01 Jan 1980

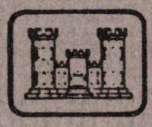
Phase 1 Inspection Report: National Dam Safety Program. Mississippi -St. Francis Basin. Nims Lake Dam, Washington County, Missouri

Woodward-Clyde Consultants, Chicago, Illinois

MISSISSIPPI - ST. FRANCIS BASIN

NIMS LAKE DAM
WASHINGTON COUNTY, MISSOURI
MO 30064

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY INSPECTION



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Corps of Engineers
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St. Louis District

PREPARED BY: U.S. ARMY ENGINEER DISTRICT, ST. LOUIS

FOR: STATE OF MISSOURI

NOVEMBER 1980

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 TUCKER BOULEVARD, NORTH
ST. LOUIS, MISSOURI 63101

REPLY TO ATTENTION OF

SUBJECT: Nims Lake Dam (MO 30064)

This report presents the results of field inspection and evaluation of Nims Lake Dam, Missouri Inventory Number 30064.

It was prepared under the National Program of Inspection of Non-Federal Dams.

This dam has been classified as unsafe, non-emergency by the St. Louis District as a result of the application of the following criteria:

a. Spillway will not pass 50 percent of the Probable Maximum Flood without overtopping the dam.

b. Overtopping of the dam could result in failure of the dam.

c. Dam failure significantly increases the hazard to loss of life downstream.

SUBMITTED BY: SIGNED — 18 DEC 1980

Chief, Engineering Division — Date

APPROVED BY: SIGNED — 22 DEC 1980

Colonel, CE, District Engineer — Date

NIMS LAKE DAM

Madison County, Missouri

Missouri Inventory No. 30064

Phase I Inspection Report

National Dam Safety Program

Prepared by

Woodward-Clyde Consultants

Chicago, Illinois

Under Direction of

St Louis District, Corps of Engineers

For

Governor of Missouri

November 1980

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 the Chief of Engineers, Washington, D. C., 20314. The purpose of a Phase I investigation is not to provide a complete evaluation of the safety of the structure nor to provide a guarantee on its future integrity. Rather the purpose of the program is to identify potentially hazardous conditions to the extent they can be identified by a visual examination. The assessment of the general condition of the dam is based upon available data (if any) and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify the need for more detailed studies. In view of the limited nature of the Phase I studies no assurance can be given that all deficiencies have been identified.

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 any data which may be available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action removes the normal load on the structure, as well as the reservoir head along with seepage pressures, and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected, so that corrective action can be taken. Likewise continued care and maintenance are necessary to minimize the possibility of development of unsafe conditions.

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam	Nims Lake Dam
State Located	Missouri
County Located	Madison
Stream	Wills Branch
Date of Inspection	7 & 8 August 1980

Nims Lake Dam, Missouri Inventory No. 30064, was inspected by S. F. Gizienski (geotechnical engineer), R. Juyal (hydrologist) and J. B. Stevens (geotechnical engineer).

The dam inspection was made following the guidelines presented in the "Recommended Guidelines for Safety Inspection of Dams". These guidelines were developed by the Chief of Engineers, U.S. Army, Washington, D.C., with the help of federal and state agencies, professional engineering organizations, and private engineers. The resulting guidelines represent a consensus of the engineering profession. These guidelines are intended to provide for an expeditious identification, based on available data and a visual inspection, of those dams which may pose hazards to human life and property. In view of the limited nature of the study, no assurance can be given that all deficiencies have been identified.

The dam has been classified by the St Louis District, Corps of Engineers (SLD), as having a high hazard potential. The damage zone length, as determined by SLD, extends approximately seven miles downstream. Within the estimated damage zone are numerous occupied structures including the town of Fredericktown.

The dam is classified as intermediate size due to its approximately 59 ft height and 8,100 ac-ft storage volume. The intermediate size classification includes dams between 40 and 100 ft in height, or having storage capacity between 1000 and 50,000 ac-ft.

Our inspection and evaluation indicate the embankment is in generally good condition. The deficiencies noted included inadequate spillway capacity, lack of regular maintenance and periodic inspections, and lack of seepage and stability analyses for the dam.

Hydrologic/hydraulic studies indicate that the one percent probability-of-occurrence event (100-yr flood) will not result in overtopping of the dam. These analyses also indicate that the dam will be overtopped for a hydrologic event which produces greater than 27 percent of the Probable Maximum Flood (PMF). The PMF is defined as the flood event that may be expected to occur from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

The following specific remedial measures and additional studies are recommended for the Nims Lake Dam:

1. Design and construct a spillway of adequate capacity and/or raise the dam crest elevation and/or lower the maximum operating pool elevation to allow passage of the PMF without overtopping the dam.

2. Perform seepage and stability analyses for the as-built configuration of the dam as per the "Recommended Guidelines for Safety Inspections of Dams".

3. Implement an inspection and maintenance program for the dam and appurtenant structures. Records of the inspections and maintenance should be kept.

4. Develop a monitoring program for the seepage area near the dam toe to identify potential changes in the quantity of seepage or turbidity in the seepage water.

5. Evaluate the feasibility of a practical and effective warning system to alert downstream residents, should potentially hazardous conditions develop.

The analyses and implementation of remedial measures should be performed by an engineer experienced in the design and construction of dams.

It is recommended the owner take action on these recommendations as soon as practical to preclude deterioration which could lead to the development of hazardous conditions at this facility. The actions concerning the spillway should be taken without undue delay.

WOODWARD-CLYDE CONSULTANTS

Stanley F. Gizienski, P.E.
Principal

Jean-Yves Perez, P.E.
Vice President

OVERVIEW

NIMS LAKE DAM

MISSOURI INVENTORY NO. 30064

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PHASE I INSPECTION REPORT
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SECTION 1
PROJECT INFORMATION

1.1 General

a. **Authority.** The National Dam Inspection Act, Public Law 92-367, provides for a national inventory and inspection of dams throughout the United States. Pursuant to the above, an inspection was conducted of the Nims Lake Dam, Missouri Inventory Number 30064.

b. **Purpose of inspection.** "The primary purpose of the Phase I investigation program is to identify expeditiously those dams which may pose hazards to human life or property... The Phase I investigation will develop an assessment of the general condition with respect to safety of the project based upon available data and a visual inspection, determine any need for emergency measures and conclude if additional studies, investigations, and analyses are necessary and warranted..." (Chapter 3, "Recommended Guidelines for Safety Inspection of Dams").

c. **Evaluation criteria.** The criteria used to evaluate the dam were established in the "Recommended Guidelines for Safety Inspection of Dams", Engineering Regulation No. 1110-2-106 and Engineering Circular No. 1110-2-188, "Engineering and Design National Program for Inspection of Non-Federal Dams" prepared by the office of Chief of Engineers, Department of the Army, and "Hydrologic/Hydraulic Standards, Phase I Safety Inspection of Non-Federal Dams" prepared by the St Louis District, Corps of Engineers (SLD). These guidelines were developed with the help of several federal agencies and many state agencies, professional engineering organizations, and private engineers.

1.2 Description of Project

a. **Description of dam and appurtenances.** Nims Lake Dam is a rockfill dam with an impervious core. According to Ray Russell, an employee at the camp maintenance shop, rock for the dam was obtained from the spillway excavation near the left abutment. Fine-grained mine tailings were used for the core material. Prior to placement of the dam, the foundation rock was grouted to a depth of about 25 ft, and a 6-ft high concrete cutoff was constructed.

The spillway is a roughly trapezoidal channel cut through rock, located about 300 ft north of the dam (left abutment). Its flow is not controlled by any gates or similar structures.

A 36-in. diameter concrete pipe at the base of the dam is the only low-level outlet. It is controlled by a manually-operated gate located in a control shaft at about the center of the dam.

b. **Location.** The dam is on Wills Branch, about 7 mi north of Fredericktown, Madison County, Missouri. The dam is located in Sec 24, T34N, R6E about 1.6 mi east of US Highway 67, on the USGS Knob Lick, Missouri 7.5-minute quadrangle map.

c. **Size classification.** The dam is classified as intermediate size due to its approximately 59 ft height and 8,100 ac-ft storage volume. The intermediate size classification includes dams between 40 and 100 ft in height, or having a storage capacity between 1000 and 50,000 ac-ft.

d. **Hazard classification.** The dam as been classified by the St Louis District, Corps of Engineers (SLD), as having a high hazard potential; we concur with this classification. The estimated damage zone length, as determined by the SLD, extends approximately seven miles downstream. Within this zone are three highway bridges, a dam and reservoir which serves as the water supply for Fredericktown, and numerous occupied structures in the town of Fredericktown.

e. **Ownership.** We understand the dam is owned by the St Louis Area Council, Boy Scouts of America, 4568 West Pine Blvd., St Louis, Missouri 63108. Correspondence should be addressed to the attention of Mr Paul A. Brockland.

f. **Purpose.** The impoundment is used for recreational purposes and water supply for the Boy Scout Camp.

g. **Design and construction history.** According to Mr Brockland, the dam was designed by Sverdrup, Parcel and Associates, Inc, 801 N 11th, St Louis, Missouri 63101. It was constructed in 1963 by the Trogdon Construction Co, Box 428, Farmington, Missouri, 63640.

h. **Normal operational procedures.** There are no formal operational procedures. Maximum operating pool elevation is controlled by the elevation of the spillway. The low-level outlet is operated about every other year to lower the lake approximately 6 ft so that maintenance of various facilities can be performed in the dry.

1.3 Pertinent Data

a. **Drainage area.** 5.0 mi^2

b. **Discharge at damsite.**

Maximum known flood at damsite	Not observed
Warm water outlet at pool elevation	N/A
Diversion tunnel low pool outlet at pool elevation	N/A
Diversion tunnel outlet at pool elevation	N/A
Gated spillway capacity at pool elevation	N/A
Gated spillway capacity at maximum pool elevation	N/A
Ungated spillway capacity at maximum pool elevation	1150 ft^3/sec
Total spillway capacity at maximum pool elevation	1150 ft^3/sec

c. **Elevation (ft above MSL).**

Top of dam	854.5 to 855.9
Maximum pool-design surcharge	N/A
Full flood control pool	N/A
Recreation pool	849.4
Spillway crest (gated)	N/A
Upstream portal invert diversion tunnel	N/A

Downstream portal invert diversion tunnel	N/A
Streambed at toe of dam	796
Maximum tailwater	Unknown

d. **Reservoir.**

Length of maximum pool	12,000 ft
Length of recreation pool	11,000 ft
Length of flood control pool	N/A

e. **Storage (acre-feet).**

Recreation pool	6280
Flood control pool	N/A
Design surcharge	N/A
Top of dam	8100

f. **Reservoir surface (acres).**

Top of dam	380
Maximum pool	380
Flood-control pool	N/A
Recreation pool	340
Spillway crest	340

g. **Dam.**

Type	Rockfill with impervious core (according to the design plans)
Length	500 ft
Height	59 ft
Top width	15 ft
Side slopes	Downstream 1.75(H) to 1(V)
	Upstream unknown (designed at 1.3(H) to 1(V))
Zoning	Yes; impervious core, rock shell (according to the design plans)
Impervious core	Yes; fine-grained mine tailings (according to the design plans and Mr Ray Russell)

Cutoff	Yes; 6 ft concrete wall (according to the design plans and Mr Ray Russell)
Grout curtain	Yes; 25 ft deep (according to the design plans)

h. **Diversion and regulating tunnel.**

Type	None
Length	N/A
Closure	N/A
Access	N/A
Regulating facilities	N/A

i. **Spillway.**

Type	Trapezoidal, unlined, rock and soil
Length of weir	60 ft
Crest elevation	849.4 ft (MSL)
Gates	None
Upstream channel	None
Downstream channel	Unlined earth and rock

j. **Regulating outlets.** 36-in. diameter Class IV concrete pipe beneath dam; hand operated sluice gate, operated from crest of dam; 192 ft length on design plans; access through 48 inch vertical manhole assembly from crest of dam.

SECTION 2
ENGINEERING DATA

2.1 Design

Design plans were made available by Mr Brockland of the St Louis Area Boy Scout Council. Additional information on the design was provided by Mr J. Larsen of Sverdrup and Parcel, St Louis, Missouri.

2.2 Construction

No records of the dam construction were available. Mr Ray Russell, a maintenance employee of the Boy Scout camp supplied the following information on construction.

The dam was constructed by Trogdon Construction Company of Farmington, Missouri. The dam was constructed in 1963. The rockfill was placed in approximately 3 ft lifts and trackwalked. No information was available on the placement of the impervious core material.

2.3 Operation

There are no historical records maintained of outflow at the spillway, elevation of the pool or operation of the low-level outlet.

2.4 Evaluation

a. **Availability.** The design plans were available; however, the design analyses were not. The design engineering firm of Sverdrup and Parcel, St Louis, was unable to locate the stability and other analyses which were made in connection with the design.

b. **Adequacy.** Since the design analyses were not made available to us, we were unable to draw conclusions as to the adequacy of the design data. Because the seepage and stability analyses cannot be checked or their existence verified, this should be reported as a deficiency. The plans adequately provided information as to the designed embankment section, foundation preparation,

outlet works construction and spillway dimensions. No subsurface investigation information was available which would describe the dam foundation conditions or the embankment material properties.

c. **Validity.** We were unable to obtain construction records or as-built plans to confirm that the dam and outlet works were constructed as shown on the plans; hence, the conformance of the design plans to the existing as-built conditions cannot be ascertained.

2.5 Project Geology

The dam site is located near the center of the Ozark structural dome. This central area is underlain by a Precambrian basement complex of intrusive and volcanic igneous rock. The igneous highlands at the center of the Ozark dome apparently represent highlands that have survived repeated burial and erosion. They control drainage in the area apparently much as they did in Precambrian time.

The bedrock at the Nims Lake Dam is a medium- to fine-grained granite intrusive rock. Depth of weathering appears to be minimal (less than 5 ft), except along joints where it may extend as much as 10 ft. The rock exposed in the spillway appeared relatively unweathered and highly resistant to erosion. Jointing is approximately at 3 to 5 ft spacing, and controlled the size of the largest riprap on the face of the dam.

The soils developed at the dam site consist of gravelly to sandy silts and silty sands (ML-SP) resulting from the weathering of the volcanic and granite bedrock in the area. They are typically shallow on the slopes adjacent to the dam. Colluvial sandy and gravelly soils occur at the base of the steeper slopes. The Missouri General Soil Map and Soil Association Description describes these soils as Jonca-Lamotte-Lily-Ramsey Association.

A branch of the Simms Mountain Fault System is mapped on the Structural Features Map of Missouri approximately 2 mi northeast of the dam. The Simms Mountain System is a complex network of faults approximately 42 mi long, with the upthrown side generally to the southwest. The fault appears to be limited to Precambrian and lower Paleozoic formations. The southwestern end of the zone approaches the area of the large New Madrid earthquake. However, the damsite is not considered to be in a seismically active area and the fault system does not appear to pose a significant hazard to the dam.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. **General.** A visual inspection of Nims Lake Dam was made on 7 and 8 August 1980 with Mr Ray Russell, a maintenance supervisor at the site.

b. **Dam.** The dam has a rockfill shell and an impervious core. The rockfill is granite up to 4 ft in size. The impervious core material is fine-grained tailings from a local barite operation and is described as a highly plastic clay (CH).

The horizontal and vertical alignment of the dam does not appear to have been disturbed. There was no evidence of depressions, detrimental settlement, sinkhole development, cracking or slides.

Numerous bushes and small trees are growing on the dam crest and exposed portion of the upstream slope. The upstream face has a low potential for erosion due to the size of the rock making up the dam face. The downstream slope has only scattered bushy growth. The left abutment has a considerable growth of bushes and trees.

No animal burrows were observed in the dam.

Clear seepage was observed exiting from the lower left abutment just above the downstream discharge channel about 20 ft from the dam and about 15 ft above the water level in the discharge channel. The seepage rate was estimated at about 5 gal/min.

c. **Appurtenant structures.**

1. Spillway. The spillway is a trapezoidal-shaped, unlined, uncontrolled rock and earth channel. At the time of inspection, there was scattered vegetation and unconsolidated earth in the bottom of the channel indicative of a lack of maintenance. Side slopes of the spillway appeared stable.

2. Low-level outlet. The low-level outlet is a 36-in. diameter concrete pipe controlled by a manually operated sluice gate. The handwheel used to operate the gate is located at the upstream edge of the dam crest near the center of the dam. The sluice gate was opened during the field inspection and operated satisfactorily. Inspection of the inlet, outlet and pipe was not possible because all were submerged.

d. **Reservoir.** The reservoir is used for recreational purposes and water supply for the Boy Scout Camp. Slopes in the area are wooded and generally relatively flat. No signs of instability were observed. The drainage area is primarily wooded and undeveloped so little sediment is transported into the lake.

e. **Downstream channel.** The downstream channel is earth- and rock-lined. At the toe of the dam a pond has been formed which submerges the low level outlet. The pond is the result of blockage of the downstream channel at its lower end by debris deposited from the spillway channel excavation. This blockage does not affect the spillway capacity; however, it does create some tailwater at the discharge end of the outlet pipe and decreases its discharge capacity to a small degree.

3.2 Evaluation

Our visual inspection did not indicate any sinkhole development, slides, cracking, detrimental settlement, depressions or other evidence of instability.

In general, the dam and spillway have not received the necessary regular maintenance. Vegetation in the spillway will interfere to some degree with spillway discharges. Therefore, clearing is advisable.

The seepage noted at the time of inspection was not significant but should be monitored for potential changes in the future.

The sluice gate of the low-level outlet was in good operating condition at the time of our inspection.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures

There are no written operational procedures for Nims Lake Dam. Maximum operating pool elevation is generally controlled by the crest of the spillway. The low level outlet is operated about once every two years to draw down the lake about 6 ft so that maintenance of boat docks and beaches can be performed.

4.2 Maintenance of Dam.

No records of maintenance on this dam were available.

4.3 Maintenance of Operating Facilities

No records of maintenance of the operating facilities were available.

4.4 Description of any Warning System in Effect

The inspection did not identify any warning system in effect at this facility.

4.5 Evaluation

There are apparently no maintenance or operational procedures in effect. The lack of regular maintenance and periodic inspection is considered a deficiency.

The feasibility of a practical and effective warning system should be evaluated to alert downstream residents, should potentially hazardous conditions develop during periods of heavy precipitation.

SECTION 5
HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. **Design data.** Design plans for the spillway, low level outlet and dam embankment were obtained from Sverdrup and Parcel, Associates, St Louis, Missouri. These data are included as Appendix C. Dimensions of the reservoir and drainage basin have been measured from the USGS Knob Lick, Missouri 7.5 minute quadrangle map. Dimensions of the dam, spillway, and downstream channel were surveyed 11 August, 1980.

b. **Experience data.** No recorded history of rainfall, runoff, discharge, pool stage data or overtopping were available for this reservoir or watershed.

c. **Visual observations.**

1. Watershed. The watershed is predominantly natural woodlands, forested by mixed hardwoods and softwoods. The reservoir occupies approximately 10 percent of the 5 square mile drainage basin above the dam. The drainage basin is essentially linear, comprised of a single main valley with only minor tributaries. The length and area made it necessary to divide the drainage basin into three subareas in order to meet the specification for using the SCS lag time and time of concentration formulas. A discussion is presented in Appendix B.

2. Spillway. The open channel spillway is located beyond the left abutment, away from the dam embankment. The channel is cut into granitic bedrock and is not anticipated to be subject to erosion during high velocity flood flows. The channel is approximately 60 ft wide at the bottom.

3. Low-level outlet. A 36-in. reinforced concrete pipe is located beneath the dam and acts as a low-level outlet. It is controlled by a sluice gate

controlled from a tower located on the dam crest (see design drawings, Appendix C). The outlet is used to lower the lake periodically for control of weeds along the banks and to allow maintenance of facilities along the shores, such as boat docks. The capacity of the outlet (calculated at approximately 275 cfs at top of dam) does not appear sufficient to have a significant effect on the overtopping potential.

d. **Overtopping potential.** Hydraulic and hydrologic analyses of the Nims Lake Dam and reservoir indicate that a flood greater than 27 percent of the PMF will result in overtopping of the embankment. The PMF is defined as the flood event that may be expected to occur from the most severe combination of critical meterologic and hydrologic conditions that are reasonably possible in the region.

The following table presents data computed for various flood events assuming no erosion of the spillway or embankment.

Percent PMF	Maximum Lake Elevation	Maximum Depth of Overtopping, ft	Maximum Outflow, ft^3/sec	Duration of Overtopping, hrs
27	854.4	0	1,150	0
28	854.6	0.1	1,200	1.7
50	856.5	2.0	5,100	9.7
100	858.5	4.0	13,800	11.8

It should be noted that for 50 percent and 100 percent of the PMF, the embankment will be overtopped for a significant duration and to a considerable depth. This depth and duration of overtopping could be sufficient to cause substantial erosion of the rock fill on the downstream face of the dam. Substantial erosion could cause failure of this dam.

Data input and output details for the analyses summarized in the table are presented in Appendix B. Complete copies of the computer printout are available in the project files.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. **Visual inspection.** During the visual inspection of the dam, no evidence of sinkhole development, slides, depressions, cracking, or detrimental settlement or instability was observed.

No seepage on the downstream slope or at the toe was observed. There was clear minor seepage out of the left abutment about 20 ft away from the toe.

The soil and rockfill used to construct the dam are not considered as having a high liquefaction potential.

b. **Design and construction data.** The design plans reproduced in Appendix C present details of the proposed construction; however, the design analyses by Sverdrup, Parcel and Associates, were not found or made available to us to enable an evaluation of the structural stability. Likewise no construction records or as-built plans were found to confirm that the dam was built as designed. We understand stability analyses were made by the designers but the records could not be located up to the date of this report. It was not known whether a seepage analysis was part of the stability analysis. As the design analysis was not found, this should be noted as a deficiency. The safe performance of rockfill embankments of this type depends upon the inclination of the slopes and the soundness of the foundation material. Though the design plans show a slope inclination of 1.3(H) to 1(V) for the upstream slope our field survey of the exposed portion (about 6 ft vertical) indicates the inclination to be of the order of 2(H) to 1(V). Experience shows that the angle of repose of rock embankments of this type is of the order of from 1.4 to 1.5(H) to 1(V); hence, it is likely the embankment as built is flatter than 1.3(H) to 1(V) indicated in the plans. At the angle of repose there is risk of slope sliding when subjected to seismic loadings. Therefore it is important to determine and evaluate the true existing upstream embankment slope.

c. **Operating records.** No formal operating records or water level records are maintained for this facility.

d. **Post construction changes.** There were no post construction changes observed.

e. **Seismic stability.** The dam is in Seismic Zone 2, to which the guidelines assign a moderate damage potential. In view of the materials used in the construction of the dam, embankment liquefaction is unlikely during a moderate seismic event. However, since no static stability analysis is available for review, the seismic stability cannot be properly evaluated. As discussed in paragraph 6.1.b, measurements should be made to ascertain the as-constructed inclination of the upstream slope and analyses made to determine the static and seismic stability of this slope.

SECTION 7
ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment

a. **Safety.** Based on the visual inspection and review of available information, the embankment and outlet works for Nims Lake Dam are judged to be in generally good condition. The deficiencies noted were inadequate spillway capacity, lack of a regular maintenance program (particularly the spillway), lack of periodic inspections, and lack of availability of seepage and stability analyses in accordance with the requirements of the "Recommended Guidelines for the Safety Inspection of Dams."

b. **Adequacy of information.** No records were available to determine whether the dam was built as designed. Also, the design computations were not available for review. Thus an assessment as to embankment stability cannot be made at this time. Seepage and stability analyses could not be located for this dam, although it was reported that a stability analyses was done for the initial design of the dam.

c. **Urgency.** The deficiencies described in this report could affect the safety of this dam. It is suggested the recommendations in Section 7.2b on stability analysis and spillway capacity be implemented without undue delay to prevent the development of hazardous conditions. The recommendations presented in Section 7.2c concerning operating and maintenance should be implemented as soon as practical.

d. **Necessity for Phase II.** In accordance with the Recommended Guidelines for Safety Inspection of Dams, the subject investigation was a minimum study. This study revealed that additional in-depth investigations as described in Section 7.2.b are needed to complete the assessment of the safety of the dam. It is our understanding from discussions with the St Louis District that these additional investigations are the responsibility of the owner.

7.2 Remedial Measures

a. **Alternatives.** There are several general options which may be considered to reduce the possibility of dam failure or to diminish the harmful consequences of such a failure. Some of these options are:

1. Remove the dam, or breach it to prevent the storage of water.

2. Increase the height of dam and/or spillway size to pass the probable maximum flood without overtopping the dam.

3. Purchase downstream land that would be adversely impacted by dam failure and restrict human occupancy.

4. Provide a highly reliable flood warning system (generally does not prevent damage but diminishes the chances for loss of life).

b. **Recommendations.** Based on the inspection of Nims Lake Dam, it is recommended that further study be made without undue delay to evaluate, as a minimum, the following:

1. Design of a spillway system with adequate capacity to pass the PMF.

2. Perform seepage and stability analyses for the as-built configuration of the dam as per the "Recommended Guidelines for Safety Inspections of Dam".

c. **O & M procedures.** A program of periodic inspections and maintenance should be implemented for the dam and appurtenant structures. This program should include such items as:

1. Inspection of the embankment to identify any signs of slope instability.

2. Monitor the seepage area near the dam toe to determine if the quantity of seepage is increasing or the seepage water is becoming turbid.

3. Evaluate the need to remove trees and brush growing on the dam. Removal of large trees should only be done under the guidance of an engineer experienced in the design and construction of dams. Indiscriminate clearing of trees may jeopardize the safety of the dam.

4. Records should be kept of recommended and performed maintenance on the facilities.

5. Evaluate available options for an effective and practical warning system to alert downstream residents, should potentially hazardous conditions develop.

All remedial measures should be performed under the guidance of an engineer experienced in the design and construction of dams.

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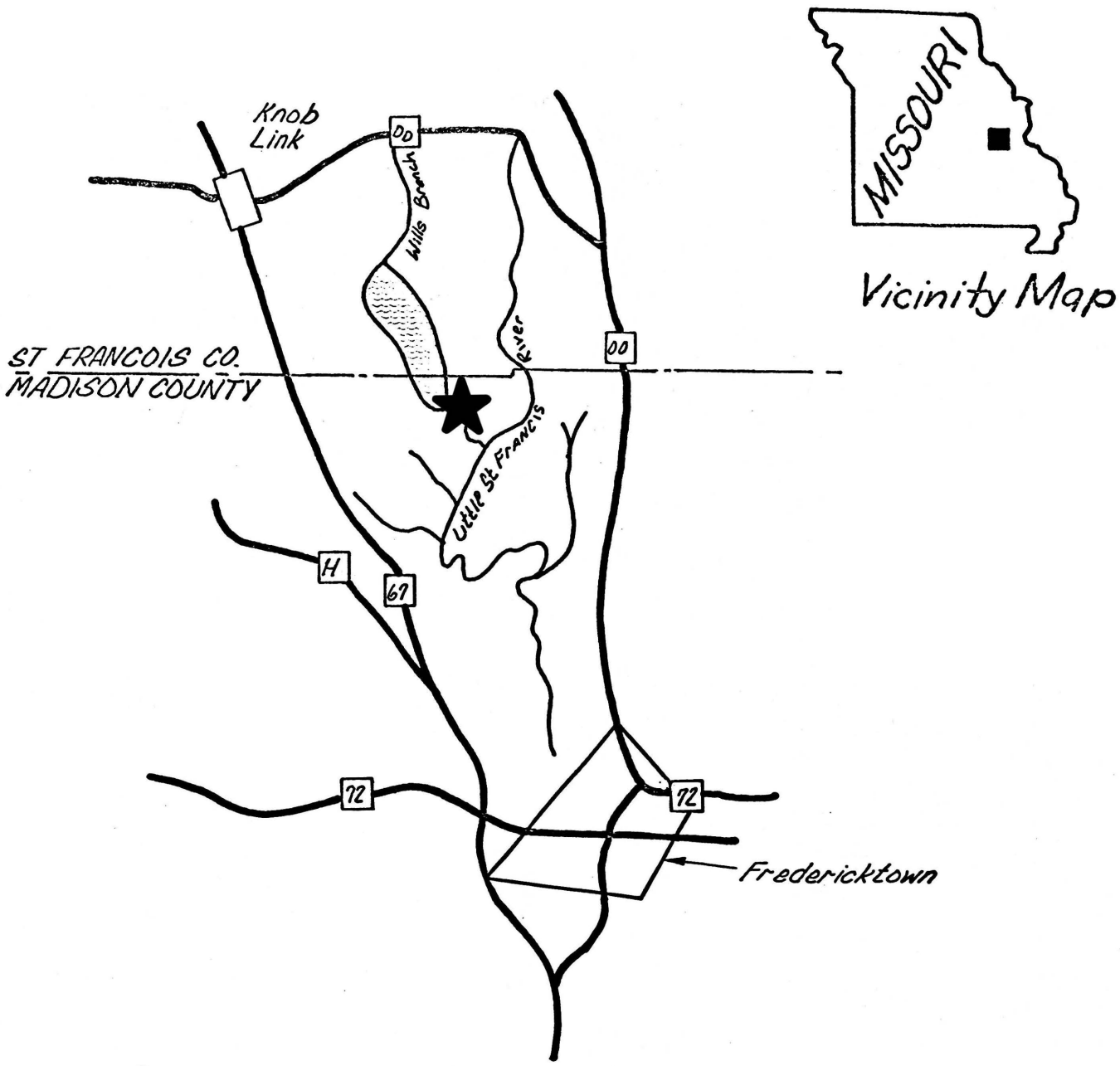
US Department of Commerce, US Weather Bureau, 1956, "Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24 and 48 Hours," Hydrometeorological Report No. 33.

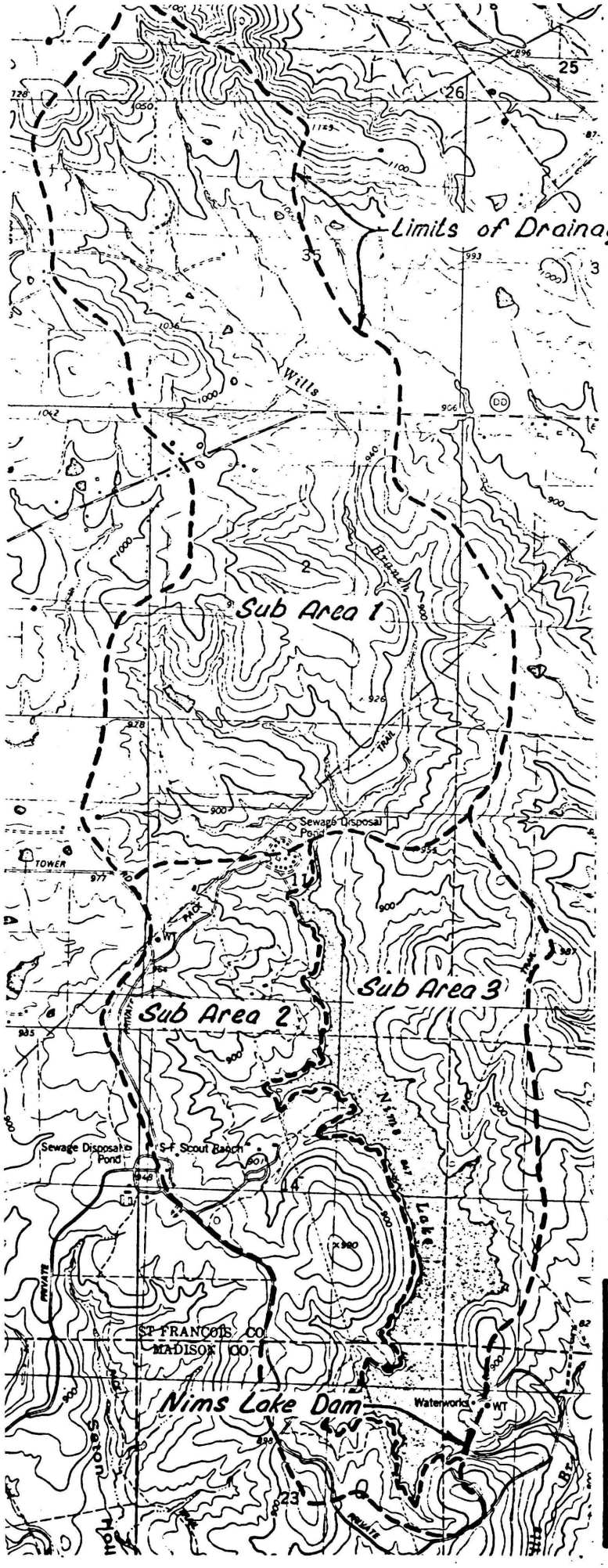
US Soil Conservation Service, 1971, "National Engineering Handbook," Section 4, Hydrology, 1971.



SITE LOCATION MAP

NIMS LAKE DAM

MO 30064 | Fig. 1



1. Topography from U.S.G.S. Knob Link 7.5 minute Quadrangle Map
2. Subareas 1,2, and 3 divided for Hydrology analysis. See Section 5 and Appendix B.

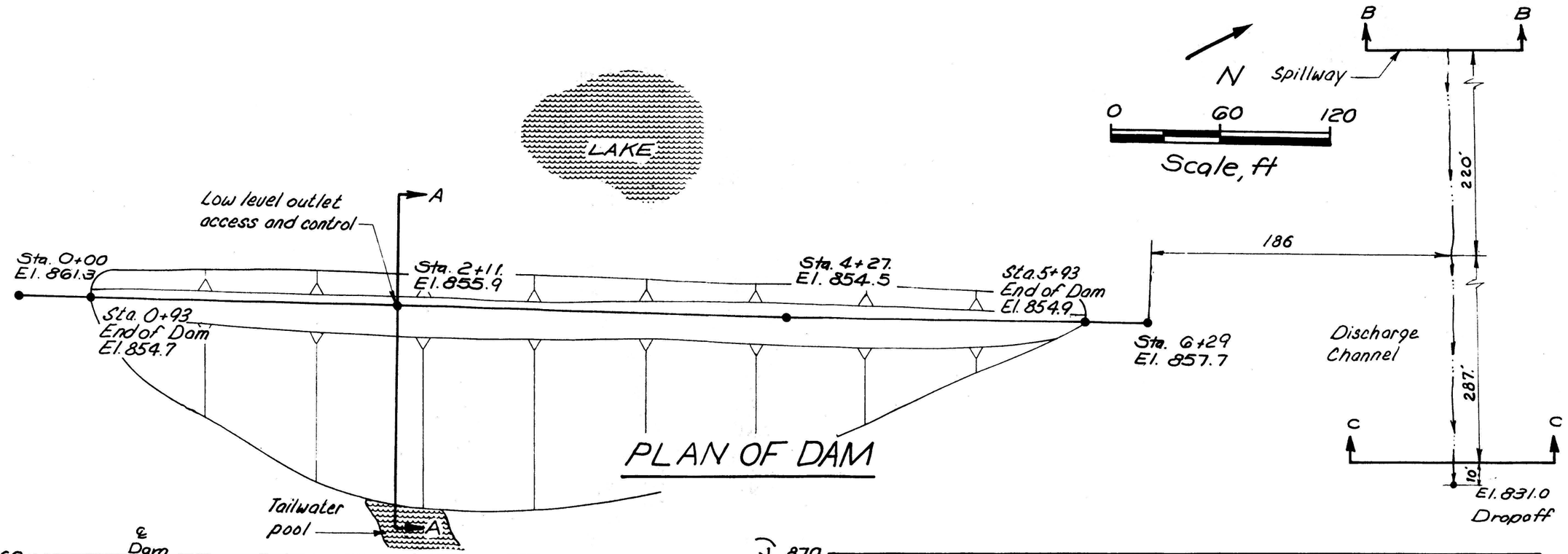
N

0 2000 4000

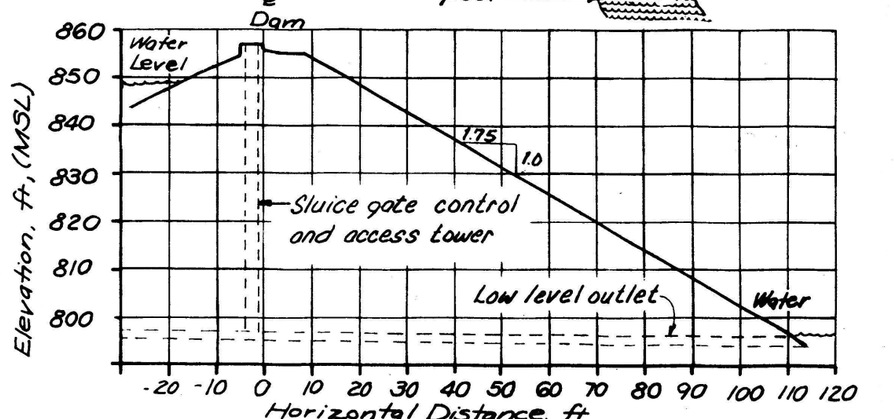
Scale, ft

DRAINAGE BASIN AND SITE TOPOGRAPHY

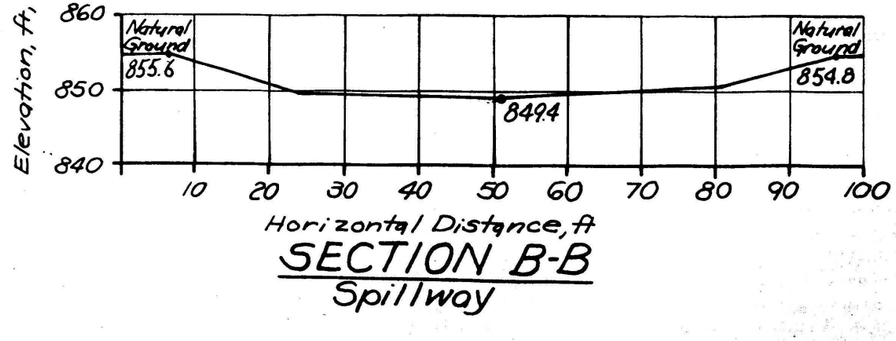
NIMS LAKE DAM	
MO 30064	Fig. 2



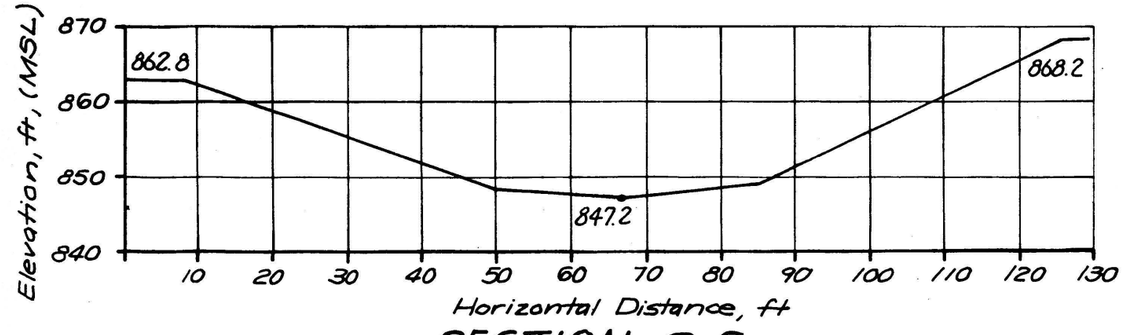
PLAN OF DAM



SECTION A-A
Maximum Section

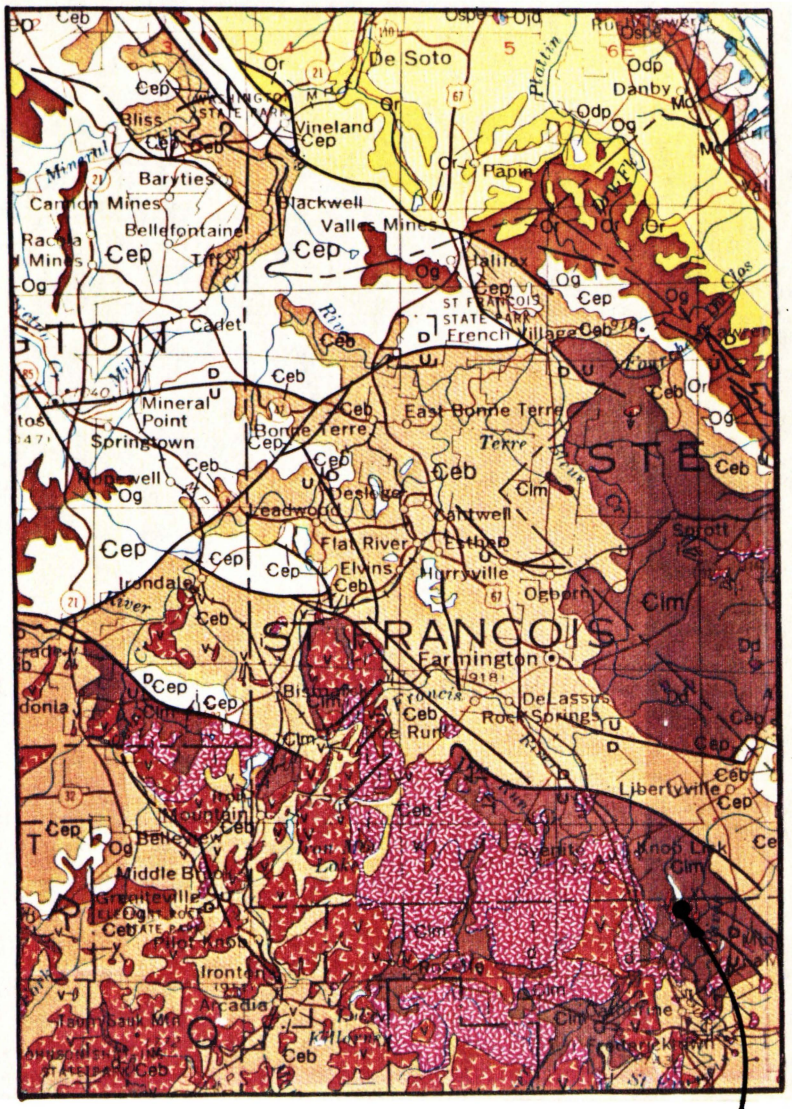


SECTION B-B
Spillway



SECTION C-C
Discharge Channel

PLAN AND SECTION OF DAM AND SECTIONS OF SPILLWAY AND DISCHARGE CHANNEL	
NIMS LAKE DAM	
MO 30064	Fig. 3



Legend

Ojc	Smithville Formation Powell Dolomite Cotter Dolomite Jefferson City Dolomite
Or	Roubidoux Formation
Og	Gasconade Dolomite Gunter Sandstone Member
Cep	Eminence Dolomite Potosi Dolomite
Ceb	Derby-Doerun Dolomite Davis Formation Bonneterre Formation Whetstone Creek Member Sullivan Siltstone Member
Cr	Reagan Sandstone
Clm	Lamotte Sandstone
d	Diabase (dikes and sills)
	St. Francois Mountains Intrusive Suite
	St. Francois Mountains Volcanic Supergroup

REGIONAL GEOLOGIC MAP

NIMS LAKE DAM

MO 30064 | Fig. 4

APPENDIX A

Photographs

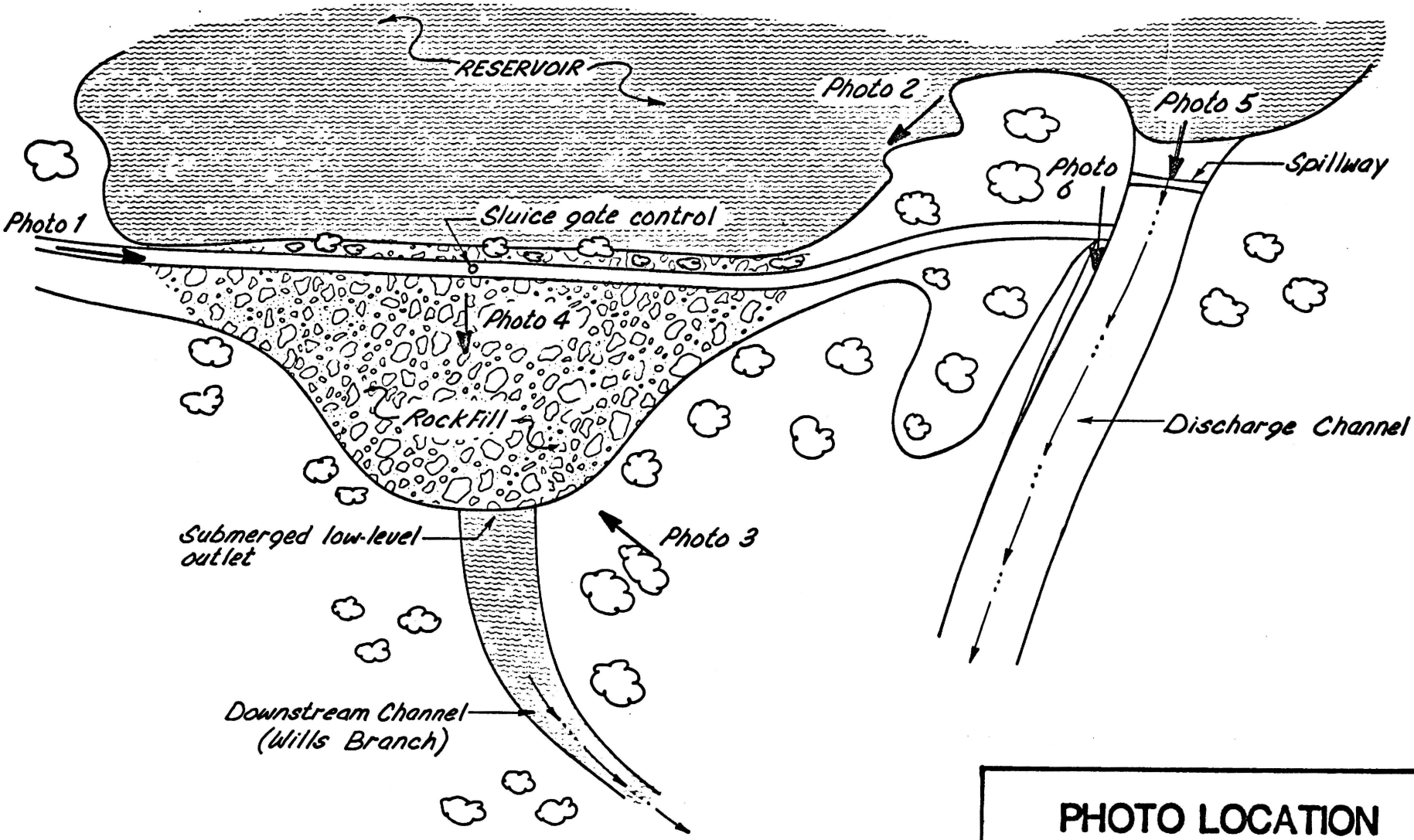


PHOTO LOCATION SKETCH

NIMS LAKE DAM

MO 30064 | Fig. A-1

1. View along crest from right abutment. Note gate control structure for low-level outlet at center.

2. Upstream slope of dam. Note rockfill wave protection and vegetation.

3. Downstream slope of dam. Note size of rockfill.

4. Downstream channel from dam crest. Exit for low-level outlet is submerged but discharges near dam toe.

5. Entrance to spillway.

6. Outlet channel from the right bank, looking downstream.

APPENDIX B

Hydraulic/Hydrologic Data and Analyses

APPENDIX B
Hydraulic/Hydrologic Data and Analyses

B.1 Procedures

a. General. The hydraulic/hydrologic analyses were performed using the "HEC-1, Dam Safety Version (1 Apr 80)" computer program. The inflow hydrographs were developed for various precipitation events by applying them to a synthetic unit hydrograph. The inflow hydrographs were subsequently routed through the reservoir and appurtenant structures by the modified Puls reservoir routing option.

b. Precipitation events. The Probable Maximum Precipitation (PMP) and the 1 and 10 percent probability-of-occurrence events were used in the analyses. The total rainfall and corresponding distributions for the 1 and 10 percent probability events were provided by the St. Louis District, Corps of Engineers. The Probable Maximum Precipitation was determined from regional curves prepared by the US Weather Bureau (Hydrometeorological Report Number 33, 1956).

c. Unit hydrograph. The Soil Conservation Services (SCS) Dimensionless Unit Hydrograph method (National Engineering Handbook, Section 4, Hydrology, 1971) was used in the analysis. This method was selected because of its simplicity, applicability to drainage areas less than 10 mi^2, and its easy availability within the HEC-1 computer program.

The watershed lag time was computed using the SCS "curve number method" by an empirical relationship as follows:

$$L = \frac{\ell^{0.8}\,(s+1)^{0.7}}{1900\,Y^{0.5}} \qquad \text{(Equation 15-4)}$$

where: L = lag in hours
ℓ = hydraulic length of the watershed in feet
$s = \frac{1000}{CN} - 10$ where CN = hydrologic soil curve number
Y = average watershed land slope in percent

This empirical relationship accounts for the soil cover, average watershed slope and hydraulic length.

With the lag time thus computed, another empirical relationship is used to compute the time of concentration as follows:

$$T_c = \frac{L}{0.6} \qquad \text{(Equation 15-3)}$$

where: T_c = time of concentration in hours

$$T_c = \frac{L}{0.6} \qquad \text{(Equation 15-3)}$$

where: T_c = time of concentration in hours

L = lag in hours.

Subsequent to the computation of the time of concentration, the unit hydrograph duration was estimated utilizing the following relationship:

$$\Delta D = 0.133 T_c \qquad \text{(Equation 16-12)}$$

where: ΔD = duration of unit excess rainfall
T_c = time of concentration in hours.

The final interval was selected to provide at least three discharge ordinates prior to the peak discharge ordinate of the unit hydrograph. For this dam, a time interval of 10 minutes was used.

d. Infiltration losses. The infiltration losses were computed by the HEC-1 computer program internally using the SCS curve number method. The curve numbers were established taking into consideration the variables of: (a) antecedent moisture condition, (b) hydrologic soil group classification, (c) degree of development, (d) vegetative cover and (e) present land usage in the watershed.

Antecedent moisture condition III (AMC III) was used for the PMF events and AMC II was used for the 1 and 10 percent probability events, in accordance with the guidelines. The remaining variables are defined in the SCS procedure and judgements in their selection were made on the basis of visual field inspection.

e. Starting elevations. Reservoir starting water surface elevations for this dam were set as follows:

(1) 1 and 10 percent probability events - observed water level

(2) Probable Maximum Storm - spillway crest elevation

Because the low-level discharge pipe has a relatively insignificant outflow capacity in relation to the spillway outflow capacity, it was considered to be closed and not contributing to the total outflow for overtopping analysis.

f. Spillway Rating Curve. The HEC-2 computer program was used to compute the spillway rating curve using discharge channel cross sections and conveyance characteristics.

B.2 Pertinent Data

a. Drainage area. Subarea 1: 2.6 mi^2 with 0% impervious
Subarea 2: 1.2 mi^2 with 0% impervious
Subarea 3: 1.1 mi^2 with 37% impervious

b. Storm duration. A unit hydrograph was developed by the SCS method option of HEC-1 program. The design storm of 48 hours duration was divided into 10 minute intervals in order to develop the inflow hydrograph.

c. Lag time. Subarea 1: 2.3 hours
Subarea 2: 0.5 hours
Subarea 3: 0.4 hours

d. Hydrologic soil group. C

e. SCS curve numbers.

1. For PMF- AMC III - Curve Number 85
2. For 1 and 10 percent probability-of-occurrence events - AMC II - Curve Number 90

f. Storage. Elevation-area data were developed by planimetering areas at various elevation contours on the USGS Knob Lick 7.5 minute quadrangle map. The data were entered on the $A and $E cards so that the HEC-1 program could compute storage volumes.

g. Outflow over dam crest. As the profile of the dam crest is irregular, flow over the crest was computed according to the "Flow Over Non-Level Dam Crest" supplement to the HEC-1 User's Manual. The crest length-elevation data and hydraulic constants were entered on the $D, $L, and $V cards.

h. Outflow capacity. The spillway rating curve was developed from the cross-section data of the spillway and the downstream channel, using the HEC-2 back water program. The results of the above were entered on the Y-4 and Y-5 cards of the HEC-1 program.

i. Reservoir elevations. For the 50 and 100 percent of the PMF events, the starting reservoir elevation was 849.4 ft, the spillway crest elevation. For the 1 and 10 percent probability-of-occurrence events, the starting reservoir elevation was 848.8 ft, the observed water level.

B.3 Results

The results of the analyses as well as the input values to the HEC-1 program follow in this Appendix. Only the results summaries are included, not the intermediate output. Complete copies of the HEC-1 and HEC-2 outputs are available in the project files.

PMF

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********************************
     1                A1       NIMS LAKE, DAM NO. 30064
     2                A2       WOODWARD-CLYDE CONSULTANTS, HOUSTON JOB NO. 79CH009
     3                A3       PROBABLE MAXIMUM FLOW (PMF) ANALYSIS
     4                B     299        0       10       -0       -0       -0       -0       -0       -0       -0
     5                B1      5
     6                J       1        4        1
     7                J1   .25      .50      .75      1.0                                                    B4
     8                K       0       A1                                                 1
     9                K1       INFLOW HYDROGRAPH COMPUTATIONS FOR SUBAREA 1
    10                M       1        2      2.6                                      1.
    11                P       0       26      102      120      130      140
    12                T                                                          -1      -85                0.
    13                W2              2.3
    14                X      -1     -.05       5.
    15                K       0       A2                                                 1
    16                K1       INFLOW HYDROGRAPH COMPUTATIONS FOR SUBAREA 2
    17                M       1        2     1.19                                     1.0
    18                P       0       26      192      120      130      140
    19                T                                                          -1      -85                0.
    20                W2              .51
    21                X      -1     -.05       5
    22                K       0       A3                                                 1
    23                K1       INFLOW HYDROGRAPH COMPUTATIONS FOR SUBAREA 3 INCLUDING LAKE
    24                M       1        2     1.07                                     1.0
    25                P       0       26      102      120      130      140
    26                T                                                          -1      -85                0.
    27                W2              .43
    28                X      -1     -.05       5
    29                K       3     LAKE                                                1
    30                K1       COMBINE ALL THE INFLOW HYDROGRAPHS TO THE LAKE
    31                K       1      DAM                                                1
    32                K1       FLOOD ROUTING AND OVERTOPPING ANALYSIS
    33                Y                                 1        1
    34                Y1      1                                                                -849.4       -1
    35                Y4  849.4    850.6    851.0    852.7    854.1    856.1     858.9
    36                Y5     0.     50.0    100.0    500.0   1000.0   2000.0    4000.0
    37                SA     0.    260.0    340.0    340.0    420.0
    38                SE  800.0    840.0    849.4    854.5    860.0
    39                S1  849.4
    40                SQ  854.5      2.8      1.5
    41                SL     0.    280.0    400.0    500.0
    42                SV  854.5    855.0    855.5    855.9
    43                K      99
```

Input Data
Various PMF Events
Nims Lake Dam
MO 30064

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********************************

 RUN  DATE: 26 AUG 80
      TIME: 12.54.09
```

NIMS LAKE, DAM NO. 30064
WOODWARD-CLYDE CONSULTANTS, HOUSTON JOB NO. 79CH009
PROBABLE MAXIMUM FLOW (PMF) ANALYSIS

JOB SPECIFICATION

NO	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
299	0	10	-0	-0	-0	-0	-0	-0	-0

JOPER	NWT	LROPT	TRACE
5	-0	-0	-0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 4 LRTIO= 1
RTIOS= .25 .50 .75 1.00

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

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH COMPUTATIONS FOR SUBAREA 1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
A1	0	-0	-0	-0	-0	1	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	2.60	-0.	2.60	1.00	-0.	-0	-0	-0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.	26.00	102.00	120.00	130.00	140.00	-0.	-0.

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0	-0.	-0.	1.00	-0.	-0.	1.00	-1.00	-85.00	-0.	0.

CURVE NO = -85.00 WETNESS = -1.00 EFFECT CN = 85.00

UNIT HYDROGRAPH DATA
TC= -0. LAG= 2.30

RECESSION DATA
STRTQ= -1.00 QRCSN= -.05 RTIOR= 5.00

TC= -0. LAG= 2.30

RECESSION DATA

STRTQ= -1.00 QRCSN= -.05 RTIOR= 5.00

UNIT HYDROGRAPH 71 END OF PERIOD ORDINATES, TC= -0. HOURS, LAG= 2.30 VOL= 1.00

11.	30.	57.	90.	131.	180.	239.	307.	372.	431.	
472.	502.	522.	526.	524.	515.	493.	468.	441.	411.	
375.	334.	291.	254.	224.	200.	178.	159.	142.	129.	
115.	103.	92.	81.	72.	65.	58.	52.	46.	41.	
37.	33.	29.	26.	23.	21.	19.	17.	15.	13.	
12.	10.	9.	8.	7.	7.	6.	5.	5.	5.	
4.	4.	3.	3.	2.	2.	2.	1.	1.	1.	
0.										

Output Summary
Various PMF Event
Nims Lake Dam
MO 30064

B6

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.10	1	.00	0.	.00	2.	1.02	1.00	150	.03	.02	.01	92.
1.01	.20	2	.00	0.	.00	2.	1.02	1.10	151	.03	.02	.01	90.
1.01	.30	3	.00	0.	.00	2.	1.02	1.20	152	.03	.02	.01	88.
1.01	.40	4	.00	0.	.00	1.	1.02	1.30	153	.03	.02	.00	85.
1.01	.50	5	.00	0.	.00	1.	1.02	1.40	154	.03	.02	.00	83.
1.01	1.00	6	.00	0.	.00	1.	1.02	1.50	155	.03	.02	.00	81.
1.01	1.10	7	.00	0.	.00	1.	1.02	2.00	156	.03	.02	.00	79.
1.01	1.20	8	.00	0.	.00	1.	1.02	2.10	157	.03	.02	.00	127.
1.01	1.30	9	.00	0.	.00	1.	1.02	2.20	158	.03	.02	.00	112.
1.01	1.40	10	.00	0.	.00	1.	1.02	2.30	159	.03	.02	.00	122.
1.01	1.50	11	.00	0.	.00	0.	1.02	2.40	160	.03	.02	.00	139.
1.01	2.00	12	.00	0.	.00	0.	1.02	2.50	161	.03	.02	.00	149.
1.01	2.10	13	.00	0.	.00	0.	1.02	3.00	162	.03	.02	.00	159.
1.01	2.20	14	.00	0.	.00	0.	1.02	3.10	163	.03	.02	.00	167.
1.01	2.30	15	.00	0.	.00	0.	1.02	3.20	164	.03	.02	.00	171.
1.01	2.40	16	.00	0.	.00	0.	1.02	3.30	165	.03	.02	.00	176.
1.01	2.50	17	.00	0.	.00	0.	1.02	3.40	166	.03	.02	.00	186.
1.01	3.00	18	.00	0.	.00	0.	1.02	3.50	167	.03	.02	.00	192.
1.01	3.10	19	.00	0.	.00	0.	1.02	4.00	168	.03	.02	.00	198.
1.01	3.20	20	.00	0.	.00	0.	1.02	4.10	169	.03	.02	.00	203.
1.01	3.30	21	.00	0.	.00	0.	1.02	4.20	170	.03	.02	.00	207.
1.01	3.40	22	.00	0.	.00	0.	1.02	4.30	171	.03	.02	.00	211.
1.01	3.50	23	.00	0.	.00	0.	1.02	4.40	172	.03	.02	.00	215.
1.01	4.00	24	.00	0.	.00	0.	1.02	4.50	173	.03	.03	.00	218.
1.01	4.10	25	.00	0.	.00	0.	1.02	5.00	174	.03	.03	.00	222.
1.01	4.20	26	.00	0.	.00	0.	1.02	5.10	175	.03	.03	.00	225.
1.01	4.30	27	.00	0.	.00	0.	1.02	5.20	176	.03	.03	.00	227.
1.01	4.40	28	.00	0.	.00	0.	1.02	5.30	177	.03	.03	.00	230.
1.01	4.50	29	.00	0.	.00	0.	1.02	5.40	178	.03	.03	.00	232.
1.01	5.00	30	.00	0.	.00	0.	1.02	5.50	179	.03	.03	.00	234.
1.01	5.10	31	.00	0.	.00	0.	1.02	6.00	180	.03	.03	.00	236.
1.01	5.20	32	.00	0.	.00	0.	1.02	6.10	181	.13	.11	.02	238.
1.01	5.30	33	.00	0.	.00	0.	1.02	6.20	182	.13	.12	.01	240.
1.01	5.40	34	.00	0.	.00	0.	1.02	6.30	183	.13	.12	.01	241.
1.01	5.50	35	.00	0.	.00	0.	1.02	6.40	184	.13	.12	.01	259.
1.01	6.00	36	.00	0.	.00	0.	1.02	6.50	185	.13	.12	.01	272.
1.01	6.10	37	.01	0.	.01	0.	1.02	7.00	186	.13	.12	.01	284.
1.01	6.20	38	.01	0.	.01	0.	1.02	7.10	187	.13	.12	.01	312.
1.01	6.30	39	.01	0.	.01	0.	1.02	7.20	188	.13	.12	.01	341.
1.01	6.40	40	.01	0.	.01	0.	1.02	7.30	189	.13	.12	.01	378.
1.01	6.50	41	.01	0.	.01	0.	1.02	7.40	190	.13	.12	.01	416.
1.01	7.00	42	.01	0.	.01	0.	1.02	7.50	191	.13	.12	.01	460.
							1.02	8.00	192	.13	.12	.01	507.

1.01	6.30	39	.01	0.	.01	0.	1.02	7.20	188	.13	.12	.01	3410.
1.01	6.40	40	.01	0.	.01	0.	1.02	7.30	189	.13	.12	.01	3760.
1.01	6.50	41	.01	0.	.01	0.	1.02	7.40	190	.13	.12	.01	4110.
1.01	7.00	42	.01	0.	.01	0.	1.02	7.50	191	.13	.12	.01	4460.
1.01	7.10	43	.01	0.	.01	0.	1.02	8.00	192	.13	.12	.01	4810.
1.01	7.20	44	.01	0.	.01	0.	1.02	8.10	193	.13	.12	.01	5160.
1.01	7.30	45	.01	0.	.01	0.	1.02	8.20	194	.13	.12	.01	5510.
1.01	7.40	46	.01	0.	.01	0.	1.02	8.30	195	.13	.12	.01	5860.
1.01	7.50	47	.01	0.	.01	0.	1.02	8.40	196	.13	.12	.01	6210.
1.01	8.00	48	.01	0.	.01	0.	1.02	8.50	197	.13	.12	.01	6560.
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1.01	8.20	50	.01	0.	.01	0.	1.02	9.10	199	.13	.12	.01	7260.
1.01	8.30	51	.01	0.	.01	0.	1.02	9.20	200	.13	.12	.01	7610.
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1.01	8.50	53	.01	0.	.01	0.	1.02	9.40	202	.13	.12	.01	8310.
1.01	9.00	54	.01	0.	.01	0.	1.02	9.50	203	.13	.12	.01	8660.
1.01	9.10	55	.01	0.	.01	0.	1.02	10.00	204	.13	.12	.01	9010.
1.01	9.20	56	.01	0.	.01	0.	1.02	10.10	205	.13	.12	.01	9360.
1.01	9.30	57	.01	0.	.01	0.	1.02	10.20	206	.13	.12	.01	9710.
1.01	9.40	58	.01	0.	.01	0.	1.02	10.30	207	.13	.12	.01	10060.
1.01	9.50	59	.01	0.	.01	0.	1.02	10.40	208	.13	.12	.01	10410.
1.01	10.00	60	.01	0.	.01	0.	1.02	10.50	209	.13	.12	.01	10760.
1.01	10.10	61	.01	0.	.01	0.	1.02	11.00	210	.13	.12	.01	11110.
1.01	10.20	62	.01	0.	.01	0.	1.02	11.10	211	.13	.13	.00	11460.
1.01	10.30	63	.01	0.	.01	0.	1.02	11.20	212	.13	.13	.00	11810.
1.01	10.40	64	.01	.00	.01	0.	1.02	11.30	213	.13	.13	.00	12160.
1.01	10.50	65	.01	.00	.01	0.	1.02	11.40	214	.13	.13	.00	12510.
1.01	11.00	66	.01	.00	.01	0.	1.02	11.50	215	.13	.13	.00	12860.
1.01	11.10	67	.01	.00	.01	0.	1.02	12.00	216	.13	.13	.00	13210.
1.01	11.20	68	.01	.00	.01	0.	1.02	12.10	217	.44	.43	.01	13560.
1.01	11.30	69	.01	.00	.01	0.	1.02	12.20	218	.44	.43	.01	13910.
1.01	11.40	70	.01	.00	.01	0.	1.02	12.30	219	.44	.43	.01	14260.
1.01	11.50	71	.01	.00	.01	0.	1.02	12.40	220	.44	.43	.01	14610.
1.01	12.00	72	.01	.00	.01	0.	1.02	12.50	221	.44	.43	.01	14960.
1.01	12.10	73	.03	.00	.03	1.	1.02	13.00	222	.44	.43	.01	15310.
1.01	12.20	74	.03	.00	.03	1.	1.02	13.10	223	.53	.52	.01	15660.
1.01	12.30	75	.03	.01	.03	1.	1.02	13.20	224	.53	.52	.01	16010.
1.01	12.40	76	.03	.01	.03	2.	1.02	13.30	225	.53	.52	.01	16360.
1.01	12.50	77	.03	.01	.03	3.	1.02	13.40	226	.53	.52	.01	16710.
1.01	13.00	78	.03	.01	.03	4.	1.02	13.50	227	.53	.52	.01	17060.
1.01	13.10	79	.04	.01	.03	6.	1.02	14.00	228	.53	.52	.01	17410.
1.01	13.20	80	.04	.01	.03	8.	1.02	14.10	229	.66	.65	.01	17770.
1.01	13.30	81	.04	.01	.03	10.	1.02	14.20	230	.66	.66	.01	18130.
1.01	13.40	82	.04	.01	.03	14.	1.02	14.30	231	.66	.66	.01	18490.
1.01	13.50	83	.04	.02	.03	17.	1.02	14.40	232	.66	.66	.01	18850.
1.01	14.00	84	.04	.02	.02	22.	1.02	14.50	233	.66	.66	.01	19210.
1.01	14.10	85	.05	.02	.03	27.	1.02	15.00	234	.66	.66	.01	19570.
1.01	14.20	86	.05	.02	.03	33.	1.02	15.10	235	.60	.60	.00	19930.
1.01	14.30	87	.05	.02	.03	40.	1.02	15.20	236	1.01	1.00	.01	20290.
1.01	14.40	88	.05	.03	.03	47.	1.02	15.30	237	1.81	1.80	.01	20650.
1.01	14.50	89	.05	.03	.02	55.	1.02	15.40	238	4.53	4.51	.02	21010.
1.01	15.00	90	.05	.03	.02	64.	1.02	15.50	239	1.31	1.30	.01	21370.
1.01	15.10	91	.05	.03	.02	73.	1.02	16.00	240	.81	.80	.00	21730.
1.01	15.20	92	.08	.04	.03	83.	1.02	16.10	241	.62	.62	.00	22090.
1.01	15.30	93	.14	.08	.06	94.	1.02	16.20	242	.62	.62	.00	22450.
1.01	15.40	94	.35	.23	.12	109.	1.02	16.30	243	.62	.62	.00	22810.
1.01	15.50	95	.10	.07	.03	127.	1.02	16.40	244	.62	.62	.00	23170.
1.01	16.00	96	.06	.04	.02	147.	1.02	16.50	245	.62	.62	.00	23530.
1.01	16.10	97	.05	.03	.01	170.	1.02	17.00	246	.62	.62	.00	23890.
1.01	16.20	98	.05	.04	.01	195.	1.02	17.10	247	.49	.48	.00	24240.

Output Summary
Various PMF Events
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1.01	16.20	98	.05	.04	.01	195.	1.02	17.10	247	.49	.48	.00	8246.
1.01	16.30	99	.05	.04	.01	223.	1.02	17.20	248	.49	.48	.00	8581.
1.01	16.40	100	.05	.04	.01	253.	1.02	17.30	249	.49	.48	.00	8829.
1.01	16.50	101	.05	.04	.01	286.	1.02	17.40	250	.49	.48	.00	8990.
1.01	17.00	102	.05	.04	.01	318.	1.02	17.50	251	.49	.49	.00	9056.
1.01	17.10	103	.04	.03	.01	348.	1.02	18.00	252	.49	.49	.00	9062.
1.01	17.20	104	.04	.03	.01	372.	1.02	18.10	253	.04	.04	.00	8997.
1.01	17.30	105	.04	.03	.01	392.	1.02	18.20	254	.04	.04	.00	8847.
1.01	17.40	106	.04	.03	.01	408.	1.02	18.30	255	.04	.04	.00	8648.
1.01	17.50	107	.04	.03	.01	419.	1.02	18.40	256	.04	.04	.00	8421.
1.01	18.00	108	.04	.03	.01	427.	1.02	18.50	257	.04	.04	.00	8180.
1.01	18.10	109	.00	.00	.00	431.	1.02	19.00	258	.04	.04	.00	7939.
1.01	18.20	110	.00	.00	.00	430.	1.02	19.10	259	.04	.04	.00	7698.
1.01	18.30	111	.00	.00	.00	426.	1.02	19.20	260	.04	.04	.00	6962.
1.01	18.40	112	.00	.00	.00	419.	1.02	19.30	261	.04	.04	.00	6460.
1.01	18.50	113	.00	.00	.00	410.	1.02	19.40	262	.04	.04	.00	6031.
1.01	19.00	114	.00	.00	.00	396.	1.02	19.50	263	.04	.04	.00	5614.
1.01	19.10	115	.00	.00	.00	379.	1.02	20.00	264	.04	.04	.00	5209.
1.01	19.20	116	.00	.00	.00	359.	1.02	20.10	265	.04	.04	.00	4808.
1.01	19.30	117	.00	.00	.00	339.	1.02	20.20	266	.04	.04	.00	4429.
1.01	19.40	118	.00	.00	.00	319.	1.02	20.30	267	.04	.04	.00	4069.
1.01	19.50	119	.00	.00	.00	298.	1.02	20.40	268	.04	.04	.00	3721.
1.01	20.00	120	.00	.00	.00	278.	1.02	20.50	269	.04	.04	.00	3395.
1.01	20.10	121	.00	.00	.00	258.	1.02	21.00	270	.04	.04	.00	3091.
1.01	20.20	122	.00	.00	.00	239.	1.02	21.10	271	.04	.04	.00	2806.
1.01	20.30	123	.00	.00	.00	220.	1.02	21.20	272	.04	.04	.00	2548.
1.01	20.40	124	.00	.00	.00	202.	1.02	21.30	273	.04	.04	.00	2316.
1.01	20.50	125	.00	.00	.00	185.	1.02	21.40	274	.04	.04	.00	2107.
1.01	21.00	126	.00	.00	.00	169.	1.02	21.50	275	.04	.04	.00	1920.
1.01	21.10	127	.00	.00	.00	153.	1.02	22.00	276	.04	.04	.00	1753.
1.01	21.20	128	.00	.00	.00	140.	1.02	22.10	277	.04	.04	.00	1602.
1.01	21.30	129	.00	.00	.00	127.	1.02	22.20	278	.04	.04	.00	1466.
1.01	21.40	130	.00	.00	.00	116.	1.02	22.30	279	.04	.04	.00	1345.
1.01	21.50	131	.00	.00	.00	106.	1.02	22.40	280	.04	.04	.00	1238.
1.01	22.00	132	.00	.00	.00	98.	1.02	22.50	281	.04	.04	.00	1143.
1.01	22.10	133	.00	.00	.00	90.	1.02	23.00	282	.04	.04	.00	1058.
1.01	22.20	134	.00	.00	.00	83.	1.02	23.10	283	.04	.04	.00	1033.
1.01	22.30	135	.00	.00	.00	77.	1.02	23.20	284	.04	.04	.00	971.
1.01	22.40	136	.00	.00	.00	72.	1.02	23.30	285	.04	.04	.00	912.
1.01	22.50	137	.00	.00	.00	67.	1.02	23.40	286	.04	.04	.00	857.
1.01	23.00	138	.00	.00	.00	63.	1.02	23.50	287	.04	.04	.00	819.
1.01	23.10	139	.00	.00	.00	59.	1.03	0.	288	.04	.04	.00	774.
1.01	23.20	140	.00	.00	.00	55.	1.03	.10	289	0.	0.	0.	738.
1.01	23.30	141	.00	.00	.00	52.	1.03	.20	290	0.	0.	0.	702.
1.01	23.40	142	.00	.00	.00	50.	1.03	.30	291	0.	0.	0.	670.
1.01	23.50	143	.00	.00	.00	47.	1.03	.40	292	0.	0.	0.	640.
1.02	0.	144	.00	.00	.00	45.	1.03	.50	293	0.	0.	0.	611.
1.02	.10	145	.03	.02	.01	43.	1.03	1.00	294	0.	0.	0.	582.
1.02	.20	146	.03	.02	.01	42.	1.03	1.10	295	0.	0.	0.	554.
1.02	.30	147	.03	.02	.01	42.	1.03	1.20	296	0.	0.	0.	525.
1.02	.40	148	.03	.02	.01	42.	1.03	1.30	297	0.	0.	0.	494.
1.02	.50	149	.03	.02	.01	44.	1.03	1.40	298	0.	0.	0.	462.
							1.03	1.50	299	0.	0.	0.	429.
									SUM	36.40	34.36	2.04	342068.
										(925.1(	873.1(	52.1(| 9686.29)

Output Summary
Various PMF Events
Nims Lake Dam
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SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH COMPUTATIONS FOR SUBAREA 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
A2	0	-0	-0	-0	-0	1	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	1.19	-0.	1.19	1.00	-0.	-0	-0	-0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.	26.00	102.00	120.00	130.00	140.00	-0.	-0.

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0	-0.	-0.	1.00	-0.	-0.	1.00	-1.00	-85.00	-0.	0.

CURVE NO = -85.00 WETNESS = -1.00 EFFECT CN = 85.00

UNIT HYDROGRAPH DATA

TC= -0. LAG= .51

RECESSION DATA

STRTQ= -1.00 QRCSN= -.05 RTIOR= 5.00

UNIT HYDROGRAPH 17 END-OF-PERIOD ORDINATES, TC= -0. HOURS, LAG= .51 VOL= 1.00

167.	569.	925.	945.	751.	460.	287.	187.	118.	74.	
47.	30.	19.	12.	8.	5.	2.				

0 MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	END-OF-PERIOD FLOW MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.10	1	.00	0.	.00	1.	1.02	1.00	150	.03	.02	.01	92.
1.01	.20	2	.00	0.	.00	1.	1.02	1.10	151	.03	.02	.01	98.
1.01	.30	3	.00	0.	.00	1.	1.02	1.20	152	.03	.02	.01	102.
1.01	.40	4	.00	0.	.00	1.	1.02	1.30	153	.03	.02	.00	105.
1.01	.50	5	.00	0.	.00	1.	1.02	1.40	154	.03	.02	.00	107.
1.01	1.00	6	.00	0.	.00	0.	1.02	1.50	155	.03	.02	.00	108.
1.01	1.10	7	.00	0.	.00	0.	1.02	2.00	156	.03	.02	.00	109.
1.01	1.20	8	.00	0.	.00	0.	1.02	2.10	157	.03	.02	.00	110.
1.01	1.30	9	.00	0.	.00	0.	1.02	2.20	158	.03	.02	.00	110.
1.01	1.40	10	.00	0.	.00	0.	1.02	2.30	159	.03	.02	.00	111.
1.01	1.50	11	.00	0.	.00	0.	1.02	2.40	160	.03	.02	.00	111.
1.01	2.00	12	.00	0.	.00	0.	1.02	2.50	161	.03	.02	.00	111.
1.01	2.10	13	.00	0.	.00	0.	1.02	3.00	162	.03	.02	.00	112.
1.01	2.20	14	.00	0.	.00	0.	1.02	3.10	163	.03	.02	.00	112.
1.01	2.30	15	.00	0.	.00	0.	1.02	3.20	164	.03	.02	.00	112.
1.01	2.40	16	.00	0.	.00	0.	1.02	3.30	165	.03	.02	.00	113.
1.01	2.50	17	.00	0.	.00	0.	1.02	3.40	166	.03	.02	.00	113.
1.01	3.00	18	.00	0.	.00	0.	1.02	3.50	167	.03	.02	.00	113.
1.01	3.10	19	.00	0.	.00	0.	1.02	4.00	168	.03	.02	.00	113.
1.01	3.20	20	.00	0.	.00	0.	1.02	4.10	169	.03	.02	.00	114.
1.01	3.30	21	.00	0.	.00	0.	1.02	4.20	170	.03	.02	.00	114.
1.01	3.40	22	.00	0.	.00	0.	1.02	4.30	171	.03	.02	.00	114.
1.01	3.50	23	.00	0.	.00	0.	1.02	4.40	172	.03	.02	.00	114.
1.01	4.00	24	.00	0.	.00	0.	1.02	4.50	173	.03	.03	.00	115.
1.01	4.10	25	.00	0.	.00	0.	1.02	5.00	174	.03	.03	.00	115.
1.01	4.20	26	.00	0.	.00	0.	1.02	5.10	175	.03	.03	.00	115.

Output Summary
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1.01	4.20	26	.00	0.	.00	0.	1.02	5.10	175	.03	.03	.00	115.
1.01	4.30	27	.00	0.	.00	0.	1.02	5.20	176	.03	.03	.00	115.
1.01	4.40	28	.00	0.	.00	0.	1.02	5.30	177	.03	.03	.00	115.
1.01	4.50	29	.00	0.	.00	0.	1.02	5.40	178	.03	.03	.00	116.
1.01	5.00	30	.00	0.	.00	0.	1.02	5.50	179	.03	.03	.00	116.
1.01	5.10	31	.00	0.	.00	0.	1.02	6.00	180	.03	.03	.00	116.
1.01	5.20	32	.00	0.	.00	0.	1.02	6.10	181	.13	.11	.02	131.
1.01	5.30	33	.00	0.	.00	0.	1.02	6.20	182	.13	.12	.01	182.
1.01	5.40	34	.00	0.	.00	0.	1.02	6.30	183	.13	.12	.01	269.
1.01	5.50	35	.00	0.	.00	0.	1.02	6.40	184	.13	.12	.01	391.
1.01	6.00	36	.00	0.	.00	0.	1.02	6.50	185	.13	.12	.01	420.
1.01	6.10	37	.01	0.	.01	0.	1.02	7.00	186	.13	.12	.01	463.
1.01	6.20	38	.01	0.	.01	0.	1.02	7.10	187	.13	.12	.01	491.
1.01	6.30	39	.01	0.	.01	0.	1.02	7.20	188	.13	.12	.01	510.
1.01	6.40	40	.01	0.	.01	0.	1.02	7.30	189	.13	.12	.01	523.
1.01	6.50	41	.01	0.	.01	0.	1.02	7.40	190	.13	.12	.01	532.
1.01	7.00	42	.01	0.	.01	0.	1.02	7.50	191	.13	.12	.01	539.
1.01	7.10	43	.01	0.	.01	0.	1.02	8.00	192	.13	.12	.01	544.
1.01	7.20	44	.01	0.	.01	0.	1.02	8.10	193	.13	.12	.01	548.
1.01	7.30	45	.01	0.	.01	0.	1.02	8.20	194	.13	.12	.01	551.
1.01	7.40	46	.01	0.	.01	0.	1.02	8.30	195	.13	.12	.01	553.
1.01	7.50	47	.01	0.	.01	0.	1.02	8.40	196	.13	.12	.01	555.
1.01	8.00	48	.01	0.	.01	0.	1.02	8.50	197	.13	.12	.01	557.
1.01	8.10	49	.01	0.	.01	0.	1.02	9.00	198	.13	.12	.01	559.
1.01	8.20	50	.01	0.	.01	0.	1.02	9.10	199	.13	.12	.01	560.
1.01	8.30	51	.01	0.	.01	0.	1.02	9.20	200	.13	.12	.01	562.
1.01	8.40	52	.01	0.	.01	0.	1.02	9.30	201	.13	.12	.01	563.
1.01	8.50	53	.01	0.	.01	0.	1.02	9.40	202	.13	.12	.01	564.
1.01	9.00	54	.01	0.	.01	0.	1.02	9.50	203	.13	.12	.01	565.
1.01	9.10	55	.01	0.	.01	0.	1.02	10.00	204	.13	.12	.01	567.
1.01	9.20	56	.01	0.	.01	0.	1.02	10.10	205	.13	.12	.01	568.
1.01	9.30	57	.01	0.	.01	0.	1.02	10.20	206	.13	.12	.01	569.
1.01	9.40	58	.01	0.	.01	0.	1.02	10.30	207	.13	.12	.01	570.
1.01	9.50	59	.01	0.	.01	0.	1.02	10.40	208	.13	.12	.01	571.
1.01	10.00	60	.01	0.	.01	0.	1.02	10.50	209	.13	.12	.01	571.
1.01	10.10	61	.01	0.	.01	0.	1.02	11.00	210	.13	.12	.01	572.
1.01	10.20	62	.01	0.	.01	0.	1.02	11.10	211	.13	.13	.00	573.
1.01	10.30	63	.01	0.	.01	0.	1.02	11.20	212	.13	.13	.00	574.
1.01	10.40	64	.01	.00	.01	0.	1.02	11.30	213	.13	.13	.00	575.
1.01	10.50	65	.01	.00	.01	0.	1.02	11.40	214	.13	.13	.00	575.
1.01	11.00	66	.01	.00	.01	0.	1.02	11.50	215	.13	.13	.00	576.
1.01	11.10	67	.01	.00	.01	0.	1.02	12.00	216	.13	.13	.00	577.
1.01	11.20	68	.01	.00	.01	1.	1.02	12.10	217	.44	.43	.01	628.
1.01	11.30	69	.01	.00	.01	1.	1.02	12.20	218	.44	.43	.01	801.
1.01	11.40	70	.01	.00	.01	1.	1.02	12.30	219	.44	.43	.01	1082.
1.01	11.50	71	.01	.00	.01	2.	1.02	12.40	220	.44	.43	.01	1370.
1.01	12.00	72	.01	.00	.01	2.	1.02	12.50	221	.44	.43	.01	1559.
1.01	12.10	73	.03	.00	.03	3.	1.02	13.00	222	.44	.43	.01	1742.
1.01	12.20	74	.03	.00	.03	5.	1.02	13.10	223	.53	.52	.01	1847.
1.01	12.30	75	.03	.01	.03	9.	1.02	13.20	224	.53	.52	.01	1956.
1.01	12.40	76	.03	.01	.03	14.	1.02	13.30	225	.53	.52	.01	2079.
1.01	12.50	77	.03	.01	.03	19.	1.02	13.40	226	.53	.52	.01	2183.
1.01	13.00	78	.03	.01	.03	23.	1.02	13.50	227	.53	.52	.01	2269.
1.01	13.10	79	.04	.01	.03	28.	1.02	14.00	228	.53	.52	.01	2318.
1.01	13.20	80	.04	.01	.03	34.	1.02	14.10	229	.66	.65	.01	2373.
1.01	13.30	81	.04	.01	.03	40.	1.02	14.20	230	.66	.66	.01	2470.
1.01	13.40	82	.04	.01	.03	46.	1.02	14.30	231	.66	.66	.01	2607.
1.01	13.50	83	.04	.02	.03	52.	1.02	14.40	232	.66	.66	.01	2741.
1.01	14.00	84	.04	.02	.02	58.	1.02	14.50	233	.66	.66	.01	2847.
1.01	14.10	85	.05	.02	.03	64.	1.02	15.00	234	.66	.66	.01	2912.

Output Summary
Various PMF Events
Nims Lake Dam
MO 30064
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1.01	14.10	85	.05	.02	.03	64.	1.02	15.00	234	.66	.65	.01	2[illegible]
1.01	14.20	86	.05	.02	.03	71.	1.02	15.10	235	.60	.60	.00	2944.
1.01	14.30	87	.05	.02	.03	80.	1.02	15.20	236	1.01	1.00	.01	3006.
1.01	14.40	88	.05	.03	.03	89.	1.02	15.30	237	1.81	1.80	.01	3332.
1.01	14.50	89	.05	.03	.02	97.	1.02	15.40	238	4.53	4.51	.02	4969.
1.01	15.00	90	.05	.03	.02	104.	1.02	15.50	239	1.31	1.30	.01	6[illegible]
1.01	15.10	91	.05	.03	.02	110.	1.02	16.00	240	.81	.80	.00	8295.
1.01	15.20	92	.08	.04	.03	117.	1.02	16.10	241	.62	.62	.00	8349.
1.01	15.30	93	.14	.08	.06	136.	1.02	16.20	242	.62	.62	.00	7292.
1.01	15.40	94	.35	.23	.12	202.	1.02	16.30	243	.62	.62	.00	5741.
1.01	15.50	95	.10	.07	.03	314.	1.02	16.40	244	.62	.62	.00	4687.
1.01	16.00	96	.06	.04	.02	408.	1.02	16.50	245	.62	.62	.00	4021.
1.01	16.10	97	.05	.03	.01	419.	1.02	17.00	246	.62	.62	.00	3587.
1.01	16.20	98	.05	.04	.01	372.	1.02	17.10	247	.49	.48	.00	3289.
1.01	16.30	99	.05	.04	.01	301.	1.02	17.20	248	.49	.49	.00	3041.
1.01	16.40	100	.05	.04	.01	251.	1.02	17.30	249	.49	.48	.00	2810.
1.01	16.50	101	.05	.04	.01	219.	1.02	17.40	250	.49	.48	.00	2617.
1.01	17.00	102	.05	.04	.01	199.	1.02	17.50	251	.49	.49	.00	2474.
1.01	17.10	103	.04	.03	.01	186.	1.02	18.00	252	.49	.49	.00	2388.
1.01	17.20	104	.04	.03	.01	174.	1.02	18.10	253	.04	.04	.00	2259.
1.01	17.30	105	.04	.03	.01	163.	1.02	18.20	254	.04	.04	.00	1969.
1.01	17.40	106	.04	.03	.01	153.	1.02	18.30	255	.04	.04	.00	1928.
1.01	17.50	107	.04	.03	.01	146.	1.02	18.40	256	.04	.04	.00	1099.
1.01	18.00	108	.04	.03	.01	142.	1.02	18.50	257	.04	.04	.00	7[illegible]
1.01	18.10	109	.00	.00	.00	135.	1.02	19.00	258	.04	.04	.00	553.
1.01	18.20	110	.00	.00	.00	118.	1.02	19.10	259	.04	.04	.00	424.
1.01	18.30	111	.00	.00	.00	92.	1.02	19.20	260	.04	.04	.00	3[illegible]
1.01	18.40	112	.00	.00	.00	67.	1.02	19.30	261	.04	.04	.00	30[illegible]
1.01	18.50	113	.00	.00	.00	46.	1.02	19.40	262	.04	.04	.00	261.
1.01	19.00	114	.00	.00	.00	34.	1.02	19.50	263	.04	.04	.00	23[illegible]
1.01	19.10	115	.00	.00	.00	26.	1.02	20.00	264	.04	.04	.00	219.
1.01	19.20	116	.00	.00	.00	21.	1.02	20.10	265	.04	.04	.00	211.
1.01	19.30	117	.00	.00	.00	18.	1.02	20.20	266	.04	.04	.00	206.
1.01	19.40	118	.00	.00	.00	16.	1.02	20.30	267	.04	.04	.00	202.
1.01	19.50	119	.00	.00	.00	14.	1.02	20.40	268	.04	.04	.00	200.
1.01	20.00	120	.00	.00	.00	13.	1.02	20.50	269	.04	.04	.00	199.
1.01	20.10	121	.00	.00	.00	13.	1.02	21.00	270	.04	.04	.00	199.
1.01	20.20	122	.00	.00	.00	13.	1.02	21.10	271	.04	.04	.00	199.
1.01	20.30	123	.00	.00	.00	12.	1.02	21.20	272	.04	.04	.00	199.
1.01	20.40	124	.00	.00	.00	12.	1.02	21.30	273	.04	.04	.00	199.
1.01	20.50	125	.00	.00	.00	12.	1.02	21.40	274	.04	.04	.00	199.
1.01	21.00	126	.00	.00	.00	12.	1.02	21.50	275	.04	.04	.00	199.
1.01	21.10	127	.00	.00	.00	12.	1.02	22.00	276	.04	.04	.00	199.
1.01	21.20	128	.00	.00	.00	12.	1.02	22.10	277	.04	.04	.00	199.
1.01	21.30	129	.00	.00	.00	12.	1.02	22.20	278	.04	.04	.00	199.
1.01	21.40	130	.00	.00	.00	12.	1.02	22.30	279	.04	.04	.00	199.
1.01	21.50	131	.00	.00	.00	12.	1.02	22.40	280	.04	.04	.00	199.
1.01	22.00	132	.00	.00	.00	12.	1.02	22.50	281	.04	.04	.00	199.
1.01	22.10	133	.00	.00	.00	12.	1.02	23.00	282	.04	.04	.00	199.
1.01	22.20	134	.00	.00	.00	12.	1.02	23.10	283	.04	.04	.00	199.
1.01	22.30	135	.00	.00	.00	12.	1.02	23.20	284	.04	.04	.00	199.
1.01	22.40	136	.00	.00	.00	12.	1.02	23.30	285	.04	.04	.00	199.
1.01	22.50	137	.00	.00	.00	12.	1.02	23.40	286	.04	.04	.00	199.
1.01	23.00	138	.00	.00	.00	12.	1.02	23.50	287	.04	.04	.00	199.
1.01	23.10	139	.00	.00	.00	12.	1.03	0.	288	.04	.04	.00	199.
1.01	23.20	140	.00	.00	.00	12.	1.03	.10	289	0.	0.	0.	192.
1.01	23.30	141	.00	.00	.00	12.	1.03	.20	290	0.	0.	0.	167.
1.01	23.40	142	.00	.00	.00	12.	1.03	.30	291	0.	0.	0.	142.
1.01	23.50	143	.00	.00	.00	12.	1.03	.40	292	0.	0.	0.	121.
1.02	0.	144	.00	.00	.00	12.	1.03	.50	293	0.	0.	0.	103.

1.01	20.30	123	.00	.00	.00	12.	1.02	21.20	272	.04	.04	.00	199.
1.01	20.40	124	.00	.00	.00	12.	1.02	21.30	273	.04	.04	.00	199.
1.01	20.50	125	.00	.00	.00	12.	1.02	21.40	274	.04	.04	.00	199.
1.01	21.00	126	.00	.00	.00	12.	1.02	21.50	275	.04	.04	.00	199.
1.01	21.10	127	.00	.00	.00	12.	1.02	22.00	276	.04	.04	.00	199.
1.01	21.20	128	.00	.00	.00	12.	1.02	22.10	277	.04	.04	.00	199.
1.01	21.30	129	.00	.00	.00	12.	1.02	22.20	278	.04	.04	.00	199.
1.01	21.40	130	.00	.00	.00	12.	1.02	22.30	279	.04	.04	.00	199.
1.01	21.50	131	.00	.00	.00	12.	1.02	22.40	280	.04	.04	.00	199.
1.01	22.00	132	.00	.00	.00	12.	1.02	22.50	281	.04	.04	.00	199.
1.01	22.10	133	.00	.00	.00	12.	1.02	23.00	282	.04	.04	.00	199.
1.01	22.20	134	.00	.00	.00	12.	1.02	23.10	283	.04	.04	.00	199.
1.01	22.30	135	.00	.00	.00	12.	1.02	23.20	284	.04	.04	.00	199.
1.01	22.40	136	.00	.00	.00	12.	1.02	23.30	285	.04	.04	.00	199.
1.01	22.50	137	.00	.00	.00	12.	1.02	23.40	286	.04	.04	.00	199.
1.01	23.00	138	.00	.00	.00	12.	1.02	23.50	287	.04	.04	.00	199.
1.01	23.10	139	.00	.00	.00	12.	1.03	0.	288	.04	.04	.00	199.
1.01	23.20	140	.00	.00	.00	12.	1.03	.10	289	0.	0.	0.	192.
1.01	23.30	141	.00	.00	.00	12.	1.03	.20	290	0.	0.	0.	167.
1.01	23.40	142	.00	.00	.00	12.	1.03	.30	291	0.	0.	0.	142.
1.01	23.50	143	.00	.00	.00	12.	1.03	.40	292	0.	0.	0.	121.
1.02	0.	144	.00	.00	.00	12.	1.03	.50	293	0.	0.	0.	103.
1.02	.10	145	.03	.02	.01	16.	1.03	1.00	294	0.	0.	0.	88.
1.02	.20	146	.03	.02	.01	28.	1.03	1.10	295	0.	0.	0.	75.
1.02	.30	147	.03	.02	.01	47.	1.03	1.20	296	0.	0.	0.	64.
1.02	.40	148	.03	.02	.01	66.	1.03	1.30	297	0.	0.	0.	54.
1.02	.50	149	.03	.02	.01	82.	1.03	1.40	298	0.	0.	0.	46.
							1.03	1.50	299	0.	0.	0.	39.
									SUM	36.40	34.36	2.04	158670.
										1929.11	879.06	52.11	4493.201

Output Summary
Various PMF Events
Nims Lake Dam
MO 30064

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH COMPUTATIONS FOR SUBAREA 3 INCLUDING LAKE

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
23	0	-0	-0	-0	-0	1	-0	-0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	1.07	-0.	1.07	1.00	-0.	-0	-0	-0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.	26.00	102.00	120.00	130.00	140.00	-0.	-0.

Output Summary
Various PMF Events
Nims Lake Dam
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LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
-0	-0.	-0.	1.00	-0.	-0.	1.00	-1.00	-85.00	-0.	0.

CURVE NO = -85.00 WETNESS = -1.00 EFFECT CN = 85.00

UNIT HYDROGRAPH DATA
TC= -0. LAG= .43

RECESSION DATA
STRTQ= -1.00 QRCSN= -.05 RTIOR= 5.00

UNIT HYDROGRAPH 15 END OF PERIOD ORDINATES, TC= -0. HOURS, LAG= .43 VOL= 1.00

222. 746. 1007. 869. 542. 309. 187. 109. 64. 38.
22. 13. 8. 5. 1.

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.10	1	.00	0.	.00	1.	1.02	1.00	150	.03	.02	.01	88.
1.01	.20	2	.00	0.	.00	1.	1.02	1.10	151	.03	.02	.01	92.
1.01	.30	3	.00	0.	.00	1.	1.02	1.20	152	.03	.02	.01	95.
1.01	.40	4	.00	0.	.00	1.	1.02	1.30	153	.03	.02	.00	98.
1.01	.50	5	.00	0.	.00	0.	1.02	1.40	154	.03	.02	.00	97.
1.01	1.00	6	.00	0.	.00	0.	1.02	1.50	155	.03	.02	.00	98.
1.01	1.10	7	.00	0.	.00	0.	1.02	2.00	156	.03	.02	.00	99.
1.01	1.20	8	.00	0.	.00	0.	1.02	2.10	157	.03	.02	.00	99.
1.01	1.30	9	.00	0.	.00	0.	1.02	2.20	158	.03	.02	.00	100.
1.01	1.40	10	.00	0.	.00	0.	1.02	2.30	159	.03	.02	.00	100.
1.01	1.50	11	.00	0.	.00	0.	1.02	2.40	160	.03	.02	.00	100.
1.01	2.00	12	.00	0.	.00	0.	1.02	2.50	161	.03	.02	.00	100.
1.01	2.10	13	.00	0.	.00	0.	1.02	3.00	162	.03	.02	.00	101.
1.01	2.20	14	.00	0.	.00	0.	1.02	3.10	163	.03	.02	.00	101.
1.01	2.30	15	.00	0.	.00	0.	1.02	3.20	164	.03	.02	.00	101.
1.01	2.40	16	.00	0.	.00	0.	1.02	3.30	165	.03	.02	.00	101.
1.01	2.50	17	.00	0.	.00	0.	1.02	3.40	166	.03	.02	.00	102.
1.01	3.00	18	.00	0.	.00	0.	1.02	3.50	167	.03	.02	.00	102.
1.01	3.10	19	.00	0.	.00	0.	1.02	4.00	168	.03	.02	.00	102.
1.01	3.20	20	.00	0.	.00	0.	1.02	4.10	169	.03	.02	.00	102.
1.01	3.30	21	.00	0.	.00	0.	1.02	4.20	170	.03	.02	.00	102.
1.01	3.40	22	.00	0.	.00	0.	1.02	4.30	171	.03	.02	.00	103.
1.01	3.50	23	.00	0.	.00	0.	1.02	4.40	172	.03	.02	.00	103.
1.01	4.00	24	.00	0.	.00	0.	1.02	4.50	173	.03	.03	.00	103.

1.01	4.00	24	.00	0.	.00	0.	1.02	4.50	173	.03	.03	.00	103.
1.01	4.10	25	.00	0.	.00	0.	1.02	5.00	174	.03	.03	.00	103.
1.01	4.20	26	.00	0.	.00	0.	1.02	5.10	175	.03	.03	.00	103.
1.01	4.30	27	.00	0.	.00	0.	1.02	5.20	176	.03	.03	.00	104.
1.01	4.40	28	.00	0.	.00	0.	1.02	5.30	177	.03	.03	.00	104.
1.01	4.50	29	.00	0.	.00	0.	1.02	5.40	178	.03	.03	.00	104.
1.01	5.00	30	.00	0.	.00	0.	1.02	5.50	179	.03	.03	.00	104.
1.01	5.10	31	.00	0.	.00	0.	1.02	6.00	180	.03	.03	.00	104.
1.01	5.20	32	.00	0.	.00	0.	1.02	6.10	181	.13	.11	.02	124.
1.01	5.30	33	.00	0.	.00	0.	1.02	6.20	182	.13	.12	.01	191.
1.01	5.40	34	.00	0.	.00	0.	1.02	6.30	183	.13	.12	.01	282.
1.01	5.50	35	.00	0.	.00	0.	1.02	6.40	184	.13	.12	.01	361.
1.01	6.00	36	.00	0.	.00	0.	1.02	6.50	185	.13	.12	.01	411.
1.01	6.10	37	.01	0.	.01	0.	1.02	7.00	186	.13	.12	.01	441.
1.01	6.20	38	.01	0.	.01	0.	1.02	7.10	187	.13	.12	.01	460.
1.01	6.30	39	.01	0.	.01	0.	1.02	7.20	188	.13	.12	.01	472.
1.01	6.40	40	.01	0.	.01	0.	1.02	7.30	189	.13	.12	.01	480.
1.01	6.50	41	.01	0.	.01	0.	1.02	7.40	190	.13	.12	.01	485.
1.01	7.00	42	.01	0.	.01	0.	1.02	7.50	191	.13	.12	.01	489.
1.01	7.10	43	.01	0.	.01	0.	1.02	8.00	192	.13	.12	.01	493.
1.01	7.20	44	.01	0.	.01	0.	1.02	8.10	193	.13	.12	.01	495.
1.01	7.30	45	.01	0.	.01	0.	1.02	8.20	194	.13	.12	.01	497.
1.01	7.40	46	.01	0.	.01	0.	1.02	8.30	195	.13	.12	.01	499.
1.01	7.50	47	.01	0.	.01	0.	1.02	8.40	196	.13	.12	.01	501.
1.01	8.00	48	.01	0.	.01	0.	1.02	8.50	197	.13	.12	.01	502.
1.01	8.10	49	.01	0.	.01	0.	1.02	9.00	198	.13	.12	.01	503.
1.01	8.20	50	.01	0.	.01	0.	1.02	9.10	199	.13	.12	.01	505.
1.01	8.30	51	.01	0.	.01	0.	1.02	9.20	200	.13	.12	.01	506.
1.01	8.40	52	.01	0.	.01	0.	1.02	9.30	201	.13	.12	.01	507.
1.01	8.50	53	.01	0.	.01	0.	1.02	9.40	202	.13	.12	.01	508.
1.01	9.00	54	.01	0.	.01	0.	1.02	9.50	203	.13	.12	.01	509.
1.01	9.10	55	.01	0.	.01	0.	1.02	10.00	204	.13	.12	.01	510.
1.01	9.20	56	.01	0.	.01	0.	1.02	10.10	205	.13	.12	.01	511.
1.01	9.30	57	.01	0.	.01	0.	1.02	10.20	206	.13	.12	.01	512.
1.01	9.40	58	.01	0.	.01	0.	1.02	10.30	207	.13	.12	.01	513.
1.01	9.50	59	.01	0.	.01	0.	1.02	10.40	208	.13	.12	.01	514.
1.01	10.00	60	.01	0.	.01	0.	1.02	10.50	209	.13	.12	.01	514.
1.01	10.10	61	.01	0.	.01	0.	1.02	11.00	210	.13	.12	.01	515.
1.01	10.20	62	.01	0.	.01	0.	1.02	11.10	211	.13	.13	.00	516.
1.01	10.30	63	.01	0.	.01	0.	1.02	11.20	212	.13	.13	.00	516.
1.01	10.40	64	.01	.00	.01	0.	1.02	11.30	213	.13	.13	.00	517.
1.01	10.50	65	.01	.00	.01	0.	1.02	11.40	214	.13	.13	.00	518.
1.01	11.00	66	.01	.00	.01	0.	1.02	11.50	215	.13	.13	.00	518.
1.01	11.10	67	.01	.00	.01	0.	1.02	12.00	216	.13	.13	.00	519.
1.01	11.20	68	.01	.00	.01	1.	1.02	12.10	217	.44	.43	.01	588.
1.01	11.30	69	.01	.00	.01	1.	1.02	12.20	218	.44	.43	.01	813.
1.01	11.40	70	.01	.00	.01	2.	1.02	12.30	219	.44	.43	.01	1118.
1.01	11.50	71	.01	.00	.01	2.	1.02	12.40	220	.44	.43	.01	1369.
1.01	12.00	72	.01	.00	.01	2.	1.02	12.50	221	.44	.43	.01	1550.
1.01	12.10	73	.03	.00	.03	3.	1.02	13.00	222	.44	.43	.01	1647.
1.01	12.20	74	.03	.00	.03	6.	1.02	13.10	223	.53	.52	.01	1726.
1.01	12.30	75	.03	.01	.03	10.	1.02	13.20	224	.53	.52	.01	1826.
1.01	12.40	76	.03	.01	.03	15.	1.02	13.30	225	.53	.52	.01	1936.
1.01	12.50	77	.03	.01	.03	19.	1.02	13.40	226	.53	.52	.01	2026.
1.01	13.00	78	.03	.01	.03	23.	1.02	13.50	227	.53	.52	.01	2083.
1.01	13.10	79	.04	.01	.03	28.	1.02	14.00	228	.53	.52	.01	2116.
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1.01	13.30	81	.04	.01	.03	39.	1.02	14.20	230	.66	.66	.01	2278.
1.01	13.40	82	.04	.01	.03	45.	1.02	14.30	231	.66	.66	.01	2418.
1.01	13.50	83	.04	.01	.03	50.	1.02	14.40	232	.66	.66	.01	2537.

1.01	13.20	80	.04	.01	.03	33.	1.02	14.10	229	.66	.65	.01	2167.
1.01	13.30	81	.04	.01	.03	39.	1.02	14.20	230	.66	.66	.01	2278.
1.01	13.40	82	.04	.01	.03	45.	1.02	14.30	231	.66	.66	.01	2418.
1.01	13.50	83	.04	.02	.03	50.	1.02	14.40	232	.66	.66	.01	2597.
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1.01	14.10	85	.05	.02	.03	60.	1.02	15.00	234	.66	.66	.01	2696.
1.01	14.20	86	.05	.02	.03	65.	1.02	15.10	235	.60	.60	.00	2671.
1.01	14.30	87	.05	.02	.03	77.	1.02	15.20	236	1.01	1.00	.01	2739.
1.01	14.40	88	.05	.03	.03	85.	1.02	15.30	237	1.81	1.80	.01	3161.
1.01	14.50	89	.05	.03	.02	92.	1.02	15.40	238	4.53	4.51	.02	4719.
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1.01	15.40	94	.35	.23	.12	214.	1.02	16.30	243	.62	.62	.00	4597.
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1.01	16.30	99	.05	.04	.01	243.	1.02	17.20	248	.49	.48	.00	2571.
1.01	16.40	100	.05	.04	.01	204.	1.02	17.30	249	.49	.48	.00	2380.
1.01	16.50	101	.05	.04	.01	181.	1.02	17.40	250	.49	.48	.00	2291.
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1.01	17.20	104	.04	.03	.01	149.	1.02	18.10	253	.04	.04	.00	1946.
1.01	17.30	105	.04	.03	.01	139.	1.02	18.20	254	.04	.04	.00	1601.
1.01	17.40	106	.04	.03	.01	132.	1.02	18.30	255	.04	.04	.00	1148.
1.01	17.50	107	.04	.03	.01	127.	1.02	18.40	256	.04	.04	.00	799.
1.01	18.00	108	.04	.03	.01	125.	1.02	18.50	257	.04	.04	.00	517.
1.01	18.10	109	.00	.00	.00	117.	1.02	19.00	258	.04	.04	.00	398.
1.01	18.20	110	.00	.00	.00	97.	1.02	19.10	259	.04	.04	.00	339.
1.01	18.30	111	.00	.00	.00	70.	1.02	19.20	260	.04	.04	.00	289.
1.01	18.40	112	.00	.00	.00	46.	1.02	19.30	261	.04	.04	.00	246.
1.01	18.50	113	.00	.00	.00	31.	1.02	19.40	262	.04	.04	.00	209.
1.01	19.00	114	.00	.00	.00	23.	1.02	19.50	263	.04	.04	.00	197.
1.01	19.10	115	.00	.00	.00	19.	1.02	20.00	264	.04	.04	.00	185.
1.01	19.20	116	.00	.00	.00	16.	1.02	20.10	265	.04	.04	.00	182.
1.01	19.30	117	.00	.00	.00	14.	1.02	20.20	266	.04	.04	.00	180.
1.01	19.40	118	.00	.00	.00	12.	1.02	20.30	267	.04	.04	.00	179.
1.01	19.50	119	.00	.00	.00	12.	1.02	20.40	268	.04	.04	.00	179.
1.01	20.00	120	.00	.00	.00	11.	1.02	20.50	269	.04	.04	.00	179.
1.01	20.10	121	.00	.00	.00	11.	1.02	21.00	270	.04	.04	.00	179.
1.01	20.20	122	.00	.00	.00	11.	1.02	21.10	271	.04	.04	.00	179.
1.01	20.30	123	.00	.00	.00	11.	1.02	21.20	272	.04	.04	.00	179.
1.01	20.40	124	.00	.00	.00	11.	1.02	21.30	273	.04	.04	.00	179.
1.01	20.50	125	.00	.00	.00	11.	1.02	21.40	274	.04	.04	.00	179.
1.01	21.00	126	.00	.00	.00	11.	1.02	21.50	275	.04	.04	.00	179.
1.01	21.10	127	.00	.00	.00	11.	1.02	22.00	276	.04	.04	.00	179.
1.01	21.20	128	.00	.00	.00	11.	1.02	22.10	277	.04	.04	.00	179.
1.01	21.30	129	.00	.00	.00	11.	1.02	22.20	278	.04	.04	.00	179.
1.01	21.40	130	.00	.00	.00	11.	1.02	22.30	279	.04	.04	.00	179.
1.01	21.50	131	.00	.00	.00	11.	1.02	22.40	280	.04	.04	.00	179.
1.01	22.00	132	.00	.00	.00	11.	1.02	22.50	281	.04	.04	.00	179.
1.01	22.10	133	.00	.00	.00	11.	1.02	23.00	282	.04	.04	.00	179.
1.01	22.20	134	.00	.00	.00	11.	1.02	23.10	283	.04	.04	.00	179.
1.01	22.30	135	.00	.00	.00	11.	1.02	23.20	284	.04	.04	.00	179.
1.01	22.40	136	.00	.00	.00	11.	1.02	23.30	285	.04	.04	.00	179.
1.01	22.50	137	.00	.00	.00	11.	1.02	23.40	286	.04	.04	.00	179.
1.01	23.00	138	.00	.00	.00	11.	1.02	23.50	287	.04	.04	.00	179.
1.01	23.10	139	.00	.00	.00	11.	1.03	0.	288	.04	.04	.00	179.

Output Summary
Various PMF Events
Nims Lake Dam
MO 30064
B15

1.01	21.30	129	.00	.00	.00	11.	1.02	22.20	278	.04	.04	.00	179.
1.01	21.40	130	.00	.00	.00	11.	1.02	22.30	279	.04	.04	.00	179.
1.01	21.50	131	.00	.00	.00	11.	1.02	22.40	280	.04	.04	.00	179.
1.01	22.00	132	.00	.00	.00	11.	1.02	22.50	281	.04	.04	.00	179.
1.01	22.10	133	.00	.00	.00	11.	1.02	23.00	282	.04	.04	.00	179.
1.01	22.20	134	.00	.00	.00	11.	1.02	23.10	283	.04	.04	.00	179.
1.01	22.30	135	.00	.00	.00	11.	1.02	23.20	284	.04	.04	.00	179.
1.01	22.40	136	.00	.00	.00	11.	1.02	23.30	285	.04	.04	.00	179.
1.01	22.50	137	.00	.00	.00	11.	1.02	23.40	286	.04	.04	.00	179.
1.01	23.00	138	.00	.00	.00	11.	1.02	23.50	287	.04	.04	.00	179.
1.01	23.10	139	.00	.00	.00	11.	1.03	0.	288	.04	.04	.00	179.
1.01	23.20	140	.00	.00	.00	11.	1.03	.10	289	0.	0.	0.	164.
1.01	23.30	141	.00	.00	.00	11.	1.03	.20	290	0.	0.	0.	144.
1.01	23.40	142	.00	.00	.00	11.	1.03	.30	291	0.	0.	0.	123.
1.01	23.50	143	.00	.00	.00	11.	1.03	.40	292	0.	0.	0.	105.
1.02	0.	144	.00	.00	.00	11.	1.03	.50	293	0.	0.	0.	89.
1.02	.10	145	.03	.02	.01	16.	1.03	1.00	294	0.	0.	0.	76.
1.02	.20	146	.03	.02	.01	31.	1.03	1.10	295	0.	0.	0.	65.
1.02	.30	147	.03	.02	.01	52.	1.03	1.20	296	0.	0.	0.	55.
1.02	.40	148	.03	.02	.01	70.	1.03	1.30	297	0.	0.	0.	47.
1.02	.50	149	.03	.02	.01	81.	1.03	1.40	298	0.	0.	0.	40.
							1.03	1.50	299	0.	0.	0.	34.
									SUM	36.40	34.36	2.04	142697.
									(	925.1(	873.1(	52.1(| 4045.26)

Output Summary
Various PMF Events
Nims Lake Dam
MO 30064

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .25	RATIO 2 .50	RATIO 3 .75	RATIO 4 1.00
HYDROGRAPH AT	A1	2.60	1	2266.	4531.	6797.	9062.
		(6.73)		(64.15)(	128.31)(	192.46)(	256.61)(
HYDROGRAPH AT	A2	1.19	1	2086.	4172.	6258.	8343.
		(3.08)		(59.06)(	118.13)(	177.19)(	236.26)(
HYDROGRAPH AT	A3	1.07	1	2070.	4140.	6210.	8279.
		(2.77)		(58.61)(	117.22)(	175.83)(	234.44)(
3-COMBINED	LAKE	4.86	1	5391.	10781.	16172.	21563.
		(12.59)		(152.65)(	305.29)(	457.94)(	610.59)(
ROUTED TO	DAM	4.86	1	1001.	5129.	9694.	13816.
		(12.59)		(28.35)(	145.23)(	274.50)(	391.21)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	849.40	849.40	854.50
STORAGE	6278.	6278.	8113.
OUTFLOW	0.	0.	1200.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.25	854.10	0.	7963.	1001.	0.	44.67	0.
.50	856.53	2.03	8899.	5129.	9.67	42.67	0.
.75	857.67	3.17	9355.	9694.	10.83	42.17	0.
1.00	858.54	4.04	9707.	13816.	11.83	41.67	0.

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO APPLIED TO FLOWS RATIO 1 .26	RATIO 2 .27	RATIO 3 .28	RATIO 4 .29
HYDROGRAPH AT	A1	2.60	1	2358.	2447.	2537.	2628.
		(6.73)		(66.72)(	69.29)(	71.85)(	74.42)(
HYDROGRAPH AT	A2	1.19	1	2169.	2253.	2336.	2420.
		(3.08)		(61.43)(	63.79)(	66.15)(	68.52)(
HYDROGRAPH AT	A3	1.07	1	2153.	2235.	2318.	2401.
		(2.77)		(60.96)(	63.30)(	65.64)(	67.99)(
3 COMBINED	A4&C	4.86	1	5606.	5822.	6038.	6253.
		(12.59)		(158.75)(	164.86)(	170.96)(	177.07)(
ROUTED TO	DAM	4.86	1	1077.	1151.	1224.	1306.
		(12.59)		(30.50)(	32.59)(	34.67)(	36.98)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

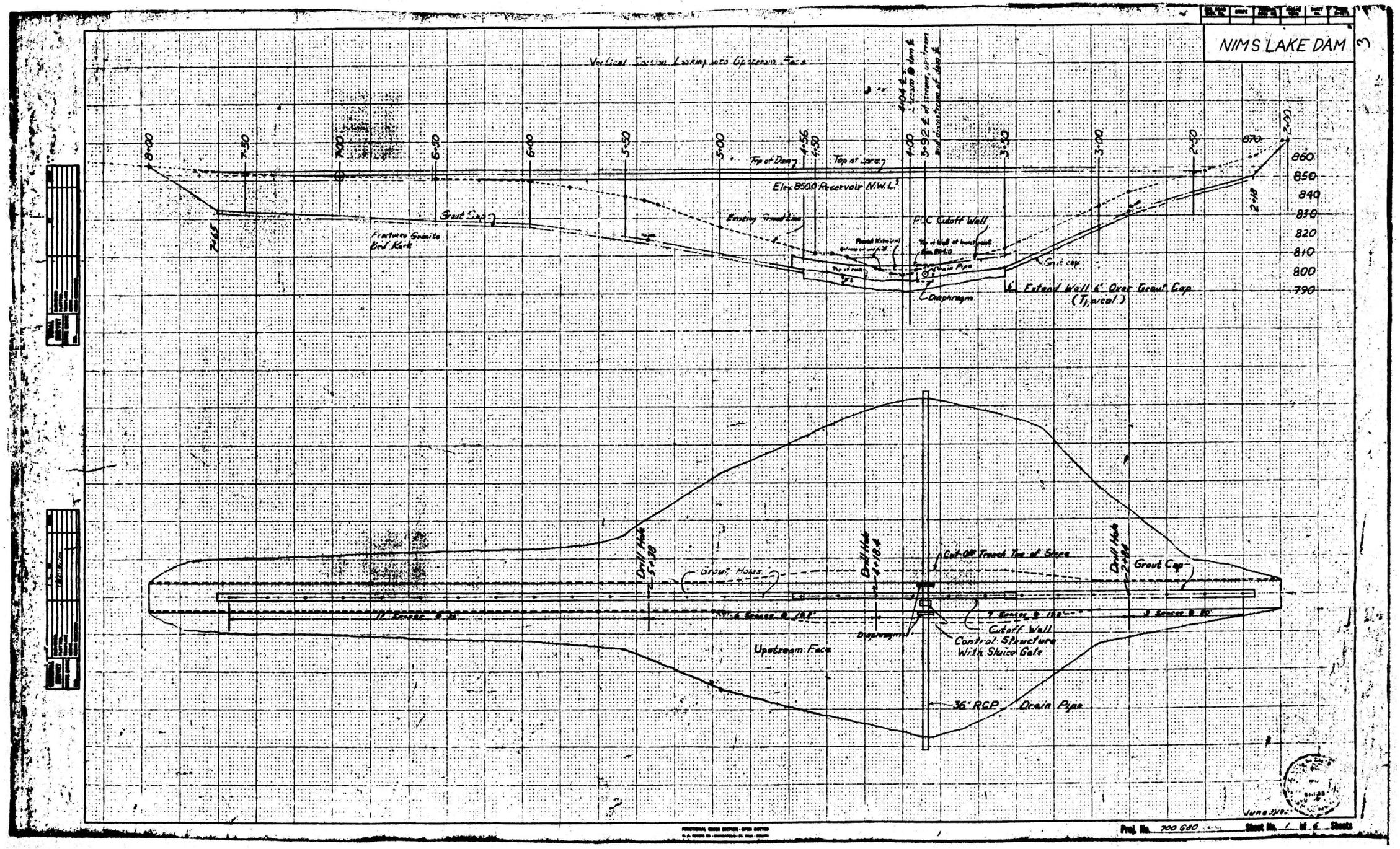
	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	849.40	849.40	854.50
STORAGE	6278.	6278.	8113.
OUTFLOW	0.	0.	1200.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.26	854.25	0.	8020.	1077.	0.	44.67	0.
.27	854.40	0.	8076.	1151.	0.	44.67	0.
.28	854.55	.05	8132.	1224.	1.67	44.50	0.
.29	854.69	.19	8186.	1306.	3.50	44.50	0.

APPENDIX C

Design Plans

NIMS LAKE DAM

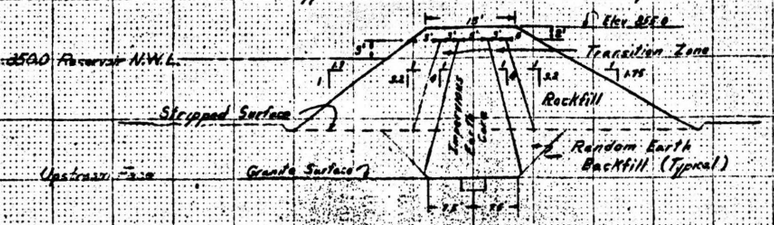


June 5, 19--

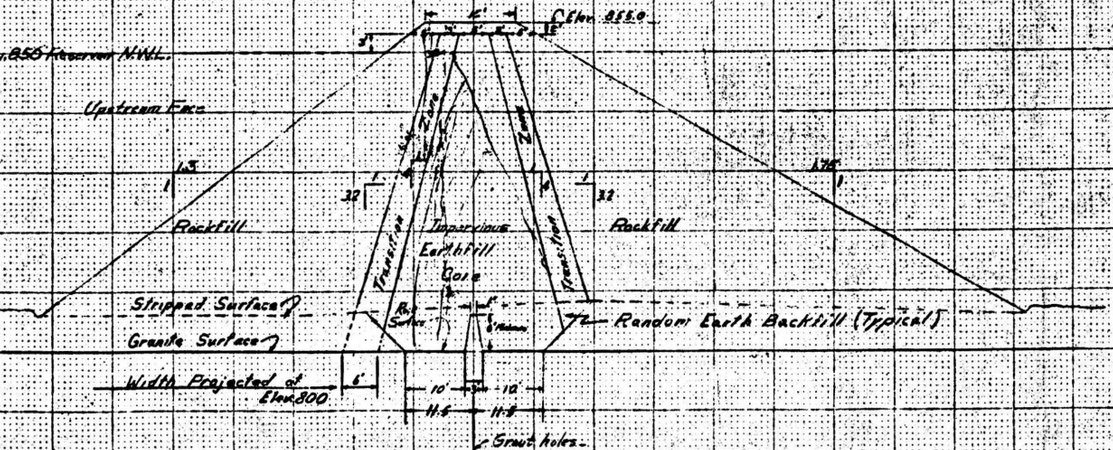
Proj. No. 700 680 Sheet No. 1 of 6 Sheets

NIMS LAKE DAM

Typical Section of Dam Over Grout Cap



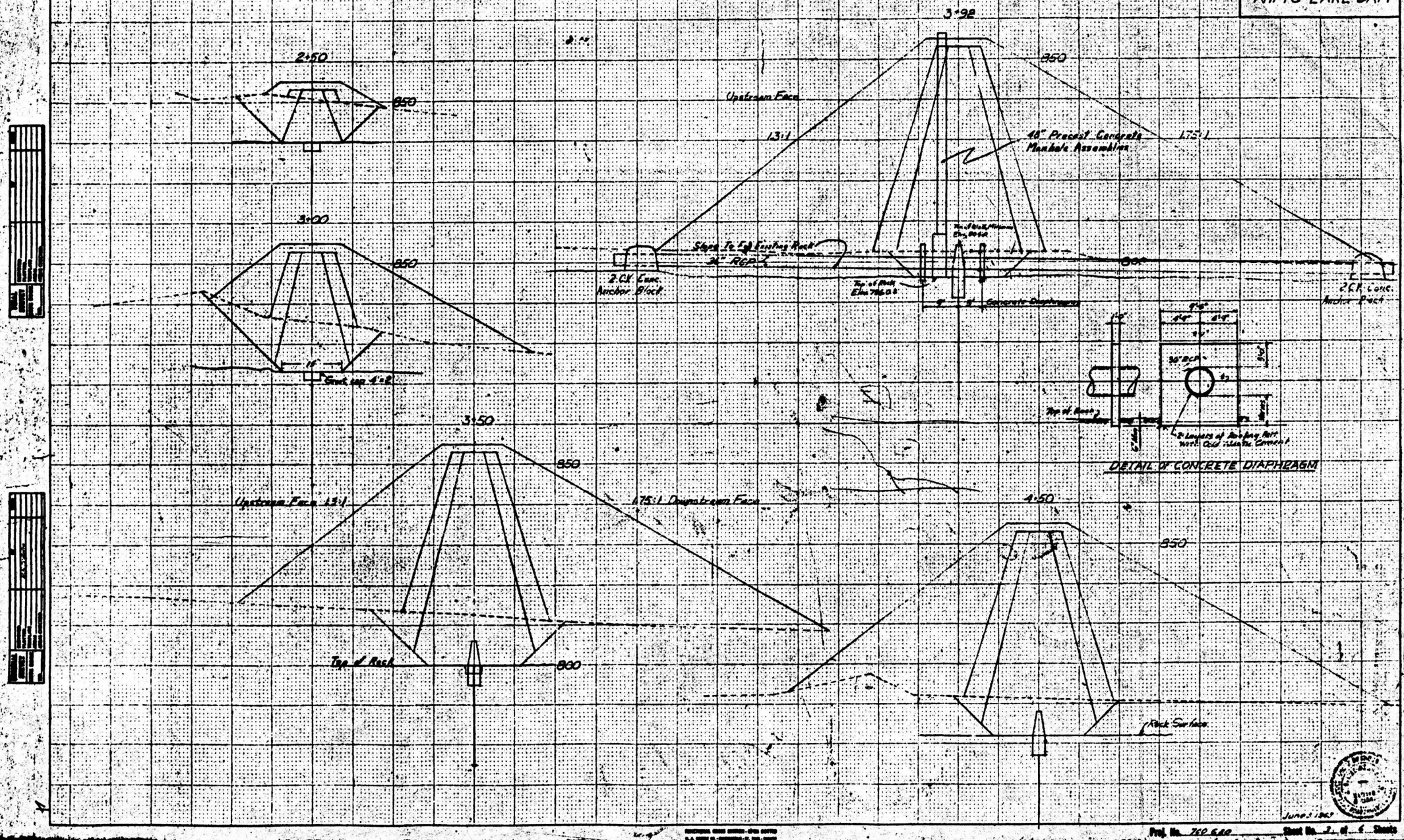
Typical Section of Dam Over Cut-Off Wall Sta. 3+48 to 4+62



June 3, 1943

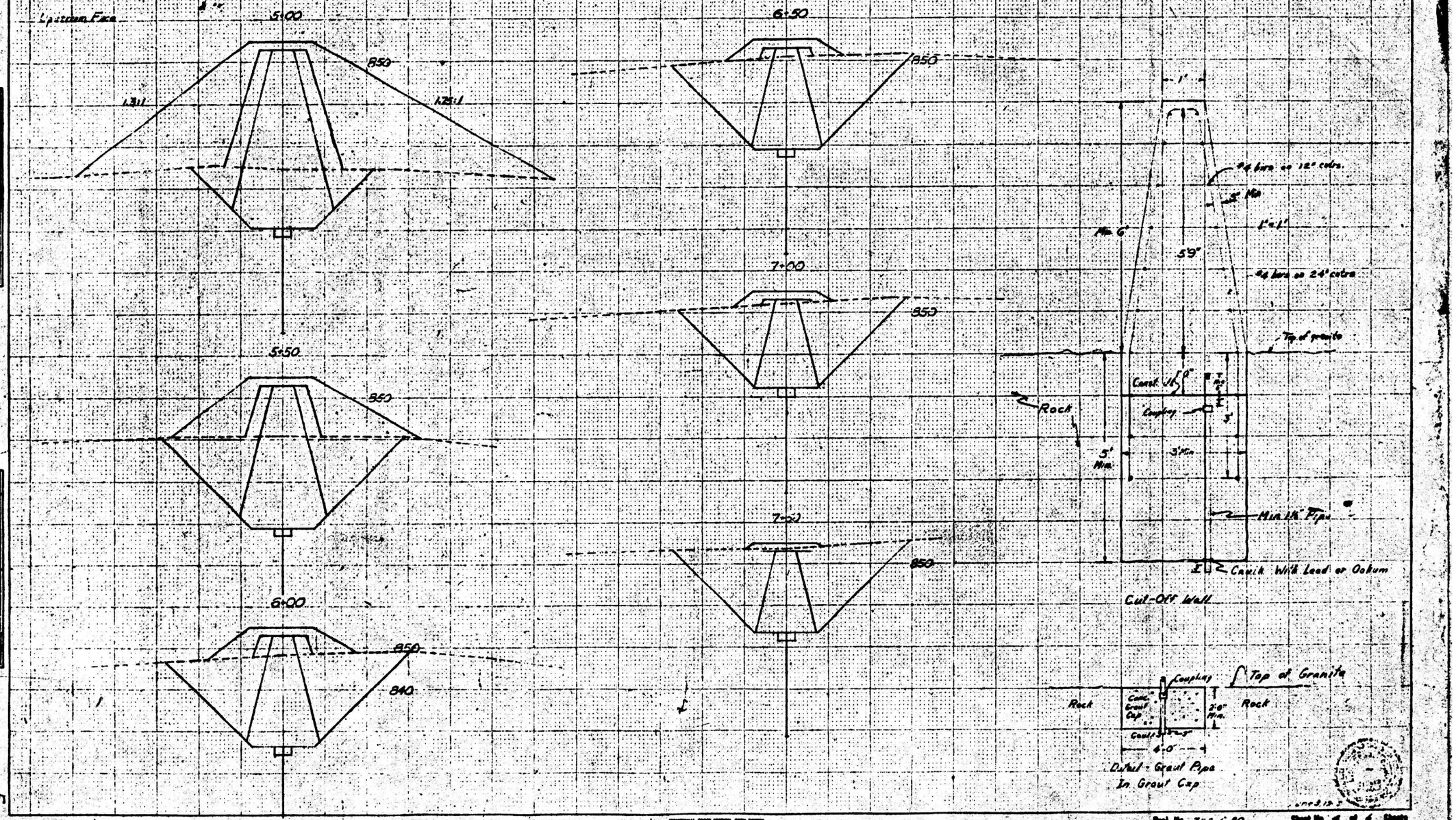
Proj. No. 700 680 Sheet No. 2 of 6 Sheets

NIMS LAKE DAM



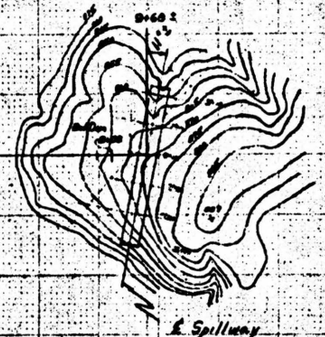
Proj. No. 760 640 Sheet No. 2 of 6 Sheets

NIMS LAKE DAM



NIMS LAKE DAM

Plan of proposed spillway location
Scale 1" = 200'

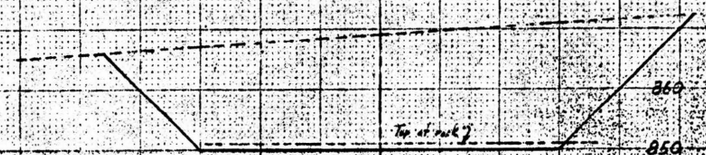


Spillway Cut Sections
1" = 10'

28+00

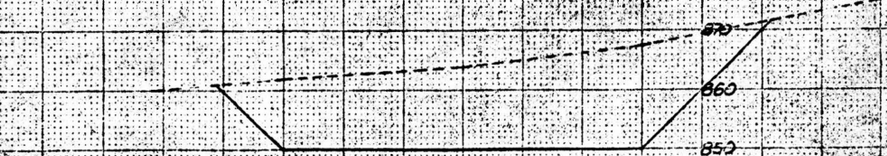
29+00

30+00



31+00

32+00



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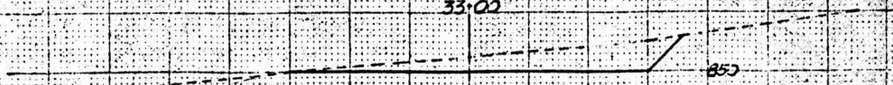

JUNE 3 1963

Proj. No. 700 G.90 Sheet No. 6 of 6 Sheets

NIMS LAKE DAM
CONTROL STRUCTURE DETAIL