGE AND PIERS OF SPILLWAY		Not applicable

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None observed No conduit	
INTAKE STRUCTURE	u/s side of stoplog/gate section	
OUTLET PIPE	No pipe. Three-foot diameter opening was poured with section	
OUTLET CHANNEL	Wide and unobstructed	
EMERGENCY GATE	Slide gate with hand-operated screw lift on u/s side on river side of stoplog/gate section.	Gate operated by City of Rahway Water Department to supplement spillway flow when necessary.

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	None observed	
APPROACH CHANNEL	Concrete training walls on both sides	
DISCHARGE CHANNEL	Wide and unobstructed	
BRIDGE AND PIERS	Steel I beam used for walkway to gate wheel is rusted. Stoplog supports are rusted.	Clean and paint
GATES AND OPERATION EQUIPMENT	Five 3 ft long bays of 12-inch high by 2-inch thick stoplogs extend from sill of dam to height equal to spillway crest. Stoplog steps are wood and appear to be in deteriorated condition. Top stoplogs in three bays are broken.	Replace or repair to restore to good condition

INSTRUMENTATION

VISUAL EXAMINATION

OBSERVATIONS

REMARKS OR RECOMMENDATIONS

MONUMENTATION/SURVEYS

None apparent

OBSERVATION WELLS

None apparent

WEIRS

None apparent

PIEZOMETERS

None apparent

OTHER

None apparent

RESERVOIR

VISUAL EXAMINATION OF

REMARKS OR RECOMMENDATIONS

OBSERVATIONS

SLOPES

Gentle to moderately sloped, lightly wooded, mostly urban-suburban

SEDIMENTATION

Significant sedimentation in the middle of the reservoir upstream of spillway

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Wide, unobstructed. This is a run of river dam. Valley Road, a heavily traveled street, crosses the river about 150 feet d/s	
SLOPES	Moderate to gentle slopes, with considerable erosion on both banks	
APPROXIMATE NO. OF HOMES AND POPULATION	Valley Road. Two houses, possibly affected by high water. No danger of loss of life.	Bridge downstream has in the past been closed as a result of back-water.

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	No plans of original construction found. Plans found by Union County Park Commission, City of Rahway, New Jersey for repair of sluice gate, and WPA-New Jersey Project #10-197 dam elevation (1935) was available.
REGIONAL VICINITY MAP	Prepared for this report
CONSTRUCTION HISTORY	None found
TYPICAL SECTIONS OF DAM	None found
HYDROLOGIC/HYDRAULIC DATA	None found
OUTLETS - PLAN	
- DETAILS	None found
- CONSTRAINTS	
- DISCHARGE RATINGS	
RAINFALL/RESERVOIR RECORDS	None found

ITEM	REMARKS
DESIGN REPORTS	None found
GEOLOGY REPORTS	None found
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None found
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None found
POST-CONSTRUCTION SURVEYS OF DAM	Sluice gate repair plan #626; W.P.A. elevation (Project #10-197).
BORROW SOURCES	Unknown

ITEMS	REMARKS
SPILLWAY PLAN	Some information from repair plan #626 and WPA Project 10-197
SECTIONS	See above
DETAILS	None found
OPERATING EQUIPMENT PLANS & DETAILS	Some information from repair plan #626

ITEM	REMARKS
MONITORING SYSTEMS	None
MODIFICATIONS	Repair of sluice gate plan #626
HIGH POOL RECORDS	None
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	See MODIFICATIONS above
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Unknown
MAINTENANCE OPERATION RECORDS	None

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 40 square miles, gentle slope,
lightly wooded area, suburban

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 25.1' NGVD (with
flashboards) 90 acre-feet

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY) _____
Not applicable

ELEVATION MAXIMUM TEST FLOOD POOL: 35.5' NGVD

ELEVATION TOP DAM: 27.9' NGVD (182 acre-feet)

SPILLWAY CREST: free overflow concrete capped, stone masonry

a. Elevation 24.1 feet NGVD (without
flashboards)

b. Type broad crested with flashboards

c. Width 5 feet (estimated)

d. Length 97 feet

e. Location Spillover Center of dam

f. Number and Type of Gates None

STOPLOG SECTION: 6" x 12" Timbers (5 bays)

a. Elevation 25.9' NGVD

b. Type Wood timbers

c. Width 3 feet (per bay)

d. Length 15 feet

e. Location Spillover Right side of dam

OUTLET WORKS: One-30 inch diameter orifice integrally
formed in concrete wall

- a. Type Slide-gated orifice
- b. Location at left of stoplog section
- c. Entrance Invert 20.2' NGVD
- d. Exit Invert 20.2' NGVD

HYDROMETEOROLOGICAL GAGES: Rahway River at Rahway USGS Gage
No. 01395000, downstream; drainage area 40.9 square miles
at gage

MAXIMUM NON-DAMAGING DISCHARGE: 2366 cfs

APPENDIX 2

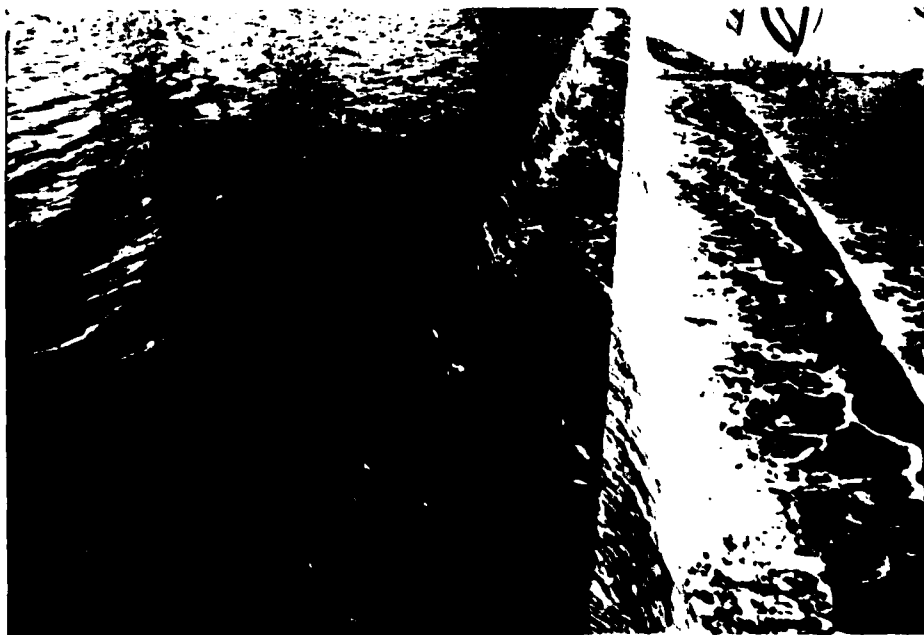
PHOTOGRAPHS

JACKSON POND DAM



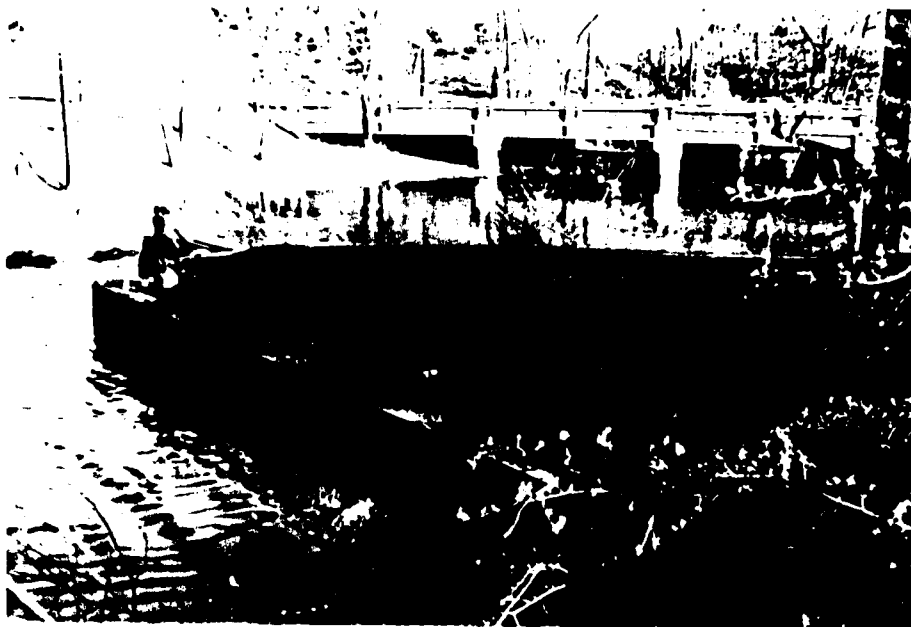
April 20, 1981

View along axis of dam from left abutment. Note concrete corewall.



April 20, 1981

View of overflow spillway with flashboards from left side of stoplog section looking left.



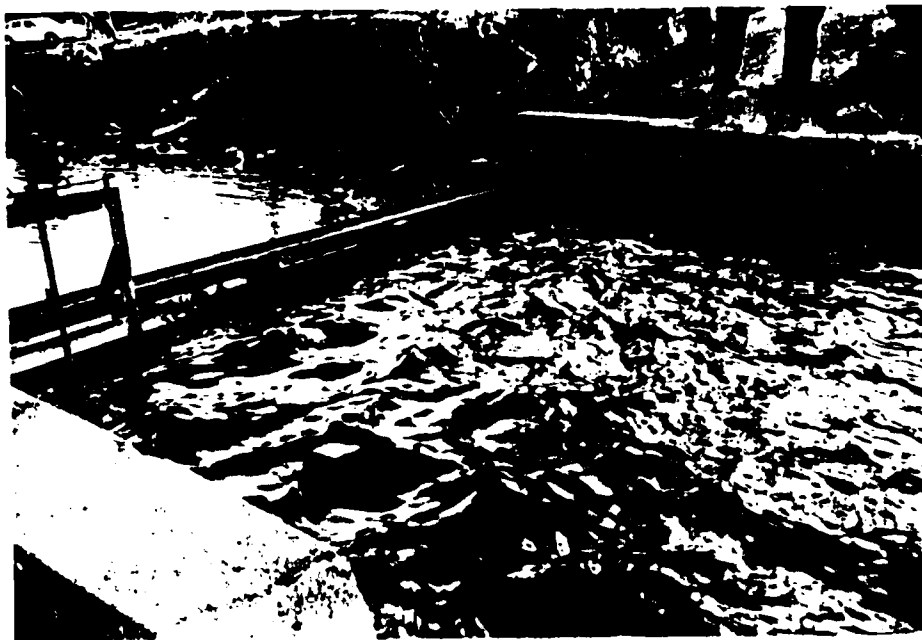
April 20, 1981

Upstream face, right side of dam.



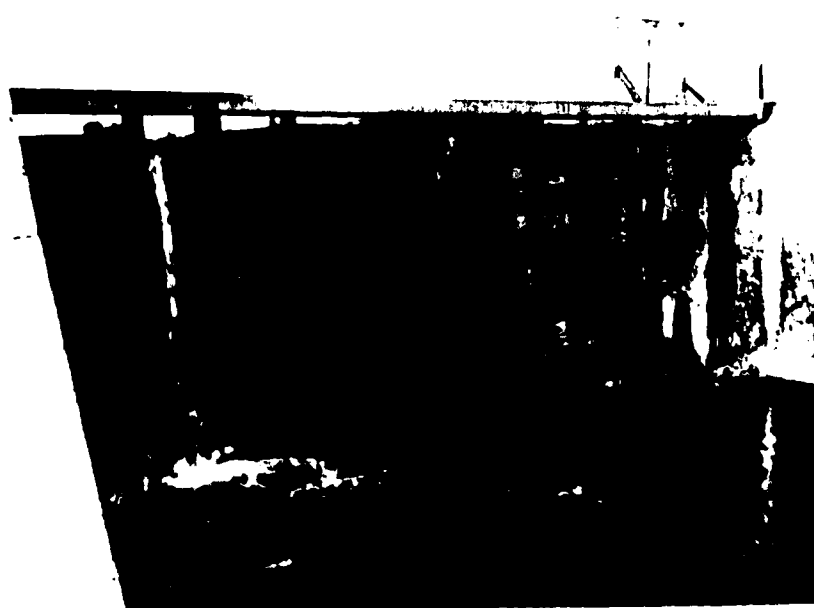
April 20, 1981

Left side of dam, upstream face, trees up to 22 inches in diameter.



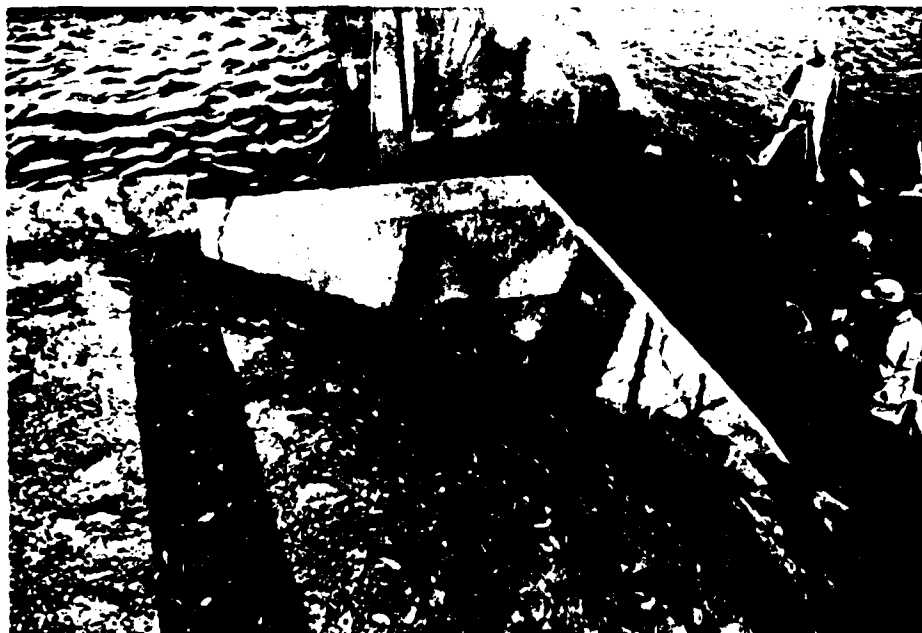
April 20, 1981

Upstream view of stoplog and gate section for low-level outlet.



April 20, 1981

Five bays of stoplogs and gated outlet pipe.



April 20, 1981

Crack in concrete and erosion of embankment at contact with stoplog spillway training wall on right (west) side of spillway.



April 20, 1981

Downstream face, right side of dam.



April 20, 1981

Erosion of downstream wall adjacent to left side of spillway.



April 20, 1981

Erosion of downstream embankment, tree stump 16 inches in diameter.



April 20, 1981

View of Valley Road bridge about 150 feet downstream from dam.



April 20, 1981

View downstream from Valley Road.

APPENDIX 3

HYDROLOGIC COMPUTATIONS

JACKSON POND DAM



**NATIONAL PROGRAM OF INSPECTION OF
NON-FED. DAMS**

JACKSON POND DAM

CLARK TOWNSHIP, NEW JERSEY

REGIONAL VICINITY MAP

JUNE 1981

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
PHILADELPHIA, PENNSYLVANIA

Anderson-Nichols & Company, Inc.

BOSTON, MA

SCALE IN MILES



MAP BASED ON U.S.G.S. 7.5 MINUTE QUADRANGLE
SHEETS. CHATHAM, N.J. 1955, REVISED 1970.
ROSELLE, N.J. 1955, REVISED 1970. PLAINFIELD,
N.J. 1955, REVISED 1970. PERTH AMBOY, N.J. 1956,
REVISED 1970.

A son-Nichols & Company, Inc.

Subject Jackson's PondSheet No. 1 of 12Date 7/2/81Computed TCG

Checked _____

JOB NO.

RES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
SCALEClark Unit Hydrograph Coefficients

$$t_c = 8.29 (1.0 + 0.03 I)^{-1.28} \left(\frac{DA}{S} \right)^{0.28}$$

$$R = 1.85 t_c$$

Where: t_c and R = coefficients I = % impervious of upstream basin DA = Drainage area in square miles S = slope of main stream between points 10% and 85% of the way along its length in ft./mi

This equation is from the HEC's 1976 "Special Projects Memo No.

469, Hydrologic-Hydraulic Simulation, Rahway R. Basin, N.J."

For our basin, I = 30% (estimated from USGS Roselle, Caldwell, Orangequads) DA = 40.0 sq. mi (D.A. downstream of U.S.G.S. gage at Springfield planimetered and added to D.A. at gage). S = 22.5 ft./mile (stream is 18.6 miles from Crystal Lake to Jackson's Pond Dam, measured on Roselle, Caldwell, and Orangequads).

Elevation at 10% 1.86 miles ups of Jackson's Pond Dam, is about 30' NGVD. At 85%, 15.81 miles ups of Jackson's Pond Dam, elevation is about 44' NGVD.

$$S = \frac{440 - 30}{15.81 \text{ mi} - 1.86 \text{ mi}} = 22.2 \text{ ft./mi}$$

$$\text{So, } t_c = 8.29 (1 + 0.03(30))^{-1.28} \left(\frac{40}{22.2} \right)^{0.28}$$

$$= 4.30 \text{ hours}$$

$$R = 1.85 t_c = 7.96 \text{ hours}$$

JOB NO.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Stage Vs. Discharge.

A hydraulic profile for Jackson Pond Dam is shown on page 3.

For our stage-discharge curve, Assume:

- ① Flashboards out (would wash out under $\frac{1}{2}$ PMF)
- ② Stop logs in
- ③ gate closed

Numbers in circles (①, ②, etc.) refer to sections in hydraulic profile. We will calculate Q at 24.1, 25.0, 25.9, 27.0, 28.0, 29.0, 30.0, 31.0, 32.0

Spillway (section ⑤)

$$Q = CLH^{3/2} = 3.0(97)(E - 24.1)^{3/2}$$

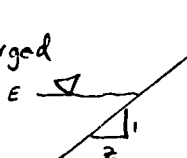
Stop log gate (sections ⑥ and ⑦)

$$Q = 3.0(2)(E - 26.1)^{3/2} + 3.3(21)(E - 25.9)^{3/2}$$

Top of dam (sections ②, ③, ④, ⑧, and ⑨)Section ② is a 59', 22.7 H:1 V sloping weir, ends at 28.1 and 30.7. $C = 2.7$ Section ③ is a 41', 410 H:1 V sloping weir, ends at 28.0 and 28.1. $C = 2.7$ Section ④ is an even crested 15' weir, at 28.0. $C = 3.0$ Section ⑧ is a 21', 8.4 H:1 V sloping weir, ends at 27.9 and 30.4. $C = 2.7$ Section ⑨ is a 20', 9.5 H:1 V sloping weir, ends at 30.4 and 32.5. $C = 2.7$

For a sloping weir:

a) partially submerged



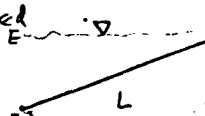
$$Q = CL_{\text{submerged}} H_{\text{avg}}^{3/2}$$

$$L_{\text{submerged}} = 2(L - E_{\text{low}})$$

$$H_{\text{avg}} = \frac{(E - E_{\text{low}}) + 0}{2} = 0.5(E - E_{\text{low}})$$

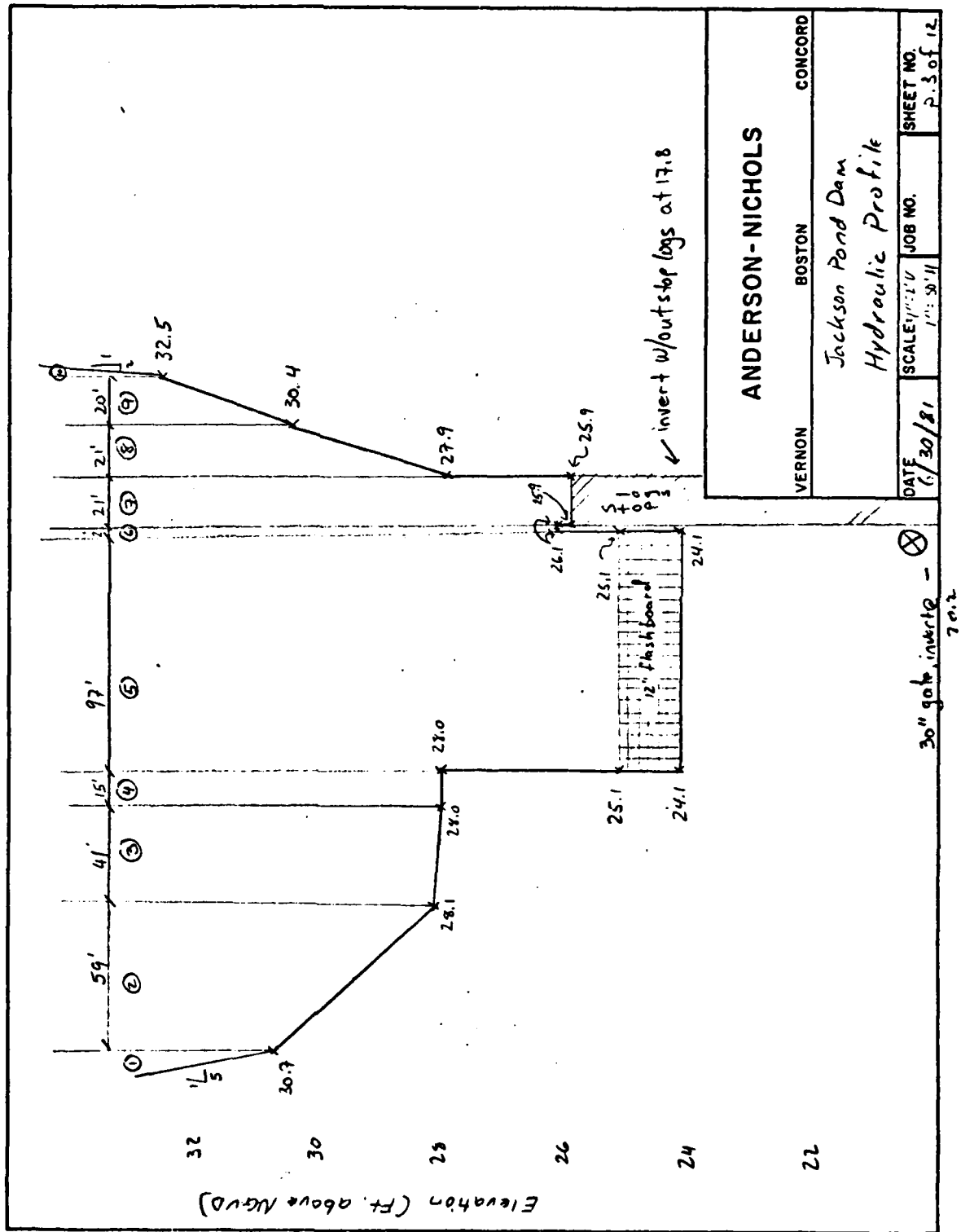
$$Q = C(7)(E - E_{\text{low}})(0.5(E - E_{\text{low}}))^{3/2}$$

b) fully submerged



$$Q = CLH_{\text{avg}}^{3/2}$$

$$= CL(E - E_{\text{avg}})^{3/2}$$



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Subject Jackson's Pond

Sheet No. 4 of 12

Date 7/1/81

Computed TCL

Checked C.E.P.

JOB NO.

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at or below 27.9, $Q_{top\ of\ dam} = 0.0$

at 29 & 30, $Q_{top\ of\ dam} = 2.7(22.7)(E-28.1)^{(2)}(0.5(E-28.1))^{3/2} + 2.7(41)(E-28.05)^{(3)}3/2$
 $+ 3.0(15)(E-28)^{(4)}3/2 + 2.7(8.4)(E-27.9)(0.5(E-27.9))^{3/2}$

at 31 and 32, $Q_{top\ of\ dam} = 2.7(59)(E-29.4)^{(2)}3/2 + 2.7(41)(E-28.05)^{(3)}3/2 + 3.0(15)(E-28.0)^{(4)}3/2$
 $+ 2.7(21)(E-29.15)^{(5)}3/2 + 2.7(9.5)(E-30.4)(0.5(E-30.4))^{3/2}$
 at 33 and up, $Q_{top} = 2.7(59)(E-29.4)^{(5)}3/2 + 2.7(41)(E-28.05)^{(6)}3/2 + 3.0(15)(E-28)^{(7)}3/2$
 $+ 2.7(21)(E-29.15)^{(8)}3/2 + 2.7(20)(E-31.45)^{(9)}3/2$

Side Slopes (sections (1) and (10))

at or below 30, $Q = 0$

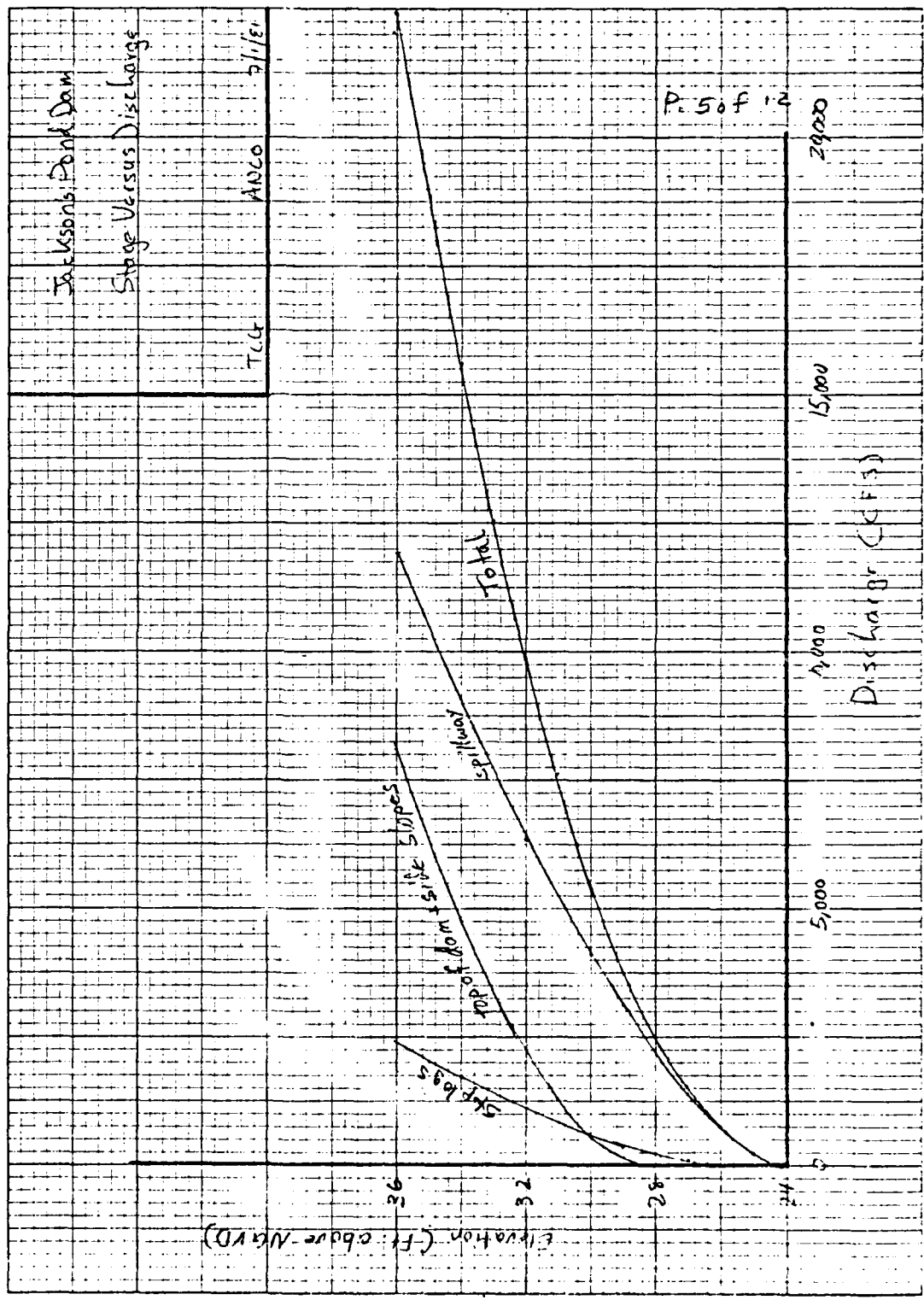
at 31 and 32, $Q = 2.7(5)(E-30.7)^{(1)}(0.5(E-30.7))^{3/2}$

at 33 and up, $Q = 2.7(5)(E-30.7)^{(10)}(0.5(E-30.7))^{3/2} + 2.7(2)(E-32.3)(0.5(E-32.3))^{3/2}$

Elevation (ft. above NGVD)	Description	$Q_{spillway}$ (CFS)	$Q_{springs}$ (CFS)	$Q_{top\ of\ dam}$ (CFS)	$Q_{side\ slopes}$ (CFS)	Q_{total} (CFS)
15.8 ✓	nat. ground at dam	0	0	0	0	0
24.1 ✓	spillway crest	0	0	0	0	0
25.0		248	0	0	0	248
25.9 ✓	stop log crest	703	0	0	0	703
27.0 ✓		1,437	85	0	0	1,522
27.9	top of dam	2,156	210	0	0	2,366
29.0 ✓		3,156	408	174	0	3,738
30.0		4,170	622	588	0	5,380
31.0 ✓		5,274	863	1,262	0	7,399
32.0		6,462	1,130	2,199	9	9,800
33		7,726	1,420	3,343	39	12,528
34		9,065	1,731	4,665	100	15,561
35		10,472	2,062	6,136	202	18,872
36 ✓		11,946	2,411	7,741	352	22,450

K-5 10 X 10 TO THE INCH 3.7 X 10 INCHES
NEUFEL & ESSER CO. MADE IN U.S.A.

46 0782



JOB NO.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Spillway Submergence

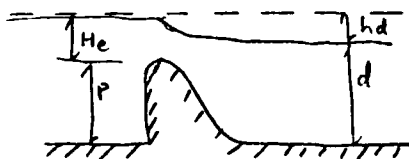
The tailwater at Jackson's Pond Dam is controlled by Valley Road bridge, which is located about 200 feet downstream of the dam. Flood Insurance study work provides this:

<u>Recurrence interval (yrs.)</u>	<u>G C CFS</u>	<u>Stage (Ft. above NGVD)</u>
10	2,050	22.4
50	4,000	24.5
100	5,450	25.8
500	11,700	28.9

This is plotted on semi-log paper on p.

According to Design of Small Dams, p. 382, Figure 254 the reduction in flow due to tailwater submergence can be related to $\frac{h_d}{H_e}$,

where H_e & h_d are as shown below:



At our maximum flow of 22,450 cfs, $h_d = 36 - 32.1 = 3.9'$, H_e

$$= 36 - 24.1 = 11.9'. \quad \frac{h_d}{H_e} = \frac{3.9}{11.9} = 0.33 \quad \text{From Figure 254,}$$

the spillway flow would be reduced by less than 5%. We will therefore ignore submergence effects.

P. 7 of 12

Jackson Pond Dam
Tailwater 1/s. Q

TCG

ANCO

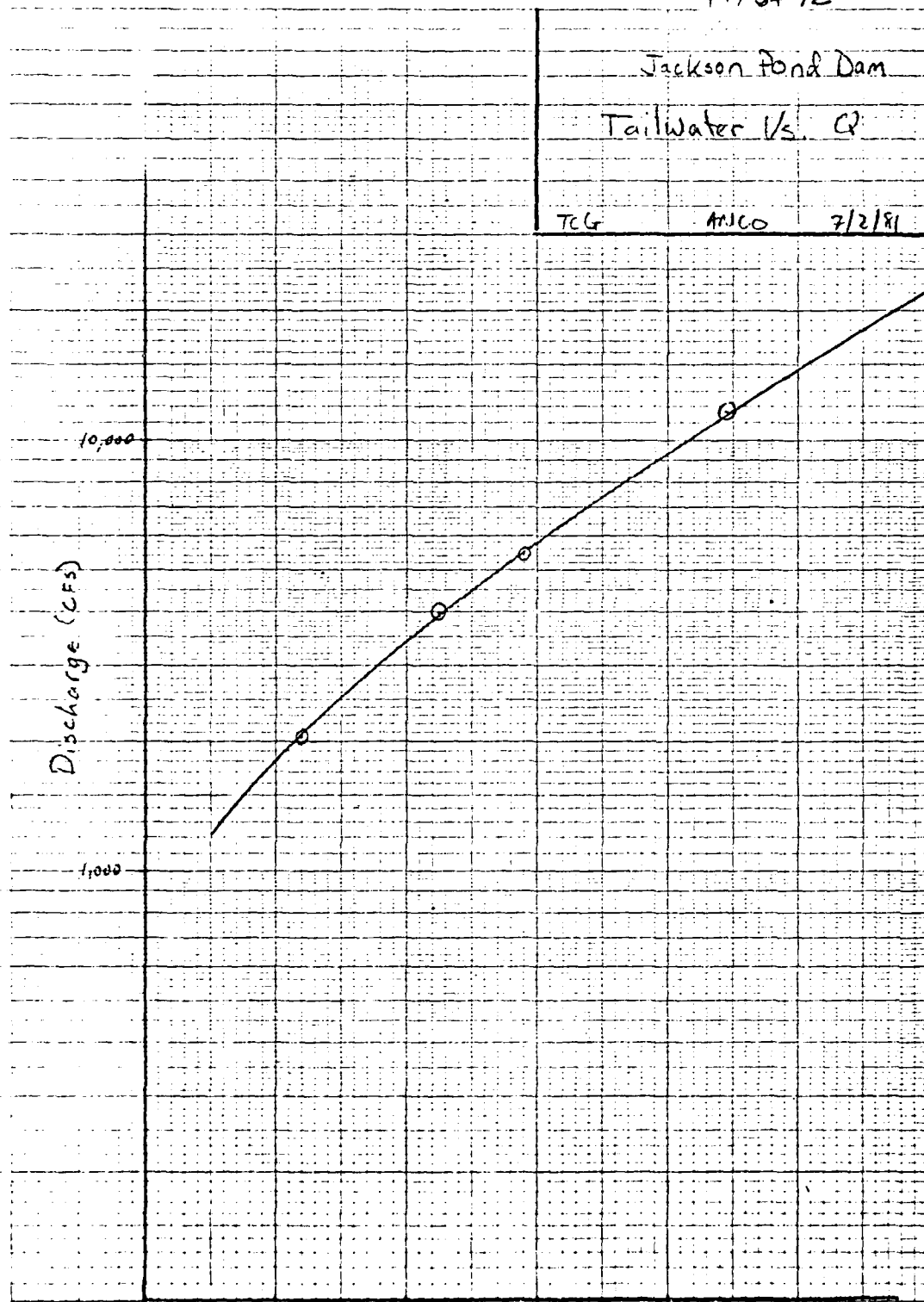
7/2/81

Discharge (CFS)

10,000

1,000

Elevation (Ft. above NAVD)



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Subject Jackson's Pond

Sheet No. 8 of 12

Date 7/1/81

Computed TCT

Checked CR

JOB NO.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Stage Versus Storage

Storage at spillway crest

elevation 20 = 1400 ft u/s dam (from W.P.A. 1936 riparian stream survey)

elevation 80 = 50,900 ft u/s dam. (Elevations 40 and 60 do not cross the river on its natural channel, & thus don't indicate slope)

Elevation 80 crossing from U.S.G.S. Roselle quad.)

$$Slope = \frac{80-20}{50,900-1,400} = 0.0012$$

Distance U/s from dam where water surface = 24.1 is:

$$1400 + \frac{4.1}{0.0012} = 4,817 \text{ feet}$$

- Storage: ① Assume linear variation in bottom elevation with distance
② Assume 300 foot average width for 1400 feet; 75' average width thereafter.

first 1400 feet:

$$depth \text{ at dam} = 24.1 - 15.8 = 8.3'$$

$$depth \text{ 1400' u/s} = 24.1 - 20 = 4.1'$$

$$Avg. = 6.2'$$

$$Storage = 6.2 (300') (1400') = 2,604,000 \text{ ft}^2 = 59.8 \text{ ac-ft.}$$

from 1400 to 4,817

$$depth \text{ at 1400} = 4.1'$$

$$depth \text{ at 4817} = 0.0$$

$$avg. = 2.05'$$

$$Storage = 2.05 (75) (4817 - 1400) = 525,364 \text{ ft}^2 = 12.1 \text{ ac-ft}$$

total storage at spillway crest = 71.9 ac-ft.

Anderson-Nichols & Company, Inc.

Subject Jackson's Pond

Sheet No. 9 of 12
 Date 7/1/81
 Computed T.C.C.
 Checked C.K.W.

JOB NO.

AREAS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

SCALE

Surcharge storage

The surface area at the spillway crest, assuming 300' width
 for 1400' and 75' from 1,400 to 4,817 is:

$$1400(300) + 75(4817 - 1400) = 676,275 \text{ ft}^2 = 15.5 \text{ ac.}$$

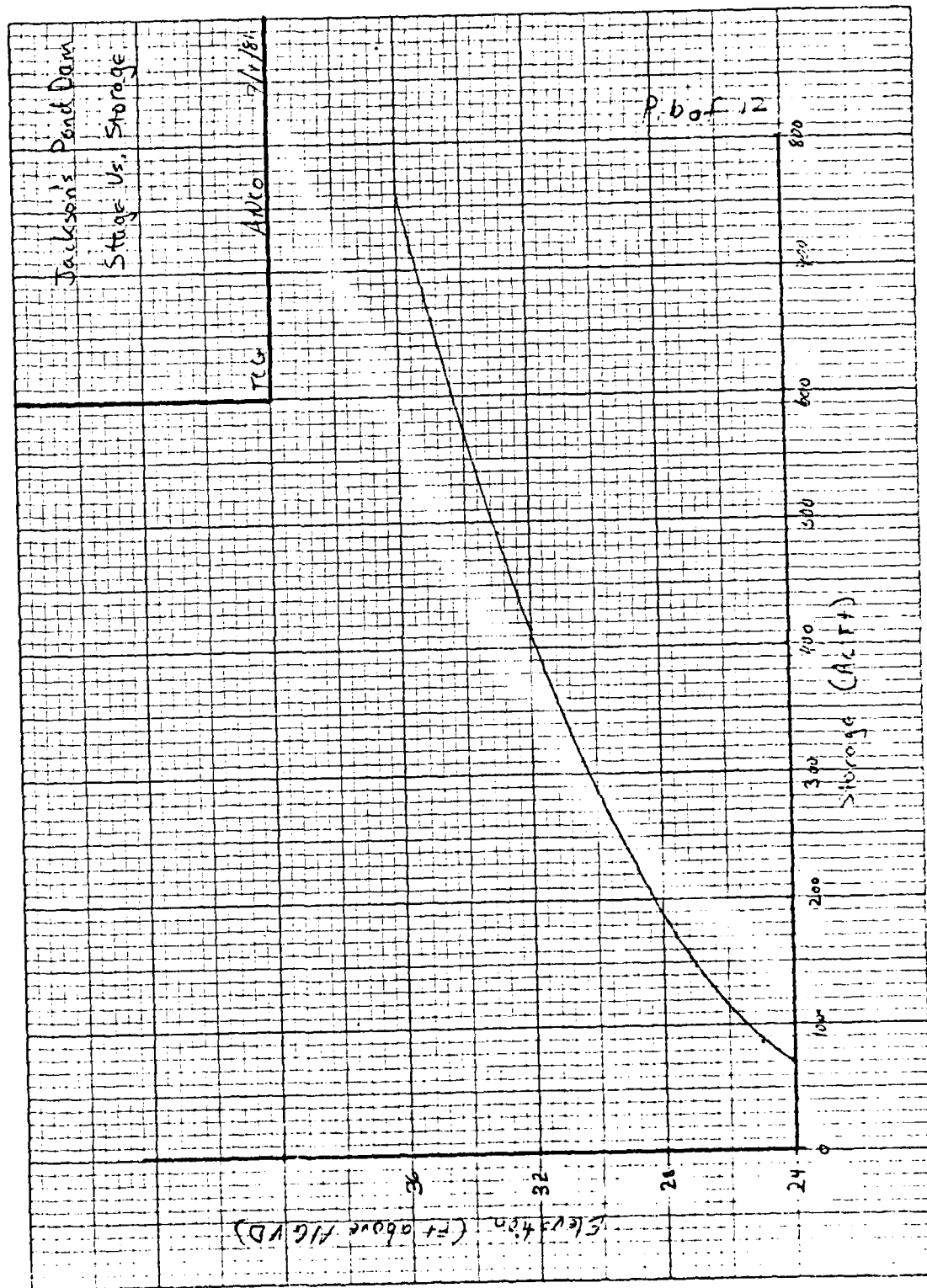
At 40' NGVD, surface area = 128 ac. (planimetered)

- ① Assume linear increase in surface area with elevation
- ② Assume storage = 0.0 at 15.8

Elevation (Feet above NGVD)	Δ H (Ft)	Surface Area (Acres)	Avg. S.A. (Acres)	Incremental Storage (Ac - Ft)	Cumulative Storage (Ac - Ft)
15.8		-			0
24.1	8.3	15.5			71.9
25.0	0.9	21.9	18.7	16.8	88.7
25.9	0.9	28.2	25.05	22.5	111.2
27.0	1.1	36.0	32.1	35.3	146.7
27.9	0.9	42.4	39.2	35.3	182
29.0	1.1	50.2	46.3	50.9	232.9
30.0	1	57.2	53.7	53.7	286.6
31.0	1	64.3	60.75	60.8	347.4
32.0	1	71.4	67.85	67.8	415.2
33.0	1	78.5	74.95	75.0	490.2
34.0	1	85.5	82.0	82.0	572.2
35.0	1	92.6	89.05	89.0	661.2
36.0	1	99.7	96.15	96.2	757.4

K.E. 10 X 10 TO THE INCH, 2 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0782



JOB NO.

AREAS SCALE 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Drawdown Analysis

- ① There are 45 stop logs (5 9-log bays). With a crane, logs could be removed even against pressure from water flowing over. Assume:
 - a. 3 logs can be removed from each bay before allowing pond to drop to 1 foot above the last log.
 - b. 5 minutes/log/bay = $5(3)(5) = 75$ minutes / "lift".
 - c. Assume water surface does not change during each "lift." (Actually, the water level would decline - thus decreasing outflow time required).

② Inflow = 47 cfs (Avg. flow at Rahway gage at Rahway).

③ 30-inch gated opening Invert = 20.2, $Q = C A \sqrt{2g} \sqrt{H}$, $C = 0.61$, $A = 4.9 \text{ ft}^2$. $Q = 0.61(4.9) \sqrt{64.4} (E - 21.45)^{1/2} = 24.0 (E - 21.45)^{1/2}$

④ At $T=0$, $E=25.1$, storage = 91.2 ac-ft. Storage from p. 9

⑤ $\text{Ac-Ft/Day} = \frac{(Q_{\text{avg}} - 47) \times 86400}{\text{Time}}$ ⑥ Days = $\Delta \text{storage} / \text{acre-ft/day}$

① Remove top 3 logs in each bay. Time = $3(5)(5 \text{ min}) = 75 \text{ min} = 0.053 \text{ days}$

Elevation $25.9 - 3(0.9) = 23.2$

② Get water to 24.2 feet.

Elevation (ft above NGVD)	Storage (Ac-Ft)	DS (Ac-Ft)	$Q_{30 \text{ inch}}$ (cfs)	Q_{SL}^* (cfs)	Avg. Q (cfs)	Avg Q - 47 cfs	Ac-Ft/ DAY	DAYS
25.1	91.2		45.9	121.8				
		10.0			143.65	96.65	191.7	0.052
24.6	81.2		42.6	77.0				
		7.4			102.95	55.95	111.0	0.067
24.2	73.8		39.8	46.5				

$\times (E - 23.2)^{3/2} (3.1) 15$

$E = 0.119 \text{ days}$

A. J. rson-Nichols & Company, Inc.

Subject Jackson Pond

Sheet No. 11A of 12
Date 8/13/77
Computed SL
Checked SL

JOB NO.

AREAS
SCALE

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

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③ Remove next 3 stop logs.

$$\text{Time} = 3(5)(5) = 75 \text{ min} \\ = 0.053 \text{ days}$$

$$\text{Elevation} = 23.2 - 3(0.9) = 20.5$$

④ Get water to 21.5 feet

Elevation (ft above NGVD)	Storage (Ac-Ft)	ΔS (Ac-Ft)	30-inch opening (cfs)	Q_{SL}^* (cfs)	Total Avg. Q (cfs)	Avg Q -47	Ac-Ft/ Day	Days
24.2	73.8		39.8	330.9				
23.7	68.4	5.4	36	266.2	336.45	289.45	547.11	0.010
23.2	64.1	4.3	31.7	206.3	270.1	223.1	442.51	0.010
22.8	60.6	3.5	27.9	162.2	214.05	167.05	331.3	0.011
22.4	57.2	3.4	23.4	121.8	167.65	120.65	239.3	0.014
22.0	53.7	3.5	17.8	85.4	124.2	77.2	153.1	0.023
21.5	49.4	4.3	5.4	46.5	77.55	30.55	60.6	0.071

$$* = 3.1(15)(E-20.5)^{3/2}$$

$$E = 0.139 \text{ days}$$

⑤ Remove last 3 logs
E = 17.8 feet

$$\text{Time} = 3(5)(5) = 75 \text{ min} = 0.053 \text{ days}$$

erson-Nichols & Company, Inc.

Subject Jackson's Pond

Sheet No. 11B of 12
 Date 2/13/81
 Computed J. E. E.
 Checked CE

JOB NO.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

AREAS
IN SCALE

1

2 ① Get water to 18.8 feet

3

Elevation (ft MVD)	Storage (Ac-Ft)	ΔS (Ac-Ft)	Q_{pipe} (cfs)	Q_{SL} (cfs)	TOTL AVG. Q (cfs)	AVG Q -47	Ac-Ft/ Day	Days
21.5	49.4		5.4	330.9				
20.5	40.7	8.7	0	206.3	271.3	224.3	444.9	0.020
19.5	32.1	8.6	0	103.1	154.7	107.7	213.6	0.040
18.8	26.0	6.1	0	46.5	74.8	27.8	55.1	0.111

= 0.171
days

Total = $3(0.053) + 0.119 + 0.139 + 0.171 = 0.588 \text{ days}$

= 14 hours

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A. J. rson-Nichols & Company, Inc.

Subject Jackson's Pond

Sheet No. 12 of 12

Date 6/2/51

Computed J. J. R.

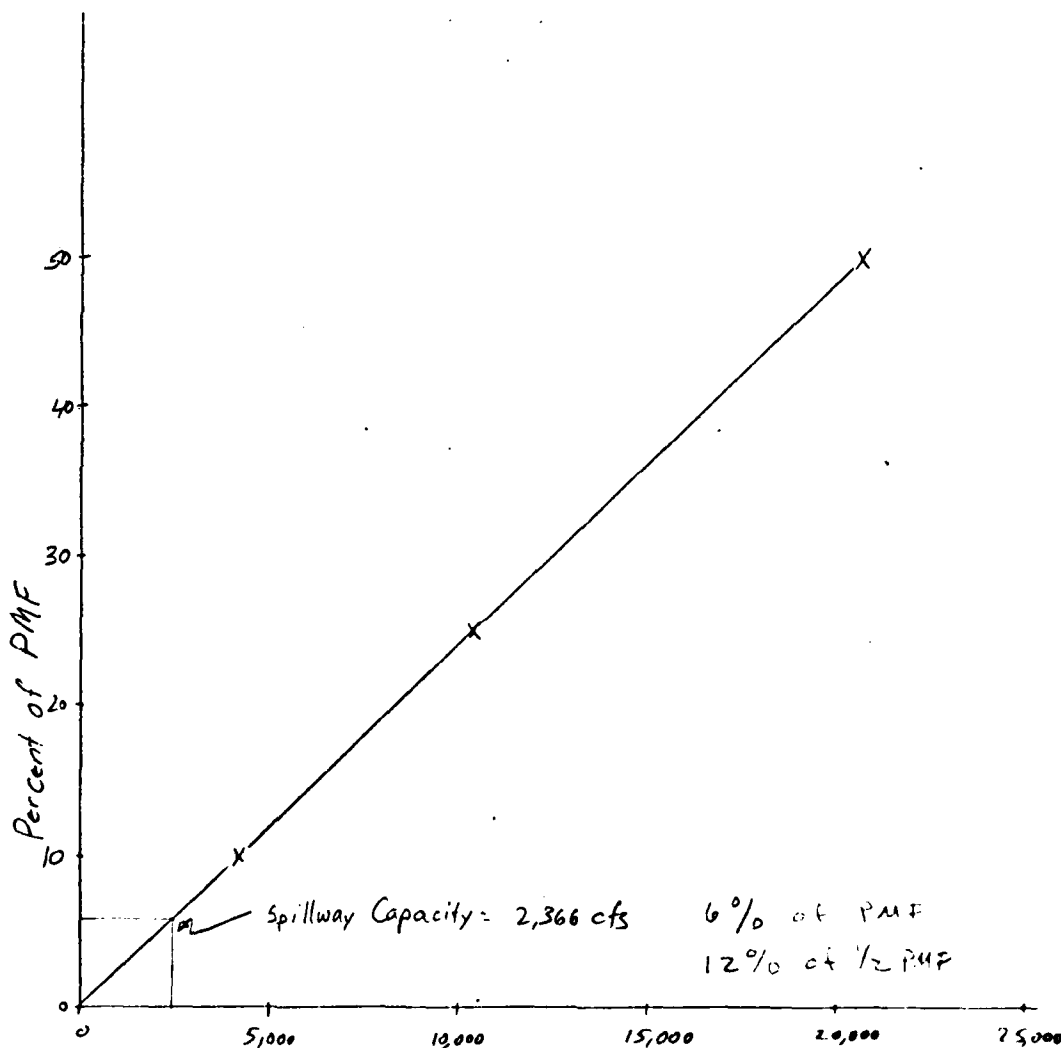
Checked C. K. P.

JOB NO.

IN. SCALE

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Overtopping Analysis



APPENDIX 4

HEC 1 OUTPUT

JACKSON POND DAM

REC-1 INI-UI

[illegible]

U.S. ARMY CORPS OF ENGINEERS
 THE HYDROLOGIC ENGINEERING CENTER
 609 SOUTH STREET
 DAVIS, CALIFORNIA 95616
 (916) 445-3251 (FIS) 445-3252

 FLOD HYDROGRAPH PACKAGE (HLC-1)
 FEBRUARY 1981
 RUN DATE 07/06/81 TIME 09.19.33

JACKSON POND DAM OVERTIPPING ANALYSIS TOM GOUGH ARCC
 NEW JERSEY DAM NO. 771 - UNION COUNTY - KAHNAY CITY
 0.5 MULTIPLE OF THE PMF

5 IO OUTPUT CONTROL VARIABLES
 IPLOT 1 PRINT CONTROL
 QSCALE 0 PLOT HYDROGRAPH PLOT SCALE
 DMSC YES PRINT DIAGNOSTIC MESSAGES

IT HYDROGRAPH TIME DATA 10 MINUTES IN COMPUTATION INTERVAL
 DATE 1 0 STARTING DATE
 TIME 1 0000 STARTING TIME
 NO DATE 2 250 NUMBER OF HYDROGRAPH ORDINATES
 NO TIME 2 1730 ENDING DATE
 ENDING TIME

COMPUTATION INTERVAL 0.17 HOURS
 TOTAL TIME BASE 41.50 HOURS

-ENGLISH UNITS
 DRAINAGE AREA SQUARE MILES
 PRECIPITATION DEPTH INCHES
 LENGTH, ELEVATION FEET
 FLOW CUBIC FEET PER SECOND
 STORAGE VOLUME ACRES-Feet
 SURFACE AREA ACRES
 TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION 1 NUMBER OF PLANS
 JR MULTI-RATIO OPTION
 RATIOS OF RUNOFF
 0.50

 7 KK * A1 * JACKSON POND INFLOW HYDROGRAPH

INFLOW FROM CLARK UNIT HYDROGRAPH COMPUTATIONS

SUBBASIN RUNOFF DATA

9 BA SUBBASIN CHARACTERISTICS
 AREA 40.00 SUBBASIN AREA

10 BF BASE FLOW CHARACTERISTICS
 SRTD 120.00 INITIAL FLOW
 SECIN 120.00 BEGIN BASE FLOW
 RTTOR 1.00000 RECESION CONSTANT

PRECIPITATION DATA

11 PM PROBABLE MAXIMUM STORM INDEX PRECIPITATION
 23.00 TRANSPOSITION COEFFICIENT
 0.04 TRANSPOSITION AREA
 40.00 USE SMO DISTRIBUTION
 340 NO

PERCENT OF INDEX PRECIPITATION OCCURRING IN GIVEN TIME
 99-HR 11.0 0.0
 48-HR 0.0 0.0
 24-HR 0.0 0.0

12 LU UNIFORM LOSS RATE 1.00 INITIAL LOSS RATE
 0.00 UNIFORM PERCENT IMPERVIOUS AREA
 0.00

13 UC CLARK UNITGRAPH 4.30 TIME OF CONCENTRATION
 7.96 STORAGE COEFFICIENT

SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

UNIT HYDROGRAPH PARAMETERS
 CLARK TP= 4.27 HR, P= 7.96 HR
 SUTNER CP= 0.40

UNIT HYDROGRAPH COORDINATES
 150 END OF REPLETION VOLUME 0.54

17	66	137	224	323	433	550	674	800	927	1054	1181	1308	1435	1562	1689	1816	1943	2070	2197	2324	2451	2578	2705	2832	2959	3086	3213	3340	3467	3594	3721	3848	3975	4102	4229	4356	4483	4610	4737	4864	4991	5118	5245	5372	5499	5626	5753	5880	6007	6134	6261	6388	6515	6642	6769	6896	7023	7150	7277	7404	7531	7658	7785	7912	8039	8166	8293	8420	8547	8674	8801	8928	9055	9182	9309	9436	9563	9690	9817	9944	10071	10198	10325	10452	10579	10706	10833	10960	11087	11214	11341	11468	11595	11722	11849	11976	12103	12230	12357	12484	12611	12738	12865	12992	13119	13246	13373	13500	13627	13754	13881	14008	14135	14262	14389	14516	14643	14770	14897	15024	15151	15278	15405	15532	15659	15786	15913	16040	16167	16294	16421	16548	16675	16802	16929	17056	17183	17310	17437	17564	17691	17818	17945	18072	18199	18326	18453	18580	18707	18834	18961	19088	19215	19342	19469	19596	19723	19850	19977	20104	20231	20358	20485	20612	20739	20866	20993	21120	21247	21374	21501	21628	21755	21882	22009	22136	22263	22390	22517	22644	22771	22898	23025	23152	23279	23406	23533	23660	23787	23914	24041	24168	24295	24422	24549	24676	24803	24930	25057	25184	25311	25438	25565	25692	25819	25946	26073	26200	26327	26454	26581	26708	26835	26962	27089	27216	27343	27470	27597	27724	27851	27978	28105	28232	28359	28486	28613	28740	28867	28994	29121	29248	29375	29502	29629	29756	29883	30010	30137	30264	30391	30518	30645	30772	30899	31026	31153	31280	31407	31534	31661	31788	31915	32042	32169	32296	32423	32550	32677	32804	32931	33058	33185	33312	33439	33566	33693	33820	33947	34074	34201	34328	34455	34582	34709	34836	34963	35090	35217	35344	35471	35598	35725	35852	35979	36106	36233	36360	36487	36614	36741	36868	36995	37122	37249	37376	37503	37630	37757	37884	38011	38138	38265	38392	38519	38646	38773	38900	39027	39154	39281	39408	39535	39662	39789	39916	40043	40170	40297	40424	40551	40678	40805	40932	41059	41186	41313	41440	41567	41694	41821	41948	42075	42202	42329	42456	42583	42710	42837	42964	43091	43218	43345	43472	43599	43726	43853	43980	44107	44234	44361	44488	44615	44742	44869	44996	45123	45250	45377	45504	45631	45758	45885	46012	46139	46266	46393	46520	46647	46774	46901	47028	47155	47282	47409	47536	47663	47790	47917	48044	48171	48298	48425	48552	48679	48806	48933	49060	49187	49314	49441	49568	49695	49822	49949	50076	50203	50330	50457	50584	50711	50838	50965	51092	51219	51346	51473	51600	51727	51854	51981	52108	52235	52362	52489	52616	52743	52870	53000	53127	53254	53381	53508	53635	53762	53889	54016	54143	54270	54397	54524	54651	54778	54905	55032	55159	55286	55413	55540	55667	55794	55921	56048	56175	56302	56429	56556	56683	56810	56937	57064	57191	57318	57445	57572	57699	57826	57953	58080	58207	58334	58461	58588	58715	58842	58969	59096	59223	59350	59477	59604	59731	59858	59985	60112	60239	60366	60493	60620	60747	60874	61001	61128	61255	61382	61509	61636	61763	61890	62017	62144	62271	62398	62525	62652	62779	62906	63033	63160	63287	63414	63541	63668	63795	63922	64049	64176	64303	64430	64557	64684	64811	64938	65065	65192	65319	65446	65573	65699	65826	65953	66080	66207	66334	66461	66588	66715	66842	66969	67096	67223	67350	67477	67604	67731	67858	67985	68112	68239	68366	68493	68620	68747	68874	69001	69128	69255	69382	69509	69636	69763	69890	70017	70144	70271	70398	70525	70652	70779	70906	71033	71160	71287	71414	71541	71668	71795	71922	72049	72176	72303	72430	72557	72684	72811	72938	73065	73192	73319	73446	73573	73699	73826	73953	74080	74207	74334	74461	74588	74715	74842	74969	75096	75223	75350	75477	75604	75731	75858	75985	76112	76239	76366	76493	76620	76747	76874	77001	77128	77255	77382	77509	77636	77763	77890	78017	78144	78271	78398	78525	78652	78779	78906	79033	79160	79287	79414	79541	79668	79795	79922	80049	80176	80303	80430	80557	80684	80811	80938	81065	81192	81319	81446	81573	81699	81826	81953	82080	82207	82334	82461	82588	82715	82842	82969	83096	83223	83350	83477	83604	83731	83858	83985	84112	84239	84366	84493	84620	84747	84874	85001	85128	85255	85382	85509	85636	85763	85890	86017	86144	86271	86398	86525	86652	86779	86906	87033	87160	87287	87414	87541	87668	87795	87922	88049	88176	88303	88430	88557	88684	88811	88938	89065	89192	89319	89446	89573	89699	89826	89953	90080	90207	90334	90461	90588	90715	90842	90969	91096	91223	91350	91477	91604	91731	91858	91985	92112	92239	92366	92493	92620	92747	92874	93001	93128	93255	93382	93509	93636	93763	93890	94017	94144	94271	94398	94525	94652	94779	94906	95033	95160	95287	95414	95541	95668	95795	95922	96049	96176	96303	96430	96557	96684	96811	96938	97065	97192	97319	97446	97573	97699	97826	97953	98080	98207	98334	98461	98588	98715	98842	98969	99096	99223	99350	99477	99604	99731	99858	99985	100112	100239	100366	100493	100620	100747	100874	101001	101128	101255	101382	101509	101636	101763	101890	102017	102144	102271	102398	102525	102652	102779	102906	103033	103160	103287	103414	103541	103668	103795	103922	104049	104176	104303	104430	104557	104684	104811	104938	105065	105192	105319	105446	105573	105699	105826	105953	106080	106207	106334	106461	106588	106715	106842	106969	107096	107223	107350	107477	107604	107731	107858	107985	108112	108239	108366	108493	108620	108747	108874	109001	109128	109255	109382	109509	109636	109763	109890	110017	110144	110271	110398	110525	110652	110779	110906	111033	111160	111287	111414	111541	111668	111795	111922	112049	112176	112303	112430	112557	112684	112811	112938	113065	113192	113319	113446	113573	113699	113826	113953	114080	114207	114334	114461	114588	114715	114842	114969	115096	115223	115350	115477	115604	115731	115858	115985	116112	116239	116366	116493	116620	116747	116874	117001	117128	117255	117382	117509	117636	117763	117890	118017	118144	118271	118398	118525	118652	118779	118906	119033	119160	119287	119414	119541	119668	119795	119922	120049	120176	120303	120430	120557	120684	120811	120938	121065	121192	121319	121446	121573	121699	121826	121953	122080	122207	122334	122461	122588	122715	122842	122969	123096	123223	123350	123477	123604	123731	123858	123985	124112	124239	124366	124493	124620	124747	124874	125001	125128	125255	125382	125509	125636	125763	125890	126017	126144	126271	126398	126525	126652	126779	126906	127033	127160	127287	127414	127541	127668	127795	127922	128049	128176	128303	128430	128557	128684	128811	128938	129065	129192	129319	129446	129573	129699	129826	129953	130080	130207	130334	130461	130588	130715	130842	130969	131096	131223	131350	131477	131604	131731	131858	131985	132112	132239	132366	132493	132620	132747	132874	133001	133128	133255	133382	133509	133636	133763	133890	134017	134144	134271	134398	134525	134652	134779	134906	135033	135160	135287	135414	135541	135668	135795	135922	136049	136176	136303	136430	136557	136684	136811	136938	137065	137192	137319	137446	137573	137699	137826	137953	138080	138207	138334	138461	138588	138715	138842	138969	139096	139223	139350	139477	139604	139731	139858	139985	140112	140239	140366	140493	140620	140747	140874	141001	141128	141255	141382	141509	141636	141763	141890	142017	142144	142271	142398	142525	142652	142779	142906	143033	143160	143287	143414	143541	143668	143795	143922	144049	144176	144303	144430	144557	144684	144811	144938	145
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[illegible]

Category	Count	Percentage	Percentage of Total
1	2040	123	0.03
2	2040	123	0.03
3	2040	123	0.03
4	2040	123	0.03
5	2040	123	0.03
6	2040	123	0.03
7	2040	123	0.03
8	2040	123	0.03
9	2040	123	0.03
10	2040	123	0.03
11	2040	123	0.03
12	2040	123	0.03
13	2040	123	0.03
14	2040	123	0.03
15	2040	123	0.03
16	2040	123	0.03
17	2040	123	0.03
18	2040	123	0.03
19	2040	123	0.03
20	2040	123	0.03
21	2040	123	0.03
22	2040	123	0.03
23	2040	123	0.03
24	2040	123	0.03
25	2040	123	0.03
26	2040	123	0.03
27	2040	123	0.03
28	2040	123	0.03
29	2040	123	0.03
30	2040	123	0.03
31	2040	123	0.03
32	2040	123	0.03
33	2040	123	0.03
34	2040	123	0.03
35	2040	123	0.03
36	2040	123	0.03
37	2040	123	0.03
38	2040	123	0.03
39	2040	123	0.03
40	2040	123	0.03
41	2040	123	0.03
42	2040	123	0.03
43	2040	123	0.03
44	2040	123	0.03
45	2040	123	0.03
46	2040	123	0.03
47	2040	123	0.03
48	2040	123	0.03
49	2040	123	0.03
50	2040	123	0.03
51	2040	123	0.03
52	2040	123	0.03
53	2040	123	0.03
54	2040	123	0.03
55	2040	123	0.03
56	2040	123	0.03
57	2040	123	0.03
58	2040	123	0.03
59	2040	123	0.03
60	2040	123	0.03
61	2040	123	0.03
62	2040	123	0.03
63	2040	123	0.03
64	2040	123	0.03
65	2040	123	0.03
66	2040	123	0.03
67	2040	123	0.03
68	2040	123	0.03
69	2040	123	0.03
70	2040	123	0.03
71	2040	123	0.03
72	2040	123	0.03
73	2040	123	0.03
74	2040	123	0.03
75	2040	123	0.03
76	2040	123	0.03
77	2040	123	0.03
78	2040	123	0.03
79	2040	123	0.03
80	2040	123	0.03
81	2040	123	0.03
82	2040	123	0.03
83	2040	123	0.03
84	2040	123	0.03
85	2040	123	0.03
86	2040	123	0.03
87	2040	123	0.03
88	2040	123	0.03
89	2040	123	0.03
90	2040	123	0.03
91	2040	123	0.03
92	2040	123	0.03

CUMULATIVE AREA = 40.00 SQ MI

HYDROGRAPH AT STATION:
PLAN 1, PATIC = 0.50 41

[illegible]

41.50-144
5,957.
9,576.
26,430.

CUMULATIVE AREA = 40.00 SQ MI

ROUTE INFLOW HYDROGRAPH THROUGH JACKSON POND

14 KK A2

HYDROGRAPH ROUTING DATA

15 RS	STORAGE ROUTING	1	NUMBER OF SURFEACHES
NTSPS	NTSPS	STOR	TYPE OF INITIAL CONDITION
RSVRIC	RSVRIC	71.90	INITIAL CONDITION
X	X	3.3	WORKING R AND D COEFFICIENT

16 SW	STORAGE	0.0	71.9	111.2	146.7	182.6	232.9	347.4	490.2	661.2	757.9
17 SE	ELEVATION	15.80	24.10	25.90	27.00	27.90	29.00	31.00	33.00	35.00	36.00
18 SO	DISCHARGE	0.	0.	703.	1522.	2366.	3736.	7399.	12526.	16672.	22450.
19 SE	ELEVATION	15.80	24.10	25.90	27.00	27.90	29.00	31.00	33.00	35.00	36.00

20	SS	SPILLWAY	CEFL	SPWD	SPILLWAY WIDTH	SPILLWAY CREST ELEVATION
					97.00	
					3.00	
					1.50	
					EXPONENT OF HEAD	

21 ST	TOP OF DAM	ELEVATION AT TOP OF DAM
TOPCEL	27.90	
DAM WID	175.00	
COGO	0.0	
EXPO	1.50	

STORAGE	0.0	71.90	COMPUTED STORAGE-OUTFLOW CURVE			
			111.20	146.70	182.60	232.90
	0.0					347.40
						601.20
	0.0					757.40
OUTFLOW	0.0	0.0	703.00	1522.00	2366.00	3738.00
						7399.00
						12528.00
						18872.00
						22450.00

HYDROGRAPH AT STATION
PLAN 1. RATIO = 0.50 A2

..... S L
..... STORAGE
..... UTILUM
..... CHD
..... HRMN
..... MON
..... DA
..... STAGE
..... STORAGE
..... OUTFLW
..... CHD
..... HRMN
..... MON
..... DA

1150	71	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	72	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	73	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	74	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	75	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	76	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	77	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	78	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	79	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	80	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	81	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	82	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	83	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5
1150	84	613	104	325	75	325	0150	125	125	42.5	32.5	150	150	275	150	275	27.5

EAK OUTFLOW IS 20756. AT TIME 20.17 HOURS

PEAK FLOW (CFS) 20756.	TIME (HR) 20.17	(CFS) (INCEFT) (ACFT)	6-HR 1857.7 9103.	MAXIMUM AVERAGE FLOW 24-HR 20389.	41.50-HR 279.
EAK STORAGE (AC-FT) 712.	TIME (HR) 20.17		6-HR 847.	MAXIMUM AVERAGE STORAGE 24-HR 410.	41.50-HR 279.
PEAK STAGE (FEET) 35.53	TIME (HR) 20.17		6-HR 34.82	MAXIMUM AVERAGE STAGE 24-HR 31.61	41.50-HR 28.91

CUMULATIVE AREA = 40.00 SQ MI

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PEAK-FAITH COLUMBIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AGED BY SQUARE MILLS
 TIME TO PEAK IN HOURS

RATIOS APPLIED TO FLOWS

PERATION	STATION	AREA	PLAN	RATIO 1
OROGRAPH-AT	A1	40.00	1	20914.83
UTED TO	A2	40.00	1	20756.17
			** PEAK STAGES IN FEET **	
			1	35.53
				20.17

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION A2

PLAN 1

ELEVATION
STORAGE
OUTFLOW

INITIAL VALUE
24.10
72.
0.

SPILLWAY CREST
24.10
72.
0.

TOP OF DAM
27.91
102.
236.6.

RATIO
OF
PMF

MAXIMUM
RESERV. ELEV
W.S.

MAXIMUM
DEPTH
OVER DAM

MAXIMUM
STORAGE
AC-FT

MAXIMUM
OUTFLOW
CFS

DURATION
OVER TOP
HOURS

TIME OF
MAX OUTFLOW
HOURS

TIME OF
FAILURE
HOURS

0.50

35.53

7.63

712.

20756.

23.83

20.17

0.0

NORMAL END OF JOB ***

LINE	10.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1	JACKSON POND DAM
2	NEW JERSEY DAM NO. 771 - UNION COUNTY - RAHWAY CITY
3	0.1, 0.25, 0.5 MULTIPLES OF THE PMF
4	10
5	250
6	FLOW 0.1 0.25 0.5
7	A1 JACKSON POND INFLOW HYDROGRAPH COMPUTATIONS
8	INFLOW FROM CLARK UNIT HYDROGRAPH COMPUTATIONS
9	40.0 120. 1
10	23.0 0.1
11	4.30 7.96
12	NO 99 108 118
13	A2 ROUTE INFLOW HYDROGRAPH THROUGH JACKSON POND
14	ROUTES
15	1 171.9 146.7 182. 232.9 347.4 490.2 661.2 757.4
16	0 21.9 27.9 27.9 31. 31. 33. 35. 36.
17	15.8 24.1 25.9 1522. 27.9 27.9 27.9 27.9 27.9
18	15.8 24.1 25.9 1522. 27.9 27.9 27.9 27.9 27.9
19	24.1 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9
20	27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9
21	27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9
22	27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS			
				RATIO 1	RATIO 2	RATIO 3	
HYDROGRAPH AT	A1	40.00	1	41.83	10.57	20.14	
				19.83	19.83	19.83	
ROUTED TO	A2	40.00	1	41.83	10.57	20.14	
				20.33	20.17	20.17	
** PEAK STAGES IN FEET **							
	1			29.22	32.16	35.53	
				20.33	20.17	20.17	

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION

.....	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	TIME OF MAX FLOW	TIME OF MAX OUTFLOW	TIME OF FAILURE HOURS
0.10	39.22	24.10	24.10	27.77	20.33	20.33	0.0
0.25	39.22	72.0	72.0	102.0	20.17	20.17	0.0
0.50	35.53	0.	0.	236.5	23.87	23.87	0.0

NCRRAL END-OF-JOB - 444

APPENDIX 5

REFERENCES

JACKSON POND DAM

APPENDIX 5
REFERENCES

JACKSON POND DAM

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