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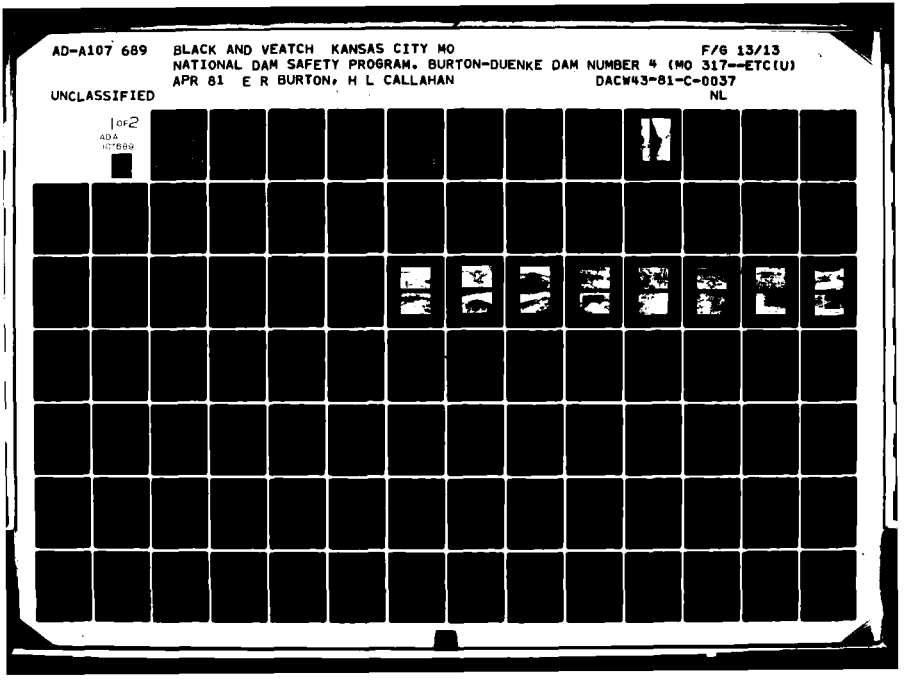

LEVEL II

MISSOURI-OSAGE-GASCONADE BASIN

AD A107 989

BURTON-DUENKE DAM #4
CAMDEN COUNTY, MISSOURI
MO 31713

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

United States Army
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St. Louis District

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Dam Safety, Lake, Dam Inspection, Private Dams

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

This report was prepared under the National Program of Inspection of Non-Federal Dams. This report assesses the general condition of the dam with respect to safety, based on available data and on visual inspection, to determine if the dam poses hazards to human life or property.

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MISSOURI-OSAGE-GASCONADE BASIN

BURTON-DUENKE DAM #4

CAMDEN COUNTY, MISSOURI

MO 31713

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

United States Army
Corps of Engineers
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St. Louis District

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

FOR: STATE OF MISSOURI

APRIL 1981

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

REPLY TO ATTENTION OF

SUBJECT: Dam Phase I Inspection Report

This report presents the results of field inspection and evaluation of the Burton-Duenke Dam #4 (MO 31713).

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
Chief, Engineering Division — 21 JUL 1981 Date

APPROVED BY: SIGNED
Colonel, CE, Commanding — 21 JUL 1981 Date

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BURTON-DUENKE DAM #4

CAMDEN COUNTY, MISSOURI

MISSOURI INVENTORY NO. 31713

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

PREPARED BY:

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

UNDER DIRECTION OF

ST. LOUIS DISTRICT CORPS OF ENGINEERS

FOR

GOVERNOR OF MISSOURI

APRIL 1981

PHASE I REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam	Burton-Duenke Dam #4
State Located	Missouri
County Located	Camden County
Stream	Tributary of the Lake of the Ozarks
Date of Inspection	24 April 1981

Burton-Duenke Dam #4 was inspected by a team of engineers from Black & Veatch, Consulting Engineers for the St. Louis District, Corps of Engineers. The purpose of the inspection was to make an assessment of the general condition of the dam with respect to safety, based upon available data and visual inspection, in order to determine if the dam poses hazards to human life or property.

The guidelines used in the assessment were furnished by the Department of the Army, Office of the Chief of Engineers and developed with the help of several Federal and state agencies, professional engineering organizations, and private engineers. Based on these guidelines, this dam is classified as an intermediate size dam with a high downstream hazard potential. According to the St. Louis District, Corps of Engineers, failure would threaten lives and property. The estimated damage zone extends approximately one mile downstream to the Lake of the Ozarks. Within the estimated damage zone are a marina, two dwellings, and thirteen trailers. Contents of the estimated downstream damage zone were verified by the inspection team.

Our inspection and evaluation indicates that the spillway does not meet the criteria set forth in the guidelines for a dam having the above size and hazard potential. The spillway will not pass the probable maximum flood without overtopping the dam but will pass 20 percent of the probable maximum flood. The spillway will pass the flood which has a one percent chance of occurrence in any given year (100-year flood). The spillway design flood recommended by the guidelines is the probable maximum flood. The probable maximum flood is defined as the flood discharge which may be expected from the most severe combination of critical meteorologic and hydrologic conditions which are reasonably possible in the region.

Based on visual observations, this dam appears to be in good condition. Deficiencies visually observed by the inspection team were seepage at the interface of the left abutment and the downstream slope, below the inlet of the spillway pipe, and on both abutments at the upstream enbankment slope, erosion on the upstream and downstream slopes, at the

embankment/abutment interfaces at each of the corners of the embankment, and below the inlet of the spillway pipe, and the very thin vegetal cover. Seepage and stability analyses required by the guidelines were not available.

There were no observed deficiencies or conditions existing at the time of the inspection which indicated an immediate safety hazard. Future corrective action and regular maintenance will be required to correct or control the described deficiencies. In addition, detailed seepage and stability analyses of the existing dam, as required by the guidelines, should be performed. A detailed report discussing each of these deficiencies is attached.

Edwin R Burton

Edwin R. Burton, PE
Missouri E-10137

Harry L Callahan

Harry L. Callahan, Partner
Black & Veatch

OVERVIEW OF DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
BURTON-DUENKE DAM #4

TABLE OF CONTENTS

Paragraph No.	Title	Page No.
	SECTION 1 - PROJECT INFORMATION	
1.1	General	1
1.2	Description of Project	1
1.3	Pertinent Data	2
	SECTION 2 - ENGINEERING DATA	
2.1	Design	5
2.2	Construction	5
2.3	Operation	5
2.4	Geology	5
2.5	Evaluation	5
	SECTION 3 - VISUAL INSPECTION	
3.1	Findings	7
3.2	Evaluation	9
	SECTION 4 - OPERATIONAL PROCEDURES	
4.1	Procedures	10
4.2	Maintenance of Dam	10
4.3	Maintenance of Operating Facilities	10
4.4	Description of Any Warning System in Effect	10
4.5	Evaluation	10
	SECTION 5 - HYDRAULIC/HYDROLOGIC	
5.1	Evaluation of Features	11
	SECTION 6 - STRUCTURAL STABILITY	
6.1	Evaluation of Structural Stability	13
	SECTION 7 - ASSESSMENT/REMEDIAL MEASURES	
7.1	Dam Assessment	14
7.2	Remedial Measures	14

TABLE OF CONTENTS (Cont'd)

LIST OF PLATES

Plate No.	Title
1	Location Map
2	Vicinity Topography
3	Dam Plan
4	Dam Cross Section and Dam Crest Profile
5	Photo Index

LIST OF PHOTOGRAPHS

Photo No.	Title
1	Upstream Face of Dam Looking East
2	Upstream Face of Dam Looking West
3	Upstream Face of Dam at Waterline
4	Crest of Dam Looking East
5	Crest of Dam Looking West
6	Downstream Face of Dam Looking East
7	Downstream Face of Dam Looking West
8	Spillway Pipe Inlet
9	Channel Downstream of Spillway Pipe Outlet
10	Erosion on Upstream Face of Dam
11	Erosion at Upstream Face and Left Abutment
12	Erosion at Downstream Face and Left Abutment
13	Left Abutment Just Upstream of Dam

TABLE OF CONTENTS (Cont'd)

LIST OF PHOTOGRAPHS

Photo No.	Title
14	Right Bank of Reservoir
15	Lake and Watershed Viewed From Dam
16	Valley Downstream of Dam

APPENDIX

Appendix A - Hydrologic and Hydraulic Analyses

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority. The National Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of safety inspection of dams throughout the United States. Pursuant to the above, the District Engineer of the St. Louis District, Corps of Engineers, directed that a safety inspection of the Burton-Duenke Dam #4 be made.

b. Purpose of Inspection. The purpose of the inspection was to make an assessment of the general condition of the dam with respect to safety, based upon available data and visual inspection, in order to determine if the dam poses hazards to human life or property.

c. Evaluation Criteria. Criteria used to evaluate the dam were furnished by the Department of the Army, Office of the Chief of Engineers, in "Recommended Guidelines for Safety Inspection of Dams." 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.

(1) The dam is an earth structure located in the valley of a tributary to the Lake of the Ozarks (see Plate 1). The watershed is an area of steep hills consisting of about 80 percent timber, 15 percent grassland on a golf course fairway and 5 percent urban. The lake would back up to near the toe of an upstream dam when the water surface is at the spillway level. The dam is approximately 380 feet long along the crest and 44 feet high. The dam crest is 40 feet wide. The downstream face of the dam has a nonuniform slope from the crest to the valley floor below.

(2) The spillway is an uncontrolled 36-inch corrugated metal pipe installed in the embankment. The spillway has a concrete headwall at the upstream end. The pipe acts as an orifice. Flow through the pipe discharges into a ditch and then to the hillside downstream of the left abutment. There is no emergency spillway.

(3) Pertinent physical data are given in paragraph 1.3.

b. Location. The dam is located in northeast Camden County, Missouri, as indicated on Plate 1. The lake formed by the dam is in an

area shown on the United States Geological Survey 7.5 minute series quadrangle map for Lake Ozark, Missouri in Section 8 of T39N, R16W.

c. Size Classification. Criteria for determining the size classification of dams and impoundments are presented in the guidelines referenced in paragraph 1.1c above. Based on these criteria, the Burton-Duenke Dam #4, which is 44 feet high and has a normal storage capacity of 118 acre-feet, is in the intermediate size category. An intermediate size dam is classified as having a height less than 100 feet, but greater than or equal to 40 feet and/or a storage capacity less than 50,000 acre-feet, but greater than or equal to 1,000 acre-feet.

d. Hazard Classification. The hazard classification assigned by the Corps of Engineers for this dam is as follows: Burton-Duenke Dam #4 has a high hazard potential, meaning that the dam is located where failure may cause loss of life, and serious damage to homes, agricultural, industrial and commercial facilities, and to important public utilities, main highways, or railroads. For the Burton-Duenke Dam #4 the estimated flood damage zone extends approximately one mile downstream to the Lake of the Ozarks. Within the estimated damage zone are a marina, two dwellings, and thirteen trailers. Contents of the estimated downstream damage zone were verified by the inspection team.

e. Ownership. The dam is owned by the Burton-Duenke Development Company, P. O. Box 213-32, Osage Beach, Missouri 65065, c/o Mr. Westhoff.

f. Purpose of Dam. The dam forms a 9.7-acre lake used for recreation.

g. Design and Construction History. Data relating to the design and construction were not available. The owner's representative, Mr. Westhoff, stated that the dam was designed by Mr. Dave Krehbiel and was constructed in the summer of 1979.

h. Normal Operating Procedure. Normal rainfall, runoff, transpiration, evaporation, and overflow through the uncontrolled spillway all combine to maintain a relatively stable water surface elevation. The lake was considerably below normal pool at the time of the inspection.

1.3 PERTINENT DATA

a. Drainage Area - 134 acres (includes 75 acres above two upstream reservoirs)

b. Discharge at Damsite.

(1) Normal discharge at the damsite is through an uncontrolled 36-inch corrugated metal pipe.

(2) Estimated experienced maximum flood at damsite - Unknown.

(3) Estimated ungated spillway capacity at maximum pool elevation - elevation-80 cfs (Probable Maximum Flood Pool El. 717.4)

c. Elevation (Feet above m.s.l. Approximate Tie to USGS Map).

(1) Top of dam - 714.4 (see Plate 3)

(2) Spillway outlet invert - 707.0

(3) Streambed at toe of dam - 670.5

(4) Maximum tailwater - Unknown.

d. Reservoir.

(1) Length of maximum pool - 1,800 feet ± (Probable maximum flood pool level)

(2) Length of normal pool - 1,600 feet ± (Spillway outlet invert)

e. Storage (Acre-feet).

(1) Top of dam - 200

(2) Spillway outlet invert - 118

(3) Design surcharge - Not available.

f. Reservoir Surface (Acres).

(1) Top of dam - 12.8

(2) Spillway outlet invert - 9.7

g. Dam.

(1) Type - Earth embankment.

(2) Length - 380 feet

(3) Height - 44 feet ±

(4) Top width - 40 feet

(5) Side slopes - upstream face 1.0 V on 2.6 H, downstream face between 1.0 V on 3.4 H and 1.0 V on 4.2 H (see Plate 4).

(6) Zoning - Unknown.

(7) Impervious core - Unknown.

(8) Cutoff - Unknown.

(9) Grout curtain - Unknown.

h. Diversion and Regulating Tunnel - None.

i. Spillway.

(1) Type - 36-inch corrugated metal pipe.

(2) Inlet invert elevation - 705.0 feet m.s.l.

(3) Outlet invert elevation - 707.0 feet m.s.l.

(4) Gates - None.

(5) Upstream channel - The normal pool would back up to near the toe of an upstream dam.

(6) Downstream channel - Discharges to a ditch and then to the hillside.

j. Emergency Spillway - None.

k. Regulating Outlets - None.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Design data were not available.

2.2 CONSTRUCTION

Construction records were unavailable; however, the owner's representative stated that the dam was designed by Mr. Dave Krehbeil and was constructed in the summer of 1979.

2.3 OPERATION

Operational records and documentation of past floods were unavailable.

2.4 GEOLOGY

The site of the dam and reservoir is located in a narrow, steep-sided valley in hilly terrain. The dam impounds a small intermittent side tributary of the Osage River which is dammed to form the Lake of the Ozarks.

The soils in the area of the dam and reservoir consist of the Lebanon, Doniphan, Gepp, Bardley and Clarksville soil series. The Lebanon soils are formed in loess overlying residuum weathered from cherty limestone or dolomite on ridgetops and upper side slopes. For engineering purposes, the soils are classified as CL material. The Doniphan soils are formed in residuum weathered from clayey shales and cherty dolomite on ridgetops and side slopes. For engineering purposes, the soils are classified as CL, CH, MH, GM, or SM-SC materials. The Gepp, Bardley and Clarksville soils are developed in residuum weathered from cherty dolomite. For engineering purposes, the soils are classified as GC, GM, SC, SM, ML, CL or CH materials depending on location of the samples.

The bedrock in the area of the dam and reservoir consists of dolomite with abundant chert of the Gasconade formation of the Canadian Series of the Ordovician System. The Gasconade formation forms nearly vertical bluffs and cliffs along streams in the central Ozarks and caves and springs are common.

2.5 EVALUATION

a. Availability. No engineering data were available.

b. Adequacy. No engineering data were available. Thus, an assessment of the design, construction, and operation could not be made.

Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency. These seepage and stability analyses should be performed for appropriate loading conditions (including earthquake loads) and made a matter of record.

c. Validity. The validity of the design, construction, and operation could not be determined due to the lack of engineering data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General. A visual inspection of Burton-Duenke Dam #4 was made on 24 April 1981. The inspection team consisted of Edwin Burton, team leader; Robert Pinker, geologist; Gary Van Riessen, geotechnical engineer; and John Ruhl, hydrologic/hydraulic engineer. Mr. Westhoff and Mr. Krehbiel, representatives of the owner, met the inspection team at the dam and provided information regarding design, construction, and maintenance. The dam appears to be in good condition. Specific observations are discussed below. No observations were made of the condition of the upstream face of the dam below the pool elevation at the time of the inspection.

b. Dam. The inspection team observed the following conditions at the dam. No cracking, sliding, sloughing, sinkholes, or other signs of settlement or instability were observed. The embankment has a broad crest with a flat downstream slope and a mild upstream slope. No toe drains, relief wells, or instruments to measure the performance of the dam were located.

Minor seepage was occurring at the interface of the left abutment and the downstream slope, below the inlet of the spillway pipe, and on both abutments at the upstream enbankment slope. The area at the interface of the left abutment and the downstream slope was flowing clear at a rate of approximately 5 gallons/hour. Seepage below the spillway pipe and at the upstream/abutment interfaces was less than 5 gallons/hour, was above the lake level and was coming from the abutments. The area downstream of the dam was fairly wet, but because of rain on the day previous to the inspection, it was impossible to determine if this was due to seepage.

Minor erosion of silty clay material has taken place on the upstream and downstream slopes, at the embankment/abutment interfaces at each of the corners of the embankment, and below the inlet of the spillway pipe. There is no evidence to indicate that the embankment has ever been overtopped.

The ground cover on the embankment consists of thin weeds and no grass in rocky soil. There was no riprap on the embankment. There were no animal burrows or trees.

c. Appurtenant Structures. The spillway is the only appurtenant structure observed by the inspection team. The alignment of the spillway pipe was observed to dogleg to the left when viewed from the upstream end. There is a concrete headwall (8 feet wide, 5.5 feet high and 0.6 feet thick) at the pipe inlet. There was no trash rack at the pipe inlet.

There was approximately 2 to 3 inches of sediment in the pipe at the upstream end. About 6 feet and 4 feet of the outside of the pipe was observed at the upstream and downstream ends, respectively. One joint in the pipe was observed and was in good condition with no apparent movement. The survey made during the inspection showed the spillway pipe outlet to be about 2 feet higher than its inlet which appeared to be the way it was constructed. There is no evidence of leakage into, out of, or around the pipe. The pipe appears to be in good condition with no rust observed. The pipe discharges into a ditch which is approximately 3-1/2 feet wide and 2 feet deep. The ditch ends about 75 feet below the pipe outlet where discharge is released to the hillside north of the left abutment. There is no erosion downstream of the pipe outlet.

d. Geology. The soils in the area of the dam and reservoir consist of silty clay with numerous rock fragments ranging in diameter from 1/4 inch to 6 inches. The soil developed from residuum weathered from the underlying dolomite and chert bedrock. The soil is typically less than 5 feet thick.

The bedrock in the area of the dam and reservoir consists of dolomite with abundant chert and a 6 to 10-foot thick sandstone bed. The rocks are classified as the Gasconade formation; the sandstone is the upper portion of the Gunter member of the Gasconade formation.

The upper two-thirds of the abutments at the ends of the embankment consist of dolomite with abundant chert. The lower one-third consists of sandstone. Seepage was observed coming from the sandstone unit where it is exposed on the abutments of the upstream slope at approximately 10 feet above the water in the reservoir. The dolomite is vuggy and contains numerous chert nodules and beds.

Samples of the near-surface materials in the embankments were taken near the center of the downstream crest using an Oakfield sampler.

These materials were classified as silty clay with numerous chert fragments. For engineering purposes, these samples were classified as CL materials. Based on these samples, it is anticipated that the remainder of the embankment is constructed of similar silty clay (CL) material.

e. Reservoir Area. Minor slumping or sliding of the reservoir right and left banks was observed (Photos 14 and 15). This is probably due to excavation of borrow material from the reservoir and should have no detrimental effects on the dam. The lake was noted to be clear with no noticeable siltation and a visibility of 1-1/2 to 2 feet.

f. Downstream Channel. The spillway discharges to a ditch and then to the hillside north of the left abutment.

3.2 EVALUATION

The various deficiencies observed at the time of the inspection are not believed to represent an immediate safety hazard. They do, however, warrant monitoring and control.

The seepage should be monitored regularly for quality and quantity. Similar areas of seepage were observed in natural hillsides in the area with no adverse effects. Seepage can cause internal erosion creating cavities and underground channels, thereby weakening the embankment. The erosion gullies should be backfilled with suitable material and compacted. The embankment should be seeded to prevent erosion.

The doglegged alinement and adverse slope of the spillway pipe make it susceptible to clogging from debris hangup inside the pipe and to sediment in the pipe. Realinement of the spillway pipe or constructing an inlet baffle would reduce the potential for clogging.

The lack of good ground cover on the embankment has resulted in minor erosion of the embankment due to seepage and local runoff. The absence of riprap on the upstream face does not appear to be a problem.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The pool is primarily controlled by rainfall, runoff, evaporation, transpiration, seepage, and capacity of the uncontrolled spillway. The lake was considerably below normal pool at the time of the inspection.

4.2 MAINTENANCE OF DAM

There was no evidence of a regular maintenance program. The crest appeared to have been graded within a year prior to the inspection.

4.3 MAINTENANCE OF OPERATING FACILITIES

No operating facilities exist.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

There is no existing warning system or preplanned scheme for alerting downstream residents for this dam.

4.5 EVALUATION

A maintenance program should be established to include seeding the embankment with grass, mowing the grass and weed cover on the embankment when it is developed, and removal of any trees that appear.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data. No design data were available.

b. Experience Data. The drainage area and lake surface area are developed from the USGS Lake Ozark Quadrangle Map. The dam layout is from a survey made during the inspection.

c. Visual Observations.

(1) The spillway appears to be in good condition. The lake level at the time of the inspection (El. 698.0) was below the spillway outlet invert. There were no obstructions to flow in the downstream channel. There was approximately 2 to 3 inches of sediment in the pipe at the upstream end.

(2) There is no emergency spillway for this dam.

(3) Spillway discharges do not endanger the integrity of the dam.

d. Overtopping Potential. The spillway will not pass the probable maximum flood without overtopping the dam. The probable maximum flood is defined as the flood discharge that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. The spillway will pass 20 percent of the probable maximum flood without overtopping the dam. The spillway will pass the one percent chance flood estimated to have a peak outflow of 15 cfs developed by a 24-hour, one percent chance rainfall. According to the recommended guidelines from the Department of the Army, Office of the Chief of Engineers, a high hazard dam of intermediate size should pass the probable maximum flood. The portion of the estimated peak discharge of 50 percent of the probable maximum flood overtopping the dam would be 2,180 cfs of the total discharge from the reservoir of 2,260 cfs. The estimated duration of overtopping is 5.8 hours with a maximum height of 2.8 feet. The portion of the estimated peak discharge of the probable maximum flood overtopping the dam would be 2,540 cfs of the total discharge from the reservoir of 2,620 cfs. The estimated duration of overtopping is 8.8 hours with a maximum height of 3.0 feet. The embankment could be jeopardized should overtopping occur for these periods of time.

According to the St. Louis District, Corps of Engineers, the effect from rupture of the dam could extend approximately one mile downstream to the Lake of the Ozarks. A marina, two dwellings, and thirteen trailers could be severely damaged and lives could be lost should failure of the dam occur. Contents of the estimated downstream damage zone were verified

by the inspection team. There does not appear to be any flood plain regulations or other constraints in force to limit future downstream development.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations. Visual observations of conditions which affect the structural stability of this dam are discussed in Section 3, paragraph 3.1b.

b. Design and Construction Data. No design data relating to the structural stability of the dam were found. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency.

c. Operating Records. No operational records exist.

d. Postconstruction Changes. The only postconstruction change which was observed is the grading on the crest. It appeared that this repair had been made within the past year.

e. Seismic Stability. The dam is located in Seismic Zone 1 which is a zone of minor seismic risk. A properly designed and constructed earth dam using sound engineering principles and conservatism should pose no serious stability problems during earthquakes in this zone. The seismic stability of an earth dam is dependent upon a number of factors: embankment and foundation material classifications and shear strengths; abutment materials, conditions, and strengths; embankment zoning; and embankment geometry. Adequate descriptions of embankment design parameters, foundation and abutment conditions, or static stability analyses to assess the seismic stability of this embankment were not available and therefore no inferences will be made regarding the seismic stability. An assessment of the seismic stability should be included as part of the stability analysis required by the guidelines.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety. Several conditions observed during the visual inspection by the inspection team should be monitored and/or controlled. There is seepage at the interface of the left abutment and the downstream slope, below the inlet of the spillway pipe, and on both abutments at the upstream embankment slope, erosion on the upstream and downstream slopes, at the embankment/abutment interfaces at each of the corners of the embankment, and below the inlet of the spillway pipe, and a very thin vegetal cover. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency.

b. Adequacy of Information. Due to the absence of engineering design data, the conclusions in this report were based only on performance history and visual conditions. The inspection team considers that these data are sufficient to support the conclusions herein. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency.

c. Urgency. It is the opinion of the inspection team that a program should be developed as soon as possible to implement remedial measures recommended in paragraph 7.2b. If the safety deficiencies listed in paragraph 7.1a are not corrected, they will continue to deteriorate and lead to a serious potential of failure. The item recommended in paragraph 7.2a should be pursued on a high priority basis.

d. Necessity for Phase II. The Phase I investigation does not raise any serious questions relating to the safety of the dam nor does it identify any serious dangers which would require a Phase II investigation. However, the additional analyses noted in paragraph 2.5b are necessary for compliance with the guidelines.

e. Seismic Stability. This dam is located in Seismic Zone 1. Adequate description of embankment design parameters, foundation and abutment conditions, or static stability analyses to assess the seismic stability of this embankment were not available and therefore no inferences will be made regarding the seismic stability. An assessment of the seismic stability should be included as part of the recommended stability analysis.

7.2 REMEDIAL MEASURES

a. Alternatives. The spillway capacity and/or storage volume would need to be increased or the lake level would need to be permanently lowered to increase available flood storage in order to effectively pass

the recommended spillway design flood. Spillway capacity could be increased by providing an emergency spillway. The storage volume could be increased by raising the low areas of the dam crest.

b. Operation and Maintenance Procedures. The following operation and maintenance procedures are recommended and should be carried out under the direction of a professional engineer experienced in the design, construction, and maintenance of earth dams.

(1) The seepage areas noted during the visual inspection should be closely monitored and documented as to quantity of flow. Any significant changes should be evaluated.

(2) The erosion gullies should be backfilled with suitable material and compacted.

(3) A debris baffel or a trash rack should be constructed at the spillway pipe inlet or the pipe should be realined to a straight alinement to prevent clogging.

(4) A maintenance program to control the future growth of trees on the embankment should be developed. The embankment should be seeded with grass and developed for erosion protection. Grass/weed cover on the embankment should be cut periodically after it has been developed.

(5) Seepage and stability analyses should be performed.

(6) A detailed inspection of the dam should be made periodically. The findings of this inspection should be documented and made a matter of record. More frequent inspections may be required if additional deficiencies are observed or the severity of the reported deficiencies increase.

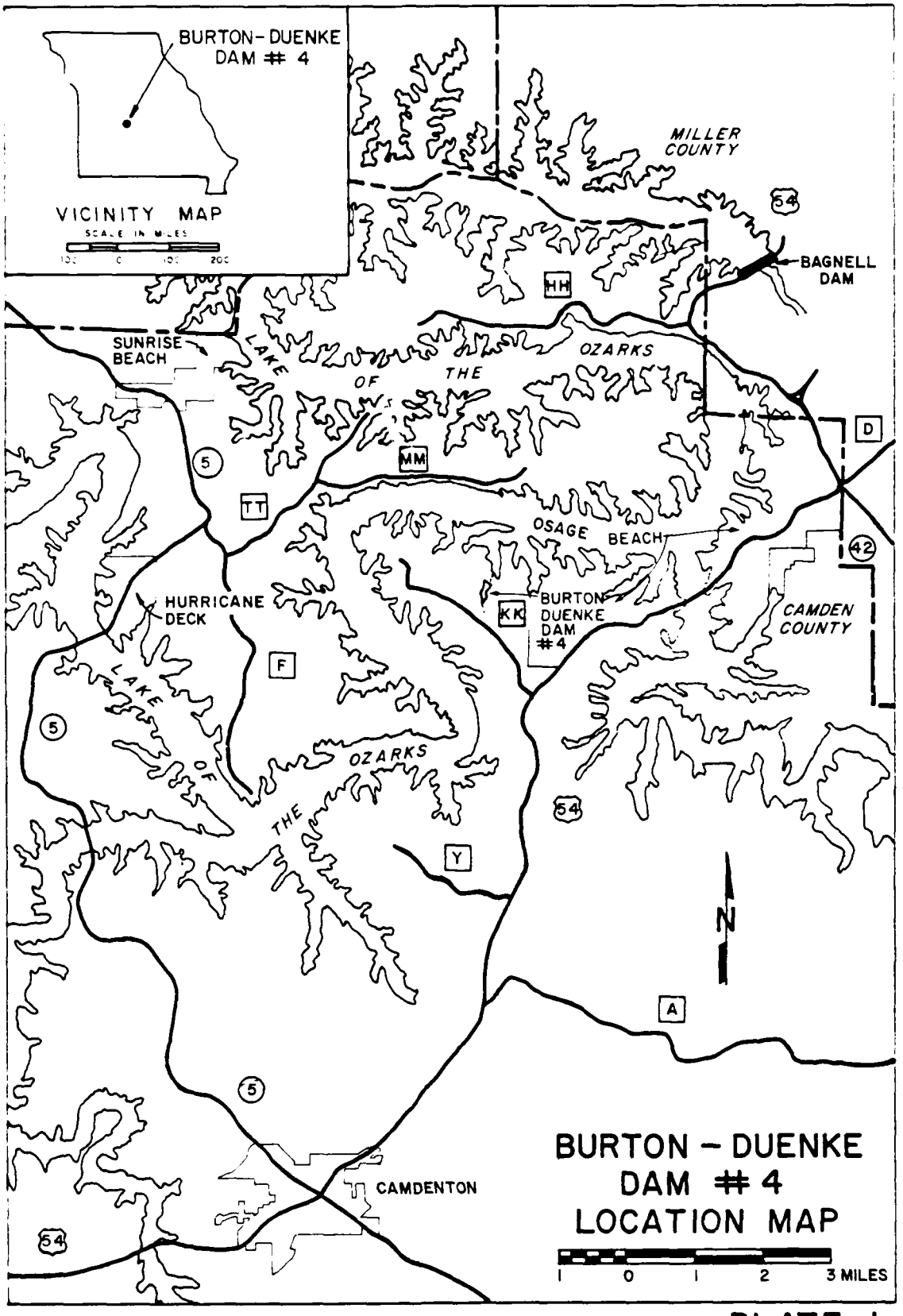
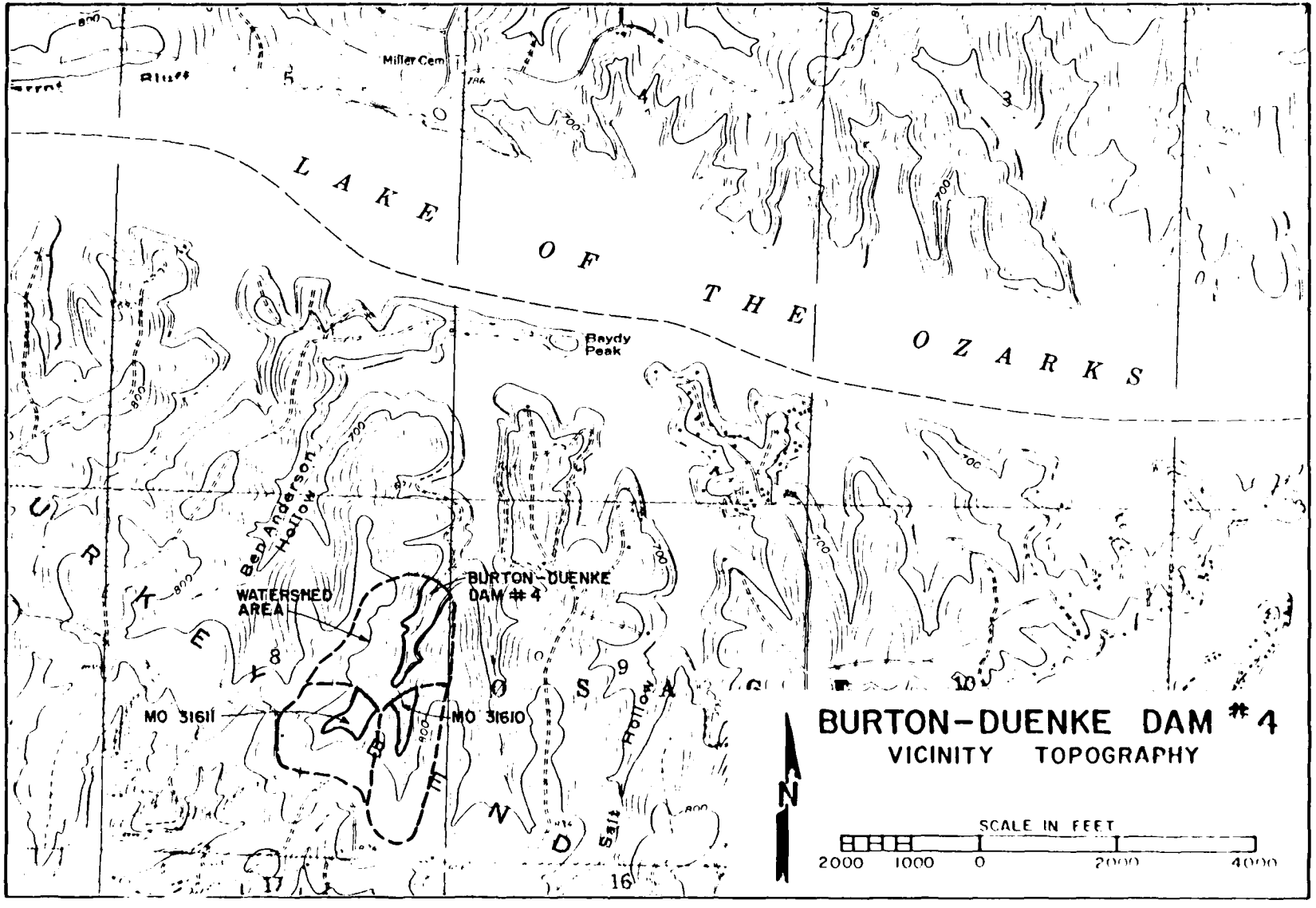

BURTON-DUENKE DAM # 4
VICINITY MAP
SCALE IN MILES
100 0 100 200
MILLER COUNTY
54
BAGNELL DAM
HH
SUNRISE BEACH
LAKE OF THE OZARKS
D
MM
5
TT
OSAGE BEACH
42
HURRICANE DECK
KK
BURTON-DUENKE DAM #4
CAMDEN COUNTY
F
LAKE OF THE OZARKS
Y
N
A
CAMDENTON
BURTON - DUENKE DAM # 4 LOCATION MAP
1 0 1 2 3 MILES

PLATE 1

PLATE 2


LAKE OF THE OZARKS
Miller Cem
Baydy Peak
Bee Anderson Hollow
WATERSHED AREA
BURTON-DUENKE DAM # 4
MO 31611
MO 31610
Salt Hollow
BURTON-DUENKE DAM # 4
VICINITY TOPOGRAPHY
N
SCALE IN FEET
2000 1000 0 2000 4000

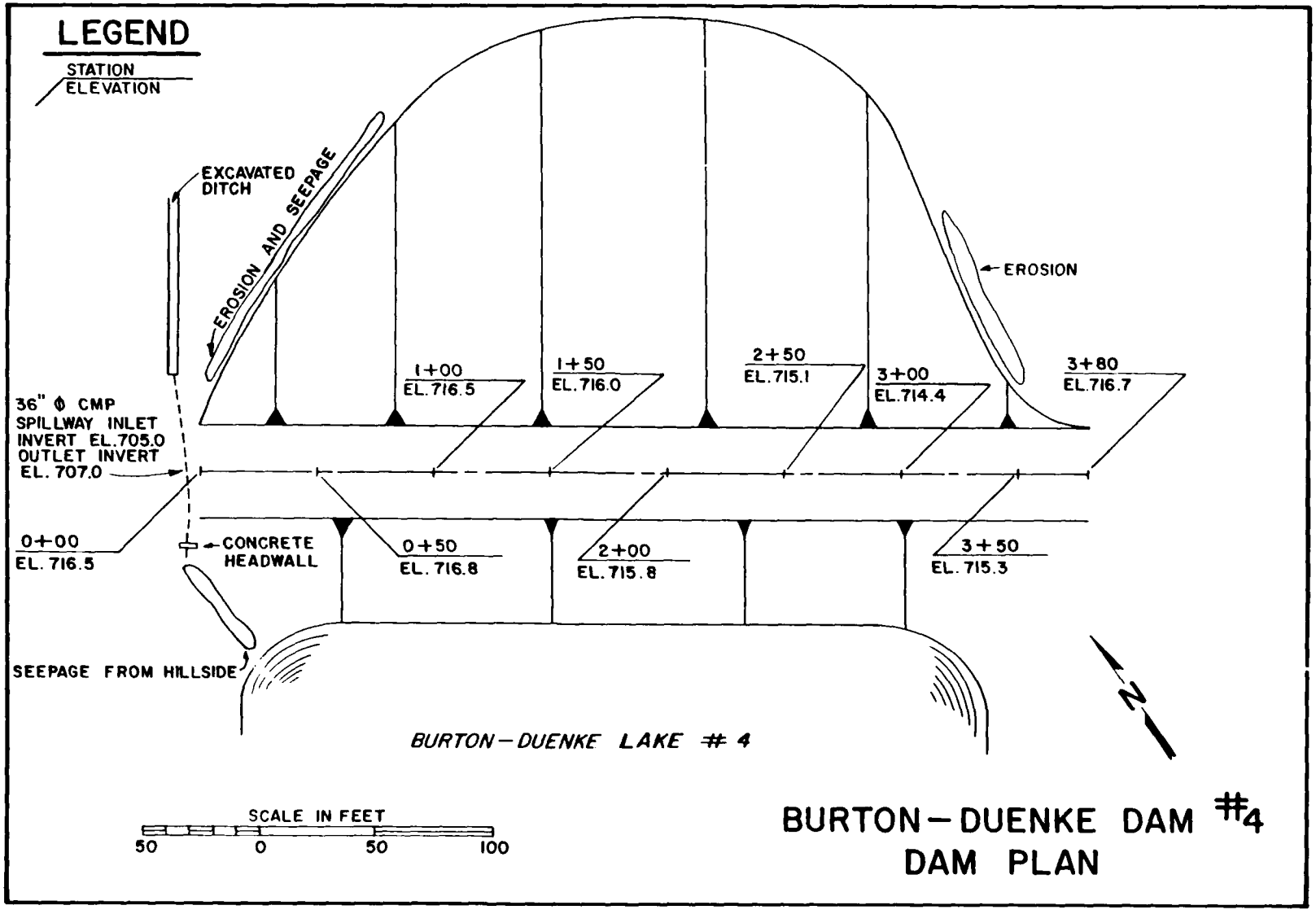


PLATE 3

BURTON-DUENKE DAM #4
DAM PLAN

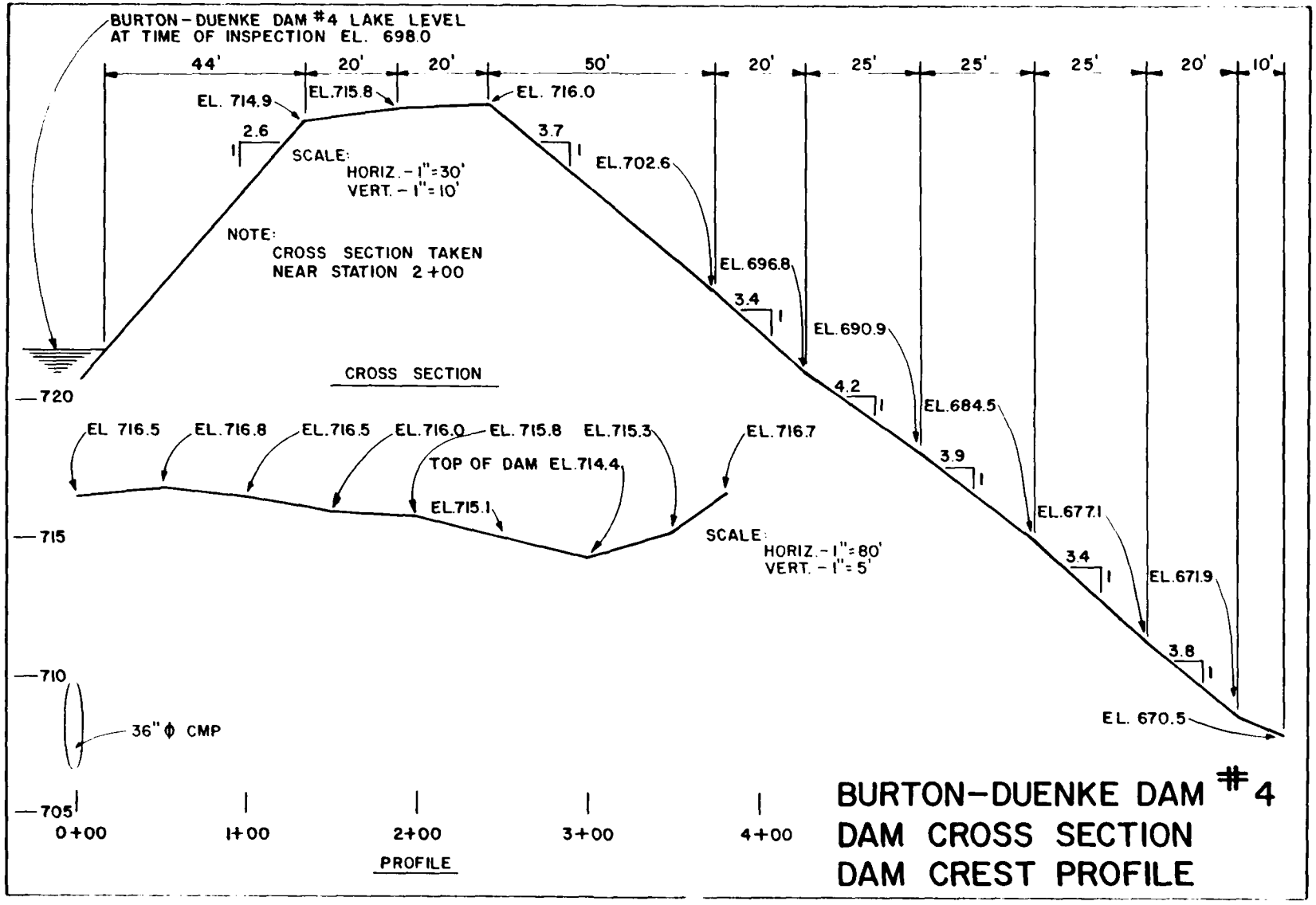


PLATE 4

BURTON-DUENKE DAM #4
DAM CROSS SECTION
DAM CREST PROFILE

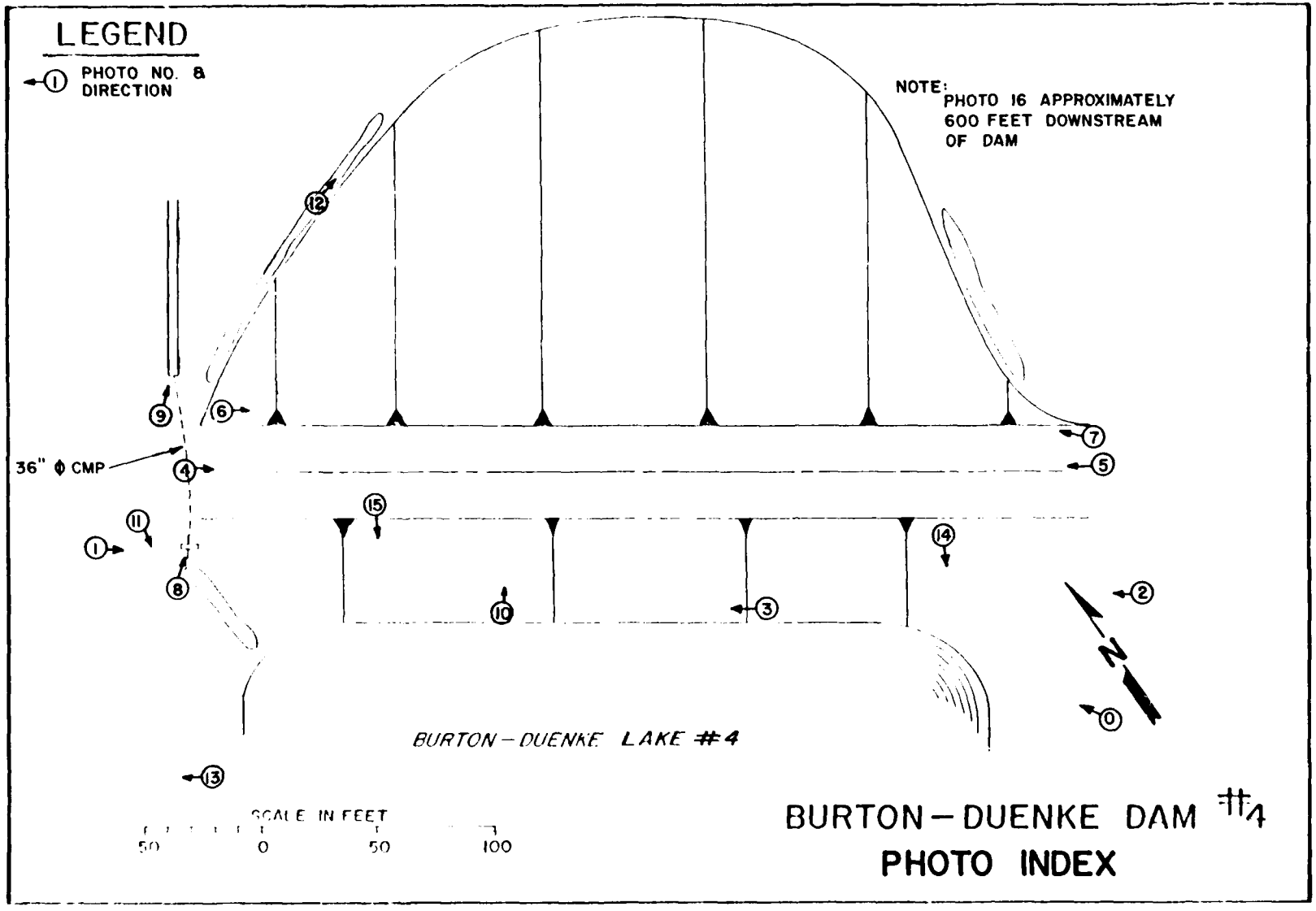

LEGEND
① PHOTO NO. & DIRECTION
NOTE: PHOTO 16 APPROXIMATELY 600 FEET DOWNSTREAM OF DAM
36" ϕ CMP
BURTON – DUENKE LAKE #4
SCALE IN FEET
50 0 50 100
BURTON – DUENKE DAM #4
PHOTO INDEX

PLATE 5

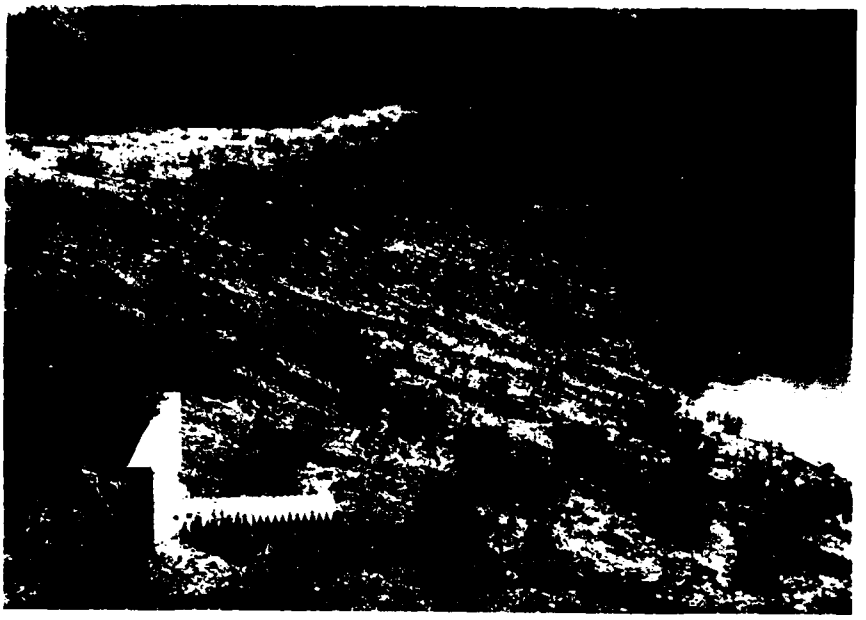


PHOTO 1 : UPSTREAM FACE OF DAM LOOKING EAST

PHOTO 2 : UPSTREAM FACE OF DAM LOOKING WEST

PHOTO 3 : UPSTREAM FACE OF DAM AT WATERLINE

PHOTO 4 : CREST OF DAM LOOKING EAST

CREST OF DAM LOOKING WEST

DOWNSTREAM FACE OF DAM LOOKING EAST

PHOTO 7 : DOWNSTREAM FACE OF DAM LOOKING WEST

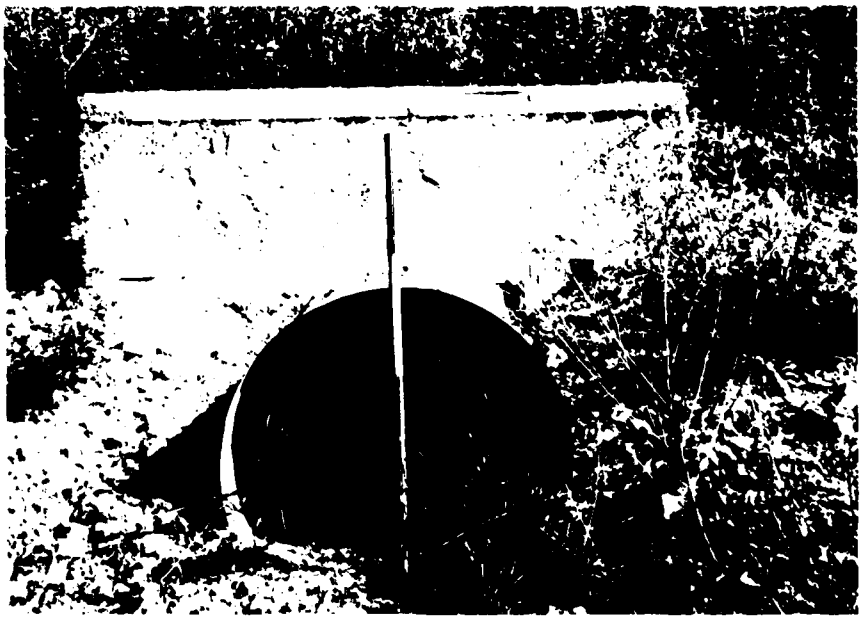


PHOTO 8 : SPILLWAY PIPE INLET

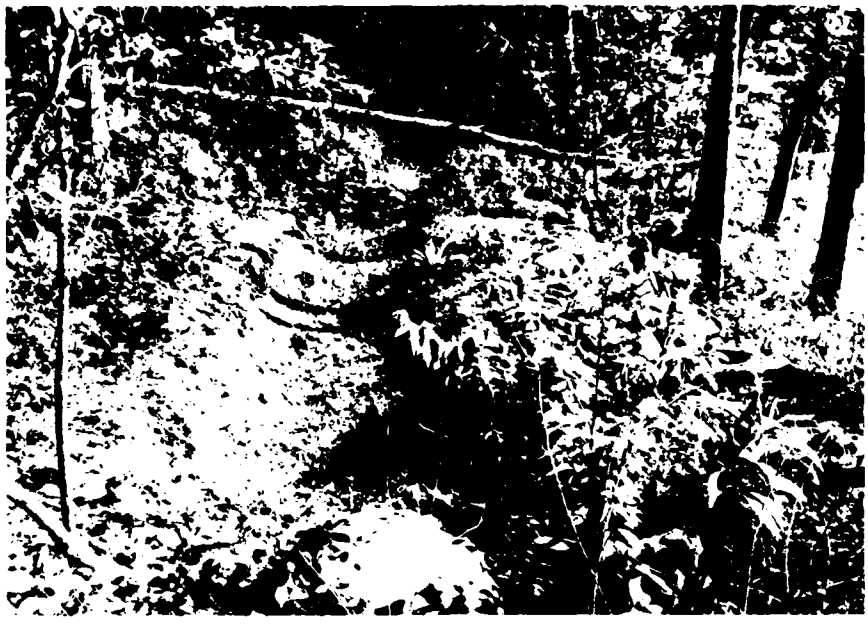


PHOTO 9 : CHANNEL DOWNSTREAM OF SPILLWAY PIPE OUTLET

PHOTO 10: EROSION ON UPSTREAM FACE OF DAM

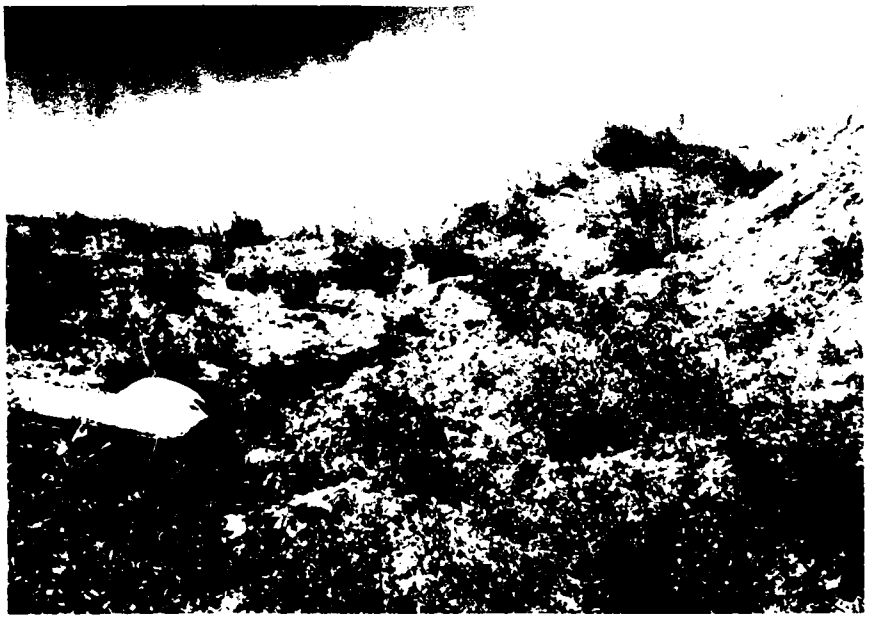


PHOTO 1.1: EROSION AT UPSTREAM FACE AND LEFT ABUTMENT

PHOTO 1.2: EROSION AT DOWNSTREAM FACE AND LEFT ABUTMENT

PHOTO 13: LEFT ABUTMENT JUST UPSTREAM OF DAM

PHOTO 14: RIGHT BANK OF RESERVOIR

PHOTO 15: LAKE AND WATERSHED VIEWED FROM DAM

PHOTO 16: VALLEY DOWNSTREAM OF DAM

APPENDIX A

HYDROLOGIC AND HYDRAULIC ANALYSES

HYDROLOGIC AND HYDRAULIC ANALYSES

To determine the overtopping potential of Burton-Duenke Dam #4, flood routings were performed by applying the Probable Maximum Precipitation (PMP) to a synthetic unit hydrograph to develop inflow hydrographs for the reservoirs being studied and the upstream reservoirs. The inflow hydrographs were then routed through the reservoirs and spillways. The overtopping analysis was determined using the computer program HEC-1 (Dam Safety Version) (1).

The PMP was determined from regional charts prepared by the National Weather Service in "Hydrometeorological Report No. 33" (HMR-33) (2). Reduction factors were not applied. The rainfall distribution for the 24-hour PMP storm was determined according to the procedures outlined in HMR-33 and EM 1110-2-1411 (3). The Jefferson City, Missouri rainfall distribution (5 min. interval - 24 hours duration), as provided by the St. Louis District, Corp of Engineers, was used when the one percent chance probability flood was routed through the reservoirs and spillways.

The synthetic unit hydrograph for the watershed was developed by the computer program using the Soil Conservation Service (SCS) method (1 and 4). The parameters for the unit hydrographs are shown in Table 1. The time of concentration (T_c) for the reservoir being studied was determined using the Kirpich method and was verified by the SCS method (4 and 5).

The SCS curve number (CN) method was used in computing the infiltration losses for the rainfall-runoff relationship. The CN values used, and the result from the computer output, are shown in Table 2.

Two impoundments in the watershed of Burton-Duenke Dam #4 were included in the hydrologic and hydraulic analyses. Storms were routed through these lakes (see Plate 2) which shall be referenced as "Dam #1" and "Dam #2" through the remainder of this appendix. Input data for the analysis of each of these dams was assumed from previous reports on these structures (6 and 7).

Routing through the reseroirs was performed using the Modified Puls Method. The initial reservoir pool elevations for the routing of each storm were determined to be equivalent to the inlet or outlet invert elevations of the spillways in accordance with antecedent storm conditions preceding the one percent probability and probable maximum storms outlined by the U.S. Army Corps of Engineers, St. Louis District (8). The hydraulic capacity of the spillways and the storage capacity of the reservoir were defined by the elevation, surface area, storage, and discharge relationships shown in Table 3.

The flow over the crest of the dams was determined using the non-level dam crest option ($L and $V cards) of the HEC-1 program. The

program assumes critical flow over a broad-crested weir. The flow through the spillways was determined from Hydraulic Charts for the Selection of Highway Culverts (9).

Where routing through the upstream reservoirs resulted in overtopping of those structures, a breach analysis was performed using HEC-1. The breaching parameters are noted in Table 4.

The result of the routing analysis indicates that the spillway under study will pass a flood equivalent to 20 percent of the PMF without overtopping the dam.

A summary of the routing analysis for different ratios of the PMF is shown in Table 5.

The computer input data and a summary of the output data are presented at the back of this appendix.

TABLE 1

SYNTHETIC UNIT HYDROGRAPH

Parameters:	Dam #4	Dam #1	Dam #2
Drainage Area (A)	134 acres	40 acres	35 acres
Length of Longest Watercourse (L)	0.26 miles	0.25 miles	0.13 miles
Elevation Difference in Watershed (H)	118 feet	107 feet	81 feet
Lag Time (L_g)	0.05 hours	0.05 hours	0.03 hours
Time of concentration (T_c)	0.09 hours	0.09 hours	0.05 hours
Duration (D)	0.7 min.	0.7 min.	0.4 min.
	(use 5 minutes in each case)		

Time (Min.) *	Discharge (cfs) *		
	Dam #4	Dam #1	Dam #2
0	0	0	0
5	476	326	316
10	182	125	89
15	42	29	17
20	10	7	3
25	2	1	0
30	0	0	

* From HEC-1 computer output

FORMULAS USED:

$$T_c = (11.9 \times L^3/H)^{.385} \quad (5)$$

$$L_g = 0.6\ T_c$$

$$D = 0.133\ T_c$$

TABLE 2

RAINFALL-RUNOFF VALUES

Selected Storm Event	Storm Duration (Hours)	Rainfall (Inches)	Runoff (Inches)	Loss (Inches)
PMP				
Dam #4	24	33.41	30.75	2.66
Dam #1	24	33.41	30.56	2.85
Dam #2	24	33.41	30.63	2.78
50% PMP				
Dam #4	24	17.91	15.38	2.53
Dam #1	24	18.28	15.28	3.00
Dam #2	24	18.31	15.31	3.00
1% Probability				
Dam #4	24	7.44	3.34	4.10
Dam #1	24	7.44	3.37	4.07
Dam #2	24	7.44	3.46	3.98

Additional Data:

1) The soil associations in this watershed are Gebb, Bardley, Clarksville, Lebanon, and Doniphan (10).
   51 percent of total drainage area in hydrologic soil group B.
   49 prcent of total drainage area in hydrologic soil group C.
   80 percent of the land use was timberland
   15 percent of the land use was grassland
   5 percent of the land use was urban (4 and 11)
2) SCS Runoff Curve CN (AMC III) for ratios of the PMF:
   81 - Dam #4
   78 - Dam #1
   78 - Dam #2
3) SCS Runoff Curve CN (AMC II) for the one percent probability flood:
   64 - Dam #4
   60 - Dam #1
   60 - Dam #2

TABLE 3

ELEVATION, SURFACE AREA, STORAGE, AND DISCHARGE RELATIONSHIPS

Elevation (feet-MSL)	Lake Surface Area (acres)	Lake Storage (acre-ft)	Spillway Discharge (cfs)
Dam #4			
*707.0	9.7	118	0
709.5	10.7	143	24
712.0	11.8	170	53
***714.4	12.8	200	66
Dam #1			
**748.4	3.7	42	0
750.0	3.9	48	10
***751.3	4.2	53	24
Dam #2			
**773.6	4.0	55	0
775.0	4.2	61	7
***777.1	4.5	70	20

*Spillway outlet invert elevation
**Spillway inlet invert elevation
***Top of dam elevation

The relationships in Table 3 were developed from the Lake Ozark, Missouri 7.5 minute quadrangle map and the field measurements.

METHOD USED

Spillway releases were determined by nomographs for corrugated metal pipe culverts with inlet and outlet control (9).

TABLE 4

BREACHING PARAMETERS

	Dam #1	Dam #2
Bottom Width of Breach (BRWID)	10 feet	10 feet
Side Slope of Breach (Z) (In feet horizontal to 1.0 foot vertical)	0.5 feet	0.5 feet
Elevation of Breach Bottom at Maximum Size of Breach (ELBM)	724.7 ft. m.s.l.	735.4 ft. m.s.l.
Time for Breach to Develop to Maximum Size (TFAIL)	1.0 hour	1.0 hour
Elevation of Water Surface Which Will Cause Dam to Fail (FAILEL)	751.3 ft. m.s.l.	777.1 ft. m.s.l.

TABLE 5

RESULTS OF FLOOD ROUTINGS

Ratio of PMF	Peak Inflow (CFS)	Peak Lake Elevation (FT.-MSL)	Total Storage (AC.-FT.)	Peak Outflow (CFS)	Depth (FT.) Over Top of Dam	Duration (HR.) Of Overtopping
-	0	*707.0	118	0	-	-
0.20	1,120	714.3	198	65	0	0
0.50	2,410	717.2	237	1,260	2.8	5.8
1.00	3,200	717.4	239	2,620	3.0	8.8

* Spillway outlet invert elevation

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(1) U.S. Army Corps of Engineers, Hydrologic Engineering Center, Flood Hydrograph Package (HEC-1), Dam Safety Version, July 1978, Davis, California.

(2) HMR-33, Seasonal Variations of Probable Maximum Precipitation, East of the 105th Meridian for Areas 10 to 1,000 Square Miles and Durations from 6 to 48 Hours, U.S. Department of Commerce, NOAA, National Weather Service, 1956.

(3) EM-1110-2-1411, Standard Project Flood Determinations, U.S. Army Corps of Engineers, 26 March 1952.

(4) U.S. Department of Agriculture, Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972.

(5) U.S. Department of the Interior, Bureau of Reclamation, Design of Small Dams, 1974, Washington, D.C.

(6) U.S. Army Corps of Engineers, St. Louis District, Burton Duenke #1 Lake Dam, Phase I Inspection Report, August 1980.

(7) U.S. Army Corps of Engineers, St. Louis District, Burton Duenke #2 Lake Dam, Phase I Inspection Report, July 1980.

(8) U.S. Army Corps of Engineers, St. Louis District, Hydrologic/ Hydraulic Standards, Phase I Safety Inspection of Non-Federal Dams, 12 December 1979.

(9) U.S. Department of Commerce, Bureau of Public Roads, Hydraulic Engineering Circular No. 5, Hydraulic Charts for the Selection of Highway Culverts, December 1965.

(10) U.S. Department of Agriculture, Soil Conservation Service, Preliminary Soils Report for Camden County, Missouri.

(11) U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 55, Urban Hydrology for Small Watersheds, January 1975.

(12) Mary H. McCracken, Missouri Division of Geological Survey, Geologic Map of Missouri, 1961.

(13) John W. Koenig, Missouri Division of Geological Survey, The Stratigraphic Succession in Missouri, 1961.

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  01 APR 80
**********
    1                A1***PHASE 1 DAM INSPECTION FOR STATE OF MISSOURI - ST.LOUIS DISTRICT COE***
    2                A2*** BURTON-DUENKE DAM #4   MO ID # 31713    FILE - H219457*MD1.OZARK4V
    3                A3 PROBABLE MAXIMUM STORM & OTHER RATIOS ~~100-YEAR-STORM~~
    4                B    288       0       5       0       0       0       0       0       0       0
    5                B1     5
    6                J       1       9       1
    7                J10.10  0.20    0.25    0.30    0.35    0.40    0.50    0.75    1.0
    8                K       0       1                               3       1
    9                K1  CALCULATE INFLOW HYDROGRAPH TO DAM #1
   10                M       1       20.063          0.063   1.0
   11                P       25.7    102.    120.    130.
   12                T                                               -1-78.          0.1
   13                M20.09  0.05
   14                X       -0.1    2.
   15                K       1       2                               4       1
   16                K1 ROUTE HYDROGRAPH THROUGH DAM #1
   17                Y                               1       1
   18                Y1      1                               42.0            -1
   19                Y4748.4 749.    750.    751.    751.3   752.    753.    754.    755.
   20                Y50.0   4.      10.     20.     24.     28.     33.     37.     41.
   21                $S0.0   4.      18.     42.     48.     53.     97.
   22                $E722.  730.    740.    748.4   750.    751.3   760.
   23                $S748.4
   24                $D751.3
   25                $L0.    85.     180.    305.    330.    370.    415.    470.
   26                $V751.3 751.4   751.6   751.7   752.1   753.2   754.    755.
   27                $B10.   0.5     724.7   1.      748.4   751.3
   28                K       0       3                               3       1
   29                K1 CALCULATE INFLOW HYDROGRAPH TO DAM #2
   30                M       1       20.055          0.055   1.0
   31                P       25.7    102.    120.    130.
   32                T                                               -1-78.          0.12
   33                M20.05  0.03
   34                X       -0.1    2.
   35                K       1       4                               4       1
   36                K1 ROUTE HYDROGRAPH THROUGH  DAM #2
   37                Y                               1       1
   38                Y1      1                               55.             -1
   39                Y4773.6 77- 0   775.0   776.0   777.1   779.0
   40                Y50.0   2.      7.0     15.0    20.0    28.0
   41                $S0.0   1.      6.      18.     42.     55.     83.
   42                $E726.  740.    750.    760.    770.    773.6   780.
   43                $S773.6
   44                $D777.1
   45                $L0.0   180.    230.    295.    350.    390.    415.
   46                $V777.1 777.5   778.    779.    780.    781.    782.
   47                $B10.   0.5     735.4   1.      773.6   777.1
   48                K       0       5                               1
   49                K1 CALCULATE INFLOW HYDROGRAPH TO DAM #4
   50                M       1       20.092                  1.0
```

```
51          P       25.7    102.    120.    130.
52          I                                       -1-81.
53          M2      0.05
54          X               1.
55          K       3       6                               1
56          K1 CALCULATE TOTAL INFLOW HYDROGRAPH TO DAM #4
57          K       1       7                               1
58          K1 ROUTE HYDROGRAPH THROUGH DAM #4
59          Y                               1       1
60          Y1      1                                   -707.       -1
61          Y4707.0 708.65  709.0   709.5   710.0   710.5   711.0   711.5   712.0   713.0
62          Y4714.0 715.0   716.0   717.0   718.0   719.0   720.0   721.0
63          Y50.0   12.     17.     24.     32.     38.     45.     50.     53.     60.
64          Y564.   68.     72.     75.     80.     84.     87.     90.
65          SA0.0   2.7     8.8     15.2    18.1
66          SE67?.5 69?.    705.    720.    730.
67          SS707.
68          SD714.4
69          SL0.0   53.     89.     161.    215.    276.    386.    410.    441.    465.
70          SV714.4 714.8   715.1   715.8   716.    716.5   716.8   717.6   719.    720.9
71          K       99
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FLOOD HYDROGRAPH PACKAGE - HEC-1

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

PHASE 1 DAM INSPECTION FOR STATE OF MISSOURI - ST.LOUIS DISTRICT COE
*** BURTON-DUENKE DAM #4 MO ID # 31713 FILE - H219457*RD1.OZARK4Y
PROBABLE MAXIMUM STORM & OTHER RATIOS - 100 YEAR STORM

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
288	0	5	0	0	0	0	0	0	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 9 LRTIO= 1

RTIOS= .10 .20 .25 .30 .35 .40 .50 .75 1.00

SUB-AREA RUNOFF COMPUTATION

CALCULATE INFLOW HYDROGRAPH TO DAM #1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	3	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.06	.00	.06	1.00	.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
.00	25.70	102.00	120.00	130.00	.00	.00	.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	.00	.00	1.00	.00	.00	1.00	-1.00	-78.00	.00	.10

CURVE NO = -78.00 WETNESS = -1.00 EFFECT CN = 78.00

UNIT HYDROGRAPH DATA
TC= .09 LAG= .05

RECESSION DATA
STRTQ= .00 QRCSN= -.10 RTIOR= 2.00

TIME INCREMENT TOO LARGE--(NHQ IS GT LAG/2)

UNIT HYDROGRAPH 5 END OF PERIOD ORDINATES, TC= .09 HOURS, LAG= .05 VOL= 1.00
326. 125. 29. 7. 1.

FLOOD HYDROGRAPH PACKAGE - HEC-1

O						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	.05	1	.01	.00	.01	0.	1.01	12.05	145	.22	.19	.02	72.
1.01	.10	2	.01	.00	.01	1.	1.01	12.10	146	.22	.20	.02	90.
1.01	.15	3	.01	.00	.01	1.	1.01	12.15	147	.22	.20	.02	95.
1.01	.20	4	.01	.00	.01	1.	1.01	12.20	148	.22	.20	.02	96.
1.01	.25	5	.01	.00	.01	1.	1.01	12.25	149	.22	.20	.02	97.
1.01	.30	6	.01	.00	.01	1.	1.01	12.30	150	.22	.20	.02	97.
1.01	.35	7	.01	.00	.01	1.	1.01	12.35	151	.22	.20	.02	98.
1.01	.40	8	.01	.00	.01	1.	1.01	12.40	152	.22	.20	.02	98.
1.01	.45	9	.01	.00	.01	1.	1.01	12.45	153	.22	.20	.02	98.
1.01	.50	10	.01	.00	.01	1.	1.01	12.50	154	.22	.20	.02	99.
1.01	.55	11	.01	.00	.01	1.	1.01	12.55	155	.22	.20	.02	99.
1.01	1.00	12	.01	.00	.01	1.	1.01	13.00	156	.22	.20	.01	99.
1.01	1.05	13	.01	.00	.01	1.	1.01	13.05	157	.26	.25	.02	113.
1.01	1.10	14	.01	.00	.01	1.	1.01	13.10	158	.26	.25	.02	118.
1.01	1.15	15	.01	.00	.01	1.	1.01	13.15	159	.26	.25	.01	120.
1.01	1.20	16	.01	.00	.01	1.	1.01	13.20	160	.26	.25	.01	121.
1.01	1.25	17	.01	.00	.01	1.	1.01	13.25	161	.26	.25	.01	121.
1.01	1.30	18	.01	.00	.01	1.	1.01	13.30	162	.26	.25	.01	121.
1.01	1.35	19	.01	.00	.01	1.	1.01	13.35	163	.26	.25	.01	122.
1.01	1.40	20	.01	.00	.01	1.	1.01	13.40	164	.26	.25	.01	122.
1.01	1.45	21	.01	.00	.01	1.	1.01	13.45	165	.26	.25	.01	122.
1.01	1.50	22	.01	.00	.01	1.	1.01	13.50	166	.26	.25	.01	122.
1.01	1.55	23	.01	.00	.01	1.	1.01	13.55	167	.26	.25	.01	123.
1.01	2.00	24	.01	.00	.01	1.	1.01	14.00	168	.26	.25	.01	123.
1.01	2.05	25	.01	.00	.01	1.	1.01	14.05	169	.33	.32	.01	144.
1.01	2.10	26	.01	.00	.01	1.	1.01	14.10	170	.33	.32	.01	152.
1.01	2.15	27	.01	.00	.01	1.	1.01	14.15	171	.33	.32	.01	154.
1.01	2.20	28	.01	.00	.01	1.	1.01	14.20	172	.33	.32	.01	154.
1.01	2.25	29	.01	.00	.01	1.	1.01	14.25	173	.33	.32	.01	155.
1.01	2.30	30	.01	.00	.01	1.	1.01	14.30	174	.33	.32	.01	155.
1.01	2.35	31	.01	.00	.01	1.	1.01	14.35	175	.33	.32	.01	155.
1.01	2.40	32	.01	.00	.01	1.	1.01	14.40	176	.33	.32	.01	155.
1.01	2.45	33	.01	.00	.01	1.	1.01	14.45	177	.33	.32	.01	155.
1.01	2.50	34	.01	.00	.01	1.	1.01	14.50	178	.33	.32	.01	156.
1.01	2.55	35	.01	.00	.01	1.	1.01	14.55	179	.33	.32	.01	156.
1.01	3.00	36	.01	.00	.01	1.	1.01	15.00	180	.33	.32	.01	156.
1.01	3.05	37	.01	.00	.01	1.	1.01	15.05	181	.20	.19	.00	115.
1.01	3.10	38	.01	.00	.01	1.	1.01	15.10	182	.40	.39	.01	163.
1.01	3.15	39	.01	.00	.01	1.	1.01	15.15	183	.40	.39	.01	194.
1.01	3.20	40	.01	.00	.01	1.	1.01	15.20	184	.60	.59	.01	253.
1.01	3.25	41	.01	.00	.01	1.	1.01	15.25	185	.70	.68	.01	310.
1.01	3.30	42	.01	.00	.01	1.	1.01	15.30	186	1.69	1.67	.03	648.
1.01	3.35	43	.01	.00	.01	1.	1.01	15.35	187	2.79	2.75	.04	1129.
1.01	3.40	44	.01	.00	.01	1.	1.01	15.40	188	1.10	1.08	.01	750.
1.01	3.45	45	.01	.00	.01	1.	1.01	15.45	189	.70	.69	.01	451.
1.01	3.50	46	.01	.00	.01	1.	1.01	15.50	190	.60	.59	.01	331.
1.01	3.55	47	.01	.00	.01	1.	1.01	15.55	191	.40	.39	.00	234.
1.01	4.00	48	.01	.00	.01	1.	1.01	16.00	192	.40	.39	.00	201.
1.01	4.05	49	.01	.00	.01	1.	1.01	16.05	193	.31	.30	.00	164.
1.01	4.10	50	.01	.00	.01	1.	1.01	16.10	194	.31	.30	.00	151.
1.01	4.15	51	.01	.00	.01	1.	1.01	16.15	195	.31	.30	.00	149.
1.01	4.20	52	.01	.00	.01	1.	1.01	16.20	196	.31	.30	.00	148.
1.01	4.25	53	.01	.00	.01	1.	1.01	16.25	197	.31	.30	.00	148.

1.01	4.30	54	.01	.00	.01	1.	1.01	16.30	198	.31	.30	.00	148.
1.01	4.35	55	.01	.00	.01	2.	1.01	16.35	199	.31	.30	.00	148.
1.01	4.40	56	.01	.00	.01	2.	1.01	16.40	200	.31	.30	.00	148.
1.01	4.45	57	.01	.00	.01	2.	1.01	16.45	201	.31	.30	.00	148.
1.01	4.50	58	.01	.00	.01	2.	1.01	16.50	202	.31	.30	.00	148.
1.01	4.55	59	.01	.00	.01	2.	1.01	16.55	203	.31	.30	.00	148.
1.01	5.00	60	.01	.00	.01	2.	1.01	17.00	204	.31	.30	.00	148.
1.01	5.05	61	.01	.00	.01	2.	1.01	17.05	205	.24	.24	.00	127.
1.01	5.10	62	.01	.00	.01	2.	1.01	17.10	206	.24	.24	.00	119.
1.01	5.15	63	.01	.00	.01	2.	1.01	17.15	207	.24	.24	.00	117.
1.01	5.20	64	.01	.00	.01	2.	1.01	17.20	208	.24	.24	.00	116.
1.01	5.25	65	.01	.00	.01	2.	1.01	17.25	209	.24	.24	.00	116.
1.01	5.30	66	.01	.00	.01	2.	1.01	17.30	210	.24	.24	.00	116.
1.01	5.35	67	.01	.00	.01	2.	1.01	17.35	211	.24	.24	.00	116.
1.01	5.40	68	.01	.00	.01	2.	1.01	17.40	212	.24	.24	.00	116.
1.01	5.45	69	.01	.00	.01	2.	1.01	17.45	213	.24	.24	.00	116.
1.01	5.50	70	.01	.00	.01	2.	1.01	17.50	214	.24	.24	.00	116.
1.01	5.55	71	.01	.00	.01	2.	1.01	17.55	215	.24	.24	.00	116.
1.01	6.00	72	.01	.00	.01	2.	1.01	18.00	216	.24	.24	.00	116.
1.01	6.05	73	.06	.02	.04	8.	1.01	18.05	217	.02	.02	.00	106.
1.01	6.10	74	.06	.02	.04	11.	1.01	18.10	218	.02	.02	.00	99.
1.01	6.15	75	.06	.03	.04	12.	1.01	18.15	219	.02	.02	.00	92.
1.01	6.20	76	.06	.03	.04	13.	1.01	18.20	220	.02	.02	.00	86.
1.01	6.25	77	.06	.03	.04	13.	1.01	18.25	221	.02	.02	.00	80.
1.01	6.30	78	.06	.03	.03	14.	1.01	18.30	222	.02	.02	.00	75.
1.01	6.35	79	.06	.03	.03	15.	1.01	18.35	223	.02	.02	.00	70.
1.01	6.40	80	.06	.03	.03	15.	1.01	18.40	224	.02	.02	.00	65.
1.01	6.45	81	.06	.03	.03	16.	1.01	18.45	225	.02	.02	.00	61.
1.01	6.50	82	.06	.03	.03	16.	1.01	18.50	226	.02	.02	.00	57.
1.01	6.55	83	.06	.03	.03	17.	1.01	18.55	227	.02	.02	.00	53.
1.01	7.00	84	.06	.04	.03	17.	1.01	19.00	228	.02	.02	.00	49.
1.01	7.05	85	.06	.04	.03	18.	1.01	19.05	229	.02	.02	.00	46.
1.01	7.10	86	.06	.04	.03	18.	1.01	19.10	230	.02	.02	.00	43.
1.01	7.15	87	.06	.04	.03	19.	1.01	19.15	231	.02	.02	.00	40.
1.01	7.20	88	.06	.04	.03	19.	1.01	19.20	232	.02	.02	.00	37.
1.01	7.25	89	.06	.04	.02	19.	1.01	19.25	233	.02	.02	.00	35.
1.01	7.30	90	.06	.04	.02	20.	1.01	19.30	234	.02	.02	.00	33.
1.01	7.35	91	.06	.04	.02	20.	1.01	19.35	235	.02	.02	.00	30.
1.01	7.40	92	.06	.04	.02	20.	1.01	19.40	236	.02	.02	.00	28.
1.01	7.45	93	.06	.04	.02	21.	1.01	19.45	237	.02	.02	.00	26.
1.01	7.50	94	.06	.04	.02	21.	1.01	19.50	238	.02	.02	.00	25.
1.01	7.55	95	.06	.04	.02	21.	1.01	19.55	239	.02	.02	.00	23.
1.01	8.00	96	.06	.04	.02	21.	1.01	20.00	240	.02	.02	.00	21.
1.01	8.05	97	.06	.04	.02	22.	1.01	20.05	241	.02	.02	.00	20.
1.01	8.10	98	.06	.05	.02	22.	1.01	20.10	242	.02	.02	.00	19.
1.01	8.15	99	.06	.05	.02	22.	1.01	20.15	243	.02	.02	.00	17.
1.01	8.20	100	.06	.05	.02	22.	1.01	20.20	244	.02	.02	.00	16.
1.01	8.25	101	.06	.05	.02	23.	1.01	20.25	245	.02	.02	.00	15.
1.01	8.30	102	.06	.05	.02	23.	1.01	20.30	246	.02	.02	.00	14.
1.01	8.35	103	.06	.05	.02	23.	1.01	20.35	247	.02	.02	.00	13.
1.01	8.40	104	.06	.05	.02	23.	1.01	20.40	248	.02	.02	.00	12.
1.01	8.45	105	.06	.05	.02	23.	1.01	20.45	249	.02	.02	.00	12.
1.01	8.50	106	.06	.05	.02	24.	1.01	20.50	250	.02	.02	.00	11.
1.01	8.55	107	.06	.05	.02	24.	1.01	20.55	251	.02	.02	.00	10.
1.01	9.00	108	.06	.05	.01	24.	1.01	21.00	252	.02	.02	.00	10.
1.01	9.05	109	.06	.05	.01	24.	1.01	21.05	253	.02	.02	.00	10.

1.01	9.10	110	.06	.05	.01	24.	1.01	21.10	254	.02	.02	.00	10.

1.01	9.10	110	.06	.05	.01	24.	1.01	21.10	254	.02	.02	.00	10.
1.01	9.15	111	.06	.05	.01	24.	1.01	21.15	255	.02	.02	.00	10.
1.01	9.20	112	.06	.05	.01	25.	1.01	21.20	256	.02	.02	.00	10.
1.01	9.25	113	.06	.05	.01	25.	1.01	21.25	257	.02	.02	.00	10.
1.01	9.30	114	.06	.05	.01	25.	1.01	21.30	258	.02	.02	.00	10.
1.01	9.35	115	.06	.05	.01	25.	1.01	21.35	259	.02	.02	.00	10.
1.01	9.40	116	.06	.05	.01	25.	1.01	21.40	260	.02	.02	.00	10.
1.01	9.45	117	.06	.05	.01	25.	1.01	21.45	261	.02	.02	.00	10.
1.01	9.50	118	.06	.05	.01	25.	1.01	21.50	262	.02	.02	.00	10.
1.01	9.55	119	.06	.05	.01	26.	1.01	21.55	263	.02	.02	.00	10.
1.01	10.00	120	.06	.05	.01	26.	1.01	22.00	264	.02	.02	.00	10.
1.01	10.05	121	.06	.05	.01	26.	1.01	22.05	265	.02	.02	.00	10.
1.01	10.10	122	.06	.05	.01	26.	1.01	22.10	266	.02	.02	.00	10.
1.01	10.15	123	.06	.05	.01	26.	1.01	22.15	267	.02	.02	.00	10.
1.01	10.20	124	.06	.05	.01	26.	1.01	22.20	268	.02	.02	.00	10.
1.01	10.25	125	.06	.05	.01	26.	1.01	22.25	269	.02	.02	.00	10.
1.01	10.30	126	.06	.05	.01	26.	1.01	22.30	270	.02	.02	.00	10.
1.01	10.35	127	.06	.05	.01	26.	1.01	22.35	271	.02	.02	.00	10.
1.01	10.40	128	.06	.05	.01	27.	1.01	22.40	272	.02	.02	.00	10.
1.01	10.45	129	.06	.05	.01	27.	1.01	22.45	273	.02	.02	.00	10.
1.01	10.50	130	.06	.05	.01	27.	1.01	22.50	274	.02	.02	.00	10.
1.01	10.55	131	.06	.05	.01	27.	1.01	22.55	275	.02	.02	.00	10.
1.01	11.00	132	.06	.06	.01	27.	1.01	23.00	276	.02	.02	.00	10.
1.01	11.05	133	.06	.06	.01	27.	1.01	23.05	277	.02	.02	.00	10.
1.01	11.10	134	.06	.06	.01	27.	1.01	23.10	278	.02	.02	.00	10.
1.01	11.15	135	.06	.06	.01	27.	1.01	23.15	279	.02	.02	.00	10.
1.01	11.20	136	.06	.06	.01	27.	1.01	23.20	280	.02	.02	.00	10.
1.01	11.25	137	.06	.06	.01	27.	1.01	23.25	281	.02	.02	.00	10.
1.01	11.30	138	.06	.06	.01	27.	1.01	23.30	282	.02	.02	.00	10.
1.01	11.35	139	.06	.06	.01	27.	1.01	23.35	283	.02	.02	.00	10.
1.01	11.40	140	.06	.06	.01	27.	1.01	23.40	284	.02	.02	.00	10.
1.01	11.45	141	.06	.06	.01	28.	1.01	23.45	285	.02	.02	.00	10.
1.01	11.50	142	.06	.06	.01	28.	1.01	23.50	286	.02	.02	.00	10.
1.01	11.55	143	.06	.06	.01	28.	1.01	23.55	287	.02	.02	.00	10.
1.01	12.00	144	.06	.06	.01	28.	1.02	.00	288	.02	.02	.00	10.
									SUM	33.41	30.56	2.85	15926.
										(849.)(	776.)(	72.)(	450.97)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1129.	173.	55.	55.	15925.
CMS	32.	5.	2.	2.	451.
INCHES		25.52	32.66	32.66	32.66
MM		648.32	829.50	829.50	829.50
AC-FT		86.	110.	110.	110.
THOUS CU M		106.	135.	135.	135.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	113.	17.	6.	6.	1592.
CMS	3.	0.	0.	0.	45.
INCHES		2.55	3.27	3.27	3.27
MM		64.83	82.95	82.95	82.95

AC-FT		9.	11.	11.	11.
THOUS CU M		11.	14.	14.	14.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	226.	35.	11.	11.	3185.
CMS	6.	1.	0.	0.	90.
INCHES		5.10	6.53	6.53	6.53
MM		129.66	165.90	165.90	165.90
AC-FT		17.	22.	22.	22.
THOUS CU M		21.	27.	27.	27.

HYDROGRAPH AT STA 1 FOR PLAN 1 RTIO 3

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	282.	43.	14.	14.	3981.
CMS	8.	1.	0.	0.	113.
INCHES		6.38	8.16	8.16	8.16
MM		162.08	207.38	207.38	207.38
AC-FT		21.	27.	27.	27.
THOUS CU M		26.	34.	34.	34.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	339.	52.	17.	17.	4777.
CMS	10.	1.	0.	0.	135.
INCHES		7.66	9.80	9.80	9.80
MM		194.49	248.85	248.85	248.85
AC-FT		26.	33.	33.	33.
THOUS CU M		32.	41.	41.	41.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 5

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	395.	61.	19.	19.	5574.
CMS	11.	2.	1.	1.	158.
INCHES		8.93	11.43	11.43	11.43
MM		226.91	290.33	290.33	290.33
AC-FT		30.	38.	38.	38.
THOUS CU M		37.	47.	47.	47.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 6

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME

CFS	451.	69.	22.	22.	6370.

CFS	451.	69.	22.	22.	6370.
CMS	13.	2.	1.	1.	180.
INCHES		10.21	13.06	13.06	13.06
MM		259.33	331.80	331.80	331.80
AC-FT		34.	44.	44.	44.
THOUS CU M		42.	54.	54.	54.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 7

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	564.	86.	28.	28.	7962.
CMS	16.	2.	1.	1.	225.
INCHES		12.76	16.33	16.33	16.33
MM		324.16	414.75	414.75	414.75
AC-FT		43.	55.	55.	55.
THOUS CU M		53.	68.	68.	68.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 8

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	846.	130.	41.	41.	11943.
CMS	24.	4.	1.	1.	338.
INCHES		19.14	24.49	24.49	24.49
MM		486.24	622.13	622.13	622.13
AC-FT		64.	82.	82.	82.
THOUS CU M		79.	101.	101.	101.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 9

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1129.	173.	55.	55.	15925.
CMS	32.	5.	2.	2.	451.
INCHES		25.52	32.66	32.66	32.66
MM		648.32	829.50	829.50	829.50
AC-FT		86.	110.	110.	110.
THOUS CU M		106.	135.	135.	135.

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HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THROUGH DAM #1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	4	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
.0	.000	.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	.000	.000	.000	42.	-1

STAGE	748.40	749.00	750.00	751.00	751.30	752.00	753.00	754.00	755.00
FLOW	.00	4.00	10.00	20.00	24.00	28.00	33.00	37.00	41.00
CAPACITY=	0.	4.	18.	42.	48.	53.	97.		
ELEVATION=	722.	730.	740.	748.	750.	751.	760.		

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
748.4	.0	.0	.0	.0	.0	.0	.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
751.3	.0	.0	0.

CREST LENGTH	0.	85.	180.	305.	330.	370.	415.	470.
AT OR BELOW ELEVATION	751.3	751.4	751.6	751.7	752.1	753.2	754.0	755.0

DAM BREACH DATA

BRWID	Z	ELBR	TFAIL	WSEL	FAILEL
10.	.50	724.70	1.00	748.40	751.30

PEAK OUTFLOW IS 11. AT TIME 18.08 HOURS

BEGIN DAM FAILURE AT 15.92 HOURS

PEAK OUTFLOW IS 1062. AT TIME 16.69 HOURS

BEGIN DAM FAILURE AT 15.67 HOURS

PEAK OUTFLOW IS 1083. AT TIME 16.44 HOURS

BEGIN DAM FAILURE AT 15.50 HOURS

PEAK OUTFLOW IS 1109. AT TIME 16.29 HOURS

BEGIN DAM FAILURE AT 15.33 HOURS

PEAK OUTFLOW IS 1157. AT TIME 16.04 HOURS

BEGIN DAM FAILURE AT 14.83 HOURS

PEAK OUTFLOW IS 1332. AT TIME 15.65 HOURS

BEGIN DAM FAILURE AT 14.17 HOURS

PEAK OUTFLOW IS 1122. AT TIME 14.96 HOURS

BEGIN DAM FAILURE AT 13.17 HOURS

PEAK OUTFLOW IS 1138. AT TIME 13.96 HOURS

BEGIN DAM FAILURE AT 12.58 HOURS

PEAK OUTFLOW IS 1165. AT TIME 13.37 HOURS

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SUB-AREA RUNOFF COMPUTATION

CALCULATE INFLOW HYDROGRAPH TO DAM #2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	0	0	0	0	3	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.06	.00	.06	1.00	.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
.00	25.70	102.00	120.00	130.00	.00	.00	.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	.00	.00	1.00	.00	.00	1.00	-1.00	-78.00	.00	.12

CURVE NO = -78.00 WETNESS = -1.00 EFFECT CN = 78.00

UNIT HYDROGRAPH DATA

TC= .05 LAG= .03

RECESSION DATA

STRTQ= .00 QRCSN= -.10 RTIOR= 2.00

TIME INCREMENT TOO LARGE--(NHQ IS GT LAG/2)

UNIT HYDROGRAPH 5 END OF PERIOD ORDINATES, TC= .05 HOURS, LAG= .03 VOL= 1.00

316. 89. 17. 3. 0.

END-OF-PERIOD FLOW

HO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	HO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	.00	.01	1.	1.01	12.05	145	.22	.19	.02	68.

1.01	.10	2	.01	.00	.01	1.	1.01	12.10	146	.22	.20	.02	80.	
1.01	.15	3	.01	.00	.01	1.	1.01	12.15	147	.22	.20	.02	83.	
1.01	.20	4	.01	.00	.01	1.	1.01	12.20	148	.22	.20	.02	84.	
1.01	.25	5	.01	.00	.01	1.	1.01	12.25	149	.22	.20	.02	85.	
1.01	.30	6	.01	.00	.01	1.	1.01	12.30	150	.22	.20	.02	85.	
1.01	.35	7	.01	.00	.01	1.	1.01	12.35	151	.22	.20	.02	85.	
1.01	.40	8	.01	.00	.01	1.	1.01	12.40	152	.22	.20	.02	86.	
1.01	.45	9	.01	.00	.01	1.	1.01	12.45	153	.22	.20	.02	86.	
1.01	.50	10	.01	.00	.01	1.	1.01	12.50	154	.22	.20	.02	86.	
1.01	.55	11	.01	.00	.01	1.	1.01	12.55	155	.22	.20	.01	87.	
1.01	1.00	12	.01	.00	.01	1.	1.01	13.00	156	.22	.20	.01	87.	
1.01	1.05	13	.01	.00	.01	1.	1.01	13.05	157	.26	.25	.02	100.	
1.01	1.10	14	.01	.00	.01	1.	1.01	13.10	158	.26	.25	.02	104.	
1.01	1.15	15	.01	.00	.01	1.	1.01	13.15	159	.26	.25	.01	105.	
1.01	1.20	16	.01	.00	.01	1.	1.01	13.20	160	.26	.25	.01	106.	
1.01	1.25	17	.01	.00	.01	1.	1.01	13.25	161	.26	.25	.01	106.	
1.01	1.30	18	.01	.00	.01	1.	1.01	13.30	162	.26	.25	.01	106.	
1.01	1.35	19	.01	.00	.01	1.	1.01	13.35	163	.26	.25	.01	106.	
1.01	1.40	20	.01	.00	.01	1.	1.01	13.40	164	.26	.25	.01	107.	
1.01	1.45	21	.01	.00	.01	1.	1.01	13.45	165	.26	.25	.01	107.	
1.01	1.50	22	.01	.00	.01	1.	1.01	13.50	166	.26	.25	.01	107.	
1.01	1.55	23	.01	.00	.01	1.	1.01	13.55	167	.26	.25	.01	107.	
1.01	2.00	24	.01	.00	.01	1.	1.01	14.00	168	.26	.25	.01	107.	
1.01	2.05	25	.01	.00	.01	1.	1.01	14.05	169	.33	.32	.01	127.	
1.01	2.10	26	.01	.00	.01	1.	1.01	14.10	170	.33	.32	.01	133.	
1.01	2.15	27	.01	.00	.01	1.	1.01	14.15	171	.33	.32	.01	135.	
1.01	2.20	28	.01	.00	.01	1.	1.01	14.20	172	.33	.32	.01	135.	
1.01	2.25	29	.01	.00	.01	1.	1.01	14.25	173	.33	.32	.01	135.	
1.01	2.30	30	.01	.00	.01	1.	1.01	14.30	174	.33	.32	.01	135.	
1.01	2.35	31	.01	.00	.01	1.	1.01	14.35	175	.33	.32	.01	136.	
1.01	2.40	32	.01	.00	.01	1.	1.01	14.40	176	.33	.32	.01	136.	
1.01	2.45	33	.01	.00	.01	1.	1.01	14.45	177	.33	.32	.01	136.	
1.01	2.50	34	.01	.00	.01	1.	1.01	14.50	178	.33	.32	.01	136.	
1.01	2.55	35	.01	.00	.01	1.	1.01	14.55	179	.33	.32	.01	136.	
1.01	3.00	36	.01	.00	.01	1.	1.01	15.00	180	.33	.32	.01	136.	
1.01	3.05	37	.01	.00	.01	1.	1.01	15.05	181	.20	.19	.00	97.	
1.01	3.10	38	.01	.00	.01	1.	1.01	15.10	182	.40	.39	.01	147.	
1.01	3.15	39	.01	.00	.01	1.	1.01	15.15	183	.40	.39	.01	162.	
1.01	3.20	40	.01	.00	.01	1.	1.01	15.20	184	.60	.59	.01	227.	
1.01	3.25	41	.01	.00	.01	1.	1.01	15.25	185	.70	.68	.01	277.	
1.01	3.30	42	.01	.00	.01	1.	1.01	15.30	186	1.69	1.67	.03	599.	
1.01	3.35	43	.01	.00	.01	1.	1.01	15.35	187	2.79	2.75	.04	1032.	
1.01	3.40	44	.01	.00	.01	1.	1.01	15.40	188	1.10	1.08	.01	618.	
1.01	3.45	45	.01	.00	.01	1.	1.01	15.45	189	.70	.69	.01	368.	
1.01	3.50	46	.01	.00	.01	1.	1.01	15.50	190	.60	.59	.01	277.	
1.01	3.55	47	.01	.00	.01	1.	1.01	15.55	191	.40	.39	.00	193.	
1.01	4.00	48	.01	.00	.01	1.	1.01	16.00	192	.40	.39	.00	172.	
1.01	4.05	49	.01	.00	.01	1.	1.01	16.05	193	.31	.30	.00	140.	
1.01	4.10	50	.01	.00	.01	1.	1.01	16.10	194	.31	.30	.00	131.	
1.01	4.15	51	.01	.00	.01	1.	1.01	16.15	195	.31	.30	.00	129.	
1.01	4.20	52	.01	.00	.01	1.	1.01	16.20	196	.31	.30	.00	129.	
1.01	4.25	53	.01	.00	.01	1.	1.01	16.25	197	.31	.30	.00	129.	
1.01	4.30	54	.01	.00	.01	1.	1.01	16.30	198	.31	.30	.00	129.	
1.01	4.35	55	.01	.00	.01	1.	1.01	16.35	199	.31	.30	.00	129.	
1.01	4.40	56	.01	.00	.01	1.	1.01	16.40	200	.31	.30	.00	129.	
1.01	4.45	57	.01	.00	.01	2.	1.01	16.45	201	.31	.30	.00	129.	

1.01	4.50	58	.01	.00	.01	2.	1.01	16.50	202	.31	.30	.00	129.	

1.01	4.50	58	.01	.00	.01	2.	1.01	16.50	202	.31	.30	.00	129.
1.01	4.55	59	.01	.00	.01	2.	1.01	16.55	203	.31	.30	.00	129.
1.01	5.00	60	.01	.00	.01	2.	1.01	17.00	204	.31	.30	.00	129.
1.01	5.05	61	.01	.00	.01	2.	1.01	17.05	205	.24	.24	.00	109.
1.01	5.10	62	.01	.00	.01	2.	1.01	17.10	206	.24	.24	.00	103.
1.01	5.15	63	.01	.00	.01	2.	1.01	17.15	207	.24	.24	.00	102.
1.01	5.20	64	.01	.00	.01	2.	1.01	17.20	208	.24	.24	.00	102.
1.01	5.25	65	.01	.00	.01	2.	1.01	17.25	209	.24	.24	.00	102.
1.01	5.30	66	.01	.00	.01	2.	1.01	17.30	210	.24	.24	.00	102.
1.01	5.35	67	.01	.00	.01	2.	1.01	17.35	211	.24	.24	.00	102.
1.01	5.40	68	.01	.00	.01	2.	1.01	17.40	212	.24	.24	.00	102.
1.01	5.45	69	.01	.00	.01	2.	1.01	17.45	213	.24	.24	.00	102.
1.01	5.50	70	.01	.00	.01	2.	1.01	17.50	214	.24	.24	.00	102.
1.01	5.55	71	.01	.00	.01	2.	1.01	17.55	215	.24	.24	.00	102.
1.01	6.00	72	.01	.00	.01	2.	1.01	18.00	216	.24	.24	.00	102.
1.01	6.05	73	.06	.02	.04	8.	1.01	18.05	217	.02	.02	.00	95.
1.01	6.10	74	.06	.02	.04	10.	1.01	18.10	218	.02	.02	.00	89.
1.01	6.15	75	.06	.03	.04	11.	1.01	18.15	219	.02	.02	.00	83.
1.01	6.20	76	.06	.03	.04	12.	1.01	18.20	220	.02	.02	.00	77.
1.01	6.25	77	.06	.03	.04	12.	1.01	18.25	221	.02	.02	.00	72.
1.01	6.30	78	.06	.03	.03	13.	1.01	18.30	222	.02	.02	.00	67.
1.01	6.35	79	.06	.03	.03	13.	1.01	18.35	223	.02	.02	.00	63.
1.01	6.40	80	.06	.03	.03	14.	1.01	18.40	224	.02	.02	.00	58.
1.01	6.45	81	.06	.03	.03	14.	1.01	18.45	225	.02	.02	.00	54.
1.01	6.50	82	.06	.03	.03	15.	1.01	18.50	226	.02	.02	.00	51.
1.01	6.55	83	.06	.04	.03	15.	1.01	18.55	227	.02	.02	.00	47.
1.01	7.00	84	.06	.04	.03	15.	1.01	19.00	228	.02	.02	.00	44.
1.01	7.05	85	.06	.04	.03	16.	1.01	19.05	229	.02	.02	.00	41.
1.01	7.10	86	.06	.04	.03	16.	1.01	19.10	230	.02	.02	.00	39.
1.01	7.15	87	.06	.04	.03	16.	1.01	19.15	231	.02	.02	.00	36.
1.01	7.20	88	.06	.04	.02	17.	1.01	19.20	232	.02	.02	.00	34.
1.01	7.25	89	.06	.04	.02	17.	1.01	19.25	233	.02	.02	.00	31.
1.01	7.30	90	.06	.04	.02	17.	1.01	19.30	234	.02	.02	.00	29.
1.01	7.35	91	.06	.04	.02	18.	1.01	19.35	235	.02	.02	.00	27.
1.01	7.40	92	.06	.04	.02	18.	1.01	19.40	236	.02	.02	.00	25.
1.01	7.45	93	.06	.04	.02	18.	1.01	19.45	237	.02	.02	.00	24.
1.01	7.50	94	.06	.04	.02	18.	1.01	19.50	238	.02	.02	.00	22.
1.01	7.55	95	.06	.04	.02	19.	1.01	19.55	239	.02	.02	.00	21.
1.01	8.00	96	.06	.04	.02	19.	1.01	20.00	240	.02	.02	.00	19.
1.01	8.05	97	.06	.05	.02	19.	1.01	20.05	241	.02	.02	.00	18.
1.01	8.10	98	.06	.05	.02	19.	1.01	20.10	242	.02	.02	.00	17.
1.01	8.15	99	.06	.05	.02	20.	1.01	20.15	243	.02	.02	.00	16.
1.01	8.20	100	.06	.05	.02	20.	1.01	20.20	244	.02	.02	.00	15.
1.01	8.25	101	.06	.05	.02	20.	1.01	20.25	245	.02	.02	.00	14.
1.01	8.30	102	.06	.05	.02	20.	1.01	20.30	246	.02	.02	.00	13.
1.01	8.35	103	.06	.05	.02	20.	1.01	20.35	247	.02	.02	.00	12.
1.01	8.40	104	.06	.05	.02	21.	1.01	20.40	248	.02	.02	.00	11.
1.01	8.45	105	.06	.05	.02	21.	1.01	20.45	249	.02	.02	.00	10.
1.01	8.50	106	.06	.05	.02	21.	1.01	20.50	250	.02	.02	.00	10.
1.01	8.55	107	.06	.05	.01	21.	1.01	20.55	251	.02	.02	.00	9.
1.01	9.00	108	.06	.05	.01	21.	1.01	21.00	252	.02	.02	.00	9.
1.01	9.05	109	.06	.05	.01	21.	1.01	21.05	253	.02	.02	.00	9.
1.01	9.10	110	.06	.05	.01	21.	1.01	21.10	256	.02	.02	.00	9.
1.01	9.15	111	.06	.05	.01	22.	1.01	21.15	255	.02	.02	.00	9.
1.01	9.20	112	.06	.05	.01	22.	1.01	21.20	256	.02	.02	.00	9.
1.01	9.25	113	.06	.05	.01	22.	1.01	21.25	257	.02	.02	.00	9.

1.01	9.30	114	.06	.05	.01	22.	1.01	21.30	258	.02	.02	.00	9.
1.01	9.35	115	.06	.05	.01	22.	1.01	21.35	259	.02	.02	.00	9.
1.01	9.40	116	.06	.05	.01	22.	1.01	21.40	260	.02	.02	.00	9.
1.01	9.45	117	.06	.05	.01	22.	1.01	21.45	261	.02	.02	.00	9.
1.01	9.50	118	.06	.05	.01	22.	1.01	21.50	262	.02	.02	.00	9.
1.01	9.55	119	.06	.05	.01	22.	1.01	21.55	263	.02	.02	.00	9.
1.01	10.00	120	.06	.05	.01	23.	1.01	22.00	264	.02	.02	.00	9.
1.01	10.05	121	.06	.05	.01	23.	1.01	22.05	265	.02	.02	.00	9.
1.01	10.10	122	.06	.05	.01	23.	1.01	22.10	266	.02	.02	.00	9.
1.01	10.15	123	.06	.05	.01	23.	1.01	22.15	267	.02	.02	.00	9.
1.01	10.20	124	.06	.05	.01	23.	1.01	22.20	268	.02	.02	.00	9.
1.01	10.25	125	.06	.05	.01	23.	1.01	22.25	269	.02	.02	.00	9.
1.01	10.30	126	.06	.05	.01	23.	1.01	22.30	270	.02	.02	.00	9.
1.01	10.35	127	.06	.05	.01	23.	1.01	22.35	271	.02	.02	.00	9.
1.01	10.40	128	.06	.05	.01	23.	1.01	22.40	272	.02	.02	.00	9.
1.01	10.45	129	.06	.05	.01	23.	1.01	22.45	273	.02	.02	.00	9.
1.01	10.50	130	.06	.06	.01	23.	1.01	22.50	274	.02	.02	.00	9.
1.01	10.55	131	.06	.06	.01	23.	1.01	22.55	275	.02	.02	.00	9.
1.01	11.00	132	.06	.06	.01	24.	1.01	23.00	276	.02	.02	.00	9.
1.01	11.05	133	.06	.06	.01	24.	1.01	23.05	277	.02	.02	.00	9.
1.01	11.10	134	.06	.06	.01	24.	1.01	23.10	278	.02	.02	.00	9.
1.01	11.15	135	.06	.06	.01	24.	1.01	23.15	279	.02	.02	.00	9.
1.01	11.20	136	.06	.06	.01	24.	1.01	23.20	280	.02	.02	.00	9.
1.01	11.25	137	.06	.06	.01	24.	1.01	23.25	281	.02	.02	.00	9.
1.01	11.30	138	.06	.06	.01	24.	1.01	23.30	282	.02	.02	.00	9.
1.01	11.35	139	.06	.06	.01	24.	1.01	23.35	283	.02	.02	.00	9.
1.01	11.40	140	.06	.06	.01	24.	1.01	23.40	284	.02	.02	.00	9.
1.01	11.45	141	.06	.06	.01	24.	1.01	23.45	285	.02	.02	.00	9.
1.01	11.50	142	.06	.06	.01	24.	1.01	23.50	286	.02	.02	.00	9.
1.01	11.55	143	.06	.06	.01	24.	1.01	23.55	287	.02	.02	.00	9.
1.01	12.00	144	.06	.06	.01	24.	1.02	.00	288	.02	.02	.00	9.
									SUM	33.41	30.63	2.78	13994.
										(849.)(	778.)(	71.)(	396.27)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1092.	151.	49.	49.	13976.
CMS	29.	4.	1.	1.	396.
INCHES		25.56	32.83	32.83	32.83
MM		649.19	833.88	833.88	833.88
AC-FT		75.	96.	96.	96.
THOUS CU M		92.	119.	119.	119.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 1

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	103.	15.	5.	5.	1398.
CMS	3.	0.	0.	0.	40.
INCHES		2.56	3.28	3.28	3.28
MM		64.92	83.39	83.39	83.39
AC-FT		7.	10.	10.	10.
THOUS CU M		9.	12.	12.	12.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 2

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	206.	30.	10.	10.	2795.
CMS	6.	1.	0.	0.	79.
INCHES		5.11	6.57	6.57	6.57
MM		129.84	166.78	166.78	166.78
AC-FT		15.	19.	19.	19.
THOUS CU M		18.	24.	24.	24.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 3

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	258.	38.	12.	12.	3494.
CMS	7.	1.	0.	0.	99.
INCHES		6.39	8.21	8.21	8.21
MM		162.30	208.47	208.47	208.47
AC-FT		19.	24.	24.	24.
THOUS CU M		23.	30.	30.	30.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 4

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	310.	45.	15.	15.	4193.
CMS	9.	1.	0.	0.	119.
INCHES		7.67	9.85	9.85	9.85
MM		194.76	250.16	250.16	250.16
AC-FT		22.	29.	29.	29.
THOUS CU M		28.	36.	36.	36.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 5

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	361.	53.	17.	17.	4891.
CMS	10.	1.	0.	0.	139.
INCHES		8.95	11.49	11.49	11.49
MM		227.22	291.86	291.86	291.86
AC-FT		26.	34.	34.	34.
THOUS CU M		32.	42.	42.	42.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 6

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	413.	60.	19.	19.	5590.
CMS	12.	2.	1.	1.	158.
INCHES		10.22	13.13	13.13	13.13
MM		259.68	333.55	333.55	333.55

AC-FT	30.	39.	39.	39.
THOUS CU M	37.	47.	47.	47.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 7

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	516.	76.	24.	24.	6988.
CMS	15.	2.	1.	1.	198.
INCHES		12.78	16.41	16.41	16.41
MM		324.60	416.94	416.94	416.94
AC-FT		37.	48.	48.	48.
THOUS CU M		46.	59.	59.	59.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 8

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	774.	113.	36.	36.	10482.
CMS	22.	3.	1.	1.	297.
INCHES		19.17	24.62	24.62	24.62
MM		486.98	625.41	625.41	625.41
AC-FT		56.	72.	72.	72.
THOUS CU M		69.	89.	89.	89.

HYDROGRAPH AT STA 3 FOR PLAN 1, RTIO 9

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1032.	151.	49.	49.	13976.
CMS	29.	4.	1.	1.	396.
INCHES		25.56	32.83	32.83	32.83
MM		649.19	833.88	833.88	833.88
AC-FT		75.	96.	96.	96.
THOUS CU M		92.	119.	119.	119.

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HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THROUGH DAM #2

ISTAR	ICOPP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	4	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
.0	.000	.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	.000	.000	.000	55.	-1

FLOOD HYDROGRAPH PACKAGE - HEC-1 PROGRAM H21/02-2V TIME 18:02:25 CASE #4

				1	0	0	.000	.000	.000	55.	-1

STAGE	773.60	774.00	775.00	776.00	777.10	779.00	
FLOW	.00	2.00	7.00	15.00	20.00	28.00	
CAPACITY=	0.	1.	6.	18.	42.	55.	83.
ELEVATION=	726.	740.	750.	760.	770.	774.	780.

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
773.6	.0	.0	.0	.0	.0	.0	.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
777.1	.0	.0	0.

CREST LENGTH AT OR BELOW ELEVATION	0.	180.	230.	295.	350.	390.	415.
	777.1	777.5	778.0	779.0	780.0	781.0	782.0

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
10.	.50	735.40	1.00	773.60	777.10

PEAK OUTFLOW IS 7. AT TIME 18.42 HOURS

PEAK OUTFLOW IS 17. AT TIME 18.25 HOURS

PEAK OUTFLOW IS 20. AT TIME 18.33 HOURS

BEGIN DAM FAILURE AT 15.83 HOURS

PEAK OUTFLOW IS 1704. AT TIME 16.33 HOURS

BEGIN DAM FAILURE AT 15.67 HOURS

PEAK OUTFLOW IS 1749. AT TIME 16.19 HOURS

BEGIN DAM FAILURE AT 15.58 HOURS

PEAK OUTFLOW IS 1801. AT TIME 16.10 HOURS

BEGIN DAM FAILURE AT 15.33 HOURS

PEAK OUTFLOW IS 1995. AT TIME 15.85 HOURS

BEGIN DAM FAILURE AT 14.08 HOURS

PEAK OUTFLOW IS 1796. AT TIME 14.60 HOURS

BEGIN DAM FAILURE AT 13.33 HOURS

PEAK OUTFLOW IS 1805. AT TIME 13.85 HOURS

SUB-AREA RUNOFF COMPUTATION

CALCULATE INFLOW HYDROGRAPH TO DAM #4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.09	.00	.09	1.00	.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
.00	25.70	102.00	120.00	130.00	.00	.00	.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	.00	.00	1.00	.00	.00	1.00	-1.00	-81.00	.00	.00

CURVE NO = -81.00 WETNESS = -1.00 EFFECT CN = 81.00

UNIT HYDROGRAPH DATA

TC= .00 LAG= .05

RECESSION DATA

STRTQ= .00 QRCSN= .00 RTIOR= 1.00

TIME INCREMENT TOO LARGE--(NNQ IS GT LAG/2)

UNIT HYDROGRAPH 5 END OF PERIOD ORDINATES, TC= .00 HOURS, LAG= .05 VOL= 1.00

476. 182. 42. 10. 2.

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	.05	1	.01	.00	.01	0.	1.01	12.05	145	.22	.20	.02	108.
1.01	.10	2	.01	.00	.01	0.	1.01	12.10	146	.22	.20	.02	134.
1.01	.15	3	.01	.00	.01	0.	1.01	12.15	147	.22	.20	.02	140.
1.01	.20	4	.01	.00	.01	0.	1.01	12.20	148	.22	.20	.02	143.
1.01	.25	5	.01	.00	.01	0.	1.01	12.25	149	.22	.20	.02	143.
1.01	.30	6	.01	.00	.01	0.	1.01	12.30	150	.22	.20	.02	144.
1.01	.35	7	.01	.00	.01	0.	1.01	12.35	151	.22	.20	.02	145.
1.01	.40	8	.01	.00	.01	0.	1.01	12.40	152	.22	.20	.01	145.
1.01	.45	9	.01	.00	.01	0.	1.01	12.45	153	.22	.20	.01	146.

1.01	.50	10	.01	.00	.01	0.	1.01	12.50	154	.22	.21	.01	146.

1.01	.50	10	.01	.00	.01	0.	1.01	12.50	154	.22	.21	.01	146.
1.01	.55	11	.01	.00	.01	0.	1.01	12.55	155	.22	.21	.01	147.
1.01	1.00	12	.01	.00	.01	0.	1.01	13.00	156	.22	.21	.01	147.
1.01	1.05	13	.01	.00	.01	0.	1.01	13.05	157	.26	.25	.01	167.
1.01	1.10	14	.01	.00	.01	0.	1.01	13.10	158	.26	.25	.01	175.
1.01	1.15	15	.01	.00	.01	0.	1.01	13.15	159	.26	.25	.01	177.
1.01	1.20	16	.01	.00	.01	0.	1.01	13.20	160	.26	.25	.01	178.
1.01	1.25	17	.01	.00	.01	0.	1.01	13.25	161	.26	.25	.01	178.
1.01	1.30	18	.01	.00	.01	0.	1.01	13.30	162	.26	.25	.01	179.
1.01	1.35	19	.01	.00	.01	0.	1.01	13.35	163	.26	.25	.01	179.
1.01	1.40	20	.01	.00	.01	0.	1.01	13.40	164	.26	.25	.01	180.
1.01	1.45	21	.01	.00	.01	0.	1.01	13.45	165	.26	.25	.01	180.
1.01	1.50	22	.01	.00	.01	0.	1.01	13.50	166	.26	.25	.01	180.
1.01	1.55	23	.01	.00	.01	0.	1.01	13.55	167	.26	.25	.01	180.
1.01	2.00	24	.01	.00	.01	0.	1.01	14.00	168	.26	.25	.01	181.
1.01	2.05	25	.01	.00	.01	0.	1.01	14.05	169	.33	.32	.01	211.
1.01	2.10	26	.01	.00	.01	0.	1.01	14.10	170	.33	.32	.01	223.
1.01	2.15	27	.01	.00	.01	0.	1.01	14.15	171	.33	.32	.01	226.
1.01	2.20	28	.01	.00	.01	0.	1.01	14.20	172	.33	.32	.01	227.
1.01	2.25	29	.01	.00	.01	0.	1.01	14.25	173	.33	.32	.01	227.
1.01	2.30	30	.01	.00	.01	0.	1.01	14.30	174	.33	.32	.01	228.
1.01	2.35	31	.01	.00	.01	0.	1.01	14.35	175	.33	.32	.01	228.
1.01	2.40	32	.01	.00	.01	0.	1.01	14.40	176	.33	.32	.01	228.
1.01	2.45	33	.01	.00	.01	0.	1.01	14.45	177	.33	.32	.01	228.
1.01	2.50	34	.01	.00	.01	0.	1.01	14.50	178	.33	.32	.01	228.
1.01	2.55	35	.01	.00	.01	0.	1.01	14.55	179	.33	.32	.01	229.
1.01	3.00	36	.01	.00	.01	0.	1.01	15.00	180	.33	.32	.01	229.
1.01	3.05	37	.01	.00	.01	0.	1.01	15.05	181	.20	.20	.00	169.
1.01	3.10	38	.01	.00	.01	1.	1.01	15.10	182	.40	.39	.01	239.
1.01	3.15	39	.01	.00	.01	1.	1.01	15.15	183	.40	.39	.01	270.
1.01	3.20	40	.01	.00	.01	1.	1.01	15.20	184	.60	.59	.01	370.
1.01	3.25	41	.01	.00	.01	1.	1.01	15.25	185	.70	.69	.01	455.
1.01	3.30	42	.01	.00	.01	1.	1.01	15.30	186	1.69	1.67	.02	950.
1.01	3.35	43	.01	.00	.01	1.	1.01	15.35	187	2.79	2.76	.03	1653.
1.01	3.40	44	.01	.00	.01	1.	1.01	15.40	188	1.10	1.09	.01	1098.
1.01	3.45	45	.01	.00	.01	1.	1.01	15.45	189	.70	.69	.01	661.
1.01	3.50	46	.01	.00	.01	1.	1.01	15.50	190	.60	.59	.00	486.
1.01	3.55	47	.01	.00	.01	1.	1.01	15.55	191	.40	.40	.00	342.
1.01	4.00	48	.01	.00	.01	2.	1.01	16.00	192	.40	.40	.00	294.
1.01	4.05	49	.01	.00	.01	2.	1.01	16.05	193	.31	.30	.00	240.
1.01	4.10	50	.01	.00	.01	2.	1.01	16.10	194	.31	.30	.00	222.
1.01	4.15	51	.01	.00	.01	2.	1.01	16.15	195	.31	.30	.00	217.
1.01	4.20	52	.01	.00	.01	2.	1.01	16.20	196	.31	.30	.00	216.
1.01	4.25	53	.01	.00	.01	2.	1.01	16.25	197	.31	.30	.00	216.
1.01	4.30	54	.01	.00	.01	2.	1.01	16.30	198	.31	.30	.00	216.
1.01	4.35	55	.01	.00	.01	2.	1.01	16.35	199	.31	.30	.00	216.
1.01	4.40	56	.01	.00	.01	2.	1.01	16.40	200	.31	.30	.00	216.
1.01	4.45	57	.01	.00	.01	2.	1.01	16.45	201	.31	.30	.00	216.
1.01	4.50	58	.01	.00	.01	2.	1.01	16.50	202	.31	.30	.00	216.
1.01	4.55	59	.01	.00	.01	3.	1.01	16.55	203	.31	.30	.00	216.
1.01	5.00	60	.01	.00	.01	3.	1.01	17.00	204	.31	.30	.00	216.
1.01	5.05	61	.01	.00	.01	3.	1.01	17.05	205	.24	.24	.00	186.
1.01	5.10	62	.01	.00	.01	3.	1.01	17.10	206	.24	.24	.00	174.
1.01	5.15	63	.01	.00	.01	3.	1.01	17.15	207	.24	.24	.00	171.
1.01	5.20	64	.01	.00	.01	3.	1.01	17.20	208	.24	.24	.00	170.
1.01	5.25	65	.01	.00	.01	3.	1.01	17.25	209	.24	.24	.00	170.

1.01	5.30	66	.01	.00	.01	3.	1.01	17.30	210	.24	.24	.00	170.
1.01	5.35	67	.01	.00	.01	3.	1.01	17.35	211	.24	.24	.00	170.
1.01	5.40	68	.01	.00	.01	3.	1.01	17.40	212	.24	.24	.00	170.
1.01	5.45	69	.01	.00	.01	3.	1.01	17.45	213	.24	.24	.00	170.
1.01	5.50	70	.01	.00	.01	3.	1.01	17.50	214	.24	.24	.00	170.
1.01	5.55	71	.01	.00	.01	3.	1.01	17.55	215	.24	.24	.00	170.
1.01	6.00	72	.01	.00	.01	3.	1.01	18.00	216	.24	.24	.00	170.
1.01	6.05	73	.06	.02	.04	12.	1.01	18.05	217	.02	.02	.00	67.
1.01	6.10	74	.06	.02	.04	16.	1.01	18.10	218	.02	.02	.00	27.
1.01	6.15	75	.06	.03	.04	18.	1.01	18.15	219	.02	.02	.00	18.
1.01	6.20	76	.06	.03	.04	20.	1.01	18.20	220	.02	.02	.00	16.
1.01	6.25	77	.06	.03	.03	21.	1.01	18.25	221	.02	.02	.00	15.
1.01	6.30	78	.06	.03	.03	22.	1.01	18.30	222	.02	.02	.00	15.
1.01	6.35	79	.06	.03	.03	23.	1.01	18.35	223	.02	.02	.00	15.
1.01	6.40	80	.06	.03	.03	23.	1.01	18.40	224	.02	.02	.00	15.
1.01	6.45	81	.06	.03	.03	24.	1.01	18.45	225	.02	.02	.00	15.
1.01	6.50	82	.06	.04	.03	25.	1.01	18.50	226	.02	.02	.00	15.
1.01	6.55	83	.06	.04	.03	26.	1.01	18.55	227	.02	.02	.00	15.
1.01	7.00	84	.06	.04	.03	26.	1.01	19.00	228	.02	.02	.00	15.
1.01	7.05	85	.06	.04	.03	27.	1.01	19.05	229	.02	.02	.00	15.
1.01	7.10	86	.06	.04	.02	28.	1.01	19.10	230	.02	.02	.00	15.
1.01	7.15	87	.06	.04	.02	28.	1.01	19.15	231	.02	.02	.00	15.
1.01	7.20	88	.06	.04	.02	29.	1.01	19.20	232	.02	.02	.00	15.
1.01	7.25	89	.06	.04	.02	30.	1.01	19.25	233	.02	.02	.00	15.
1.01	7.30	90	.06	.04	.02	30.	1.01	19.30	234	.02	.02	.00	15.
1.01	7.35	91	.06	.04	.02	31.	1.01	19.35	235	.02	.02	.00	15.
1.01	7.40	92	.06	.04	.02	31.	1.01	19.40	236	.02	.02	.00	15.
1.01	7.45	93	.06	.04	.02	31.	1.01	19.45	237	.02	.02	.00	15.
1.01	7.50	94	.06	.05	.02	32.	1.01	19.50	238	.02	.02	.00	15.
1.01	7.55	95	.06	.05	.02	32.	1.01	19.55	239	.02	.02	.00	15.
1.01	8.00	96	.06	.05	.02	33.	1.01	20.00	240	.02	.02	.00	15.
1.01	8.05	97	.06	.05	.02	33.	1.01	20.05	241	.02	.02	.00	15.
1.01	8.10	98	.06	.05	.02	33.	1.01	20.10	242	.02	.02	.00	15.
1.01	8.15	99	.06	.05	.02	34.	1.01	20.15	243	.02	.02	.00	15.
1.01	8.20	100	.06	.05	.02	34.	1.01	20.20	244	.02	.02	.00	15.
1.01	8.25	101	.06	.05	.02	34.	1.01	20.25	245	.02	.02	.00	15.
1.01	8.30	102	.06	.05	.02	35.	1.01	20.30	246	.02	.02	.00	15.
1.01	8.35	103	.06	.05	.01	35.	1.01	20.35	247	.02	.02	.00	15.
1.01	8.40	104	.06	.05	.01	35.	1.01	20.40	248	.02	.02	.00	15.
1.01	8.45	105	.06	.05	.01	36.	1.01	20.45	249	.02	.02	.00	15.
1.01	8.50	106	.06	.05	.01	36.	1.01	20.50	250	.02	.02	.00	15.
1.01	8.55	107	.06	.05	.01	36.	1.01	20.55	251	.02	.02	.00	15.
1.01	9.00	108	.06	.05	.01	36.	1.01	21.00	252	.02	.02	.00	15.
1.01	9.05	109	.06	.05	.01	37.	1.01	21.05	253	.02	.02	.00	15.
1.01	9.10	110	.06	.05	.01	37.	1.01	21.10	254	.02	.02	.00	15.
1.01	9.15	111	.06	.05	.01	37.	1.01	21.15	255	.02	.02	.00	15.
1.01	9.20	112	.06	.05	.01	37.	1.01	21.20	256	.02	.02	.00	15.
1.01	9.25	113	.06	.05	.01	37.	1.01	21.25	257	.02	.02	.00	15.
1.01	9.30	114	.06	.05	.01	38.	1.01	21.30	258	.02	.02	.00	15.
1.01	9.35	115	.06	.05	.01	38.	1.01	21.35	259	.02	.02	.00	15.
1.01	9.40	116	.06	.05	.01	38.	1.01	21.40	260	.02	.02	.00	15.
1.01	9.45	117	.06	.05	.01	38.	1.01	21.45	261	.02	.02	.00	15.
1.01	9.50	118	.06	.05	.01	38.	1.01	21.50	262	.02	.02	.00	15.
1.01	9.55	119	.06	.05	.01	38.	1.01	21.55	263	.02	.02	.00	15.
1.01	10.00	120	.06	.05	.01	39.	1.01	22.00	264	.02	.02	.00	15.
1.01	10.05	121	.06	.05	.01	39.	1.01	22.05	265	.02	.02	.00	15.

1.01	10.10	122	.06	.05	.01	39.	1.01	22.10	266	.02	.02	.00	15.

FLOOD HYDROGRAPH PACKAGE - HEC-1 PROGRAM H21/02-2V TIME 18:02:25 CASE #4

1.01	10.10	122	.06	.05	.01	39.	1.01	22.10	266	.02	.02	.00	15.
1.01	10.15	123	.06	.05	.01	39.	1.01	22.15	267	.02	.02	.00	15.
1.01	10.20	124	.06	.06	.01	39.	1.01	22.20	268	.02	.02	.00	15.
1.01	10.25	125	.06	.06	.01	39.	1.01	22.25	269	.02	.02	.00	15.
1.01	10.30	126	.06	.06	.01	39.	1.01	22.30	270	.02	.02	.00	15.
1.01	10.35	127	.06	.06	.01	40.	1.01	22.35	271	.02	.02	.00	15.
1.01	10.40	128	.06	.06	.01	40.	1.01	22.40	272	.02	.02	.00	15.
1.01	10.45	129	.06	.06	.01	40.	1.01	22.45	273	.02	.02	.00	15.
1.01	10.50	130	.06	.06	.01	40.	1.01	22.50	274	.02	.02	.00	15.
1.01	10.55	131	.06	.06	.01	40.	1.01	22.55	275	.02	.02	.00	15.
1.01	11.00	132	.06	.06	.01	40.	1.01	23.00	276	.02	.02	.00	15.
1.01	11.05	133	.06	.06	.01	40.	1.01	23.05	277	.02	.02	.00	15.
1.01	11.10	134	.06	.06	.01	40.	1.01	23.10	278	.02	.02	.00	15.
1.01	11.15	135	.06	.06	.01	40.	1.01	23.15	279	.02	.02	.00	15.
1.01	11.20	136	.06	.06	.01	41.	1.01	23.20	280	.02	.02	.00	15.
1.01	11.25	137	.06	.06	.01	41.	1.01	23.25	281	.02	.02	.00	15.
1.01	11.30	138	.06	.06	.01	41.	1.01	23.30	282	.02	.02	.00	15.
1.01	11.35	139	.06	.06	.01	41.	1.01	23.35	283	.02	.02	.00	15.
1.01	11.40	140	.06	.06	.01	41.	1.01	23.40	284	.02	.02	.00	15.
1.01	11.45	141	.06	.06	.01	41.	1.01	23.45	285	.02	.02	.00	15.
1.01	11.50	142	.06	.06	.01	41.	1.01	23.50	286	.02	.02	.00	15.
1.01	11.55	143	.06	.06	.01	41.	1.01	23.55	287	.02	.02	.00	15.
1.01	12.00	144	.06	.06	.01	41.	1.02	.00	288	.02	.02	.00	15.
									SUM	33.41	30.75	2.66	21875.
										(849.)(	781.)(	68.)(	619.43)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1653.	253.	76.	76.	21883.
CMS	47.	7.	2.	2.	620.
INCHES		25.54	30.73	30.73	30.73
MM		648.72	780.58	780.58	780.58
AC-FT		125.	151.	151.	151.
THOUS CU M		154.	186.	186.	186.

HYDROGRAPH AT STA 5 FOR PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	2.	2.	2.	2.	2.	2.	2.
2.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	11.	13.	14.	14.	14.	14.
14.	15.	15.	15.	15.	15.	17.	17.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	21.	22.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.

17.	24.	27.	37.	45.	95.	165.	110.	66.	48.
34.	29.	24.	22.	22.	22.	22.	22.	22.	22.
22.	22.	22.	22.	19.	17.	17.	17.	17.	17.
17.	17.	17.	17.	17.	17.	7.	3.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	165.	25.	8.	8.	2188.
CMS	5.	1.	0.	0.	62.
INCHES		2.55	3.07	3.07	3.07
MM		64.87	78.06	78.06	78.06
AC-FT		13.	15.	15.	15.
THOUS CU M		15.	19.	19.	19.

HYDROGRAPH AT STA 5 FOR PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	3.	4.	4.	4.	4.	5.	5.
5.	5.	5.	5.	5.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	22.	27.	28.	29.	29.	29.
29.	29.	29.	29.	29.	29.	33.	35.	35.	36.
36.	36.	36.	36.	36.	36.	36.	36.	42.	45.
45.	45.	45.	46.	46.	46.	46.	46.	46.	46.
34.	48.	54.	74.	91.	190.	331.	220.	132.	97.
68.	59.	48.	44.	43.	43.	43.	43.	43.	43.
43.	43.	43.	43.	37.	35.	34.	34.	34.	34.
34.	34.	34.	34.	34.	34.	13.	5.	4.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	331.	51.	15.	15.	4377.
CMS	9.	1.	0.	0.	124.

INCHES	5.11	6.15	6.15	6.15
MM	129.76	156.12	156.12	156.12
AC-FT	25.	30.	30.	30.
THOUS CU M	31.	37.	37.	37.

HYDROGRAPH AT STA 5 FOR PLAN 1, RTIO 3

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	3.	4.	5.	5.	5.	5.	6.	6.
6.	6.	6.	7.	7.	7.	7.	7.	7.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	27.	33.	35.	36.	36.	36.
36.	36.	36.	37.	37.	37.	42.	44.	44.	45.
45.	45.	45.	45.	45.	45.	45.	45.	53.	56.
57.	57.	57.	57.	57.	57.	57.	57.	57.	57.
42.	60.	67.	93.	114.	237.	413.	274.	165.	121.
85.	74.	60.	55.	54.	54.	54.	54.	54.	54.
54.	54.	54.	54.	46.	43.	43.	43.	43.	43.
43.	43.	43.	43.	43.	43.	17.	7.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	413.	63.	19.	19.	5471.
CMS	12.	2.	1.	1.	155.
INCHES		6.39	7.68	7.68	7.68
MM		162.18	195.14	195.14	195.14
AC-FT		31.	38.	38.	38.
THOUS CU M		39.	46.	46.	46.

HYDROGRAPH AT STA 5 FOR PLAN 1, RTIO 4

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

HYDROGRAPH AT STA 5 FOR PLAN 1, RTIO 7

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	2.
2.	2.	6.	8.	9.	10.	10.	11.	11.	12.
12.	13.	13.	13.	14.	14.	14.	14.	15.	15.
15.	15.	16.	16.	16.	16.	17.	17.	17.	17.
17.	17.	17.	18.	18.	18.	18.	18.	18.	18.
18.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	21.	21.	21.	54.	67.	70.	71.	72.	72.
72.	73.	73.	73.	73.	73.	84.	87.	89.	89.
89.	89.	90.	90.	90.	90.	90.	90.	104.	112.
113.	113.	114.	114.	114.	114.	114.	114.	114.	114.
84.	120.	135.	185.	227.	475.	827.	549.	330.	242.
171.	147.	120.	111.	109.	108.	108.	108.	108.	108.
108.	108.	108.	108.	93.	87.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	33.	13.	9.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	827.	126.	38.	38.	10942.
CMS	23.	4.	1.	1.	310.
INCHES		12.77	15.37	15.37	15.37
MM		324.36	390.29	390.29	390.29
AC-FT		63.	75.	75.	75.
THOUS CU M		77.	93.	93.	93.

HYDROGRAPH AT STA 5 FOR PLAN 1, RTIO 8

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	3.
3.	3.	9.	12.	14.	15.	15.	16.	17.	18.
18.	19.	19.	20.	20.	21.	21.	22.	22.	23.
23.	23.	24.	24.	24.	24.	25.	25.	25.	26.
26.	26.	26.	26.	27.	27.	27.	27.	27.	28.

28.	28.	28.	28.	28.	28.	29.	29.	29.	29.

FLOOD HYDROGRAPH PACKAGE - HEC-1 PROGRAM H21/02-2V TIME 18:02:25 CASE #4

28.	28.	28.	28.	28.	28.	29.	29.	29.	29.
29.	29.	29.	29.	29.	30.	30.	30.	30.	30.
30.	30.	30.	30.	30.	30.	30.	31.	31.	31.
31.	31.	31.	31.	81.	100.	105.	107.	108.	108.
108.	109.	109.	110.	110.	110.	125.	131.	133.	134.
134.	134.	134.	135.	135.	135.	135.	135.	158.	167.
170.	170.	170.	171.	171.	171.	171.	171.	172.	172.
127.	179.	202.	278.	341.	712.	1240.	823.	496.	363.
256.	221.	180.	166.	163.	162.	162.	162.	162.	162.
162.	162.	162.	162.	139.	130.	128.	128.	128.	128.
128.	126.	128.	128.	128.	128.	50.	20.	13.	12.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1240.	189.	57.	57.	16412.
CMS	35.	5.	2.	2.	465.
INCHES		19.16	23.05	23.05	23.05
MM		486.54	585.43	585.43	585.43
AC-FT		94.	113.	113.	113.
THOUS CU M		116.	139.	139.	139.

HYDROGRAPH AT STA 5 FOR PLAN 1, RTIO 9

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	12.	16.	18.	20.	21.	22.	23.	23.
24.	25.	26.	26.	27.	28.	28.	29.	30.	30.
31.	31.	31.	32.	32.	33.	33.	33.	34.	34.
34.	35.	35.	35.	36.	36.	36.	36.	37.	37.
37.	37.	37.	38.	38.	38.	38.	38.	38.	39.
39.	39.	39.	39.	39.	39.	40.	40.	40.	40.
40.	40.	40.	40.	40.	41.	41.	41.	41.	41.
41.	41.	41.	41.	108.	134.	140.	143.	143.	144.
145.	145.	146.	146.	147.	147.	167.	175.	177.	178.
178.	179.	179.	180.	180.	180.	180.	181.	211.	223.
226.	227.	227.	228.	228.	228.	228.	228.	229.	229.
169.	239.	270.	279.	455.	950.	1653.	1098.	661.	484.
342.	294.	240.	222.	217.	216.	216.	216.	216.	216.
216.	216.	216.	216.	186.	174.	171.	170.	170.	170.
170.	170.	170.	170.	170.	170.	67.	27.	18.	16.
15.	15.	15.	15.	15.	15.	15.	15.	15.	15.
15.	15.	15.	15.	15.	15.	15.	15.	15.	15.
15.	15.	15.	15.	15.	15.	15.	15.	15.	15.
15.	15.	15.	15.	15.	15.	15.	15.	15.	15.

15.	15.	15.	15.	15.	15.	15.	15.	15.	15.
15.	15.	15.	15.	15.	15.	15.	15.	15.	15.
15.	15.	15.	15.	15.	15.	15.	15.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1653.	253.	76.	76.	21883.
CMS	47.	7.	2.	2.	620.
INCHES		25.54	30.73	30.73	30.73
MM		648.72	780.58	780.58	780.58
AC-FT		125.	151.	151.	151.
THOUS CU M		154.	186.	186.	186.

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COMBINE HYDROGRAPHS

CALCULATE TOTAL INFLOW HYDROGRAPH TO DAM #4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	3	0	0	0	0	1	0	0

SUM OF 3 HYDROGRAPHS AT 6 PLAN 1 RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	2.	2.	2.	2.	2.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	13.	16.	17.	17.	17.	18.
18.	18.	18.	18.	19.	19.	21.	22.	22.	23.
23.	23.	23.	23.	24.	24.	24.	24.	27.	29.
29.	30.	30.	30.	30.	31.	31.	31.	31.	31.
26.	33.	36.	46.	55.	106.	177.	123.	81.	64.
50.	45.	40.	38.	38.	38.	38.	38.	38.	38.
38.	39.	39.	39.	36.	35.	34.	34.	34.	34.
35.	35.	35.	35.	35.	35.	25.	21.	20.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
18.	18.	18.	18.	18.	18.	18.	18.	18.	17.
17.	17.	17.	17.	17.	17.	17.	17.	16.	16.
16.	16.	16.	16.	16.	16.	15.	15.	15.	15.
15.	15.	15.	15.	15.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	12.	12.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	177.	36.	14.	14.	4056.
CMS	5.	1.	0.	0.	115.
INCHES		1.59	2.50	2.50	2.50
MM		40.49	63.38	63.38	63.38
AC-FT		18.	28.	28.	28.
THOUS CU M		22.	34.	34.	34.

SUM OF 3 HYDROGRAPHS AT 6 PLAN 1 RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	3.	4.	4.	4.	5.	5.	5.	5.
5.	6.	6.	6.	6.	6.	7.	7.	7.	7.
7.	7.	8.	8.	8.	8.	8.	8.	8.	9.
9.	9.	9.	9.	9.	9.	9.	10.	10.	10.
10.	10.	10.	10.	10.	10.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	12.	12.	12.	12.
12.	12.	12.	12.	12.	12.	12.	12.	12.	13.
13.	13.	13.	13.	26.	32.	33.	34.	35.	35.
35.	36.	36.	37.	37.	37.	42.	44.	44.	45.
45.	46.	46.	47.	47.	47.	48.	48.	55.	57.
58.	59.	59.	60.	60.	61.	61.	62.	62.	63.
51.	66.	76.	93.	112.	213.	359.	252.	169.	135.
108.	117.	185.	327.	523.	737.	920.	1017.	1079.	1115.
910.	732.	654.	245.	125.	95.	83.	79.	76.	75.
75.	74.	74.	74.	74.	74.	53.	44.	41.	39.
38.	37.	36.	35.	34.	33.	32.	31.	30.	29.
29.	28.	27.	27.	26.	26.	25.	25.	24.	24.
23.	23.	23.	22.	22.	22.	21.	21.	20.	20.
20.	19.	19.	19.	19.	19.	18.	18.	18.	18.
18.	18.	18.	17.	17.	17.	17.	17.	17.	17.
16.	16.	16.	16.	16.	16.	16.	16.	16.	15.
15.	15.	15.	15.	15.	15.	15.	15.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1115.	179.	53.	53.	15148.
CMS	32.	5.	1.	1.	429.
INCHES		7.94	9.32	9.32	9.32
MM		201.61	236.71	236.71	236.71
AC-FT		89.	104.	104.	104.
THOUS CU M		110.	129.	129.	129.

SUM OF 3 HYDROGRAPHS AT 6 PLAN 1 RTIO 3

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2783.	405.	111.	111.	31959.
CMS	79.	11.	3.	3.	905.
INCHES		17.94	19.66	19.66	19.66
MM		455.79	499.42	499.42	499.42
AC-FT		201.	220.	220.	220.
THOUS CU M		248.	271.	271.	271.

SUM OF 3 HYDROGRAPHS AT 6 PLAN 1 RTIO 6

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	2.	2.	2.	2.
2.	2.	5.	7.	8.	9.	9.	10.	10.	11.
11.	11.	12.	12.	13.	13.	13.	14.	14.	14.
15.	15.	15.	16.	16.	16.	16.	17.	17.	17.
18.	18.	18.	18.	19.	19.	19.	19.	19.	20.
20.	20.	20.	21.	21.	21.	21.	21.	22.	22.
22.	22.	22.	22.	23.	23.	23.	23.	23.	23.
24.	24.	24.	24.	24.	24.	25.	25.	25.	25.
25.	25.	25.	26.	53.	63.	67.	68.	69.	70.
71.	71.	72.	73.	74.	74.	83.	87.	89.	90.
91.	93.	94.	95.	96.	97.	98.	100.	119.	119.
121.	123.	124.	126.	128.	129.	130.	132.	153.	234.
763.	595.	831.	1078.	1224.	1527.	1959.	1939.	1571.	1652.
1629.	1798.	1973.	1814.	1693.	1242.	990.	552.	419.	197.
197.	197.	197.	197.	177.	163.	159.	157.	156.	156.
155.	155.	155.	155.	155.	155.	111.	90.	81.	76.
71.	67.	63.	59.	56.	52.	49.	47.	44.	41.
39.	37.	35.	33.	31.	30.	28.	27.	25.	24.
23.	22.	21.	20.	19.	18.	17.	17.	16.	15.
15.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1973.	436.	120.	120.	34599.
CMS	56.	12.	3.	3.	980.
INCHES		19.33	21.29	21.29	21.29
MM		490.90	540.68	540.68	540.68
AC-FT		216.	238.	238.	238.
THOUS CU M		267.	294.	294.	294.

SUM OF 3 HYDROGRAPHS AT 6 PLAN 1 RTIO 7

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

FLOOD HYDROGRAPH PACKAGE - HEC-1 PROGRAM H21/02-2V TIME 18:02:25 CASE #4

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	7.	9.	10.	11.	11.	12.	13.	13.
14.	14.	15.	15.	16.	16.	17.	17.	17.	18.
18.	19.	19.	19.	20.	20.	21.	21.	21.	22.
22.	22.	23.	23.	23.	23.	24.	24.	24.	25.
25.	25.	25.	26.	26.	26.	26.	27.	27.	27.
27.	28.	28.	28.	28.	28.	29.	29.	29.	29.
29.	30.	30.	39.	39.	30.	31.	31.	31.	31.
31.	32.	32.	32.	66.	79.	83.	85.	86.	87.
88.	89.	90.	92.	93.	94.	106.	111.	113.	115.
117.	118.	120.	121.	122.	124.	126.	127.	144.	151.
174.	258.	415.	623.	850.	1056.	1150.	1210.	1245.	1064.
827.	779.	466.	345.	452.	1008.	1980.	2275.	2362.	2413.
2140.	1705.	1387.	1071.	612.	503.	247.	247.	247.	247.
247.	247.	247.	247.	221.	203.	198.	196.	195.	194.
194.	194.	194.	194.	194.	194.	138.	112.	101.	94.
88.	83.	78.	73.	69.	65.	61.	58.	55.	52.
49.	46.	43.	41.	39.	37.	35.	33.	32.	30.
29.	27.	26.	25.	24.	23.	22.	21.	20.	19.
18.	18.	18.	18.	18.	17.	17.	17.	17.	17.
17.	17.	17.	17.	17.	17.	17.	17.	17.	17.
17.	17.	17.	17.	17.	17.	17.	17.	17.	17.
17.	17.	17.	17.	17.	17.	17.	17.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2413.	496.	138.	138.	39708.
CMS	68.	14.	4.	4.	1124.
INCHES		21.99	24.43	24.43	24.43
MM		558.44	620.51	620.51	620.51
AC-FT		246.	273.	273.	273.
THOUS CU M		304.	337.	337.	337.

SUM OF 3 HYDROGRAPHS AT 6 PLAN 1 RTIO 8

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	10.	13.	15.	16.	17.	18.	19.	20.
21.	21.	22.	23.	24.	24.	25.	26.	26.	27.
27.	28.	29.	29.	30.	30.	31.	31.	32.	32.
33.	33.	34.	34.	35.	35.	35.	36.	36.	37.
37.	38.	38.	38.	39.	39.	39.	40.	40.	40.
41.	41.	41.	42.	42.	42.	43.	43.	43.	44.
44.	44.	45.	45.	45.	46.	46.	46.	46.	47.
47.	47.	47.	48.	98.	119.	126.	129.	132.	134.

136.	138.	140.	142.	144.	146.	164.	172.	197.	283.
442.	654.	884.	1094.	1189.	1249.	1283.	1111.	933.	916.
740.	957.	1382.	1808.	2064.	1958.	1862.	1436.	1180.	747.
601.	389.	447.	591.	747.	1441.	2421.	2088.	1397.	890.
668.	503.	448.	382.	381.	370.	372.	370.	370.	370.
370.	370.	370.	370.	330.	304.	296.	293.	292.	291.
291.	291.	291.	291.	291.	291.	207.	167.	151.	140.
131.	124.	116.	109.	103.	97.	91.	86.	81.	77.
72.	68.	65.	61.	58.	55.	52.	49.	47.	45.
42.	40.	39.	37.	35.	34.	32.	31.	30.	28.
27.	27.	27.	26.	26.	26.	26.	26.	26.	26.
26.	26.	26.	26.	26.	26.	26.	26.	26.	26.
26.	26.	26.	26.	26.	26.	26.	26.	26.	26.
26.	26.	26.	26.	26.	26.	26.	26.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2421.	649.	183.	183.	52700.
CMS	69.	18.	5.	5.	1492.
INCHES		28.77	32.42	32.42	32.42
MM		730.75	823.54	823.54	823.54
AC-FT		322.	363.	363.	363.
THOUS CU M		397.	448.	448.	448.

SUM OF 3 HYDROGRAPHS AT 6 PLAN 1 RTIO 9

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	2.	2.	2.	2.	2.
2.	3.	3.	3.	3.	3.	3.	3.	3.	3.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
5.	5.	13.	18.	20.	21.	23.	24.	25.	26.
27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
37.	37.	38.	39.	40.	40.	41.	42.	42.	43.
44.	44.	45.	45.	46.	47.	47.	48.	48.	49.
49.	50.	50.	51.	51.	52.	52.	53.	53.	54.
54.	55.	55.	56.	56.	57.	57.	58.	58.	59.
60.	60.	61.	61.	62.	62.	63.	63.	64.	64.
65.	65.	66.	66.	134.	162.	171.	175.	179.	182.
185.	210.	298.	457.	671.	903.	1137.	1248.	1314.	1354.
1253.	1236.	1514.	1583.	1857.	2093.	1962.	1865.	1505.	1281.
866.	796.	517.	518.	518.	519.	519.	520.	520.	521.
414.	510.	604.	789.	1006.	1879.	3197.	2771.	1825.	1306.
875.	705.	573.	518.	500.	495.	494.	493.	493.	493.
494.	494.	494.	494.	439.	403.	394.	390.	389.	388.
388.	388.	388.	388.	388.	388.	276.	222.	200.	186.
174.	164.	154.	145.	136.	128.	121.	114.	108.	102.
96.	91.	86.	81.	77.	73.	69.	65.	62.	59.
56.	54.	51.	49.	47.	45.	43.	41.	39.	38.
36.	36.	35.	35.	35.	35.	35.	35.	35.	35.
35.	35.	35.	35.	35.	35.	35.	35.	35.	35.
35.	35.	35.	35.	35.	35.	35.	35.	35.	35.
35.	35.	35.	35.	35.	35.	35.	35.		

PROGRAM H21/02-2V TIME 18:02:25 CASE #4

FLOOD HYDROGRAPH PACKAGE - HEC-1

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3197.	801.	226.	226.	65610.
CMS	91.	23.	6.	6.	1858.
INCHES		35.48	40.37	40.37	40.37
MM		901.23	1025.28	1025.28	1025.28
AC-FT		397.	452.	452.	452.
THOUS CU M		490.	557.	557.	557.

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HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THROUGH DAM #4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
7	1	0	0	0	0	1	0	0

ROUTING DATA

BLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
.0	.000	.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	.000	.000	.000	-707.	-1

STAGE	707.00	708.65	709.00	709.50	710.00	710.50	711.00	711.50	712.00	713.00
	714.00	715.00	716.00	717.00	718.00	719.00	720.00	721.00		
FLOW	.00	12.00	17.00	24.00	32.00	38.00	45.00	50.00	53.00	60.00
	64.00	68.00	72.00	75.00	80.00	84.00	87.00	90.00		
SURFACE AREA=	0.	3.	9.	15.	18.					
CAPACITY=	0.	19.	99.	277.	444.					
ELEVATION=	670.	690.	705.	720.	730.					

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
707.0	.0	.0	.0	.0	.0	.0	.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
714.4	.0	.0	0.

CREST LENGTH	0.	53.	89.	161.	215.	276.	386.	410.	441.	465.
AT OR BELOW ELEVATION	714.4	714.8	715.1	715.8	716.0	716.5	716.8	717.6	719.0	720.9

STATION 7, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

135.	135.	135.	135.	135.	135.	135.	135.	135.	135.
135.	135.	135.	135.	136.	136.	136.	136.	136.	136.
136.	136.	136.	136.	136.	135.	135.	135.	135.	135.
135.	135.	135.	135.	135.	135.	135.	135.		

STAGE

707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.1	707.1	707.1	707.1	707.1	707.1
707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1
707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1
707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.2	707.2	707.2
707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2
707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.3	707.3
707.3	707.3	707.3	707.3	707.3	707.3	707.3	707.4	707.4	707.4
707.4	707.4	707.4	707.4	707.5	707.5	707.5	707.5	707.5	707.5
707.5	707.6	707.6	707.6	707.6	707.6	707.7	707.7	707.7	707.7
707.7	707.7	707.8	707.8	707.8	707.9	708.0	708.1	708.1	708.2
708.2	708.2	708.3	708.3	708.3	708.3	708.3	708.4	708.4	708.4
708.4	708.4	708.4	708.5	708.5	708.5	708.5	708.5	708.5	708.6
708.6	708.6	708.6	708.6	708.6	708.7	708.7	708.7	708.7	708.7
708.7	708.7	708.7	708.7	708.7	708.7	708.7	708.7	708.7	708.7
708.7	708.7	708.7	708.7	708.7	708.7	708.7	708.7	708.8	708.8
708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8
708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8
708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8
708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8
708.8	708.8	708.8	708.8	708.8	708.8	708.8	708.8		

PEAK OUTFLOW IS 14. AT TIME 22.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	14.	14.	5.	5.	1474.
CMS	0.	0.	0.	0.	42.
INCHES		.60	.91	.91	.91
MM		15.27	23.03	23.03	23.03
AC-FT		7.	10.	10.	10.
THOUS CU M		8.	13.	13.	13.

STATION 7, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	4.	4.
4.	4.	4.	4.	5.	5.	5.	5.	5.	6.
6.	6.	6.	6.	7.	7.	7.	7.	7.	8.
8.	8.	8.	9.	9.	9.	9.	10.	10.	10.
10.	11.	11.	11.	12.	13.	16.	18.	20.	21.
22.	23.	24.	27.	31.	36.	42.	49.	53.	57.
61.	62.	64.	64.	65.	65.	65.	65.	65.	65.
65.	65.	65.	65.	65.	65.	65.	65.	65.	65.
65.	65.	65.	65.	65.	65.	65.	64.	64.	64.
64.	64.	64.	64.	64.	64.	64.	64.	64.	63.
63.	63.	63.	63.	63.	63.	63.	63.	63.	63.
62.	62.	62.	62.	62.	62.	62.	62.	62.	62.
61.	61.	61.	61.	61.	61.	61.	61.	61.	61.
61.	60.	60.	60.	60.	60.	60.	60.	59.	59.
59.	59.	59.	59.	58.	58.	58.	58.		

STORAGE

118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	119.
119.	119.	119.	119.	119.	119.	119.	119.	119.	119.
119.	119.	119.	119.	119.	119.	119.	119.	119.	120.
120.	120.	120.	120.	120.	120.	120.	120.	120.	120.
120.	120.	120.	120.	120.	121.	121.	121.	121.	121.
121.	121.	121.	121.	121.	121.	121.	121.	121.	121.
122.	122.	122.	122.	122.	122.	122.	122.	123.	123.
123.	123.	123.	124.	124.	124.	124.	125.	125.	125.
125.	126.	126.	126.	127.	127.	127.	127.	128.	128.
128.	129.	129.	129.	130.	130.	130.	131.	131.	132.
132.	132.	133.	133.	134.	135.	137.	139.	140.	141.
141.	142.	143.	145.	147.	151.	157.	163.	170.	177.
184.	189.	193.	196.	197.	197.	197.	197.	198.	198.
198.	198.	198.	198.	198.	198.	198.	198.	198.	198.
197.	197.	197.	197.	197.	196.	196.	196.	196.	195.
195.	195.	195.	194.	194.	194.	194.	193.	193.	193.
193.	192.	192.	192.	191.	191.	191.	191.	190.	190.
190.	189.	189.	189.	189.	188.	188.	188.	187.	187.
187.	186.	186.	186.	186.	185.	185.	185.	184.	184.

184.	183.	183.	183.	183.	182.	182.	182.	181.	181.

184.	183.	183.	183.	183.	182.	182.	182.	181.	181.
181.	180.	180.	180.	180.	179.	179.	179.		

STAGE

707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.1	707.1	707.1	707.1	707.1	707.1	707.1
707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1
707.1	707.1	707.1	707.2	707.2	707.2	707.2	707.2	707.2	707.2
707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2
707.3	707.3	707.3	707.3	707.3	707.3	707.3	707.3	707.3	707.3
707.3	707.3	707.3	707.3	707.3	707.4	707.4	707.4	707.4	707.4
707.4	707.4	707.4	707.4	707.4	707.4	707.5	707.5	707.5	707.5
707.5	707.6	707.6	707.6	707.6	707.7	707.7	707.7	707.7	707.8
707.8	707.8	707.8	707.9	707.9	707.9	708.0	708.0	708.0	708.0
708.1	708.1	708.2	708.2	708.2	708.3	708.3	708.3	708.4	708.4
708.4	708.5	708.5	708.6	708.6	708.7	708.9	709.1	709.2	709.3
709.4	709.4	709.5	709.7	709.9	710.3	710.8	711.4	712.0	712.6
713.1	713.6	713.9	714.1	714.2	714.2	714.2	714.2	714.2	714.2
714.3	714.3	714.3	714.3	714.3	714.3	714.3	714.3	714.3	714.2
714.2	714.2	714.2	714.2	714.2	714.1	714.1	714.1	714.1	714.1
714.1	714.0	714.0	714.0	714.0	714.0	713.9	713.9	713.9	713.9
713.8	713.8	713.8	713.8	713.8	713.7	713.7	713.7	713.7	713.6
713.6	713.6	713.6	713.5	713.5	713.5	713.5	713.4	713.4	713.4
713.4	713.3	713.3	713.3	713.3	713.3	713.2	713.2	713.2	713.2
713.1	713.1	713.1	713.1	713.0	713.0	713.0	713.0	712.9	712.9
712.9	712.9	712.8	712.8	712.8	712.8	712.7	712.7		

PEAK OUTFLOW IS 65. AT TIME 18.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	65.	63.	22.	22.	6305.
CMS	2.	2.	1.	1.	179.
INCHES		2.80	3.88	3.88	3.88
MM		71.21	98.53	98.53	98.53
AC-FT		31.	43.	43.	43.
THOUS CU M		39.	54.	54.	54.

STATION 7, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

FLOOD HYDROGRAPH PACKAGE - HEC-1 PROGRAM H21/02-2V TIME 18:02:25 CASE #4

707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.1	707.1	707.1	707.1
707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.2
707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.2	707.3
707.3	707.3	707.3	707.3	707.3	707.3	707.3	707.3	707.4	707.4
707.4	707.4	707.4	707.4	707.4	707.4	707.5	707.5	707.5	707.5
707.5	707.5	707.5	707.5	707.6	707.6	707.6	707.6	707.6	707.6
707.6	707.7	707.7	707.7	707.7	707.7	707.7	707.7	707.7	707.8
707.8	707.8	707.8	707.8	707.8	707.9	707.9	708.0	708.0	708.0
708.1	708.1	708.2	708.2	708.3	708.3	708.3	708.4	708.5	708.5
708.6	708.6	708.7	708.7	708.8	708.8	708.9	708.9	709.0	709.1
709.1	709.2	709.3	709.3	709.4	709.5	709.6	709.6	709.7	709.8
710.0	710.3	710.7	711.2	711.9	712.7	713.6	714.7	715.5	716.1
716.5	716.8	716.9	717.0	717.0	716.9	716.7	716.5	716.3	716.1
715.9	715.8	715.7	715.6	715.5	715.5	715.4	715.4	715.4	715.3
715.3	715.3	715.3	715.3	715.3	715.2	715.2	715.2	715.2	715.1
715.1	715.1	715.0	715.0	715.0	714.9	714.9	714.9	714.9	714.8
714.8	714.8	714.8	714.7	714.7	714.7	714.7	714.7	714.6	714.6
714.6	714.6	714.5	714.5	714.5	714.5	714.4	714.4	714.4	714.3
714.3	714.3	714.3	714.2	714.2	714.2	714.1	714.1	714.1	714.1
714.0	714.0	714.0	714.0	713.9	713.9	713.9	713.8	713.8	713.8
713.8	713.7	713.7	713.7	713.7	713.6	713.6	713.6	713.5	713.5
713.5	713.5	713.4	713.4	713.4	713.4	713.3	713.3		

PEAK OUTFLOW IS 1816. AT TIME 16.17 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1816.	304.	86.	86.	24698.
CMS	51.	9.	2.	2.	699.
INCHES		13.45	15.20	15.20	15.20
MM		341.73	385.96	385.96	385.96
AC-FT		151.	170.	170.	170.
THOUS CU M		186.	210.	210.	210.

STATION 7, PLAN 1, RATIO 7

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	4.	4.	4.	4.	4.	4.	4.	4.	4.

5.	5.	5.	5.	5.	5.	5.	5.	6.	6.
6.	6.	6.	6.	6.	6.	6.	7.	7.	7.
7.	7.	7.	7.	8.	8.	8.	9.	9.	9.
10.	10.	11.	11.	11.	12.	12.	13.	14.	15.
16.	17.	18.	19.	20.	21.	22.	23.	24.	25.
27.	28.	32.	35.	41.	48.	53.	57.	61.	63.
65.	78.	116.	146.	182.	284.	624.	1290.	1899.	2221.
2259.	2100.	1806.	1458.	1131.	869.	670.	522.	440.	388.
353.	328.	309.	295.	282.	268.	254.	243.	234.	226.
221.	216.	212.	209.	206.	204.	198.	186.	174.	162.
152.	144.	136.	129.	122.	117.	111.	107.	102.	98.
94.	91.	88.	85.	83.	80.	78.	76.	75.	73.
72.	71.	70.	69.	68.	67.	67.	66.	66.	66.
66.	66.	65.	65.	65.	65.	65.	65.	65.	65.
65.	65.	64.	64.	64.	64.	64.	64.	64.	64.
64.	63.	63.	63.	63.	63.	63.	63.	63.	63.
63.	62.	62.	62.	62.	62.	62.	62.		

STORAGE

118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	119.	119.
119.	119.	119.	119.	119.	119.	119.	119.	120.	120.
120.	120.	120.	120.	120.	120.	120.	121.	121.	121.
121.	121.	121.	121.	122.	122.	122.	122.	122.	122.
122.	123.	123.	123.	123.	123.	123.	123.	124.	124.
124.	124.	124.	124.	125.	125.	125.	125.	125.	125.
125.	126.	126.	126.	126.	126.	126.	127.	127.	127.
127.	127.	127.	128.	128.	128.	129.	129.	130.	130.
131.	132.	132.	133.	137.	134.	134.	135.	136.	136.
137.	138.	138.	139.	140.	141.	141.	142.	143.	144.
145.	146.	148.	151.	156.	162.	170.	177.	185.	193.
199.	204.	207.	209.	211.	214.	221.	229.	234.	237.
237.	236.	234.	231.	228.	225.	222.	220.	218.	217.
216.	215.	215.	214.	214.	214.	213.	213.	213.	212.
212.	212.	212.	212.	212.	212.	211.	211.	210.	210.
209.	209.	209.	208.	208.	207.	207.	207.	206.	206.
206.	205.	205.	205.	205.	204.	204.	204.	203.	203.
202.	202.	202.	202.	202.	201.	201.	201.	200.	200.
200.	199.	199.	199.	198.	198.	198.	197.	197.	197.
196.	196.	196.	195.	195.	195.	195.	194.	194.	194.
193.	193.	193.	192.	192.	192.	191.	191.	191.	190.
190.	190.	189.	189.	189.	189.	188.	188.		

STAGE

707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0

707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.1	707.1	707.1	707.1	707.1	707.1
707.1	707.1	707.1	707.1	707.1	707.1	707.2	707.2	707.2	707.2
707.2	707.2	707.2	707.2	707.3	707.3	707.3	707.3	707.3	707.3
707.3	707.3	707.4	707.4	707.4	707.4	707.4	707.4	707.4	707.5
707.5	707.5	707.5	707.5	707.5	707.6	707.6	707.6	707.6	707.6
707.6	707.6	707.7	707.7	707.7	707.7	707.7	707.7	707.8	707.8
707.8	707.8	707.8	707.8	707.9	707.9	707.9	707.9	707.9	707.9
708.0	708.0	708.0	708.0	708.0	708.1	708.1	708.2	708.2	708.3
708.3	708.4	708.5	708.5	708.6	708.6	708.7	708.7	708.8	708.9
708.9	709.0	709.1	709.1	709.2	709.3	709.3	709.4	709.5	709.6
709.7	709.8	710.0	710.3	710.7	711.3	711.9	712.6	713.3	713.9
714.4	714.8	715.0	715.2	715.3	715.5	716.1	716.7	717.0	717.2
717.2	717.1	717.0	716.8	716.6	716.3	716.1	716.0	715.8	715.7
715.7	715.6	715.6	715.6	715.5	715.5	715.5	715.4	715.4	715.4
715.4	715.4	715.4	715.4	715.3	715.3	715.3	715.3	715.2	715.2
715.2	715.1	715.1	715.1	715.1	715.0	715.0	715.0	714.9	714.9
714.9	714.9	714.8	714.8	714.8	714.8	714.8	714.7	714.7	714.7
714.7	714.6	714.6	714.6	714.6	714.5	714.5	714.5	714.5	714.4
714.4	714.4	714.4	714.3	714.3	714.3	714.3	714.2	714.2	714.2
714.2	714.1	714.1	714.1	714.1	714.0	714.0	714.0	713.9	713.9
713.9	713.9	713.8	713.8	713.8	713.8	713.7	713.7	713.7	713.7
713.6	713.6	713.6	713.6	713.5	713.5	713.5	713.5		

PEAK OUTFLOW IS 2259. AT TIME 15.92 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2259.	364.	102.	102.	29514.
CMS	64.	10.	3.	3.	836.
INCHES		16.11	18.16	18.16	18.16
MM		409.18	461.22	461.22	461.22
AC-FT		180.	203.	203.	203.
THOUS CU M		222.	251.	251.	251.

STATION 7, PLAN 1, RATIO 8

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	2.	2.	2.	2.	2.	2.
2.	2.	3.	3.	3.	3.	3.	3.	3.	3.
4.	4.	4.	4.	4.	4.	5.	5.	5.	5.
5.	5.	6.	6.	6.	6.	6.	6.	7.	7.
7.	7.	7.	7.	8.	8.	8.	8.	8.	8.
9.	9.	9.	9.	9.	9.	10.	10.	10.	10.

707.1	707.2	707.2	707.2	707.2	707.2	707.2	707.3	707.3	707.3
707.3	707.3	707.3	707.4	707.4	707.4	707.4	707.4	707.5	707.5
707.5	707.5	707.5	707.6	707.6	707.6	707.6	707.6	707.7	707.7
707.7	707.7	707.8	707.8	707.8	707.8	707.8	707.9	707.9	707.9
707.9	708.0	708.0	708.0	708.0	708.1	708.1	708.1	708.1	708.2
708.2	708.2	708.2	708.3	708.3	708.3	708.3	708.3	708.4	708.4
708.4	708.4	708.5	708.5	708.5	708.6	708.7	708.8	708.8	708.9
709.0	709.1	709.2	709.2	709.3	709.4	709.5	709.6	709.7	709.8
710.0	710.4	710.8	711.4	712.0	712.7	713.4	714.1	714.6	715.0
715.4	715.7	716.0	716.4	716.8	717.0	717.0	716.9	716.8	716.6
716.4	716.2	716.1	716.0	716.1	716.3	716.7	717.0	717.0	716.8
716.5	716.3	716.2	716.0	716.0	715.9	715.8	715.8	715.8	715.8
715.7	715.7	715.7	715.7	715.7	715.7	715.7	715.6	715.6	715.6
715.6	715.6	715.6	715.6	715.6	715.6	715.5	715.5	715.4	715.4
715.4	715.3	715.3	715.2	715.2	715.2	715.2	715.1	715.1	715.1
715.0	715.0	715.0	715.0	714.9	714.9	714.9	714.9	714.9	714.8
714.8	714.8	714.8	714.7	714.7	714.7	714.7	714.7	714.6	714.6
714.6	714.6	714.5	714.5	714.5	714.5	714.5	714.4	714.4	714.4
714.4	714.3	714.3	714.3	714.3	714.3	714.2	714.2	714.2	714.2
714.2	714.1	714.1	714.1	714.1	714.1	714.0	714.0	714.0	714.0
713.9	713.9	713.9	713.9	713.9	713.8	713.8	713.8		

PEAK OUTFLOW IS 1883. AT TIME 15.67 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1883.	523.	146.	146.	41908.
CMS	53.	15.	4.	4.	1187.
INCHES		23.16	25.78	25.78	25.78
MM		588.39	654.89	654.89	654.89
AC-FT		259.	289.	289.	289.
THOUS CU M		320.	356.	356.	356.

STATION 7, PLAN 1, RATIO 9

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	2.	2.	2.	2.	2.	3.	3.
3.	3.	3.	4.	4.	4.	4.	4.	4.	5.
5.	5.	5.	5.	6.	6.	6.	6.	6.	7.
7.	7.	7.	8.	8.	8.	8.	8.	9.	9.
9.	9.	10.	10.	10.	10.	10.	11.	11.	11.
11.	12.	12.	12.	13.	13.	14.	14.	14.	15.
15.	16.	16.	17.	18.	19.	20.	22.	23.	24.
26.	28.	30.	33.	37.	44.	50.	54.	59.	63.

65.	102.	298.	663.	1117.	1582.	1864.	1908.	1773.	1541.
1280.	1057.	876.	728.	648.	601.	573.	555.	543.	536.
514.	498.	516.	576.	693.	1009.	1855.	2617.	2394.	1843.
1392.	1082.	881.	742.	653.	597.	562.	539.	524.	515.
508.	503.	500.	498.	489.	469.	449.	433.	421.	412.
406.	401.	398.	395.	394.	392.	377.	345.	314.	287.
265.	246.	229.	215.	202.	190.	180.	170.	162.	154.
146.	140.	133.	128.	122.	117.	113.	108.	104.	101.
97.	94.	91.	88.	86.	83.	81.	79.	78.	76.
75.	73.	72.	71.	70.	69.	69.	68.	68.	67.
67.	66.	66.	66.	66.	66.	66.	66.	66.	65.
65.	65.	65.	65.	65.	65.	65.	65.	65.	65.
65.	65.	65.	65.	64.	64.	64.	64.		

STORAGE

116.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	118.	118.	118.	118.	118.	118.	118.	118.
118.	118.	119.	119.	119.	119.	119.	119.	119.	119.
120.	120.	120.	120.	120.	121.	121.	121.	121.	121.
122.	122.	122.	122.	123.	123.	123.	123.	124.	124.
124.	124.	125.	125.	125.	126.	126.	126.	126.	127.
127.	127.	128.	128.	128.	128.	129.	129.	129.	130.
130.	130.	131.	131.	131.	132.	132.	132.	132.	133.
133.	133.	134.	134.	134.	135.	135.	136.	136.	136.
137.	137.	137.	138.	138.	139.	140.	141.	142.	143.
144.	145.	147.	149.	151.	158.	165.	173.	181.	190.
198.	206.	215.	222.	228.	232.	234.	234.	233.	232.
229.	227.	225.	223.	222.	221.	220.	220.	220.	220.
219.	219.	219.	221.	222.	226.	234.	239.	238.	234.
230.	227.	225.	223.	222.	221.	220.	220.	220.	219.
219.	219.	219.	219.	219.	219.	218.	218.	218.	217.
217.	217.	217.	217.	217.	217.	217.	216.	215.	214.
214.	213.	212.	212.	211.	211.	211.	210.	210.	209.
209.	209.	208.	208.	208.	206.	207.	207.	207.	206.
206.	206.	205.	205.	205.	205.	204.	204.	204.	204.
203.	203.	203.	203.	202.	202.	202.	202.	201.	201.
201.	201.	201.	200.	200.	200.	200.	199.	199.	199.
199.	199.	198.	198.	198.	198.	198.	197.	197.	197.
197.	197.	196.	196.	196.	196.	196.	195.		

STAGE

707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0	707.0
707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.1	707.2	707.2
707.2	707.2	707.2	707.3	707.3	707.3	707.3	707.3	707.4	707.4
707.4	707.4	707.5	707.5	707.5	707.5	707.6	707.6	707.6	707.6

707.7	707.7	707.7	707.7	707.8	707.8	707.8	707.9	707.9	707.9
707.9	708.0	708.0	708.0	708.1	708.1	708.1	708.2	708.2	708.2
708.2	708.3	708.3	708.3	708.4	708.4	708.4	708.5	708.5	708.5
708.6	708.6	708.6	708.7	708.7	708.7	708.8	708.8	708.8	708.9
708.9	708.9	709.0	709.0	709.0	709.1	709.2	709.3	709.4	709.5
709.6	709.7	709.9	710.1	710.4	710.9	711.5	712.2	712.9	713.6
714.3	714.9	715.6	716.1	716.5	715.9	717.0	717.0	717.0	716.8
716.7	716.5	716.3	716.2	716.1	716.1	716.0	716.0	716.0	716.0
715.9	715.9	715.9	716.0	716.2	716.5	717.0	717.4	717.3	717.0
716.7	716.5	716.3	716.2	716.1	716.0	716.0	716.0	716.0	715.9
715.9	715.9	715.9	715.9	715.9	715.9	715.8	715.8	715.8	715.8
715.8	715.8	715.8	715.8	715.8	715.7	715.7	715.7	715.6	715.5
715.5	715.4	715.4	715.4	715.3	715.3	715.3	715.2	715.2	715.2
715.2	715.1	715.1	715.1	715.1	715.0	715.0	715.0	715.0	714.9
714.9	714.9	714.9	714.8	714.8	714.8	714.8	714.8	714.7	714.7
714.7	714.7	714.7	714.6	714.6	714.6	714.6	714.6	714.6	714.5
714.5	714.5	714.5	714.5	714.4	714.4	714.4	714.4	714.4	714.4
714.3	714.3	714.3	714.3	714.3	714.3	714.2	714.2	714.2	714.2
714.2	714.2	714.1	714.1	714.1	714.1	714.1	714.1		

PEAK OUTFLOW IS 2617. AT TIME 15.67 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2617.	682.	189.	189.	54337.
CMS	74.	19.	5.	5.	1539.
INCHES		30.20	33.43	33.43	33.43
MM		767.07	849.12	849.12	849.12
AC-FT		338.	374.	374.	374.
THOUS CU M		417.	462.	462.	462.

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

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 .10	RATIO 2 .20	RATIO 3 .25	RATIO 4 .30	RATIO 5 .35	RATIO 6 .40	RATIO 7 .50	RATIO 8 .75	RATIO 9 1.00
HYDROGRAPH AT	1	.06	1	113.	226.	282.	339.	395.	451.	564.	846.	1129.
	(	.16)	(	3.20)(	6.39)(	7.99)(	9.59)(	11.19)(	12.78)(	15.98)(	23.97)(	31.96)
ROUTED TO	2	.06	1	11.	1056.	1078.	1105.	1156.	1292.	1112.	1128.	1154.
	(	.16)	(	.30)(	29.90)(	30.53)(	31.28)(	32.73)(	36.59)(	31.49)(	31.95)(	32.67)

HYDROGRAPH AT	3	.06	1	103.	206.	258.	310.	361.	413.	516.	774.	1032.
		(.14)		(2.92)	(5.84)	(7.30)	(8.77)	(10.23)	(11.69)	(14.61)	(21.91)	(29.22)
ROUTED TO	4	.06	1	7.	17.	20.	1704.	1748.	1787.	1960.	1777.	1783.
		(.14)		(.21)	(.47)	(.56)	(48.25)	(49.50)	(50.59)	(55.50)	(50.31)	(50.49)
HYDROGRAPH AT	5	.09	1	165.	331.	413.	496.	579.	661.	827.	1240.	1653.
		(.24)		(4.68)	(9.36)	(11.70)	(14.04)	(16.38)	(18.72)	(23.40)	(35.11)	(46.81)
3 COMBINED	6	.21	1	177.	1115.	1151.	2670.	2783.	1973.	2413.	2421.	3197.
		(.54)		(5.02)	(31.57)	(32.58)	(75.62)	(78.80)	(55.86)	(68.33)	(68.56)	(90.52)
ROUTED TO	7	.21	1	14.	65.	96.	2075.	2266.	1816.	2259.	1883.	2617.
		(.54)		(.40)	(1.84)	(2.71)	(58.75)	(64.17)	(51.42)	(63.96)	(53.33)	(74.10)

SUMMARY OF DAM SAFETY ANALYSIS

DAM # 1

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	748.40	748.40	751.30
STORAGE	42.	42.	53.
OUTFLOW	0.	0.	24.

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
.10	750.06	.00	48.	11.	.00	18.08	.00
.20	751.34	.04	53.	1062.	.23	16.69	15.92
.25	751.63	.33	55.	1083.	.33	16.44	15.67
.30	751.75	.45	55.	1109.	.37	16.29	15.50
.35	751.62	.32	55.	1157.	.42	16.04	15.33
.40	751.39	.09	53.	1332.	.27	15.65	14.83
.50	751.40	.10	54.	1122.	.29	14.96	14.17
.75	751.44	.14	54.	1138.	.31	13.96	13.17
1.00	751.45	.15	54.	1165.	.31	13.37	12.58

SUMMARY OF DAM SAFETY ANALYSIS

DAM # 2

PLAN 1		INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
	ELEVATION	773.60	773.60	777.10
	STORAGE	55.	55.	70.
	OUTFLOW	0.	0.	20.

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
.10	775.04	.00	61.	7.	.00	18.42	.00
.20	776.34	.00	67.	17.	.00	16.25	.00
.25	777.05	.00	70.	20.	.00	16.33	.00
.30	777.18	.08	71.	1704.	.21	16.33	15.83
.35	777.47	.37	72.	1749.	.29	16.19	15.67
.40	777.68	.58	73.	1801.	.31	16.10	15.58
.50	777.39	.29	72.	1995.	.35	15.85	15.33
.75	777.27	.17	71.	1796.	.25	14.60	14.08
1.00	777.28	.18	71.	1805.	.27	13.85	13.33

SUMMARY OF DAM SAFETY ANALYSIS

SUMMARY OF DAM SAFETY ANALYSIS

DAM #4

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	707.00	707.00	714.40
STORAGE	118.	118.	200.
OUTFLOW	0.	0.	66.

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
.10	708.79	.69	196.	14.	.00	22.50	.00
.20	714.28	.00	198.	65.	.00	18.00	.00
.25	716.91	.51	206.	96.	3.50	17.25	.00
.30	717.13	2.73	236.	2075.	4.08	16.50	.00
.35	717.22	2.82	237.	2266.	4.50	16.33	.00
.40	717.00	2.60	234.	1816.	5.00	16.17	.00
.50	717.22	2.82	237.	2259.	5.83	15.92	.00
.75	717.03	2.63	234.	1883.	7.58	15.67	.00
1.00	717.39	2.99	239.	2617.	8.83	15.67	.00

LISTING OF INPUT DATA DATE 14 MAY 81 TIME 18:01:30

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                ----------CARD COLUMNS----------
                0    1    2    3    4    5    6    7    8
SEQ #  CTS #  12345678901234567890123456789012345678901234567890

    1          * H21  02-2  9457     #4
    2          A1***PHASE 1 DAM INSPECTION FOR STATE OF MISSOURI - ST.LOUIS DISTRICT COE***
    3          A2*** BURTON-DUENKE DAM #4   MO ID # 31713    FILE = H219457*MO1.OZARK
    4           100 YEAR STORM
    5          B    288      0      5      0      0      0      0      0      0  0
    6          B1     3
    7          K      0      1                                 3      1
    8          K1  CALCULATE INFLOW HYDROGRAPH TO DAM #1
    9          M      0     20.063                      1.0
   10          O    288   7.444                  DA #     .50
   11          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   12          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   13          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   14          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   15          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   16          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   17          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   18          01  .007   .007   .013   .013   .013   .013   .013   .013   .013   .013
   19          01  .013   .013   .013   .013   .013   .013   .013   .013   .013   .013
   20          01  .013   .013   .013   .013   .013   .013   .013   .013   .013   .013
   21          01  .013   .013   .013   .013   .013   .013   .013   .013   .026   .026
   22          01  .026   .026   .026   .026   .026   .026   .026   .026   .026   .026
   23          01  .026   .026   .026   .026   .026   .026   .029   .029   .029   .029
   24          01  .029   .029   .081   .081   .081   .081   .081   .081   .123   .124
   25          01  .124   .236   .236   .551   .838   .383   .236   .124   .124   .123
   26          01  .081   .081   .081   .081   .081   .081   .029   .029   .029   .029
   27          01  .029   .029   .026   .026   .026   .026   .026   .026   .026   .026
   28          01  .026   .026   .026   .026   .026   .026   .026   .026   .026   .026
   29          01  .013   .013   .013   .013   .013   .013   .013   .013   .013   .013
   30          01  .013   .013   .013   .013   .013   .013   .013   .013   .013   .013
   31          01  .013   .013   .013   .013   .013   .013   .013   .013   .013   .013
   32          01  .013   .013   .013   .013   .013   .013   .007   .007   .007   .007
   33          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   34          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   35          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   36          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   37          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   38          01  .007   .007   .007   .007   .007   .007   .007   .007   .007   .007
   39          01  .007   .007   .007   .007   .007   .007   .007   .007
   40          T                                                -1-60.            0.1
   41          W20.09  0.05
   42          X       -0.1    2.
   43          K      1      2                                 4      1
   44          K1 ROUTE HYDROGRAPH THROUGH DAM #1
   45          Y                          1
   46          Y1     1                                      42.0          -1
   47          Y4748.4 749.    750.    751.    751.3   752.    753.    754.    755.
   48          Y50.0   4.      10.     20.     24.     28.     33.     37.     41.
   49          S50.0   4.      18.     42.     48.     53.     97.
   50          SE722.  730.    740.    748.4   750.    751.3   760.

                0    1    2    3    4    5    6    7    8
SEQ #  CTS #  12345678901234567890123456789012345678901234567890
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LISTING OF INPUT DATA DATE 14 MAY 81 TIME 18:01:30

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                ----------CARD COLUMNS----------
                0    1    2    3    4    5    6    7    8
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LISTING OF INPUT DATA DATE 14 MAY 81 TIME 18:01:30

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                                  ----------CARD COLUMNS----------
                 C       1       2       3       4       5       6       7       8
SEQ #  CTS #  12345678901234567890123456789012345678901234567890123456789012345678901234567890

   51          $$748.4
   52          $D751.3
   53          $LV.    85.     180.    305.    330.    370.    415.    470.
   54          $V751.3 751.4   751.6   751.7   752.1   753.2   754.    755.
   55          $B1C.   0.5     724.7   1.      748.4   751.3
   56          K       0       3                               3       1
   57          K1 CALCULATE INFLOW HYDROGRAPH TO DAM #2
   58          M       0       20.055                  1.0
   59          0     288    7.444                   DA #    .50
   60          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   61          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   62          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   63          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   64          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   65          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   66          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   67          01  .007    .007    .013    .013    .013    .013    .013    .013    .013    .013
   68          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
   69          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
   70          01  .013    .013    .013    .013    .013    .013    .013    .013    .026    .026
   71          01  .026    .026    .026    .026    .026    .026    .026    .026    .026    .026
   72          01  .026    .026    .026    .026    .026    .026    .029    .029    .029    .029
   73          01  .029    .029    .081    .081    .081    .081    .081    .081    .123    .124
   74          01  .124    .236    .236    .551    .838    .383    .236    .124    .124    .123
   75          01  .081    .081    .081    .081    .081    .081    .029    .029    .029    .029
   76          01  .029    .029    .026    .026    .026    .026    .026    .026    .026    .026
   77          01  .026    .026    .026    .026    .026    .026    .026    .026    .026    .026
   78          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
   79          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
   80          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
   81          01  .013    .013    .013    .013    .013    .013    .007    .007    .007    .007
   82          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   83          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   84          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   85          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   86          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   87          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
   88          01  .007    .007    .007    .007    .007    .007    .007    .007
   89          I                                                   -1-60.          0.12
   90          K20.05  0.03
   91          K       -0.1    2.
   92          K       1       4                               4       1
   93          K1 ROUTE HYDROGRAPH THROUGH  DAM #2
   94          Y                       1
   95          Y1      1                                       55.             -1
   96          Y4773.6 774.0   775.0   776.0   777.1   779.0
   97          Y5C.0   2.0     7.0     15.0    2C.0    2P.0
   98          $S0.0   1.      6.      18.     42.     55.     83.
   99          $E726.  740.    750.    760.    770.    773.6   780.
  100          $$773.6

                 C       1       2       3       4       5       6       7       8
SEQ #  CTS #  12345678901234567890123456789012345678901234567890123456789012345678901234567890
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LISTING OF INPUT DATA DATE 14 MAY 81 TIME 18:01:30

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                 ----------CARD COLUMNS----------
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SEQ #  CTS #  12345678901234567890123456789012345678901234567890123456789012345678901234567890

  101          sb777.1
  102          sL0.0   180.    230.    295.    350.    390.    415.
  103          sv777.1 777.5   778.    779.    780.    781.    782.
  104          sB10.   0.5     775.4   1.      773.6   777.1
  105          K    0       5                                  1
  106          K1 CALCULATE INFLOW HYDROGRAPH TO DAM #4
  107          M         0         20.092                 1.0
  108          0    288    7.444                  DA #     .50
  109          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  110          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  111          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  112          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  113          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  114          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  115          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  116          01  .007    .007    .013    .013    .013    .013    .013    .013    .013    .013
  117          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
  118          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
  119          01  .013    .013    .013    .013    .013    .013    .013    .013    .026    .026
  120          01  .026    .026    .026    .026    .026    .026    .026    .026    .026    .026
  121          01  .026    .026    .026    .026    .026    .026    .029    .029    .029    .029
  122          01  .029    .029    .081    .081    .081    .081    .081    .081    .123    .124
  123          01  .124    .236    .236    .551    .838    .733    .236    .124    .124    .123
  124          01  .081    .081    .081    .081    .081    .081    .029    .029    .029    .029
  125          01  .029    .029    .026    .026    .026    .026    .026    .026    .026    .026
  126          01  .026    .026    .026    .026    .026    .026    .026    .026    .026    .026
  127          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
  128          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
  129          01  .013    .013    .013    .013    .013    .013    .013    .013    .013    .013
  130          01  .013    .013    .013    .013    .013    .013    .007    .007    .007    .007
  131          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  132          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  133          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  134          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  135          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  136          01  .007    .007    .007    .007    .007    .007    .007    .007    .007    .007
  137          01  .007    .007    .007    .007    .007    .007    .007    .007
  138          T                                                  -1-64.
  139          M2       0.05
  140          X              1.
  141          K    3       6                                  1
  142          K1 CALCULATE TOTAL INFLOW HYDROGRAPH TO DAM #4
  143          K    1       7                                  1
  144          K1 ROUTE HYDROGRAPH THROUGH DAM #4
  145          Y                    1
  146          Y1   1                                  -707.      -1
  147          Y4707.0 708.65  709.0   709.5   710.0   710.5   711.0   711.5   712.0   713.0
  148          Y4714.0 715.0   716.0   717.0   718.0   719.0   720.0   721.0
  149          Y50.0   12.     17.     24.     32.     38.     45.     50.     53.     60.
  150          Y564.   68.     72.     75.     80.     84.     87.     90.

                 0    1    2    3    4    5    6    7    8
SEQ #  CTS #  12345678901234567890123456789012345678901234567890123456789012345678901234567890
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LISTING OF INPUT DATA DATE 14 MAY 81 TIME 18:01:30

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                 ----------CARD COLUMNS----------
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LISTING OF INPUT DATA DATE 14 MAY 81 TIME 18:01:30

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                 ----------CARD COLUMNS----------
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SEQ #  CTS #  12345678901234567890123456789012345678901234567890123456789012345678901234567890

  151          $AC.0  2.7  8.8  15.2 18.1
  152          $E670.5 690. 705. 720. 730.
  153          $$707.
  154          $D714.4
  155          $LC.0  53.  89.  161.  215.  276.  386.  410.  441.  465.
  156          $V714.4 714.8 715.1 715.8 716. 716.5 716.8 717.6 719. 720.9
  157          R    99

                 0    1    2    3    4    5    6    7    8
SEQ #  CTS #  12345678901234567890123456789012345678901234567890123456789012345678901234567890

@ASG,A SYSLIB*ADD.
FAC WARNING       040200104000

@ASG,T 2.

@ASG,T 3.

@ASG,T 4.

@ASG,T 7.

@ASG,T 10.

@ASG,T 11.

@ASG,T 13.

@ASG,T 14.

@ASG,T 15.

@ASG,A SYSLIB*H21.
FAC WARNING       C40200004000

@ASG,A SYSLIB*U07.
FAC WARNING       040200104000

@XQT   SYSLIB*U07.U07

@XQT,V SYSLIB*H21.H21/02-2
```

THOUS CU M 9. 16. 16. 16.

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

RUNOFF SUMMARY, AVERAGE FLOW IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES(SQUARE KILOMETERS)

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	180.	19.	6.	6.	.06
		(5.11)(.54)(.17)(.17)(.16)				
ROUTED TO	2	11.	10.	4.	4.	.06
		(.32)(.28)(.12)(.12)(.16)				
HYDROGRAPH AT	3	169.	17.	5.	5.	.06
		(4.79)(.48)(.15)(.15)(.14)				
ROUTED TO	4	7.	7.	3.	3.	.06
		(.21)(.20)(.09)(.09)(.14)				
HYDROGRAPH AT	5	274.	28.	8.	8.	.09
		(7.75)(.78)(.23)(.23)(.24)				
3-COMBINED	6	282.	43.	16.	16.	.21
		(7.97)(1.22)(.45)(.45)(.54)				
ROUTED TO	7	15.	15.	6.	6.	.21
		(.43)(.42)(.18)(.18)(.54)				

AD-A107 689 BLACK AND VEATCH KANSAS CITY MO F/G 13/13
NATIONAL DAM SAFETY PROGRAM. BURTON-DUENKE DAM NUMBER 4 (MO 317--ETC(U)
APR 81 E R BURTON, H L CALLAHAN DACW43-81-C-0037
UNCLASSIFIED NL

SUMMARY OF DAM SAFETY ANALYSIS

100-yr DAM #1

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	748.40	748.40	751.30
STORAGE	42.	42.	53.
OUTFLOW	0.	0.	24.

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
~~1.00~~	750.12	.00	48.	11.	.00	13.67	.00

SUMMARY OF DAM SAFETY ANALYSIS

FLOOD HYDROGRAPH PACKAGE - HEC-1 PROGRAM H21/02-2V TIME 18:01:47 CASE #4

SUMMARY OF DAM SAFETY ANALYSIS

100-yr DAM #2

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	773.60	773.60	777.10
STORAGE	55.	55.	70.
OUTFLOW	0.	0.	20.

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
1.00	775.05	.00	61.	7.	.00	15.08	.00

FLOOD HYDROGRAPH PACKAGE - HEC-1 PROGRAM H21/02-2V TIME 18:01:47 CASE #4

SUMMARY OF DAM SAFETY ANALYSIS

100-yr DAM #4

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	707.00	707.00	714.40
STORAGE	118.	118.	200.
OUTFLOW	0.	0.	66.

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
1.00	708.87	.00	136.	15.	.00	22.25	.00

H21ACD FIN

DATE
ILME