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NATIONAL DAM SAFETY PROGRAM. OATKA CREEK DAM (NY 435), GENESEE --ETC(U)
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GENESEE RIVER BASIN

OATKA CREEK DAM

GENESEE COUNTY
NEW YORK

INVENTORY № NY 435

John B. Stetson

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Oatka Creek Dam (NY 435), Genesee
River Basin, Genesee County, New York.
Phase I Inspection Report.

CONTRACT NO. DACW-51-79-C0001

NEW YORK DISTRICT CORPS OF ENGINEERS

SEPTEMBER 1979

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Oatka Creek Dam
Genesee County
Le Roy

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

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas, which if not remedied, have the potential for developing into hazardous conditions.

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The structural stability analysis indicates that the dam is unstable during normal operating conditions including ice load but retains stability without the ice load acting.

Computations prepared according to the Recommended Guidelines for Safety Inspection of Dams establish the spillway capacity as 9,665 cfs. This capacity is 13 percent of the Probable Maximum Flood discharge and 28 percent of the 1/2 Probable Maximum Flood discharge. The PMF and 1/2 PMF are 71,500 cfs and 34,500 cfs respectively. The spillway is inadequate to pass the 1/2 PMF without overtopping of the dam. The Route 5 highway bridge, just downstream from the dam, restricts flow so that the backwater effect of the restriction causes submergence of the dam to occur at flows of 4,700 cfs, much lower than the top of dam capacity of 9,665 cfs. It follows, therefore, that the 1/2 PMF flow would cause submergence of the dam. Therefore, conditions do not exist at the dam site from which a dam break would occur during the 1/2 PMF event. Therefore, the dam is not considered to have a seriously inadequate spillway according to the Corps of Engineers' screening criteria.

The visual inspection and screening analysis revealed deficiencies which require the following actions:

(1) A structural stability analysis of the dam should be conducted to determine the effect of the dam's steel bar anchor system and the uplift forces acting at the base of the dam. The investigation should extend to the inspection of the dam's upstream face and evaluation of the condition of the concrete in the dam's upstream zone. Plans for repair should include rehabilitation and repair of concrete joints in areas where minor deterioration has occurred.

(2) The bridge opening channel capacity should be investigated to determine the capacity of the dam/bridge combination and a determination should be made as to whether the existing discharge capacity of these structures provides adequate protection to the facility and adjoining properties.

(3) Trash racks should be installed upstream from the sluice gates.

(4) Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference.

(5) Develop an emergency action plan.

These investigations should be undertaken immediately and completed within one year. The necessary remedial work should be completed within two years of notification.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I REPORT
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Name of Dam Oatka Creek Dam, NY435

State Located New York
County Located Genesee
Stream Oatka Creek
Date of Inspection August 9, 1979

ASSESSMENT OF GENERAL CONDITIONS

The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas, which if not remedied, have the potential for developing into hazardous conditions.

The structural stability analysis indicates that the dam is unstable during normal operating conditions including ice load but retains stability without the ice load acting.

Computations prepared according to the Recommended Guidelines for Safety Inspection of Dams establish the spillway capacity as 9,665 cfs. This capacity is 13 percent of the Probable Maximum Flood discharge and 28 percent of the 1/2 Probable Maximum Flood discharge. The PMF and 1/2 PMF are 71,500 cfs and 34,500 cfs respectively. The spillway is inadequate to pass the 1/2 PMF without overtopping of the dam. The Route 5 highway bridge, just downstream from the dam, restricts flow so that the backwater effect of the restriction causes submergence of the dam to occur at flows of 4,700 cfs, much lower than the top of dam capacity of 9,665 cfs. It follows, therefore, that the 1/2 PMF flow would cause submergence of the dam. Therefore, conditions do not exist at the dam site from which a dam break would occur during the 1/2 PMF event. Therefore, the dam is not considered to have a seriously inadequate spillway according to the Corps of Engineers' screening criteria.

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5. Develop an emergency action plan.

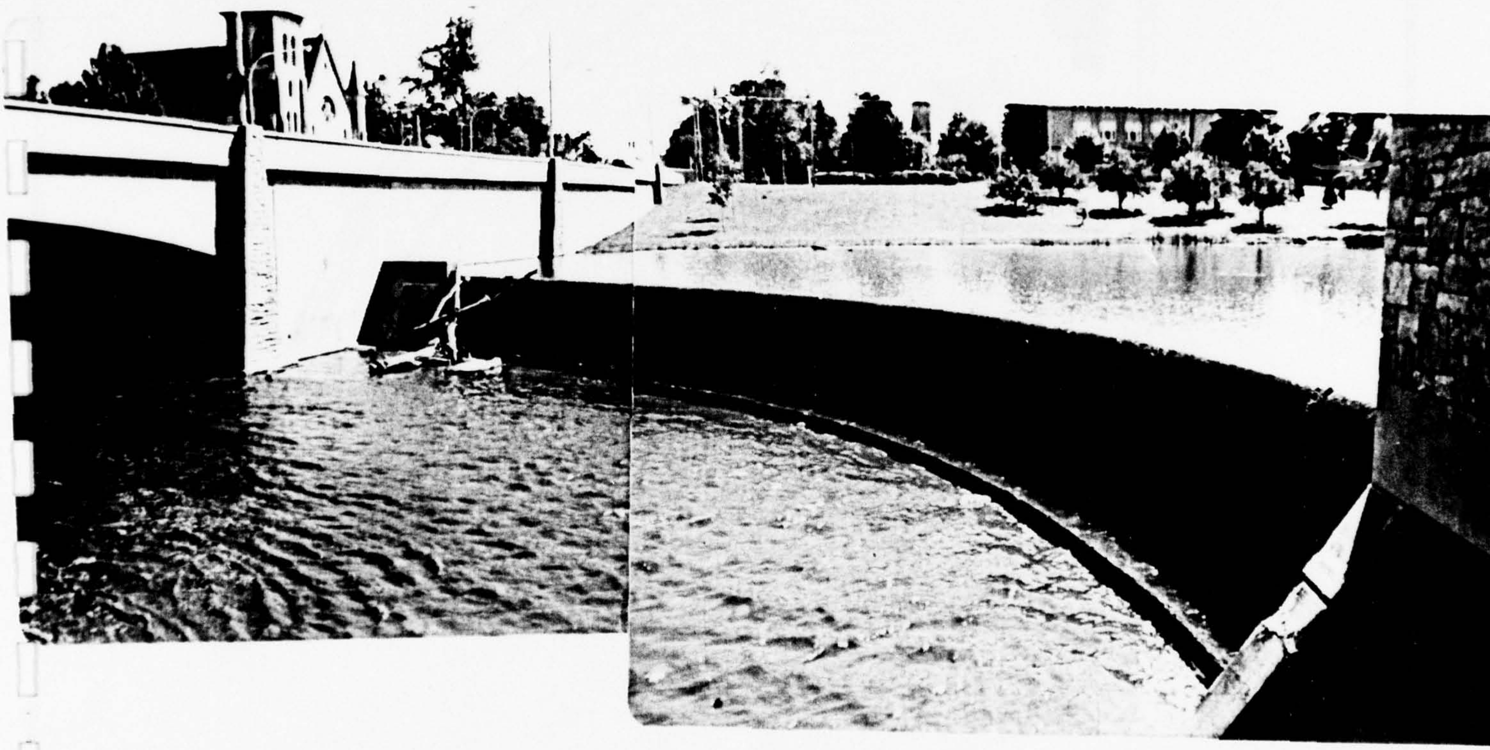
These investigations should be undertaken immediately and completed within one year. The necessary remedial work should be completed within two years of notification.

Dale Engineering Company

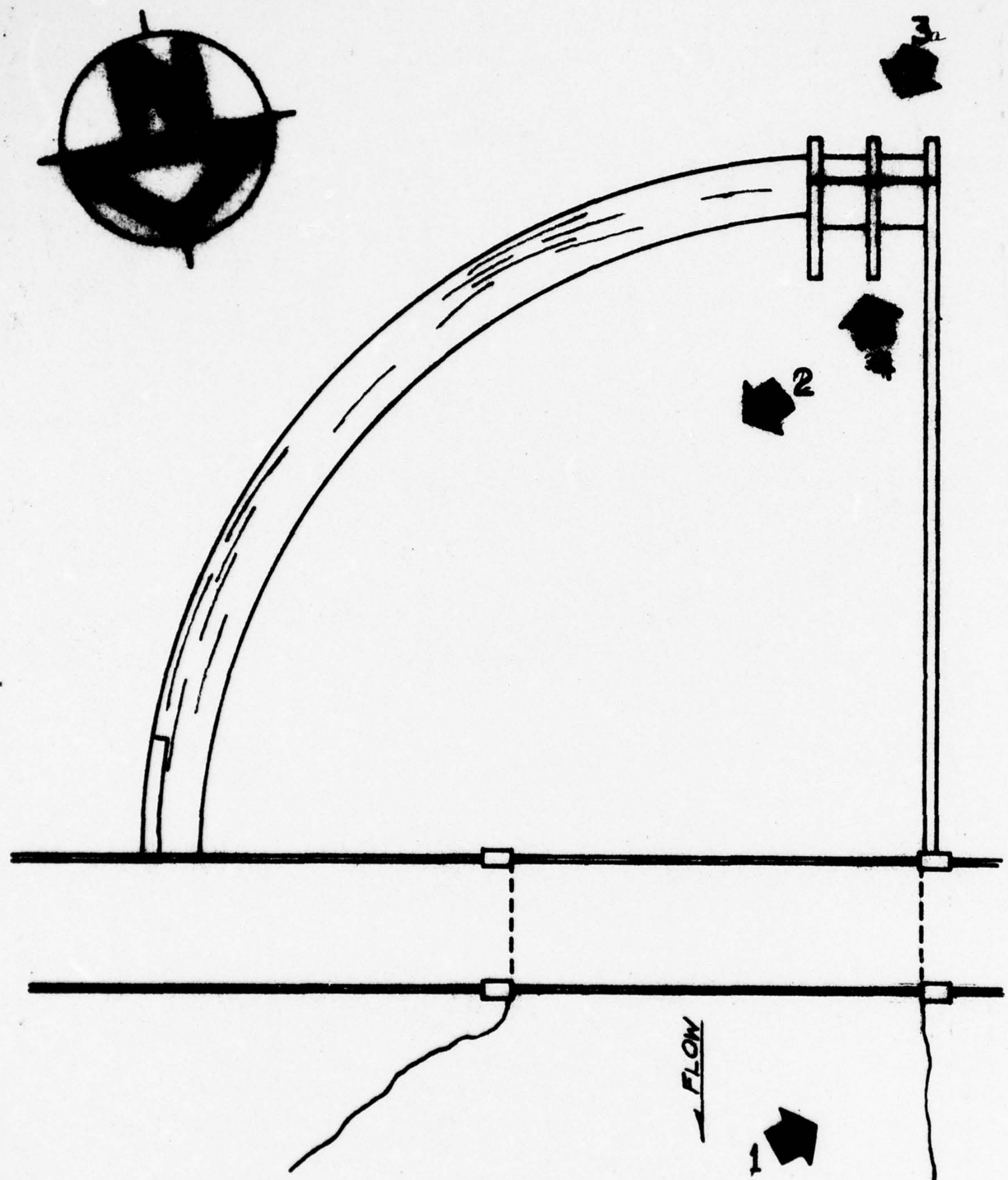
John B. Stetson, President

Approved By:
Date: 28 Sept 79

Col. Clark H. Benn
New York District Engineer



Overview of Oatka Creek Dam in LeRoy, New York. The bridge and far dam abutment has recently been reconstructed.



PHOTOGRAPHIC KEY MAP

STETSON · DALE	8·30·79	JPG	OATKA CREEK DAM
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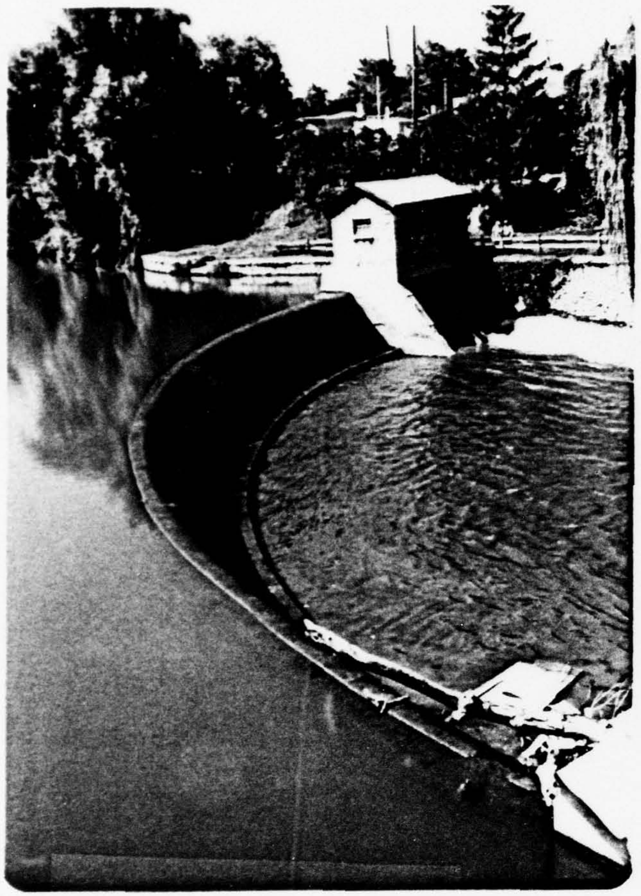
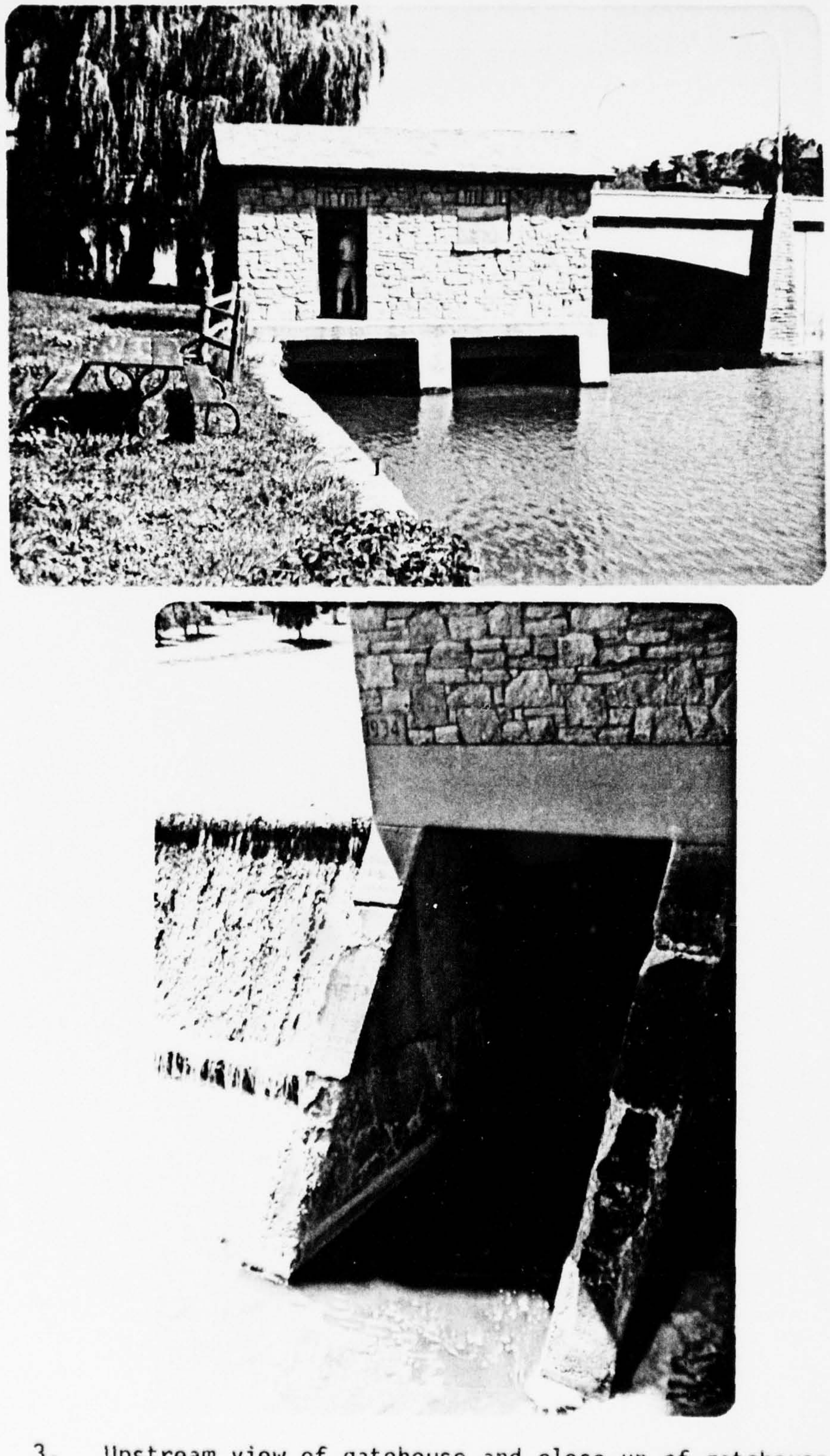
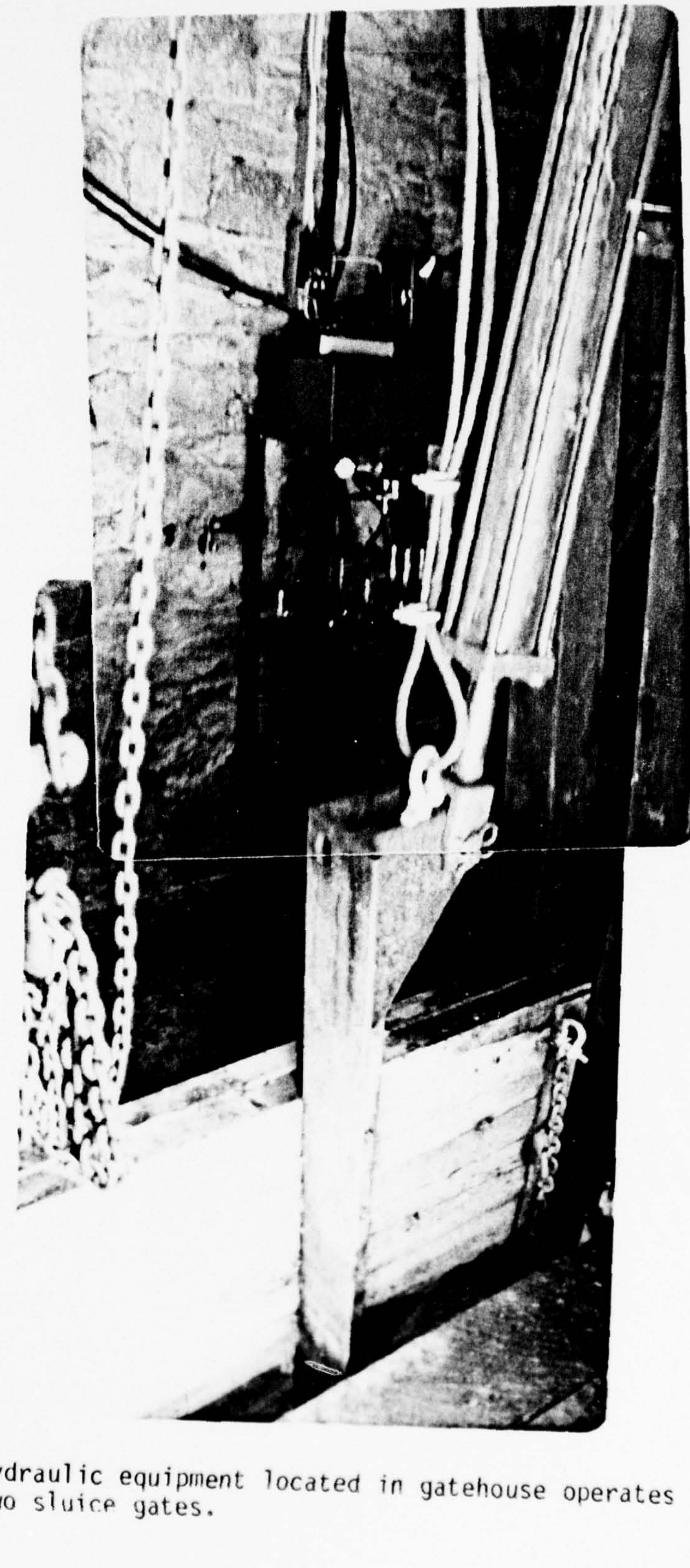


1. View of dam from bridge. Two sluice gates are located in the gatehouse in the far abutment.

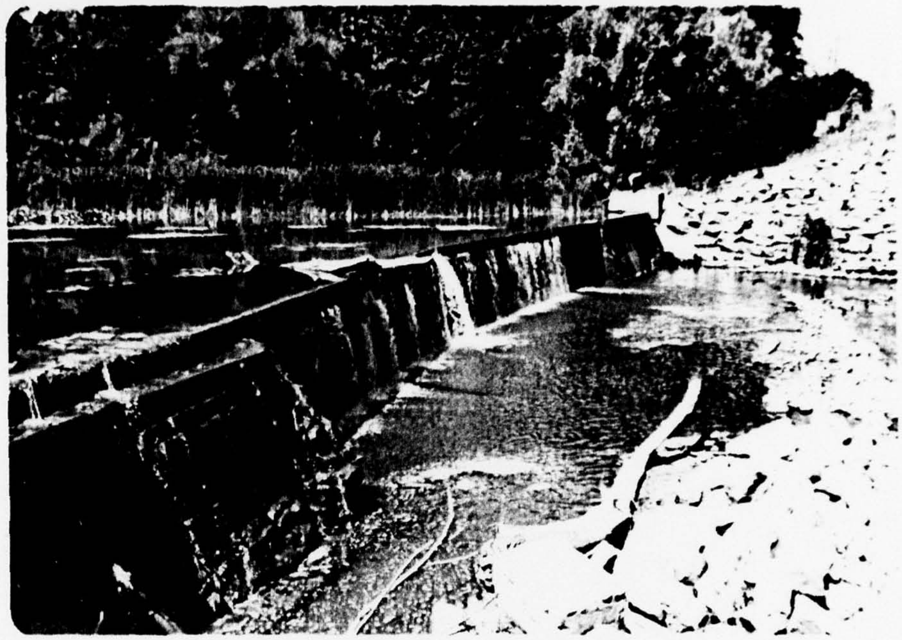
2. Close-up picture shows spillway concrete surface is in good condition.



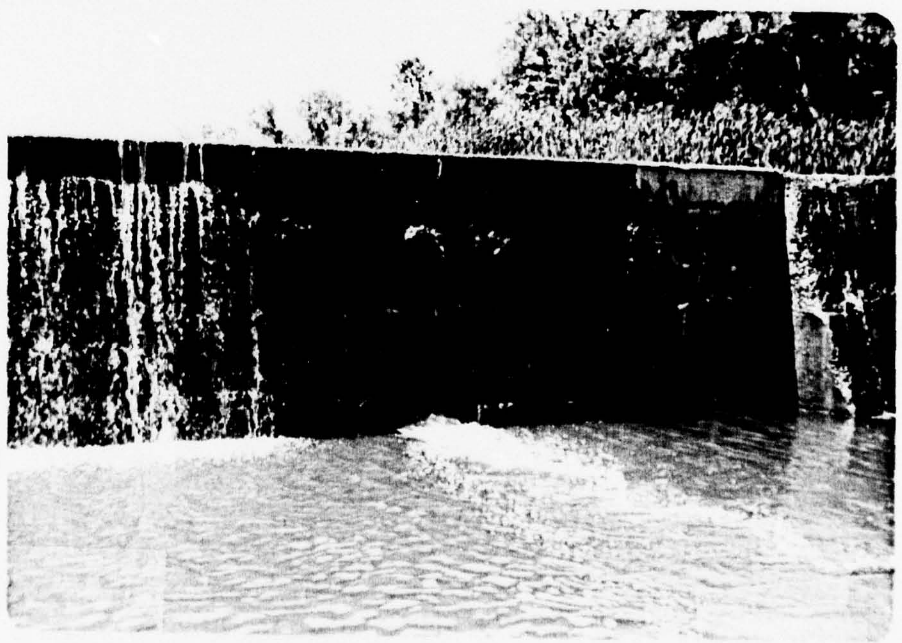
3. Upstream view of gatehouse and close-up of gatehouse walls.



4. Hydraulic equipment located in gatehouse operates the two sluice gates.



5. Overview of another dam located one mile upstream.



6. This upstream dam has a concrete cap over a timber leveling layer atop stone masonry units. Considerable flow is occurring through the structure. Several masonry units are missing at the base of the dam in the center area of this picture. The reservoir has a large amount of sediment in it.

7. Downstream hazard is a residential neighborhood located 6-8 feet above normal flow elevation.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - OATKA CREEK DAM ID# - NY 435

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Oatka Creek Dam and appurtenant structures, owned by the Village of LeRoy, New York, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Oatka Creek Dam is located in the Village of LeRoy, immediately upstream from the Route 5 bridge in the center of the Village. The dam is a crescent shaped spillway structure approximately 15 feet high and 196 feet long. The spillway is a concrete ogee crested spillway structure. The west abutment of the dam terminates at a control gate structure which is located on the west bank of Oatka Creek. The dam curves in a downstream direction so that its southerly abutment is located as a part of the Route 5 highway bridge. This makes the south abutment in a line parallel to the flow of the creek. The gatehouse contains two wooden sluice gate structures 8 feet wide by 8 feet high. These wooden sluice gates are operated by hydraulic pistons which are powered by an electrically driven hydraulic pump. The gatehouse is a stone masonry structure on a concrete foundation. The plans indicate that this structure is founded on bedrock.

b. Location

The Oatka Creek Dam is located in the Village of LeRoy, Town of LeRoy, Genesee County, New York.

c. Size Classification

The maximum height of the dam is approximately 15 feet. The storage volume of the impoundment is approximately 230 acre feet. Therefore, the dam is in the small size classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

Oatka Creek flows through the Village of LeRoy. Residential development has taken place along the banks of the creek. Therefore, the dam is in the High Hazard Category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the Village of LeRoy, New York.

Contact: Kermit Arrington
Public Works Director, Village of LeRoy
3 West Main Street
LeRoy, New York 14482
Telephone: 716-768-6350 Village Hall
716-768-8566 DPW Garage

f. Purpose of the Dam

The dam is used to create a pond near the center of the village for aesthetic and enviromental purposes in addition to emergency water supply for fire protection. No recreational use is presently made of the impoundment.

g. Design and Construction History

The construction plans included in this report indicate that the dam was designed in 1934. Construction is assumed to have taken place shortly after that time. The north abutment of the dam was recently reconstructed during the modification of the Route 5 highway bridge. This reconstruction shortened the length of the spillway by approximately 10 feet by converting that section to a non-overflow section.

h. Normal Operational Procedures

The facility is operated by the Village of LeRoy, Department of Public Works. The sluice gates are used to control the water level in the impoundment.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of Oatka Creek Dam is 140.13 square miles.

b. Discharge at Dam Site

No discharge records are available for this site.

Computed discharges:

Dam Submergence	4700 cfs
Ungated spillway, top of dam	9660 cfs
Ungated spillway	34525 cfs 1/2 PMF
Gated drawdown	Not Calculated

c. Elevation (Feet Above MSL)

Top of dam	870
Maximum pool - Design discharge	879.7 1/2 PMF
Spillway crest	864
Stream bed at centerline of dam	856

d. Reservoir

Length of maximum pool	4500 ft (1/2 PMF)
Length of normal pool	4500 ft

e. Storage

Top of dam	470± acre feet
Normal pool	230± acre feet

f. Reservoir Area

Top of dam	40± acre
Spillway pool	40± acre

g. Dam

Type - Crested concrete, gravity.
Length - 196 feet
Height - 15 feet
Freeboard between normal reservoir and top of dam - 6 feet
Top width - N/A
Side slopes - N/A
Zoning - N/A
Impervious core - N/A
Grout curtain - N/A

h. Spillway

Type - Ogee crest
Length - 160 feet
Crest elevation - 864
Gates - None
U/S channel - Natural
D/S channel - Natural bedrock stream bed

i. Regulating Outlets

Sluice gates 2 - 8 feet x 8 feet wooden sluice gates.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for the evaluation of this dam has been included in this report. The information consisting of contract drawings is contained in Figures 2 and 3. No information regarding the design of the dam was available.

2.2 CONSTRUCTION

No details were available regarding the construction of this dam other than the construction drawings which are included in the report.

2.3 OPERATION

No Operation Manual is known to exist for this structure.

2.4 EVALUATION

The data included in this report is not adequate for a detailed investigation of the dam; however, the information is sufficient for a Phase I investigation.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Oatka Creek Dam was inspected on August 9, 1979. The Dale Engineering Company Inspection Team was accompanied on the inspection by Kermit Arrington of the Village LeRoy, Department of Public Works.

b. Dam

At the time of the inspection, the water in the impoundment was drawn down through the manipulation of the sluice gate to allow an inspection of the spillway surface. Some minor cracking near the crest of the spillway was noted in this visual inspection. This situation was minor and would not effect the structural stability of the facility. There was some minor deterioration along horizontal joints of the dam and some minor deterioration along the vertical joints between the monoliths. Visual observation did not disclose physical displacement of the alignment of the structure and the facility appears to be structurally stable.

c. Appurtenant Structures

The north abutment of the dam forms a part of the Route 5 highway bridge which crosses Oatka Creek immediately downstream from the dam. This abutment has recently been reconstructed and appears to be in good condition. The west abutment of the dam terminates in a masonry wall which forms the west bank of Oatka Creek. The masonry is in generally good condition. There is some displacement of the upper masonry units probably due to frost action, but the displacement is minor and does not appear to effect the stability of the bank of the stream.

d. Control Outlet

The outlet of the impoundment is controlled by the manipulation of wooden sluice gates in the control structure at the west end of the spillway. These sluice gates are operated by hydraulic pistons powered by an electric pump. The sluice gates were operated at the time of the inspection. During the operation of the sluice gates, some floatable material became lodged in the sluice gate opening and prevented closure of the gate. There were no trash racks to prevent the entrance of floatable material into the gate structure.

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e. Reservoir Area

The reservoir area extends approximately 4500 feet upstream to another small dam which was formerly used to provide a recreational pond. The area behind this upstream dam is presently heavily silted in and the dam is in poor condition. See Photograph No. 5 and 6.

f. Downstream Channel

The downstream channel is formed in bedrock and no evidence of recent erosion was noted in the channel.

3.2 EVALUATION

The visual inspection revealed that the dam is generally in good condition with only minor deterioration of the concrete surfaces. The sluice gate structure is in operating condition and was generally in good structural condition. Some minor deterioration has taken place on the concrete walls which form the sluice gate openings. The absence of trash racks in front of the sluice gates allows floatable material to lodge in the openings and prevent closure of the gates. Some means of preventing this condition should be provided. No deformation of the alignment of any of the structures was noted in the visual inspection.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The normal operating procedure for this structure is to
water level in the impoundment in the center of the villa
aesthetic and environmental purposes. The sluice gates a
regulate the level of this impoundment.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the
LeRoy, Department of Public Works. Periodic visits are ma
site to check on the conditions of the facilities. No for
ing system is in effect.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the flow are presently in operating
and are checked periodically by the Department of Public Wo

4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenances are inspected at regular inter
Village of LeRoy, Department of Public Works. The faci
generally in good working condition and there is no evi
rioration caused by lack of maintenance.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Oatka Creek Dam, located in the Village of LeRoy immediately above the Route 5 bridge, has 140 square miles of drainage area. Oatka Creek starts in Central Wyoming County and runs north into Genesee County, a distance of 25 miles to the dam site. The upland terrain is composed of the large rolling hillsides and valleys found in the Finger Lakes Region. Some valley sections along the creek are a mile in width and are very flat.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. This has been assessed through the evaluation of the Probable Maximum Flood (PMF) for watershed and the subsequent routing of the flood through the reservoir and the dam's spillway system. The PMF event is that hypothetical flow produced by the most critical combination of precipitation, minimum infiltration loss and concentration run-off of a specific location that is considered reasonably possible for a particular drainage area. Since the dam is in the Small Dam Category and is a High Hazard, the Recommended Guidelines for Safety Inspection of Dams (Ref. 1) require that the dam be capable of passing one-half the Probable Maximum Flood.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF. In the event that the dam could not pass the 1/2 Probable Maximum Flood without overtopping, an additional analysis is to be performed on potential dam failure if the dam is designated as a High Hazard Classification. This process was done with the concept that, if the dam was unable to satisfy this criteria, further refined hydrologic investigations would be required.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB using the Modified Puls Method of flood routing was used to evaluate the dam, spillway capacity, and downstream hazard.

Unit hydrographs were defined by Snyder coefficients, Tp and Cp. The drainage area was divided into sub-areas according to the slope of the terrain. Run-off, routing and flood hydrograph combining was then performed as inflow to the reservoir.

The Probable Maximum Precipitation (PMP) was 21 inches according to Hydrometeorological Report (HMR #33) for a 24-hour duration, 200 square mile basin, while loss rates were set at 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. The loss rate function yielded 82.5 percent run-off from the PMF.

5.3 SPILLWAY CAPACITY

The spillway is a weir type structure 160 feet in length. The spillway coefficient varied between 3.47 and 4.15 for the spillway rating curve development. Immediately below the weir, flows discharge through a 70 x 12 foot bridge opening. The overall discharge capability of the spillway at the top of dam elevation is 9665 cfs.

SPILLWAY CAPACITY WITHOUT BRIDGE BELOW DAM

	Discharge	Capacity as % of PMF
PMF	71,500 cfs	13%
1/2 PMF	34,500 cfs	28%

The Route 5 bridge immediately below the spillway governs flow conditions for most significant floods. The dam becomes submerged for floods above 4700 cfs which corresponds to 9 feet of head over the spillway. For all depths up to submergence, the tailwater rises faster than the headwater over the dam. For flows above 13,000 cfs, the bridge is also overtopped.

Therefore, according to this analysis, the most critical loading flood condition on the dam exists when the headwaters are at normal operating elevations.

5.4 RESERVOIR CAPACITY

The reservoir storage capacity is given below. This was estimated for USGS mapping.

Top of Dam	310 Acre Feet
Crest of Spillway	230 Acre Feet

5.5 FLOODS OF RECORD

There is no information on water levels at the dam site.

5.6 OVERTOPPING POTENTIAL

The HEC-1 DB analysis indicates that the dam will be overtopped as follows:

OVERTOPPING IN FEET WITHOUT BRIDGE BELOW DAM

PMF	23.4 Feet
1/2 PMF	13.7 Feet

The dam becomes submerged at 4,700 cfs, as previously stated.

5.7 EVALUATION

The HEC-1 DB modeling for this 140 square mile drainage area computed PMF and 1/2 PMF values which appear excessive. A detailed computer analysis would be required to assess the upland run-off and routing characteristic of the flat valley areas. This analysis is not within the scope of this investigation. The Route 5 bridge just downstream from the dam restricts flow so that the backwater effect of the restriction causes submergence of the dam to occur at flows of 4700 cfs, much lower than the top of dam spillway capacity of 9665 cfs. It follows, therefore, that the 1/2 PMF flow would cause submergence of the dam.

Conditions do not exist at the dam site from which a dam break would occur during a 1/2 PMF event. Therefore, the dam is not considered to have a seriously inadequate spillway according to the Corps of Engineers' screening criteria.

It is recommended that the bridge opening channel capacity be evaluated to determine whether it meets standards.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

This dam is a concrete structure having a curved aligment. Its right abutment (viewed looking downstream) is formed where the dam meets a concrete viaduct which is part of the creek overpass for Highway Route 5, immediately downstream from the dam. The width of the underbridge flow channel is less than the length of the dam. A gate house structure, located on the westerly bank of the creek, forms the dam's left abutment. For the inspection, the upstream water level was drawn down to permit better evaluation of the dam alignment and downstream face. Observations at that time indicate the dam retains stability with no signs of structural displacement.

The dam's concrete is generally in good condition, but minor surface deterioration is occurring. What appears to be minor deterioration of the concrete at the location of some horizontal and vertical construction joints has also resulted. A small amount of leakage occurs at one location because of a small crack or open joint near the crest of the dam.

Minor deterioration of the concrete in various sections of the gate structure has occurred but no structural problems are indicated. The masonry land wall forming the westerly limit of the creek in the vicinity of the gate house is in good condition.

Because of the downstream water, the downstream creek bed could not be inspected for erosion or signs of underdam seepage.

b. Geology and Seismic Stability

The Village of LeRoy is located within the Southern Ontario Plain which is part of the Eastern Lake Section of the Central Lowland Province. Both the dam and spillway are sited on bedrock of the Skaneateles Formation of Middle Devonian Age. The rock grades range from grayish calcareous shale to shaley limestone. Bedding is close to horizontal with a dip of less than 1 degree to the south. According to the 1934 State Report, the bedrock, after removal of all earth and soil, was to be excavated and keyed to a minimum depth of 12 inches and a width of at least 11 feet. One inch round steel bar dowels were to be grouted in holes drilled in the rock trench and the foundation concrete tied to the dowels. During excavation, no porous seams or fissures were seen in the rock. No mention of rock grouting was made. Neither the right nor left abutments are set in bedrock, but in clay and building foundations.

Several subsurface faults, based on drill hole data, are located within 10 miles west of the dam site (see geologic map included). These faults are branches of the Clarendon-Linden Fault. The LeRoy area is in a Zone 2 Designation on the Seismic Probability Map.

The New York Geological Survey records indicate significant earthquake activity in this area. Although most activity has been of low intensity, some has been of moderate intensity as shown below:

Date	Intensity Modified Mercalli	Location Relative to Dam
1969	IV	12 mi. SW
1967	VI	12 mi. SW
1966	VI	17 mi. SW
1965, July	V	12 mi. SW
1965, Aug.	IV	12 mi. SW
1955	V	17 mi. SW
1929, Dec. 3	IV	20 mi. SW
1929, Dec. 2	IV	20 mi. SW
1929, Aug. 12	VIII	20 mi. SW

Many earthquakes of lesser intensity have occurred in the area, closer to the dam than those listed above. One of these occurred in 1972, three miles west of the dam.

c. Data Review and Stability Evaluation

Design drawings available for review show plan layout and cross-sections for the various structural elements of the facility but do not include information on the properties of the dam and foundation materials nor stability analysis. As part of the present study, stability evaluations have been performed for the dam/spillway sections. Actual properties of the dam's construction materials and foundations were not determined as part of this study; where information on properties were necessary for computations but lacking, assumptions felt to be practical were made. These stability computations assumed a dam cross-section based on dimensions indicated by the plans included in this report. The analysis also assumed the dam section to be a monolith possessing necessary internal resistance to shear and bending occurring as a result of loading. It should be considered that in areas where deterioration has occurred the section dimensions would be less than indicated by the plans, with some adverse effect on the structural strength expected.

The results of the stability computations are summarized in the table below. Analyses have been performed for the normal operations case only; hydrologic studies indicate the dam will be submerged under 1/2 PMF and PMF conditions, because of the restriction to flow developed by the Highway Route 5 Bridge immediately downstream of the dam. The normal operations case is considered as imposing a combination of forces most critical to the stability of the dam. The stability analyses are included in Appendix D.

RESULTS OF STABILITY COMPUTATIONS

	Loading Condition	Factor of Safety* Overturning	Factor of Safety* Sliding**	Location of Resultant Passing through Base***
(I)	Water elevations at normal operating levels, uplift on base plus 7.5 kip per lineal foot ice load acting.	0.62±	15+	Outside of Base
(II)	Water elevations at normal operating levels and normal uplift on base	1.7±	50±	0.4b

*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

**As determined applying the friction-shear method.

***Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

The analysis indicates unsatisfactory stability against overturning for the dam subject to forces possible during normal operations, according to the Recommended Guidelines for Safety Inspection of Dams (e.g., where the resultant of forces acting on the dam is located outside the middle third of the base, tensile stresses would develop in the dam section, a condition which is structurally undesirable.)

Critical to the analysis and resulting indication of stability are the items of uplift water pressure acting on the base of the dam and relative permeability of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on a full headwater hydrostatic pressure acting on the dam's upstream corner and a full tailwater hydrostatic pressure acting on the dam's downstream corner. Uplift pressures were assumed to vary linearly between the dam's upstream and downstream corners, and to act upon 100 percent of the dam base. The resulting uplift force represents a condition that is significant to the indication of instability.

Uplift as computed for the normal operating condition was also assigned to the flood conditions studied, assuming that uplift pressures would not increase significantly over a relatively short flood stage time period because of expected low foundation rock permeability. With this assumption for uplift, the "normal operating condition" represents a loading combination more critical to dam stability than the 1/2 PMF and PMF flood conditions.

The 1934 State Report indicates steel bars were to be provided to anchor the dam base to the site's foundation rock. Information on the location, spacing and embedment of these anchors was not available for the stability analysis performed as part of the present study. Properly installed anchors would increase the dam's resistance to overturning and sliding.

Further structural stability investigation is recommended to fully evaluate the effects of the dam's steel bar anchor system and the uplift forces acting at the base of the dam and the dam's lower section. The investigation should extend to inspection of the dam's upstream face and evaluation of the condition of the concrete in the dam's upstream zone. Plans for repair should include rehabilitation and repair to concrete in areas where deterioration has occurred.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

The Phase I visual inspection of the Oatka Creek Dam did not indicate conditions which constitute an immediate hazard to human life or property. During this inspection, the sluice gates which control outflow from the impoundment were operated to draw down the impoundment so that a visual inspection could be made of the spillway surfaces. Upon closing the sluice gates, floatable materials became lodged in the sluice gate opening and prevented closure of the gate. The installation of trash racks upstream from the gates would prevent this malfunction.

The hydrologic/hydraulic analysis indicates that the backwater effect of the bridge on Route 5, immediatley downstream from the dam, restricts flow causing submergence of the dam to occur at flows well below the top of dam spillway capacity. The stability analysis indicates that the dam is unstable for all of the conditions prescribed by the Recommended Guidelines for Safety Inspection of Dams.

b. Adequacy of Information

The information available is adequate for this Phase I inspection report. Design and construction information is limited to the construction plans.

c. Urgency

Both the structural stability of the dam under normal operating conditions and the analysis of the flows that might occur during extraordinary rainfall events represent areas where further investigations should be undertaken. The investigations recommended below should be undertaken immediately and completed within one year. The necessary remedial areas should be completed within two years.

d. Need for Additional Investigation

Additional investigations should be undertaken to determine the structural stability of the dam section and the hydrologic capacity of the dam and bridge combination.

7.2 RECOMMENDED MEASURES

The following steps should be undertaken:

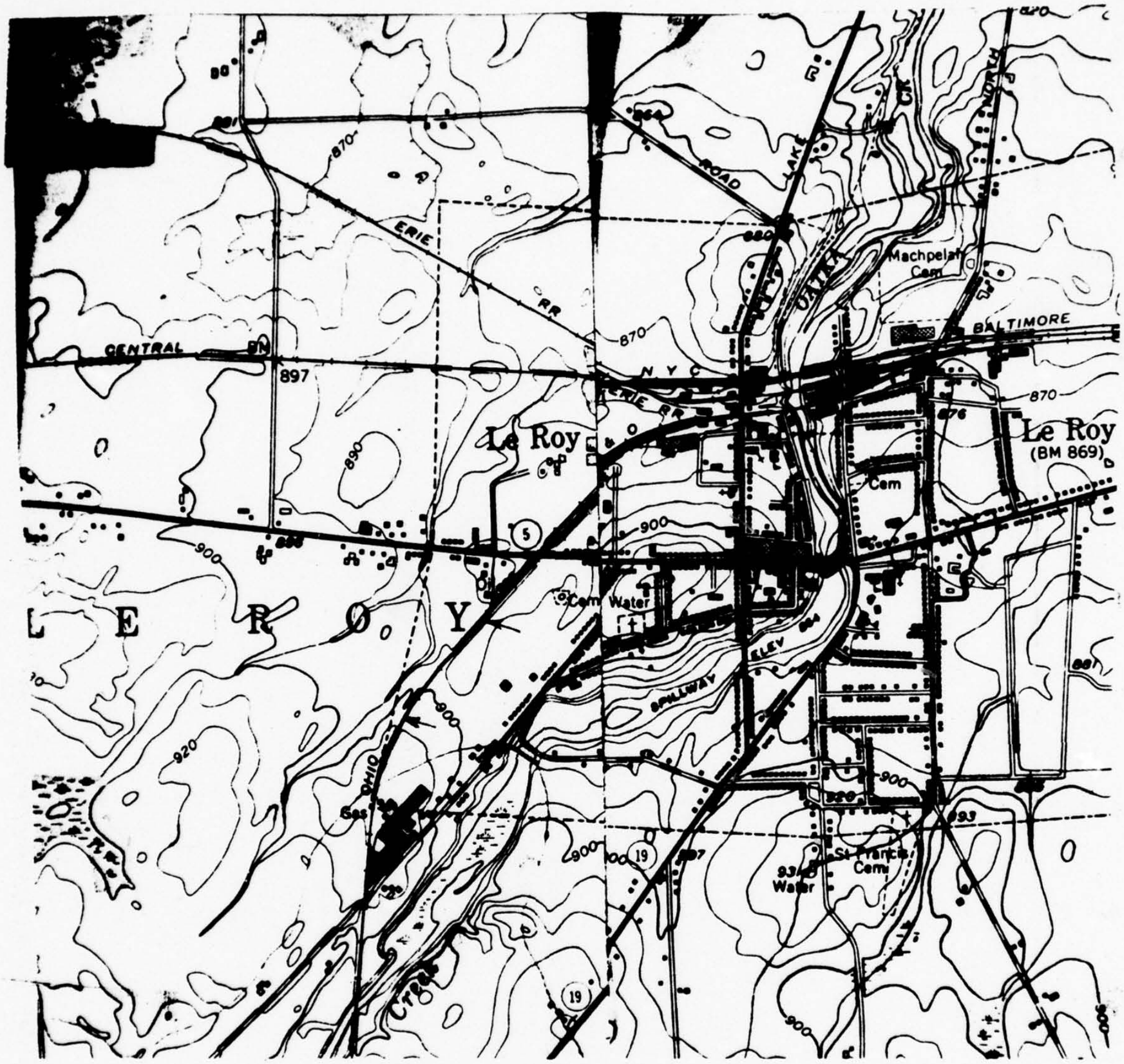
1. A structural stability analysis of the dam should be conducted to determine the effect of the dam's steel bar anchor system and the uplift forces acting at the base of the dam. The investigation should extend to the inspection of the dam's upstream face and evaluation of the condition of the concrete in the dam's upstream zone. Plans for repair should include rehabilitation and repair of concrete joints in areas where minor deterioration has occurred.

2. The bridge opening channel capacity should be investigated to determine the capacity of the dam/bridge combination and a determination should be made as to whether the existing discharge capacity of these structures provides adequate protection to the facility and adjoining properties.

3. Trash racks should be installed upstream from the sluice gates.

4. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference.

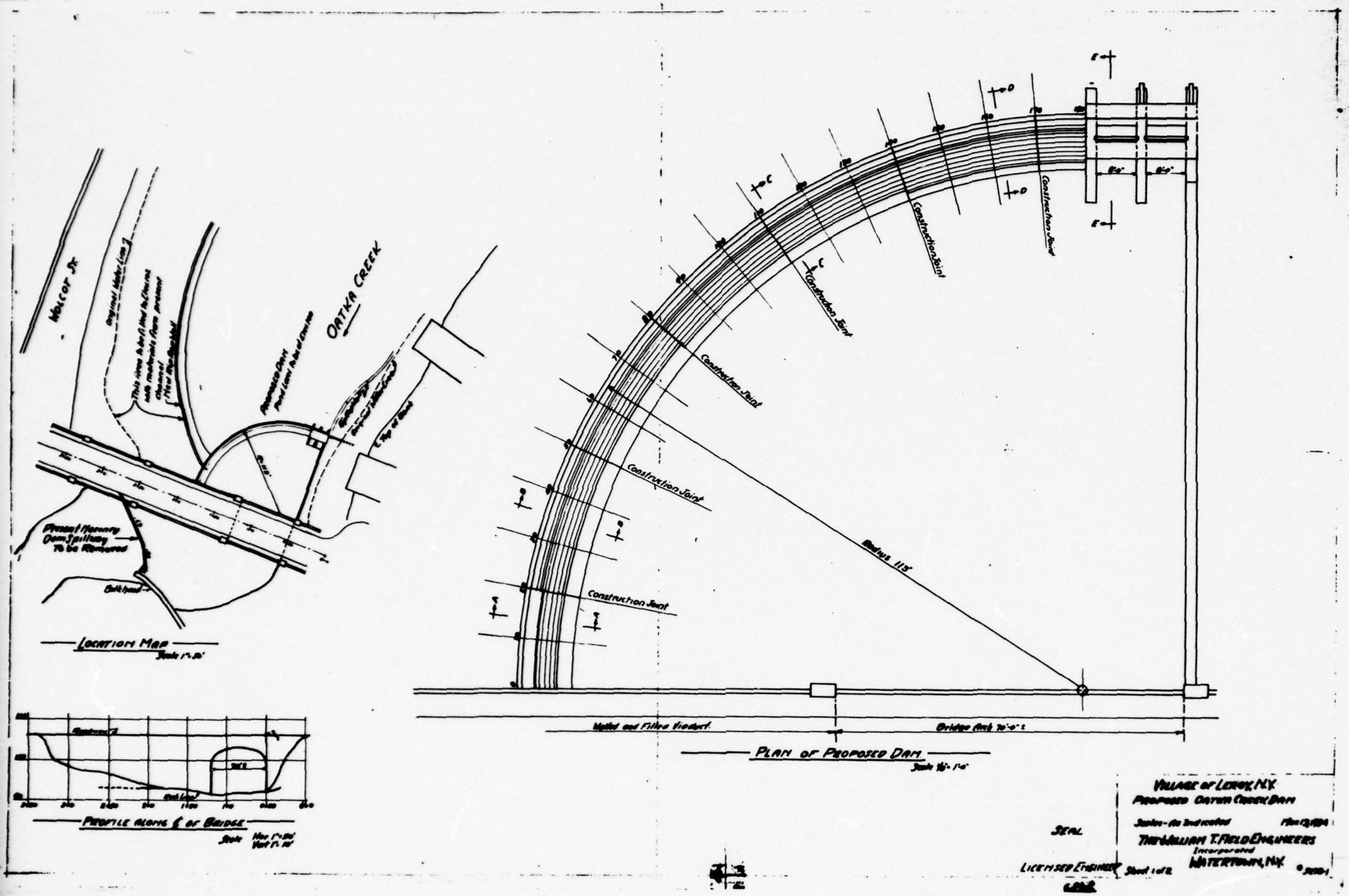
5. Develop an emergency action plan.

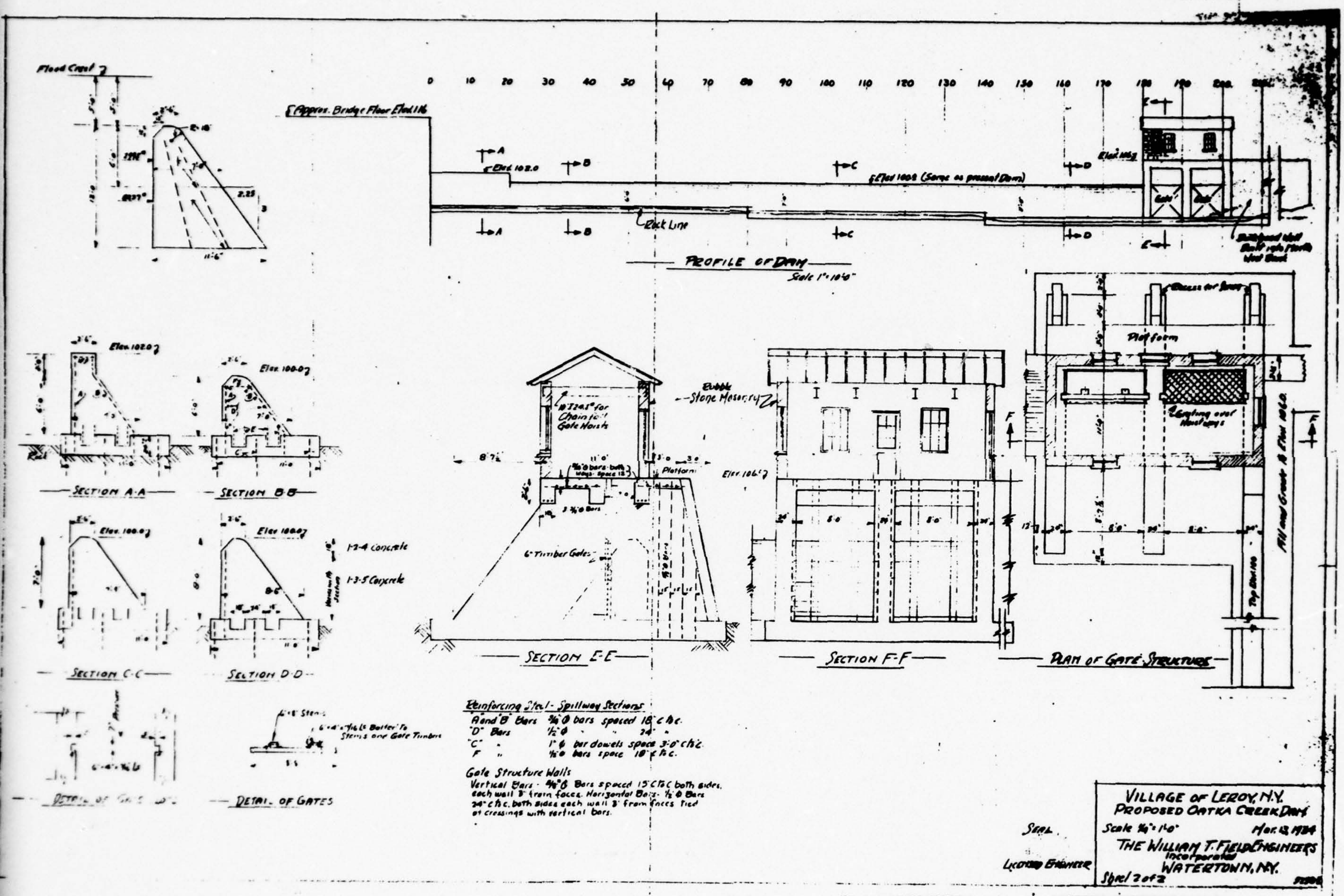


VICINITY MAP

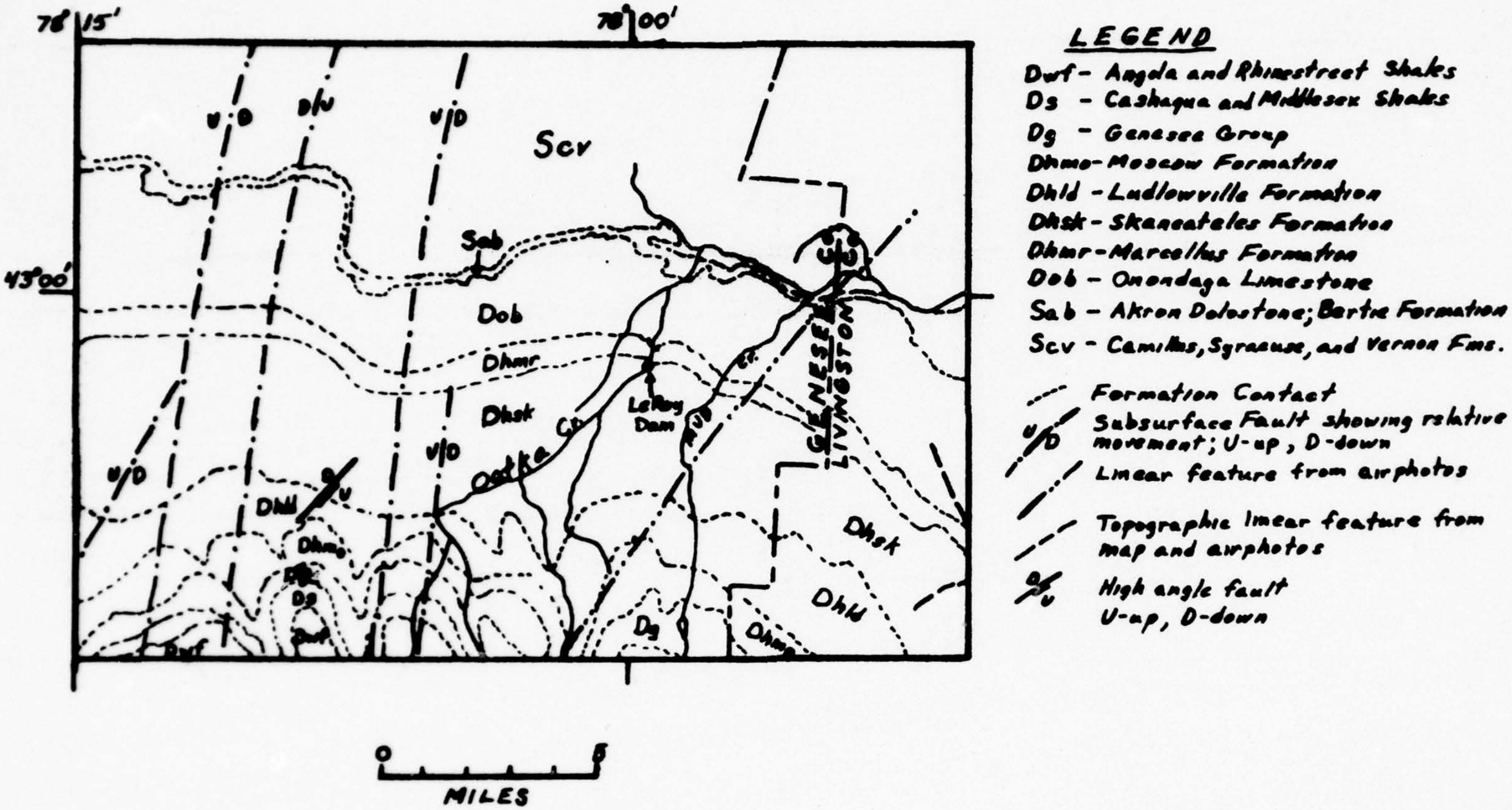
LOCATION PLAN

FIGURE 1


PLAN OF PROPOSED DAM
Scale 1/8" = 1'-0"
Construction Joint
Construction Joint
Construction Joint
Construction Joint
Construction Joint
Construction Joint
Construction Joint
Radius 115'
Walled and Filled Viaduct
Bridge Arch 70'-0" ±
LOCATION MAP
OATKA CREEK
Wolcott St.
Original Water Line
Proposed Dam
Present Masonry Dam Spillway To be Removed
Bulkhead
PROFILE ALONG ℄ OF BRIDGE
VILLAGE OF LEROY, N.Y.
PROPOSED OATKA CREEK DAM
Scales - As Indicated
THE WILLIAM T. FIELD ENGINEERS
Incorporated
WATERTOWN, N.Y.
SEAL
LICENSED ENGINEER
Sheet 1 of 2



Flood Crest
Approx. Bridge Floor Elev. 116
Elev. 102.0
Elev. 100.0 (Same as present Dam)
Rock Line
PROFILE OF DAM
Scale 1" = 10'-0"
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
1-2-4 Concrete
1-3-5 Concrete
DETAIL OF GATES
Rubble Stone Masonry
6" Timber Gates
Platform
Elev. 106.7
SECTION E-E
SECTION F-F
Platform
PLAN OF GATE STRUCTURE
Fill and Grade to Elev. 106.0
Top Elev. 100
Reinforcing Steel - Spillway Sections
"A" and "B" Bars 5/8" ⌀ bars spaced 18" c. to c.
"D" Bars 1/2" ⌀ " " 24" "
"C" " 1" ⌀ bar dowels space 3'-0" c. to c.
F " 1/2" ⌀ bars space 18" c. to c.
Gate Structure Walls
Vertical Bars - 5/8" ⌀ Bars spaced 15" c. to c. both sides, each wall 3" from faces. Horizontal Bars - 1/2" ⌀ Bars 24" c. to c. both sides each wall 3" from faces tied at crossings with vertical bars.
VILLAGE OF LEROY, N.Y.
PROPOSED OATKA CREEK DAM
Scale 1/4" = 1'-0"
Mar. 13, 1934
THE WILLIAM T. FIELD ENGINEERS
Incorporated
WATERTOWN, N.Y.
Seal
Licensed Engineer
Sheet 2 of 2



78°15'
78°00'
43°00'
Scv
Sab
Dob
Dhmr
Dhsk
Dhld
Dhmo
Dg
Dwf
U/D
D/U
Oatka Cr.
LeRoy Dam
GENESEE
LIVINGSTON
0
5
MILES
LEGEND
Dwf - Angola and Rhinestreet Shales
Ds - Cashaqua and Middlesex Shales
Dg - Genesee Group
Dhmo - Moscow Formation
Dhld - Ludlowville Formation
Dhsk - Skaneateles Formation
Dhmr - Marcellus Formation
Dob - Onondaga Limestone
Sab - Akron Dolostone; Bertie Formation
Scv - Camillus, Syracuse, and Vernon Fms.
Formation Contact
Subsurface Fault showing relative movement; U-up, D-down
Linear feature from airphotos
Topographic linear feature from map and airphotos
High angle fault U-up, D-down

APPENDIX A

FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Oatka Creek in LeRoy **County** Genesee **State** New York **ID #** NY435

Type of Dam Crested Concrete Gravity **Hazard Category** High

Date(s) Inspection August 9, 1979 **Weather** Sunny **Temperature** 70

Pool Elevation at Time of Inspection Top of Crest **M.S.L.** **Tailwater at Time of Inspection** --

Inspection Personnel:

F.W. Byszewski	Dale Engineering Company	
D.F. McCarthy	Dale Engineering Company	
H. Muskatt	Dale Engineering Company	
J.A. Gomez	Dale Engineering Company	
Kermit Arrington	LeRoy Div. D.P.W.	

N.F. Dunlevy/J.Gomez **Recorder**

<u>CONCRETE/MASONRY DAMS</u>

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	None.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Good condition.	
DRAINS	None.	
WATER PASSAGES	Twin sluice gates.	
FOUNDATION	Rock according to plans. No field observations were made regarding the foundation material.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Fair/good condition.	Some concrete replacement work occurred in connection to bridge replacement.
STRUCTURAL CRACKING	No significant cracks. Some cracks on spillway crest.	
VERTICAL & HORIZONTAL ALIGNMENT	Good condition.	
MONOLITH JOINTS	Good condition.	
CONSTRUCTION JOINTS	Good condition.	
STAFF GAGE OF RECORDER	None.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A.	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	N/A.	
RIPRAP FAILURES	N/A.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A.	
ANY NOTICEABLE SEEPAGE	N/A.	
STAFF GAGE AND RECORDER	N/A.	
DRAINS	N/A.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	See comments for main dam. In good condition.	Dam's crest along length.
APPROACH CHANNEL	Reservoir impoundment.	
DISCHARGE CHANNEL	Channel through new bridge (New York State Department of Transportation), small dam (original) below bridge appears as rapids.	
BRIDGE AND PIERS	None.	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not visible.	
APPROACH CHANNEL	Reservoir area.	
DISCHARGE CHANNEL	Stream channel.	
BRIDGE AND PIERS	None.	
GATES AND OPERATION EQUIPMENT	Hydraulic equipment operates the two sluice gates constructed of wood.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Through gate spillway described in sheet 7.	
INTAKE STRUCTURE		
OUTLET STRUCTURE		
OUTLET CHANNEL		
EMERGENCY GATE		

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Clear, unobstructed. For 500 feet below bridge, structures well above flood plain - channel sides riprapped.	
SLOPES	None.	
APPROXIMATE NO. OF HOMES AND POPULATION	Center of village below main business area. A number of residential streets located below dam. Number of homes in area 4 - 12.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	
OBSERVATION WELLS	None.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHER	None.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	None. Lawn area slopes 10 to 20 to 1 into reservoir. No structure adjacent to impoundment.	
SEDIMENTATION	None observed.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM Oatka Creek in LeRoy

ID # ____________

ITEM	REMARKS
AS-BUILT DRAWINGS	
REGIONAL VICINITY MAP	
CONSTRUCTION HISTORY	
TYPICAL SECTIONS OF DAM	
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	
RAINFALL/RESERVOIR RECORDS	

ITEM	REMARKS
DESIGN REPORTS	
GEOLOGY REPORTS	
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	
POST-CONSTRUCTION SURVEYS OF DAM	
BORROW SOURCES	

ITEM	REMARKS
MONITORING SYSTEMS	
MODIFICATIONS	
HIGH POOL RECORDS	
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	
MAINTENANCE OPERATION: RECORDS	

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS	

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: ______________________

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): ______________________

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ______________________

ELEVATION MAXIMUM DESIGN POOL: ______________________

ELEVATION TOP DAM: ______________________

CREST:

a. Elevation ______________________
b. Type ______________________
c. Width ______________________
d. Length ______________________
e. Location Spillover ______________________
f. Number and Type of Gates ______________________

OUTLET WORKS:

a. Type ______________________
b. Location ______________________
c. Entrance Inverts ______________________
d. Exit Inverts ______________________
e. Emergency Draindown Facilities ______________________

HYDROMETEOROLOGICAL GATES:

a. Type ______________________
b. Location ______________________
c. Records ______________________

MAXIMUM NON-DAMAGING DISCHARGE: ______________________

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

v. 3/77) NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DAM INSPECTION REPORT
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class	Date & Inspector
35-1002	GENESEE	LEROY	GENESEE	C	7/29/77

Stream = OATKA CREEK   Owner = VILLAGE OF LEROY

Type of Construction

- [ ] Earth w/Concrete Spillway
- [ ] Earth w/Drop Inlet Pipe
- [ ] Earth w/Stone or Riprap Spillway
- [x] Concrete
- [ ] Stone
- [ ] Timber
- [ ] Other ______

Use

- [ ] Water Supply
- [ ] Power
- [x] Recreation - [x] High Density
- [ ] Fish and Wildlife
- [ ] Farm Pond
- [ ] No Apparent Use-Abandoned
- [x] Flood Control
- [x] Other STREAM CHANNEL IMPROVEM

230 ACRE FT

Estimated Impoundment Size ~~40~~ Acres Estimated Height of Dam above Streambed 15 Ft.

Condition of Spillway

- [x] Service satisfactory
- [ ] In need of repair or maintenance
- [x] Auxiliary satisfactory
- [ ] In need of repair or maintenance

Explain: ______

Condition of Non-Overflow Section

- [x] Satisfactory
- [ ] In need of repair or maintenance

Explain: ______

Condition of Mechanical Equipment

- [ ] Satisfactory
- [ ] In need of repair or maintenance

Explain: ______

Siltation [ ] High [ ] Low

Explain: ______

Remarks: ______

Evaluation (From Visual Inspection)

- [ ] Repairs req'd. beyond normal maint.
- [x] No defects observed beyond normal maint.

Specifications

for

Oatka Creek Dam

at

LeRoy, New York

Location

The proposed Oatka Creek Dam is located just Southerly of the Main Street Bridge in the Village of LeRoy, New York and is part of a project for stream channel improvement to eliminate unsightly and unsanitary conditions. The removal of silt and alluvial deposits is being carried on as a C.W.A.

Proposed Work

The work contemplated in constructing the proposed dam consists in the excavation of earth and rock for a foundation and the construction of a concrete spillway, waste gates, gate house and bulk heads.

Excavation

All earth and soil shall be removed from the rock and a trench or channel excavated in rock with a minimum depth of 12" and a width of at least 11 feet. If in the opinion of the Engineer a greater depth of rock trench is necessary to provide stability, the rock trench shall be excavated as directed.

Dowels

One inch round steel bar dowels shall be placed in holes drilled in the rock trench as shown on the plans and grouted in place.

Foundation Concrete

Concrete mixed in the proportions of one part Portland Cement, three parts clean sand and five parts broken stone or clean screened gravel shall be poured in the excavated rock trench and brought to a level surface as shown on the plans. Clincher grooves as shown on the plans shall be formed in the foundation or footings and steel bar dowels to join with the spillway reinforcing shall be placed as shown on the plans.

Spillway Concrete

Concrete for the spillway shall be mixed in the proportions shown on the plans, and shall be poured in sections continuously from bottom to top. Sections are shown on the plans as 30 feet long between construction joints but if the equipment available for mixing and placing concrete is not of sufficient capacity to pour such sections in continuous pours, shorter sections acceptable to and approved by the Engineer may be used.

Spillway Construction Joints

At the end of each section bulkheaded off a 6"x6" keyway shall be built into the forms to form a pocket or groove the full height of the sections. Horizontal reinforcing bars shall project at least 16" through the bulkhead. After the removal of forms the surface of the construction joint shall be painted with heavy asphaltic paint before pouring concrete in the next section built. Pipes at least 6" longer than the projecting reinforcing bars shall be placed over each projecting bar before continuing the concrete work so that stresses will not be transmitted from one section to another.

Gates

Timber gates shall be constructed of dressed cypress lumber bolted and spliced together as shown on the plans.

General Specifications

The General Specifications for materials and construction herewith shall govern except as otherwise specified herein or on the plans.

GENERAL SPECIFICATIONS

FOR

MATERIALS AND CONSTRUCTION

PORTLAND CEMENT

Portland Cement shall conform to the standard specifications and Tests for Portland Cement (Serial Designation C 9-26) of the American Society for Testing Materials.

Cement shall be stored in a dry place and in such a manner as to permit easy access for inspection and identification of each shipment.

Cement shall be delivered at the site of the mixer or place of use in suitable cloth bags or approved 5 ply paper bags.

A bag shall contain 94 pounds net. A barrel shall contain 376 pounds net. One bag of cement shall be considered as containing 95/100 of a cubic foot

FINE AGGREGATES

Fine aggregates for concrete shall consist of natural sands and gravels, crushed rock or other inert materials having clean uncoated grains of strong and durable minerals or a mixture of the above. Fine aggregates shall be so graded that when dry 100 percent by weight shall pass a screen having 1/4" meshes; not more than 25 per cent by weight shall pass a standard No. 50 sieve and not more than 6 per cent shall pass a standard No. 100 sieve. Fine aggregate may be rejected if it contains more than 3 percent of loam, silt, clay, vegetable matter or other deleterious substances.

Fine aggregate or sand for mortar and grout shall consist of clean, hard, durable, uncoated stone particles free from loam, clay, silt and all other deleterious substances. Such aggregate shall be of a size that when dry 100 per cent by weight shall pass a standard No. 10 sieve and not over 5 per cent by weight shall pass a standard No. 100 sieve.

COARSE AGGREGATE

Corase Aggregate shall consist of clean, hard, durable uncoated broken stone or gravel. It shall be sized so that 100 per cent by weight shall pass a screen having 2 3/4" circular openings and none shall pass a screen having 1/4" square or 3/8" circular openings. No broken stone, gravel or other material showing definite lines of fracture or laminations shall be used.

REINFORCING STEEL

All reinforcing bars shall be of open hearth steel, rolled from new billets of an approved deformed bar shape. No re-rolled material or cold twisted bars will be accepted. All bars shall meet the requirements given for billet steel concrete reinforcement in the Standard Specifications of the American Society of Testing Materials, Serial Designations A—15-24, intermediate grade.

Steel Fabric may be used in such places as the Engineer may accept or direct. Such fabric shall meet the requirements given for cold drawn steel wire for concrete reinforcement in the Standard Specification of the A. S. T. M., Serial Designation A—82-27.

STRUCTURAL STEEL

All structural steel beams, shapes, etc., shall conform to the requirements of the Standard Specifications for Structural Steel for Bridges, Serial Designation A—7-24 of the American Society of Testing Materials.

Finished rolled material shall be free from cracks, flaws, seams, laps, ragged edges and other defects. It shall have a smooth, uniform finish and shall be straightened at the mill before shipment.

IRON AND STEEL CASTINGS

Iron and Steel Castings shall conform to the requirements of the Standard Specifications of the American Society for Testing Materials; Serial Designation A—27-24 for Steel Casting and A—48-18 for Gray Iron Castings.

All Castings shall be true to patterns in form and dimensions and shall be free from cracks, flaws and other defects in position affecting their strength, and durability. Castings which have been welded without the Engineer's permission will be rejected.

LUMBER

All lumber and timber used in permanent work shall be of an acceptable kind for the purpose used, sound, square edged free from shakes, loose knots, decay and other defects and shall be planed and framed as required or shown on the plans. Measurements of lumber shall be the number of feet board measure actually placed.

PROPORTIONS FOR CONCRETE

Concrete for structures shall in general be mixed in the proportion of one part Portland Cement, two parts fine aggregate and four parts of coarse aggregate by volume. The proportions of aggregates may be varied by the Engineer in order to obtain better working mixtures.

No extra compensation for cement necessary to obtain workable and satisfactory concrete by reason of such variation will be allowed, unless by special order.

Proportions of cement and aggregates shall be accurately measured by means of batch boxes or other devices acceptable to the Engineer. Wheelbarrow measurement will be allowed only in barrows calibrated and marked by the Engineer.

Clean "Bank Run of Gravel" may be used for aggregate in such places as the Engineer may accept, but such gravel shall not contain more than 40 per cent by volume of material that will pass a screen having 1/4" square meshes and not contain particles larger than would pass a screen having 2 3/4" circular openings. If deemed necessary to add additional cement to obtain a concrete of the desired strength or consistency, no extra compensation will be allowed.

Payment for concrete will be made on the basis of the number of cubic yards of concrete actually in place, unless otherwise called for.

FORMS

Forms for concrete shall conform to the shape, lines and dimensions shown on the plans. They shall be substantial and sufficiently tight to prevent leakage of mortar. Ample studding, waling and bracing shall be provided to prevent bulging and to maintain position and shape under the stresses incident to filling and work. Wire ties shall be sparingly used and after the removal of forms such wires to be cut off below the surface and the cavity filled with a mortar of fine aggregate and cement in the proportions used in the concrete. In all straight walls suitable tongue and groove bulkheads for construction joints shall be provided to insure continuity of such walls or members when pouring concrete.

In all walls or members of such dimensions as to be difficult of access, loose boards shall be left for cleaning out forms before placing concrete.

The interior surface of all forms in contact with concrete surfaces shall be of lumber dressed on one face and both edges and shall be so constructed as to leave all surfaces with a smooth even surface. Forms re-used shall be maintained at all times in good condition as to accuracy of shape, strength and smoothness of surface.

PLACING REINFORCING STEEL

Metal reinforcing shall be accurately placed as shown on the plans or directed by the Engineer, and shall be securely tied or fastened in place so that placing of concrete will not change its position.

Splices in reinforcing shall provide a lap of at least 16 diameters for deformed bars and 24 diameters for plain bars. All splices shall be securely tied with annealed wire.

MIXING CONCRETE

All concrete shall be mixed in approved batch mixers for at least one minute after all materials are in the mixer drum. Aggregates and sand shall first be mixed dry before adding water. Water shall be clear and free from mud, clay, acids, alkalies, oils and other deleterious substances. Only such amounts of water shall be used as will be required to obtain a plastic workable concrete. Excess water added for the purpose of making concrete flow in the forms will not be permitted.

Hand mixing will only be permitted in case of emergency or in places where very small amounts of concrete are needed. Hand mixing shall be done on water tight platforms or mixing boards and shall proceed as follows: Cement and fine aggregate shall be mixed first dry and then wet to the proper consistency after which the coarse aggregate shall be added and thoroughly mixed.

PLACING CONCRETE

No concrete shall be placed until the forms have been thoroughly cleaned and have been inspected by the Engineer.

When concreting has once started, it shall be carried on as a continuous operation until the placing of the section, panel or portion bulkheaded off is completed.

Concrete shall be placed in uniform layers as close as practicable to its final position. It shall be thoroughly compacted by puddling with proper tools and great care shall be exercised to obtain a smooth face free from stone spots and porous places. If for any reason, concreting has to be suspended before a vertical wall or section is completed, the concrete already in place shall be brought to a level and keyways or steel bar dowels placed. Before concreting is resumed, this joint shall be thoroughly scarified, all loose material removed and a paste of neat cement applied. Construction joints or vertical joints in walls shall be located as the Engineer may direct.

No concrete shall be placed in or under water except with the approval of the Engineer and under his direct supervision. When concrete is so placed extra cement in an amount acceptable to the Engineer shall be added to each batch but no extra compensation will be allowed therefore.

PLACING CONCRETE IN FREEZING WEATHER

No concrete shall be placed in freezing weather or when the temperature is below 40° Fahrenheit except by permission of the Engineer. In the event of such permission, heating apparatus of approved form shall be provided to heat water and aggregates so that no concrete shall have a temperature of less than 60° Fahrenheit when deposited in the forms. Heating apparatus and covering shall be provided so that the air surrounding concrete may be maintained at a temperature of at least 50° Fahrenheit for a period of five days after placing concrete. The use of salt or chemicals will not be permitted.

CURING CONCRETE

Careful attention shall be given to the proper curing of all exposed concrete surfaces. Such surfaces shall be protected from the sun and kept wet for a period to be determined by the Engineer.

REMOVAL OF FORMS

The removal of forms shall be carried out in such a manner as to insure the complete safety of the structure. Forms, shoring or braces shall be maintained until the supported portion or member has hardened sufficiently to permit its removal with safety.

DAMAGED CONCRETE

All damaged or injured concrete shall be replaced and repaired to the satisfaction of the Engineer before acceptance.

BRICK

All brick shall be of the class called for on the plans or in the specifications and shall be hard burned, free from kiln cracks and other defects that would impair the strength or appearance of a structure. Care shall be exercised in handling brick to prevent injury and damage.

BRICK LAYING.

All brick shall be laid in cement lime mortar mixed in the proportions of one part lime, one part portland cement and three parts of clean sand. The proportions of cement and lime may be varied to a slight extent to obtain a free working mortar. If required brick shall be wetted before laying. All brick on exposed faces shall be laid to line and shall present true and even faces. Joints and beds shall be full and every precaution taken to obtain air tight walls. An air space for insulation shall be left when directed by the Engineer.

WILLIAM T. FIELD, C. E.
PRES. AND TREAS.
C. A. SOLAR
ASST. TREAS.

THE WILLIAM T. FIELD ENGINEERS
INCORPORATED
CONSULTING ENGINEERS
WATERTOWN, N.Y.

ARTHUR H. EMERSON, C. E.
V. PRES. AND SEC'Y
JAMES W. HAMBLEY, L. S.
ASST. SEC'Y

March 17, 1934

Mr. Thomas F. Farrell
Chief Engineer
State Department of Public Works
Albany, New York

Attention: Mr. J. P. Neuton

Dear Sir:

We are enclosing herewith an application for the construction of a dam in the Village of Leroy, New York together with blue prints and specifications.

This dam is located on Oatka Creek and is to replace an old stone masonry dam and is part of a project undertaken to dredge out the stream channel as a C.W.A. Project.

No change in pond surface is contemplated as the crest of the new dam will be at the same elevation as that of the old dam.

We believe that the new structure will tend to improve run off conditions as the spill crest proper will be considerably lengthened and gates will be installed for flood relief.

Very truly yours

THE WILLIAM T. FIELD ENGINEERS,INC.

By A.H. Emerson.

AHE:S

A. H. Emerson,
Vice-President

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS

FRED'K STUART GREENE
SUPERINTENDENT

HOWARD E. SMITH, DIST. ENG.
BARGE CANAL TERMINAL
P. O. BOX 36, EAST AVENUE STATION, ROCHESTER, N. Y.

FOURTH DISTRICT

COUNTIES IN 4TH DISTRICT
GENESEE
LIVINGSTON
MONROE
ONTARIO
ORLEANS
WYOMING

WJZ:AML

APR - 4

Newto -

ROCHESTER, N. Y., April 3, 1935.

Major T. F. Farrell,
Chief Engineer,
Albany, New York.

Dear Sir:-

For your information, I would advise that work on the construction of a new concrete dam across Oatka Creek, at Main Street Bridge in the Village of LeRoy, has been completed. This work was inspected from time to time by employees of this office as the construction work proceeded, and the same was completed in accordance with the approved plans.

The only addition made to the work was the extension of a core wall from the easterly abutment of the dam and parallel to the curtain wall on the south side of the Main Street bridge, to a point in impervious material about 20' out from the dam. The sluice gates in the dam have been closed and the pond is being filled. The water level on March 26th had reached a point about 15" from the crest.

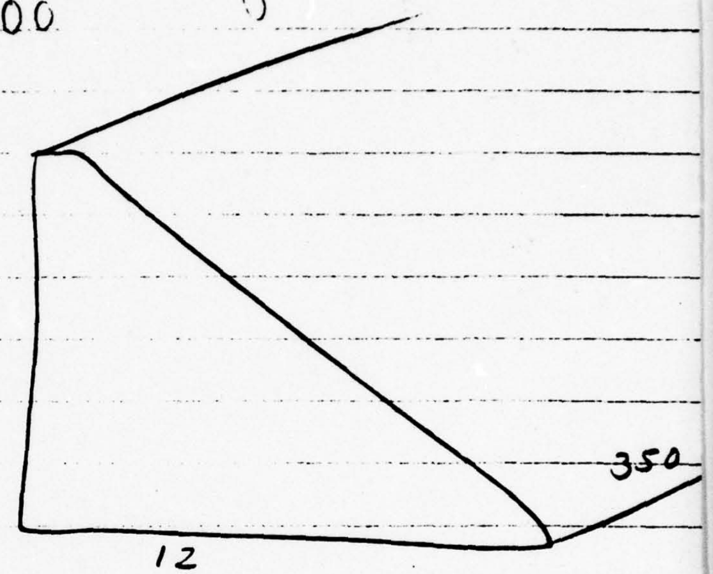
Very truly yours,

H. E. Smith

H. E. SMITH,
District Engineer.

Impounding Capacity

$$43560 \overline{)10,000,000}$$ 229 acre/ft.



$V = \frac{(9)(12)(350)}{54} = 700$ cu yd

Form E-61
8-9-33-500 (11E-898)

STATE OF NEW YORK

DEPARTMENT OF PUBLIC WORKS

DIVISION OF ENGINEERING

ALBANY

Received Mar. 19, 1934 Dam No. 35-1002

Disposition Mar. 20, 1934 Watershed Genesee

Foundation inspected

Structure inspected

Application for the Construction or Reconstruction of a Dam

Application is hereby made to the Superintendent of Public Works, Albany, N. Y., in compliance with the provisions of Section 948 of the Conservation Law (see last page of this application) for the approval of specifications and detailed drawings, marked Village of Leroy, N.Y., Proposed Oatka Creek Dam, - Sheets 1 and 2 herewith submitted for the { construction ~~reconstruction~~ } of a dam herein described. All provisions of law will be complied with in the erection of the proposed dam. It is intended to complete the work covered by the application about Sept. 1, 1934

(Date)

1. The dam will be on Oatka Creek flowing into Allen Creek and Genessee River in the town of Leroy, County of Genessee and at the Main Street Bridge in the Village of Leroy, N.Y.
(give exact distance and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)

2. Location of dam is shown on the New York Caledonia quadrangle of the United States Geological Survey.

3. The name of the owner is The Village of Leroy, N.Y.

4. The address of the owner is Village of Leroy, Leroy, N.Y.

5. The dam will be used for Stream Channel Improvement and Park Purposes

6. Will any part of the dam be built upon or its pond flood any State lands? No

7. The watershed above the proposed dam is about 175 square miles.

8. The proposed dam will create a pond area at the spillcrest elevation of 30 to 40 acres and will impound 6 to 10,000,000 cubic feet of water.

9. The maximum height of the proposed dam above the bed of the stream is 9 feet 0 inches

10. The lowest part of the natural shore of the pond is 4.75 feet vertically above the spillcrest, and everywhere else the shore will be at least 6 To 16 feet above the spillcrest.

11. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam No

12. The natural material of the bed on which the proposed dam will rest is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) Limestone Shale

13. Facing down stream, what is the nature of material composing the right bank? Concrete Bridge Viaduct, Masonry Building Foundations and Clay Banks

14. Facing down stream, what is the nature of the material composing the left bank? Retaining Wall Concrete Bridge Arch, Old Building Foundations and Clay Banks

15. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. Impervious shale and stiff clay

16. Are there any porous seams or fissures beneath the foundation of the proposed dam? No

17. Wastes. The spillway of the above proposed dam will be 160 feet long in the clear; the waters will be held at the right end by a Bridge Viaduct the top of which will be 16 feet above the spillcrest, and have a top width of 40± feet; and at the left end by a Bulkhead and Gate Structure the top of which will be 6 feet above the spillcrest, and have a top width of See Plans feet.

18. The spillway is designed to safely discharge 7000 cubic feet per second (Includes Right Bulkhead and Gate Overfall)

19. Pipes, sluice gates, etc., for flood discharge will be provided through the dam as follows: 2 Waste Gates 8'-0" wide

20. What is the maximum height of flash boards which will be used on this dam? None Planned

21. Apron. Below the proposed dam there will be an apron built of Concrete feet long across the stream, 1.5' To 3 feet wide and 2 feet thick.

22. Does this dam constitute any part of a public water supply? No

INSTRUCTIONS

Read carefully on the last page of this application the law setting forth the requirements to be complied with in order to construct or reconstruct a dam.

Each application for the construction or reconstruction of a dam must be made on this standard form, copies of which will be furnished upon request to the Chief Engineer, Division of Engineering, Department of Public Works, Albany, N. Y. The application must be accompanied by three sets of plans, and specifications. The information furnished must be in sufficient detail in order that the stability and safety of the dam can be determined. In cases of large and important dams assumptions made in calculating stresses and stability should be given.

Samples of materials to be used in the dam and of the material on which the dam is to be founded may be asked for, but need not be furnished unless requested.

If the dam constitutes a part of a public water supply, application should be made to the Water Power and Control Commission under Article XI of the Conservation Law.

An application for the construction or reconstruction of a dam must be signed by the prospective owner of the dam or his duly authorized agent. The address of the signer and the date must be given as provided for on the last page of the application form.

SECTION 948 OF THE CONSERVATION LAW

§ 948. **Structures for impounding water; inspection of docks; penalties.** No structure for impounding water and no dock, pier, wharf or other structure used as a landing place on waters shall be erected or reconstructed by any public authority or by any private person or corporation without notice to the superintendent of public works, nor shall any such structure be erected, reconstructed or maintained without complying with such conditions as the superintendent of public works may by order prescribe for safeguarding life or property against danger therefrom. No order made by the superintendent of public works shall be deemed to authorize any invasion of any property rights, public or private, by any person in carrying out the requirements of such order. The superintendent of public works shall have power, whenever in his judgment public safety shall so require, to make and serve an order directing any person, corporation, officer or board, constructing, maintaining or using any structure hereinbefore referred to, remove, repair or reconstruct the same within such reasonable time and in such manner as shall be specified in such order, and it shall be the duty of every such person, corporation, officer or board, to obey, observe and comply with such order and with the conditions prescribed by the superintendent of public works for safeguarding life or property against danger therefrom, and every person, corporation, officer or board failing, omitting or neglecting so to do, or who hereafter erects or reconstructs any such structure hereinbefore referred to without submitting to the superintendent of public works and obtaining his approval of plans and specifications for such structures when required so to do by his order or who hereafter fails to remove, erect or to reconstruct the same in accordance with the plans and specifications so approved shall forfeit to the people of this state a sum not to exceed five hundred dollars to be fixed by the court for each and every offense; every violation of any such order shall be a separate and distinct offense, and, in case of a continuing violation, every day's continuance thereof shall be and be deemed to be a separate and distinct offense. This section shall not apply to a dam where the area draining into the pond formed thereby does not exceed one square mile, unless the dam is more than ten feet in height above the natural bed of the stream at any point or unless the quantity of water which the dam impounds exceeds one million gallons; nor to a dock, pier, wharf or other structure under the jurisdiction of the department of docks, if any, in a city of over one hundred and seventy-five thousand population. This section as hereby amended shall not impair the effect of an order heretofore made by the conservation commission or commissioner under this section prior to the taking effect of chapter four hundred and ninety-nine of the laws of nineteen hundred and twenty-one, nor require the approval by the superintendent of public works of plans and specifications heretofore approved by such commission or commissioner under this section.

The foregoing information and accompanying plans and specifications are correct to the best of my knowledge and belief.

Village of Leroy, N.Y., Owner.

By The Wm. T. Field Engineers Inc By A. T. Emerson Vice Pres., authorized agent of owner.

Address of signer 40 Flower Bldg., Watertown, N.Y. Date March 15, 1934

Form W51. 5-12-16-3000 (16-16786)

272 Gen. Acc.

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK
CONSERVATION COMMISSION
ALBANY

SUPERSEDED
By 35-1002

DAM REPORT

July 16 (Date), 1917

CONSERVATION COMMISSION,

DIVISION OF WATERS.

SUPERSEDED
By -1002

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Leroy Power and Milling Dam.

This dam is situated upon the Oatka Creek (Give name of stream) in the Town of Leroy, Genesee County, ~~about~~ in (State distance) ~~from~~ the Village ~~or City~~ of Leroy

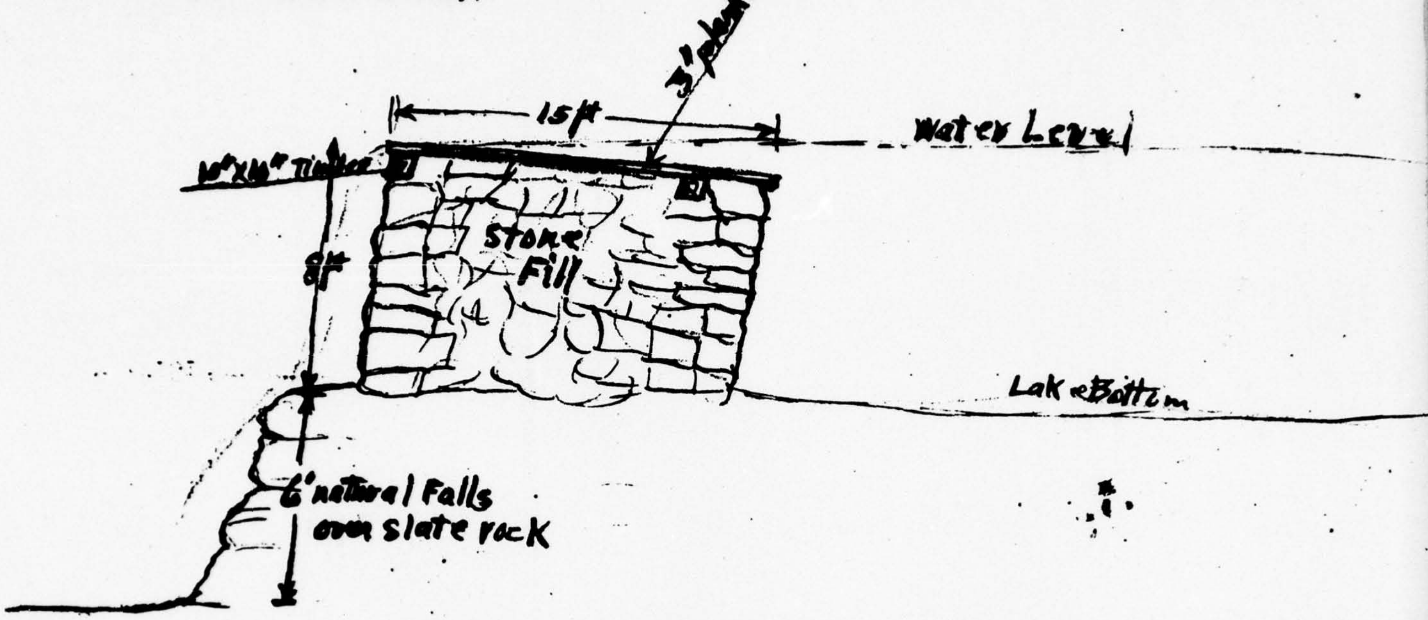
~~The distance~~ (Up or down) ~~stream from~~ the dam, ~~to the~~ is on state Highway to Buffalo (Give name of nearest important stream or of a bridge) is about (State distance)

The dam is now owned by Leroy Power and Milling Co. Leroy N.Y. (Give name and address in full) and was built in or about the year 1830 and was extensively repaired or reconstructed during the year 1917 One gate went out and was built in solid with concrete.

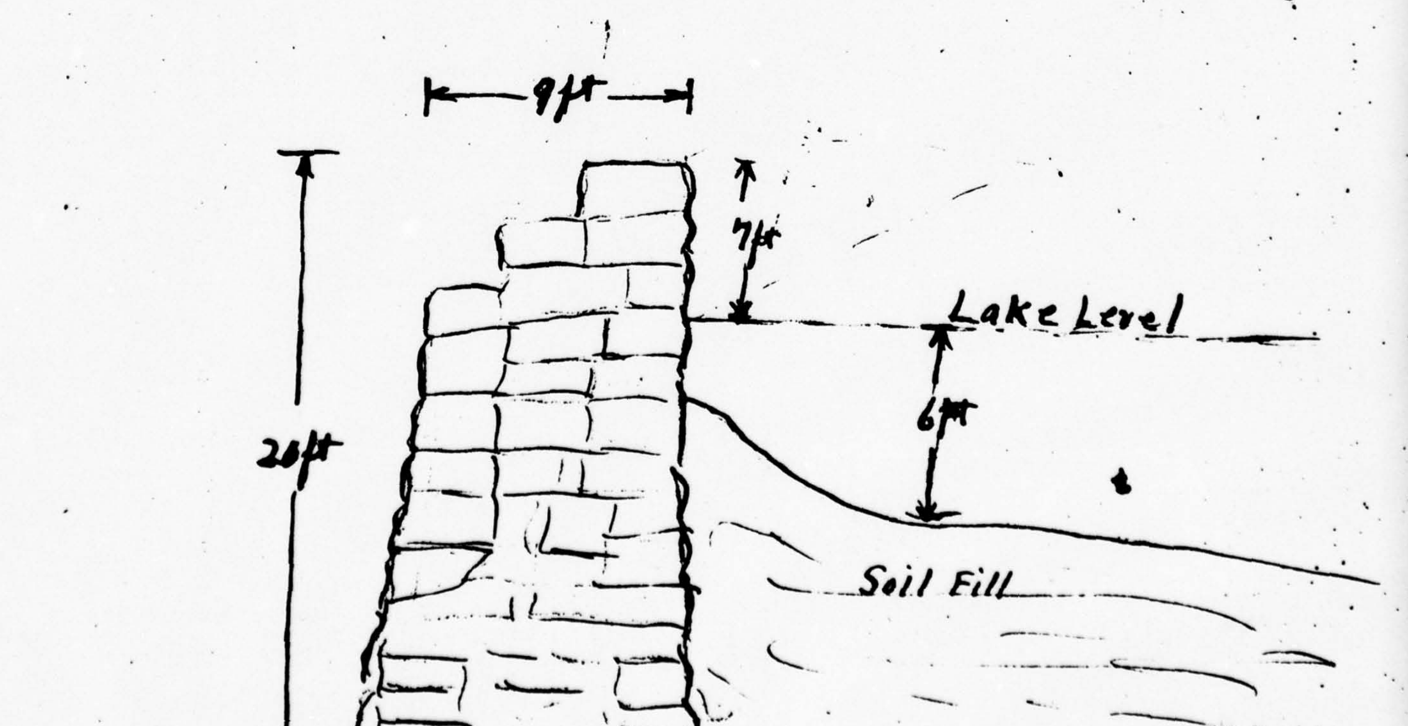
As it now stands, the spillway portion of this dam is built of masonry. (State whether of masonry, concrete or timber) and the other portions are built of masonry (mortar contains much lime (State whether of masonry, concrete, earth or timber with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is slate stone and under the remaining portions such foundation bed is " "

(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)

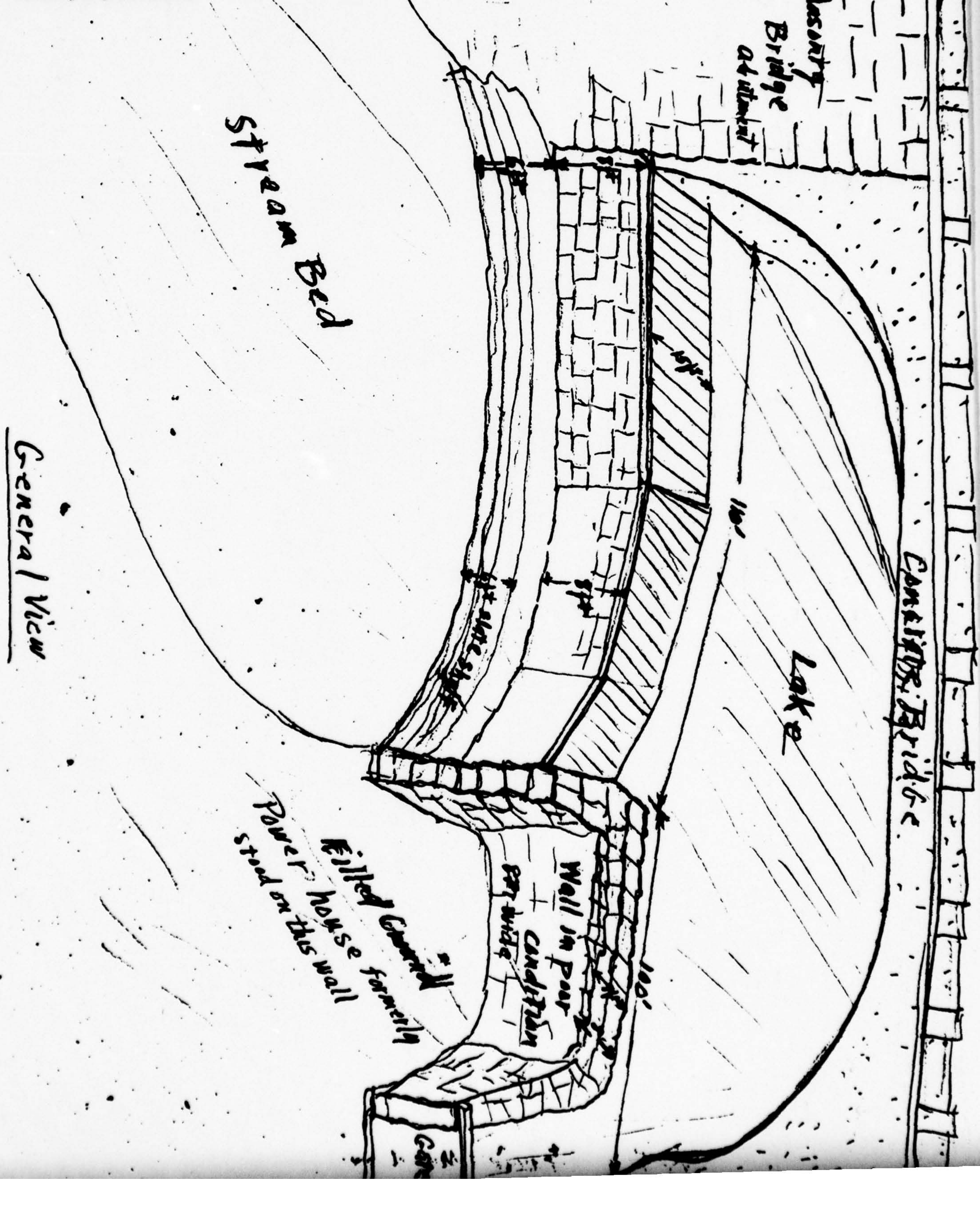


Spillway Cross section



Old Masonry dam abutment put up with mortar containing much Lime

(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam and outline the abutment, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)



The total length of this dam is 220 feet. The spillway or wast weir portion, is about 110 feet long, and the crest of the spillway is about seven feet below the abutment.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: Water is drawn to mill through two gates on east side 6' wide + 5 ft high

At the time of this inspection the water level above the dam was ..... ft. 4 in.

below
above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks or erosions which you may have observed.)

The masonry on the abutment of this dam is in poor condition. But the structure is so heavily built that it is not likely to wash down. A recent flood which was very unusual took out a gate used for power development but the other parts remained intact.

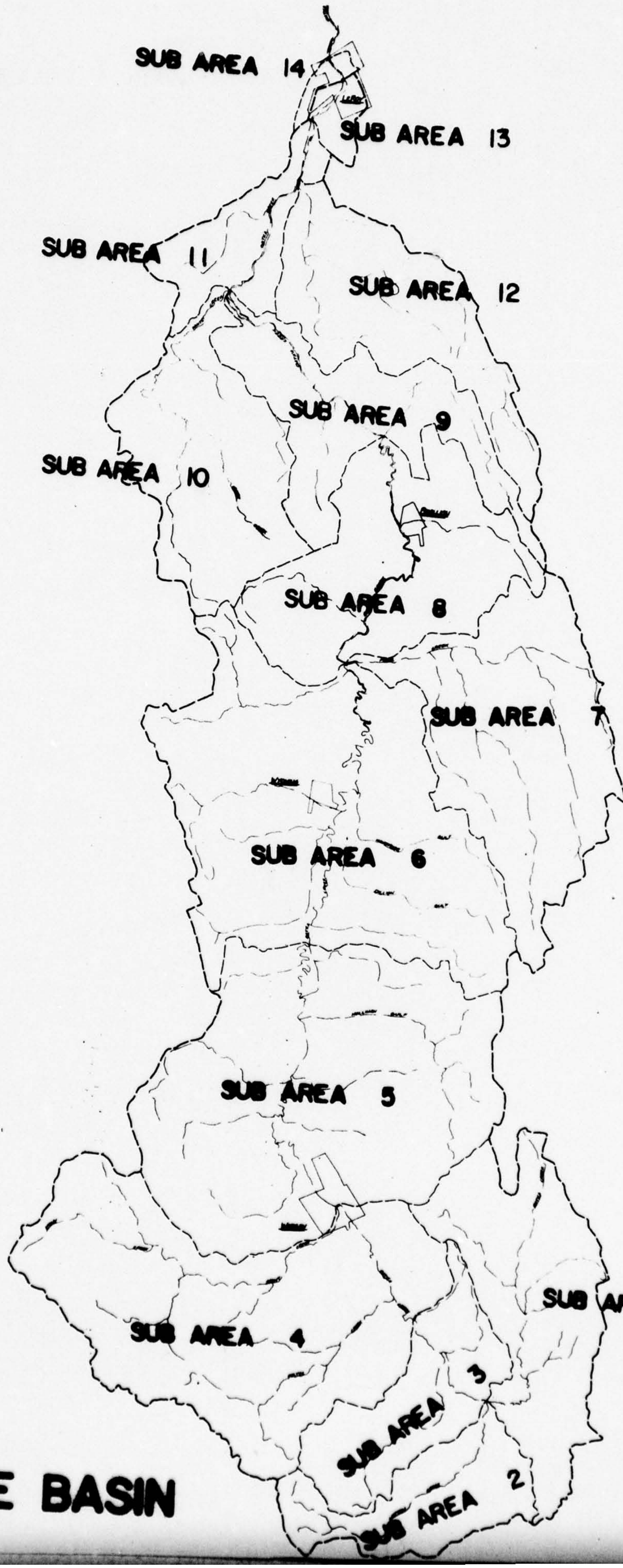
Reported by Vernon Schilt
(Signature)

P.O.B. 177 Port Chester N.Y.
(Address—Street and number, P. O. Box or R. F. D. route)

(Name of place)

APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



DRAINAGE BASIN

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME New York State Dam Inspection DATE 8·3·79

SUBJECT Drainage Basin - Sub Areas PROJECT NO. 2305

Areas DRAWN BY JPG

	Area Sq Mi	Area Acres
Sub Area 1	8.78	5617.08
" " 2	4.94	3160.70
" " 3	5.85	3744.72
" " 4	19.66	12584.02
" " 5	22.20	14206.61
" " 6	21.53	13776.86
" " 7	12.58	8049.59
" " 8	10.97	7021.12
" " 9	7.64	4890.73
" " 10	9.01	5768.60
" " 11	7.57	4845.73
" " 12	8.19	5244.26
" " 13	.84	541.78
" " 14	.37	235.08
Total	140.13	89686.88

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: New York State Dam Inspection — DATE: 8-14-79

SUBJECT: Oatka Creek Dam — PROJECT NO. 2305

Estimate of Clark's Parameters — DRAWN BY: JPG

Estimate of Tc

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

	L(MI)	H(FT)	Tc (HRS)	R
Sub Area 1	6.00	344	9.95	
" " 2	4.31	494	5.91	
" " 3	5.38	643	6.89	
" " 4	8.03	901	9.61	
" " 5	7.77	804	9.67	
" " 6	10.72	743	14.46	
" " 7	7.35	679	9.68	
" " 8	6.44	445	9.78	
" " 9	8.90	303	16.47	
" " 10	6.89	513	10.00	
" " 11	4.47	100	11.39	
" " 12	8.52	330	15.15	
" " 13	1.55	76	3.73	
" " 14	1.32	80	3.03	

SCS

$L = \dfrac{l^{.8}(S+1)^{.7}}{1900\,Y^{.5}}$ $\quad T_c = L/.6$

	l(FT)	S	Y(%)	L	Tc	R
Sub Area 1	31720	3.70	6	2.53	4.22	
" " 2	22780	↓	7	1.79	3.00	
" " 3	28400	↓	5	2.54	4.23	
" " 4	42400	↓	6	3.20	5.33	
" " 5	41000	↓	10	2.40	4.01	
" " 6	56600	↓	10	3.12	5.19	
" " 7	38800	↓	7	2.76	4.59	
" " 8	34000	↓	7	2.48	4.13	
" " 9	47000	↓	7	3.21	5.35	
" " 10	36400	↓	5	3.10	5.16	
" " 11	23600	↓	3	2.82	4.71	
" " 12	45000	↓	5	3.67	6.12	
" " 13	8200	↓	3	1.21	2.02	
" " 14	7000	3.70	3	1.07	1.78	

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 DESIGN BRIEF

PROJECT NAME: New York State Dam Inspection — DATE: 8.14.79

SUBJECT: Oatka Creek Dam — PROJECT NO. 2305

Estimate of Snyder Parameters — DRAWN BY: JPG

640 Cp

$t_p = C_t (L L_{ca})^{.3}$

		C_t	L	L_{ca}	t_p
Sub Area	1	2.5	6.00	2.40	5.56
" "	2	2.5	4.31	2.16	4.88
" "	3	2.5	5.38	2.25	5.28
" "	4	2.5	8.03	4.00	7.08
" "	5	2.0	7.77	3.35	5.32
" "	6	2.0	10.72	5.50	6.80
" "	7	2.5	7.35	4.00	6.89
" "	8	2.5	6.44	3.22	6.21
" "	9	2.5	8.90	3.28	6.88
" "	10	2.5	6.89	3.70	6.60
" "	11	3.0	4.47	2.24	5.99
" "	12	2.5	8.52	2.80	6.47
" "	13	3.0	1.55	.73	3.11
" "	14	3.0	1.32	.66	2.88

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315•797•5800 **DESIGN BRIEF**

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 8.4.79

SUBJECT: OATKA CREEK DAM — PROJECT NO. 2305

ESTIMATE OF SNYDER'S PARAMETERS — DRAWN BY: JPG

$t_r = t_p / 5.5$

	t_p	t_r
SUB AREA 1	5.56	1.01
" " 2	4.88	.89
" " 3	5.28	.96
" " 4	7.08	1.28
" " 5	5.32	.97
" " 6	6.80	1.23
" " 7	6.89	1.25
" " 8	6.21	1.13
" " 9	6.88	1.25
" " 10	6.60	1.20
" " 11	5.99	1.09
" " 12	6.47	1.18
" " 13	3.11	.57
" " 14	2.88	.52

$t_{pr} = t_p + .25 (t_R - t_r)$

t_p	t_R	t_r	t_{pr}
5.56	1	1.01	5.56
4.88	↓	.89	4.91
5.28		.96	5.29
7.08		1.28	7.05
5.32		.97	5.32
6.80		1.23	6.74
6.89		1.25	6.83
6.21		1.13	6.18
6.88		1.25	6.82
6.60		1.20	6.55
5.99		1.09	5.97
6.47		1.18	6.43
3.11	↓	.57	3.22
2.88	1	.52	3.00

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 8.3.79

SUBJECT OATKA CREEK DAM PROJECT NO. 2305

DEPTH - DURATION RELATIONSHIP DRAWN BY JPG

PMF - INDEX RAINFALL - 21"; 200 SQ MI; 24 HRS

DURATION	DEPTH	% INDEX
6 HR	16.80	80
12 HR	19.74	94
24 HR	22.26	106
48 HR	23.10	110

```
(0001)  A1     OATKA CREEK DAM
(0002)  A2     HEC-1DB
(0003)  A3     PMF - OVERTOPPING ANALYSIS
(0004)  B      90      1       0       0       0       0       0       0       4
(0005)  B1      5
(0006)  J       1      6       1
(0007)  J1     .2     .4      .5      .6      .8     1.0
(0008)  K       0      1       0       0       0       0       1
(0009)  K1     SUB AREA-1 RUNOFF
(0010)  M       1      1    8.78       0   140.1       0       0       0       1
(0011)  P       0   21.0      80      94     106     110
(0012)  T       0      0       0       0       0       0       1     0.1
(0013)  W    5.56    .77
(0014)  X      18     18       1
(0015)  K       0      1       0       0       0       0       1
(0016)  K1     SUB AREA-2 RUNOFF
(0017)  M       1      1    4.94       0   140.1       0       0       0       1
(0018)  P       0   21.0      80      94     106     110
(0019)  T       0      0       0       0       0       0       1     0.1
(0020)  W    4.88    .77
(0021)  X      10     10       1
(0022)  K       2    100       0       0       0       0       1
(0023)  K1     COMBINE 2 HYDROGRAPHS AT 100
(0024)  K       1      3       0       0       0       0       1
(0025)  K1     CHANNEL ROUTE THRU SUB AREA-3
(0026)  Y       0      0       0       1       1
(0027)  Y1      1      0       0       0       0       0      -1
(0028)  Y6    .08    .04     .08    1139    1160   11000    .015
(0029)  Y7    100   1160     300    1150     399    1140     400    1139     405    1139
(0030)  Y7    400   1140     900    1150     950    1160
(0031)  K       0      3       0       0       0       0       1
(0032)  K1     SUB AREA-3 RUNOFF
(0033)  M       1      1    5.85       0   140.1       0       0       0       1
(0034)  P       0   21.0      80      94     106     110
(0035)  T       0      0       0       0       0       0       1     0.1
(0036)  W    5.28    .77
(0037)  X      12     12
(0038)  K       2    200       0       0       0       0       1
```

```
(0039)   K1        COMBINE 2 HYDROGRAPHS AT 200
(0040)   K        1        4        0        0        0        0        1
(0041)   K1        CHANNEL ROUTE THRU SUB AREA-4
(0042)   Y        0        0        0        1        1
(0043)   Y1       1        0        0        0        0        0       -1
(0044)   Y6     .08      .04      .08      997     1050    14000     .010
(0045)   Y7     100     1050     1000     1010     1800     1000     1848      997     1875      997
(0046)   Y7    1900     1000     1950     1010     3750     1050
(0047)   K        0        4        0        0        0        0        1
(0048)   K1        SUB AREA-4 RUNOFF
(0049)   M        1        1    19.66        0    104.1        0        0        0        1
(0050)   F        0     21.0       80       94      104      110
(0051)   T        0        0        0        0        0        0        1      0.1
(0052)   W     7.08      .77
(0053)   X       40       40        1
(0054)   K        2      300        0        0        0        0        1
(0055)   K1        COMBINE 2 HYDROGRAPHS AT 300
(0056)   K        1        5        0        0        0        0        1
(0057)   K1        CHANNEL ROUTE THRU SUB AREA-5
(0058)   Y        0        0        0        1        1
(0059)   Y1       1        0        0        0        0        0       -1
(0060)   Y6     .08      .04      .08      949     1000    31000     .001
(0061)   Y7     100     1000     1000      960     1800      950     1850      949     1860      949
(0062)   Y7    1900      950     2150      960     4450      970
(0063)   K        0        5        0        0        0        0        1
(0064)   K1        SUB AREA-5 RUNOFF
(0065)   M        1        1     22.2        0    140.1        0        0        0        1
(0066)   F        0     21.0       80       94      104      110
(0067)   T        0        0        0        0        0        0        1      0.1
(0068)   W     5.32      .77
(0069)   X       44       44        1
(0070)   K        2      400        0        0        0        0        1
(0071)   K1        COMBINE 2 HYDROGRAPHS AT 400
(0072)   K        1        6        0        0        0        0        1
(0073)   K1        CHANNEL ROUTE THRU SUB AREA-6
(0074)   Y        0        0        0        1        1
(0075)   Y1       1        0        0        0        0        0       -1
(0076)   Y6     .08      .04      .08      933      970    46000    .0003
```

(0077)	Y7	100	970	1750	950	2650	940	2700	933	2750	933
(0078)	Y7	2600	940	3600	950	4500	950				
(0079)	K	0	6	0	0	0	0	1			
(0080)	K1	SUB AREA-6 RUNOFF									
(0081)	M	1	1	21.53	0	104.1	0	0	0	1	
(0082)	F	0	21.0	80	94	106	110				
(0083)	T	0	0	0	0	0	0	1	0.1		
(0084)	W	6.80	.77								
(0085)	X	43	43	1							
(0086)	K	0	7	0	0	0	0	1			
(0087)	K1	SUB AREA-7 RUNOFF									
(0088)	M	1	1	12.58	0	104.1	0	0	0	1	
(0089)	F	0	21.0	80	94	106	110				
(0090)	T	0	0	0	0	0	0	1	0.1		
(0091)	W	6.89	.77								
(0092)	X	25	25	1							
(0093)	K	3	500	0	0	0	0	1			
(0094)	K1	COMBINE 3 HYDROGRAPHS AT 500									
(0095)	K	1	8	0	0	0	0	1			
(0096)	K1	CHANNEL ROUTE THRU SUB AREA-8									
(0097)	Y	0	0	0	1	1					
(0098)	Y1	1	0	0	0	0	0	-1			
(0099)	Y6	.08	.04	.08	918	950	30200	.0007			
(0100)	Y7	100	950	700	930	1100	920	1125	918	1175	918
(0101)	Y7	1200	920	2100	940	3000	950				
(0102)	K	0	8	0	0	0	0	1			
(0103)	K1	SUB AREA-8 RUNOFF									
(0104)	M	1	1	10.97	0	104.1	0	0	0	1	
(0105)	F	0	21.0	80	94	106	110				
(0106)	T	0	0	0	0	0	0	1	0.1		
(0107)	W	6.21	.77								
(0108)	X	22	22	1							
(0109)	K	2	600	0	0	0	0	1			
(0110)	K1	COMBINE 2 HYDROGRAPHS AT 600									
(0111)	K	1	9	0	0	0	0	1			
(0112)	K1	CHANNEL ROUTE THRU SUB AREA-9									
(0113)	Y	0	0	0	1	1					
(0114)	Y1	1	0	0	0	0	0	-1			

```
(0115)   Y6    .08      .04      .08      911      950    20500    .0004
(0116)   Y7    100      950      700      930     1200      920     1210      919     1250      919
(0117)   Y7   1400      920     1600      940     3200      930
(0118)   K       0        9        0        0        0        0        1
(0119)   K1         SUB AREA-9 RUNOFF
(0120)   M       1        1     7.64        0    104.1        0        0        0        1
(0121)   P       0     21.0       80       94      106      110
(0122)   T       0        0        0        0        0        0        1      0.1
(0123)   W    6.98      .77
(0124)   X      15       15        1
(0125)   K       0       10        0        0        0        0        1
(0126)   K1         SUB AREA-10 RUNOFF
(0127)   M       1        1     9.01        0    104.1        0        0        0        1
(0128)   P       0     21.0       80       94      106      110
(0129)   T       0        0        0        0        0        0        1      0.1
(0130)   W    6.60      .77
(0131)   X      19       18        1
(0132)   K       3      700        0        0        0        0        1
(0133)   K1         COMBINE 3 HYDROGRAPGHS AT 700
(0134)   K       1       11        0        0        0        0        1
(0135)   K1         CHANNEL ROUTE THRU SUB AREA-11
(0136)   Y       0        0        0        1        1
(0137)   Y1      1        0        0        0        0        0       -1
(0138)   Y6    .08      .04      .08      896      910    11600     .002
(0139)   Y7    100      910      500      900      750      898      760      896      850      896
(0140)   Y7    860      898     1000      900     1100      910
(0141)   K       0       11        0        0        0        0        1
(0142)   K1         SUB AREA-11 RUNOFF
(0143)   M       1        1     7.57        0    104.1        0        0        0        1
(0144)   P       0     21.0       80       94      106      110
(0145)   T       0        0        0        0        0        1      0.1
(0146)   W    5.99      .77
(0147)   X      15       15        1
(0148)   K       0       12        0        0        0        1
(0149)   K1         SUB AREA-12 RUNOFF
(0150)   M       1        1     8.19        0    104.1        0        0        0        1
(0151)   P       0     21.0       80       94      106      110
(0152)   T       0        0        0        0        0        0        1      0.1
```

```
(C153)  W    6.47     .77
(C154)  X    16       16       1
(C155)  K    3        800      0        0        0        0        1
(C156)  K1         COMBINE 3 HYDROGRAPHS AT 800
(C157)  K    1        13       0        0        0        0        1
(C158)  K1         CHANNEL ROUTE THRU SUB AREA-13
(C159)  Y    0        0        0        1        1
(C160)  Y1   1        0        0        0        0        0        -1
(C161)  Y6   .08      .04      .08      860      880      4500     .001
(C162)  Y7   100      880      180      870      250      864      265      860      475      860
(C163)  Y7   500      864      600      878      700      880
(C164)  K    0        13       0        0        0        0        1
(C165)  K1         SUB AREA-13 RUNOFF
(C166)  M    1        1        .84      0        104.1    0        0        0        1
(C167)  P    0        21.0     80       94       106      110
(C168)  T    0        0        0        0        0        0        1        0.1
(C169)  W    3.11     .77
(C170)  X    2        2        1
(C171)  K    2        900      0        0        0        0        1
(C172)  K1         COMBINE 2 HYDROGRAPHS AT 900
(C173)  K    1        900      0        0        0        0        1
(C174)  K1         ROUTE OVER OATKA CREEK DAM
(C175)  Y    0        0        0        1        1
(C176)  Y1   1        0        0        0        0        0        -1
(C177)  $S   0        230      310      390      470      550      630      710      780      860
(C178)  $S   940      1020     1100     1180     1260
(C179)  $E   856      864      866      868      870      872      874      876      878      880
(C180)  $E   882      884      886      888      890
(C181)  $$   864      160      3.2      1.5
(C182)  $D   866      2.64     1.5      20
(C183)  K    1        14       0        0        0        0        1
(C184)  K1         CHANNEL ROUTE THRU SUB AREA-14
(C185)  Y    0        0        0        1        1
(C186)  Y1   1        0        0        0        0        0        -1
(C187)  Y6   .08      .04      .08      835      860      2100     .007
(C188)  Y7   100      860      250      850      300      840      310      835      350      835
(C189)  Y7   340      840      425      850      500      860
(C190)  K    0        14       0        0        0        0        1
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```
(0191)  K1      SUB AREA-14 RUNOFF
(0192)  M      1     1    .37     0  104.1     0     0     0     1
(0193)  F      0  21.0     80    94    106   110
(0194)  T      0     0      0     0      0     0     1   0.1
(0195)  W   2.88   .77
(0196)  X      1     1      1
(0197)  K      2  1000      0     0      0     0     1
(0198)  K1      COMBINE 2 HYDROGRAPHS AT 1000
(0199)  K     99
(0200)  A
(0201)  A
(0202)  A
(0203)  A
(0204)  A
```

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION       JULY 1978
  LAST MODIFICATION  26 FEB 79
**********************************

RUN  DATE?WED, AUG 29 1979
     TIME?16:12:00

                         OATKA CREEK DAM
                         HEC-1DB
                         PMF - OVERTOPPING ANALYSIS

                                        JOB SPECIFICATION
                   NQ      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
                   90        1        0        0        0        0        0        0        4        0
                                              JOPER      NWT    LROPT    TRACE
                                                  5        0        0        0

                                 MULTI-PLAN ANALYSES TO BE PERFORMED
                                     NPLAN= 1 NRTIO= 6 LRTIO= 1
                    RTIOS=   0.20    0.40    0.50    0.60    0.80    1.00

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

                                    SUB-AREA RUNOFF COMPUTATION

                    SUB AREA-1 RUNOFF
                              ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                                  1        0        0        0        0        0        1        0        0

                                        HYDROGRAPH DATA
                  IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                      1        1     8.78     0.00   140.10     0.00    0.000        0        1        0

                                         PRECIP DATA
                         SPFE      PMS       R6      R12      R24      R48      R72      R96
                         0.00    21.00    80.00    94.00   106.00   110.00     0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.875

                                           LOSS DATA
               LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
                   0     0.00     0.00     1.00     0.00     0.00     1.00     1.00     0.10     0.00     0.00

                                      UNIT HYDROGRAPH DATA
                                  TP=  5.56     CP=0.77      NTA=  0

                                          RECESSION DATA
                           STRTQ=    18.00     QRCSN=    18.00     RTIOR= 1.00
```

```
        UNIT HYDROGRAPH 21 END-OF-PERIOD ORDINATES, LAG=   5.58 HOURS, CP= 0.77  VOL= 1.00
    59.      211.      401.      592.      731.      780.      738.      597.      432.      312.
   225.      163.      117.       85.       61.       44.       32.       23.       17.       12.
     9.

     0                                END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                      SUM  20.21  16.99   3.22    97428.
                                                                          ( 513.)( 431.)(  82.)( 2758.85)


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

                                   SUB-AREA RUNOFF COMPUTATION

              SUB AREA-2 RUNOFF
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             1       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1       1    4.94    0.00  140.10    0.00   0.000       0       1       0

                                          PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.875

                                           LOSS DATA
             LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
                 0   0.00   0.00   1.00   0.00   0.00   1.00   1.00   0.10   0.00   0.00

                                     UNIT HYDROGRAPH DATA
                                TP=  4.88     CP=0.77     NTA=  0

                                         RECESSION DATA
                           STRTQ=    10.00    QRCSN=    10.00     RTIOR= 1.00

        UNIT HYDROGRAPH 16 END-OF-PERIOD ORDINATES, LAG=   4.85 HOURS, CP= 0.76  VOL= 1.00
    47.      164.      308.      435.      500.      484.      386.      268.      185.      127.
    88.       61.       42.       29.       20.       14.        9.        7.

     0                                END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                      SUM  20.21  16.99   3.22    54775.
                                                                          ( 513.)( 431.)(  82.)( 1551.05)
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**********          **********          **********          **********          **********

                                  . COMBINE HYDROGRAPHS

           COMBINE 2 HYDROGRAPHS AT 100
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       100       2       0       0       0       0       1       0       0

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

                                  HYDROGRAPH ROUTING

           CHANNEL ROUTE THRU SUB AREA-3
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         3       1       0       0       0       0       1       0       0
                                        ROUTING DATA
           QLOSS     CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
             0.0     0.000    0.00       1       1       0       0               0

                     NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                         1       0       0   0.000   0.000   0.000     -1.       0


NORMAL DEPTH CHANNEL ROUTING
----------------------------

      QN(1)    QN(2)    QN(3)   ELNVT   ELMAX   RLNTH    SEL
     0.0800   0.0400   0.0800  1139.0  1160.0  11000. 0.01500

      CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
       100.00 1160.00  300.00 1150.00  399.00 1140.00  400.00 1139.00  405.00 1139.00
       406.00 1140.00  900.00 1150.00  950.00 1160.00

STORAGE        0.00       1.78      14.63      45.76      95.18     162.90     248.91     353.21     475.80
             775.85     947.55    1126.92    1314.02    1508.84    1711.36    1921.60    2139.55    2365.21

OUTFLOW        0.00      27.91     170.32     602.69    1465.41    2876.76    4942.88    7761.74   11425.18
           21669.97   29231.83   37915.88   47704.36   58591.05   70576.48   83665.67   97866.36  113188.63

STAGE       1139.00    1140.11    1141.21    1142.32    1143.42    1144.53    1145.63    1146.74    1147.84
            1150.05    1151.16    1152.26    1153.37    1154.47    1155.58    1156.68    1157.79    1158.89

FLOW           0.00      27.91     170.32     602.69    1465.41    2876.76    4942.88    7761.74   11425.18
           21669.97   29231.83   37915.88   47704.36   58591.05   70576.48   83665.67   97866.36  113188.63

MAXIMUM STAGE IS     1144.7
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MAXIMUM STAGE IS    1146.2

MAXIMUM STAGE IS    1146.8

MAXIMUM STAGE IS    1147.3

MAXIMUM STAGE IS    1148.2

MAXIMUM STAGE IS    1149.0


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

                                        SUB-AREA RUNOFF COMPUTATION

                    SUB AREA-3 RUNOFF
                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                  3       0       0       0       0       0       1       0       0

                                             HYDROGRAPH DATA
                 IHYDG    IUHG   TAREA    SNAF   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                     1       1    5.85    0.00  140.10    0.00   0.000       0       1       0

                                              PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.875

                                               LOSS DATA
              LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                  0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                          UNIT HYDROGRAPH DATA
                                       TP=  5.28     CP=0.77     NTA=  0

                                             RECESSION DATA
                                STRTQ=    12.00     QRCSN=    12.00     RTIOR= 1.00

                 UNIT HYDROGRAPH 19 END-OF-PERIOD ORDINATES, LAG=   5.27 HOURS, CP= 0.76   VOL= 1.00
              44.      156.      295.      429.      522.      547.      502.      390.      271.      188.
             131.       91.       63.       44.       31.       21.       15.       10.        7.

          0                                 END-OF-PERIOD FLOW
      MO.DA  HR.MN  PERIOD    RAIN    EXCS    LOSS     COMP Q      MO.DA  HR.MN  PERIOD    RAIN    EXCS    LOSS     COMP Q

                                                                                SUM  20.21   16.99    3.22     64895.
                                                                                   ( 513.)( 431.)(  82.)( 1837.62)
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***********        ***********        ***********        ***********        ***********

                              COMBINE HYDROGRAPHS

            COMBINE 2 HYDROGRAPHS AT 200
                 ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                   200       2       0       0       0       0       1       0       0


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

                              HYDROGRAPH ROUTING

            CHANNEL ROUTE THRU SUB AREA-4
                 ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     4       1       0       0       0       0       1       0       0
                                      ROUTING DATA
            QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
              0.0    0.000    0.00       1       1       0       0               0

                 NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                     1       0       0   0.000   0.000   0.000     -1.       0


NORMAL DEPTH CHANNEL ROUTING
----------------------------

     QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
    0.0800  0.0400  0.0800   997.0  1050.0  14000. 0.01000

     CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
      100.00 1050.00 1000.00 1010.00 1800.00 1000.00 1848.00  997.00 1875.00  997.00
     1900.00 1000.00 1950.00 1010.00 3750.00 1050.00

STORAGE        0.00      54.63     234.95     627.40    1232.42    2047.47    3040.87    4203.07    5534.08
            8702.48   10539.80   12545.91   14720.80   17064.48   19576.95   22258.20   25108.23   28127.05

OUTFLOW        0.00     932.37    5156.52   14554.29   30876.01   56235.73   93157.55  140755.88  199678.81
          354601.56  452155.25  564128.00  691271.75  834323.88  994009.25 1171039.75 1366114.50 1579922.25

STAGE        997.00     999.79    1002.58    1005.37    1008.16    1010.95    1013.74    1016.53    1019.32
            1024.89    1027.68    1030.47    1033.26    1036.05    1038.84    1041.63    1044.42    1047.21

FLOW           0.00     932.37    5156.52   14554.29   30876.01   56235.73   93157.55  140755.88  199678.81
          354601.56  452155.25  564128.00  691271.75  834323.88  994009.25 1171039.75 1366114.50 1579922.25

MAXIMUM STAGE IS     1002.2
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MAXIMUM STAGE IS    1005.2

MAXIMUM STAGE IS    1004.4

MAXIMUM STAGE IS    1005.1

MAXIMUM STAGE IS    1006.0

MAXIMUM STAGE IS    1006.8

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                                SUB-AREA RUNOFF COMPUTATION

              SUB AREA-4 RUNOFF
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             4       0       0       0       0       0       1       0       0

                                    HYDROGRAPH DATA
            IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                1       1   19.66    0.00  104.10    0.00   0.000       0       1       0

                                      PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.00   80.00   94.00  104.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                       LOSS DATA
        LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
            0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                  UNIT HYDROGRAPH DATA
                              TP=  7.08     CP=0.77     NTA=  0

                                     RECESSION DATA
                      STRTQ=    40.00     QRCSN=    40.00     RTIOR= 1.00

          UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG=    7.02 HOURS, CP= 0.76  VOL= 1.00
           78.      283.      548.      830.     1101.     1302.     1395.     1385.     1252.     1019.
          788.      610.      472.      366.      283.      219.      170.      131.      102.       79.
           61.       47.       36.       28.       22.       17.

    0                                END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  20.05  16.56   3.49  212576.
                                                                              ( 509.)( 421.)(  89.)( 6019.48)

        **********       **********       **********       **********       **********
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                              COMBINE HYDROGRAPHS

              COMBINE 2 HYDROGRAPHS AT 300
                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          300       2       0       0       0       0       1       0       0


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

                              HYDROGRAPH ROUTING

              CHANNEL ROUTE THRU SLB AREA-5
                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            5       1       0       0       0       0       1       0       0
                                              ROUTING DATA
               QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                 0.0    0.000    0.00       1       1       0       0               0

                        NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                            1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

     QN(1)    QN(2)    QN(3)    ELNVT   ELMAX   RLNTH     SEL
    0.0800   0.0400   0.0800    949.0  1000.0  31000. 0.00100

     CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
       100.00 1000.00 1000.00  960.00 1800.00  950.00 1850.00  949.00 1860.00  949.00
      1900.00  950.00 2150.00  960.00 4450.00  970.00

 STORAGE        0.00      264.98     1063.01     2399.42     4274.22     6995.04    11006.92    16313.49    22896.39
            37208.14    44537.08    51981.38    59541.04    67216.08    75006.48    82912.27    90933.41    99069.91

 OUTFLOW        0.00      527.91     2668.51     7024.60    14149.81    24591.08    41161.73    64661.28    97107.48
           195179.56   255859.94   323830.13   398852.88   480746.56   569368.63   664606.13   766367.88   874580.00

   STAGE      949.00      951.68      954.37      957.05      959.74      962.42      965.11      967.79      970.47
              975.84      978.53      981.21      983.89      986.58      989.26      991.95      994.63      997.32

    FLOW        0.00      527.91     2668.51     7024.60    14149.81    24591.08    41161.73    64661.28    97107.48
           195179.56   255859.94   323830.13   398852.88   480746.56   569368.63   664606.13   766367.88   874580.00

MAXIMUM STAGE IS     956.6

MAXIMUM STAGE IS     959.4

MAXIMUM STAGE IS     960.4
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MAXIMUM STAGE IS     961.3

MAXIMUM STAGE IS     962.8

MAXIMUM STAGE IS     964.0


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

                                   SUB-AREA RUNOFF COMPUTATION

                    SUB AREA-5 RUNOFF
                         ISTAQ    ICOMP    IECON    ITAPE    JPLT     JPRT    INAME  ISTAGE   IAUTO
                             5        0        0        0       0        0        1       0       0

                                             HYDROGRAPH DATA
                  IHYDG    IUHG   TAREA    SNAF   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                      1       1   22.20    0.00  140.10    0.00   0.000       0       1       0

                                               PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.00   80.00   94.00  104.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.875

                                                LOSS DATA
              LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                  0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                          UNIT HYDROGRAPH DATA
                                     TP=  5.32      CP=0.77     NTA=  0

                                             RECESSION DATA
                            STRTQ=    44.00      QRCSN=    44.00      RTIOR= 1.00

                 UNIT HYDROGRAPH 19 END-OF-PERIOD ORDINATES, LAG=   5.32 HOURS, CP= 0.77  VOL= 1.00
             166.       585.      1104.      1611.      1964.      2065.      1910.      1497.      1041.       724.
             503.       350.       243.       169.       118.        82.        57.        40.        27.

           0                                     END-OF-PERIOD FLOW
        MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q        MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                                    SUM   20.21  16.70   3.50  242088.
                                                                                        ( 513.)( 424.)( 89.)( 6855.16)


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

                                           COMBINE HYDROGRAPHS
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```
COMBINE 2 HYDROGRAPHS AT 400
            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
              400       2       0       0       0       0       1       0       0

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

                              HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SUB AREA-6
            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                6       1       0       0       0       0       1       0       0
                                  ROUTING DATA
    QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
      0.0   0.000    0.00       1       1       0       0               0

            NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

   QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
  0.0800  0.0400  0.0800   933.0   970.0  46000. 0.00030

   CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
    100.00  970.00 1750.00  950.00 2650.00  940.00 2700.00  933.00 2750.00  933.00
   2800.00  940.00 3600.00  950.00 4500.00  950.00

STORAGE        0.00     131.42     320.04     565.87     920.09    1844.74    3450.11    5736.20    8703.01
           18746.38   24925.97   31555.91   38456.20   45686.85   53247.84   61139.19   69360.89   77912.92

OUTFLOW        0.00     109.55     393.45     869.85    1638.44    2962.67    5059.57    8161.70   12470.73
           26230.09   37743.18   51508.41   67492.28   85686.00  106095.28  128735.09  153626.69  180795.75

  STAGE      933.00     934.95     936.89     938.84     940.79     942.74     944.68     946.63     948.58
             952.47     954.42     956.37     958.31     960.26     962.21     964.16     966.10     968.05

   FLOW        0.00     109.55     393.45     869.85    1638.44    2962.67    5059.57    8161.70   12470.73
           26230.09   37743.18   51508.41   67492.28   85686.00  106095.28  128735.09  153626.69  180795.75

MAXIMUM STAGE IS     945.3

MAXIMUM STAGE IS     948.6

MAXIMUM STAGE IS     949.8

MAXIMUM STAGE IS     950.8
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MAXIMUM STAGE IS      952.3

MAXIMUM STAGE IS      953.7

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

                              SUB-AREA RUNOFF COMPUTATION

                SUB AREA-6 RUNOFF
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         6       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
          IHYDG     IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1        1   21.53    0.00  104.10    0.00   0.000       0       1       0

                                          PRECIP DATA
                  SPFE      PMS      R6     R12     R24     R48     R72     R96
                  0.00    21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                           LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                     UNIT HYDROGRAPH DATA
                               TP=  6.80    CP=0.77    NTA=  0

                                       RECESSION DATA
                     STRTQ=    43.00     QRCSN=    43.00     RTIOR= 1.00

          UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG=   6.79 HOURS, CP= 0.77   VOL= 1.00
          93.      334.      648.      979.      1288.     1502.     1584.     1540.     1337.     1052.
         810.      624.      481.      371.       285.      220.      169.      130.      101.       77.
          60.       46.       35.       27.        21.       16.

     0                                 END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                           SUM  20.05  16.83   3.21   236738.
                                                                             ( 509.)( 428.)(  82.)( 6703.67)

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

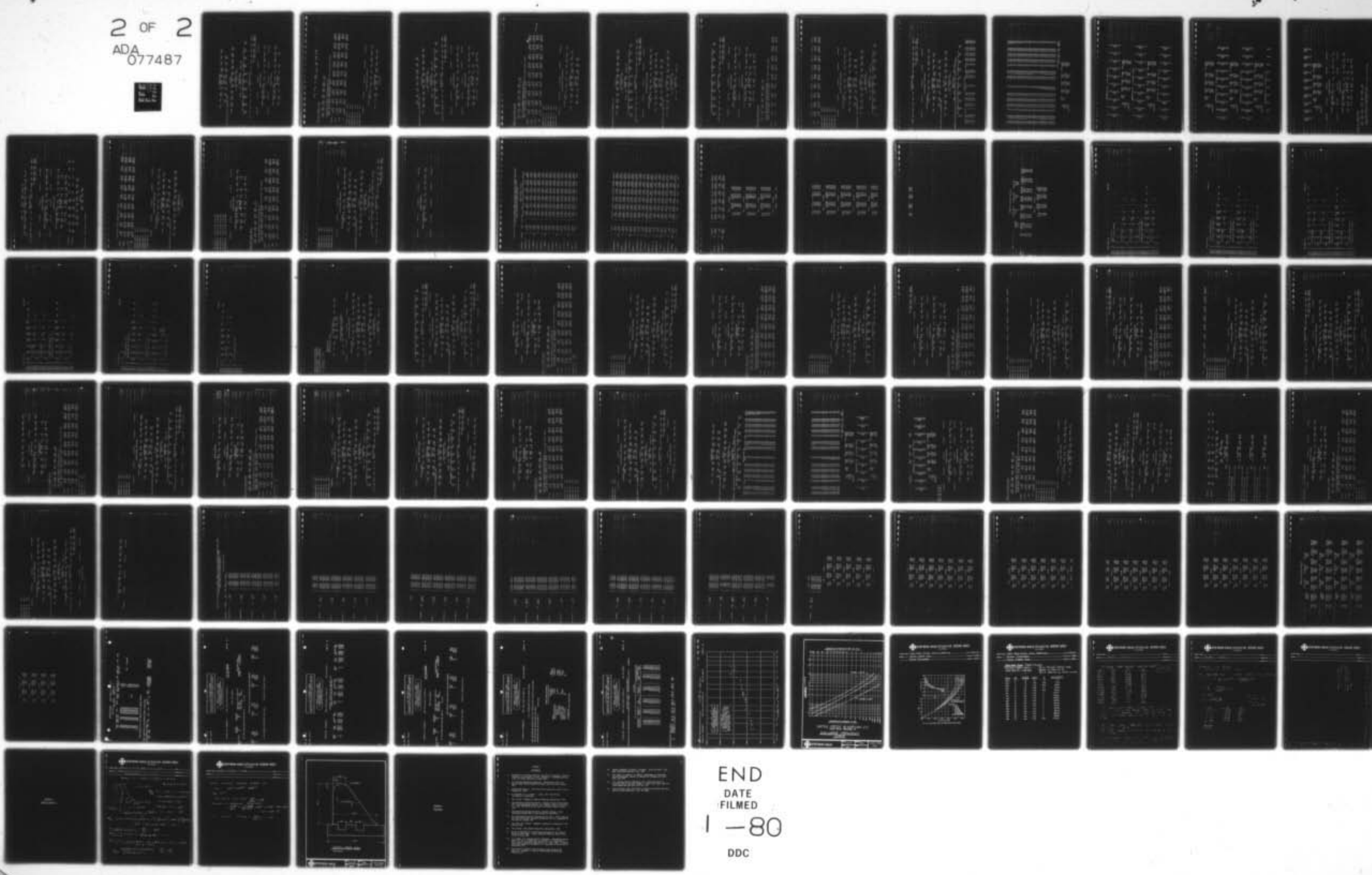
                              SUB-AREA RUNOFF COMPUTATION

                SUB AREA-7 RUNOFF
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         7       0       0       0       0       0       1       0       0
```

AD-A077 487 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. OATKA CREEK DAM (NY 435), GENESEE --ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

UNCLASSIFIED NL

2 OF 2
ADA 077487



END
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1 -80
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```
                              HYDROGRAPH DATA
    IHYDG    IUHG   TAREA    SNAF   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
        1       1   12.58    0.00  104.10    0.00   0.000       0       1       0
                               PRECIP DATA
            SPFE     PMS      R6     R12     R24     R48     R72     R96
            0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                LOSS DATA
  LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
      0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                          UNIT HYDROGRAPH DATA
                      TP=  6.89    CP=0.77     NTA=  0

                             RECESSION DATA
                STRTQ=   25.00    QRCSN=   25.00    RTIOR= 1.00

    UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG=   6.86 HOURS, CP= 0.76  VOL= 1.00
     53.       190.       368.       558.       736.       861.       912.       891.       781.       620.
    481.       373.       290.       225.       174.       135.       105.        81.        63.        49.
     38.        30.        23.        18.        14.        11.

      0                               END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                            SUM  20.05  16.83   3.21   138226.
                                                                ( 509.)( 428.)(  82.)( 3914.12)

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

                          COMBINE HYDROGRAPHS

         COMBINE 3 HYDROGRAPHS AT 500
                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    500       3       0       0       0       0       1       0       0

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

                          HYDROGRAPH ROUTING

         CHANNEL ROUTE THRU SUB AREA-8
                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      8       1       0       0       0       0       1       0       0
                                ROUTING DATA
          QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP           LSTR
            0.0   0.000    0.00       1       1       0       0              0
```

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0400	0.0800	918.0	950.0	30200.	0.00070

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

```
 100.00  950.00  700.00  930.00 1100.00  920.00 1125.00  918.00 1175.00  918.00
1200.00  920.00 2100.00  940.00 3000.00  950.00
```

STORAGE	0.00	82.96	254.04	590.20	1093.52	1763.99	2601.63	3606.42	4770.84
	7542.47	9149.52	10904.07	12806.11	14894.52	17218.75	19778.97	22575.18	25607.37
OUTFLOW	0.00	140.29	600.54	1489.81	2915.18	4977.50	7769.48	11378.04	15947.81
	28007.03	35607.34	44333.75	54243.99	64450.93	76192.83	89607.16	104771.55	121769.77
STAGE	918.00	919.68	921.37	923.05	924.74	926.42	928.11	929.79	931.47
	934.84	936.53	938.21	939.89	941.58	943.26	944.95	946.63	948.32
FLOW	0.00	140.29	600.54	1489.81	2915.18	4977.50	7769.48	11378.04	15947.81
	28007.03	35607.34	44333.75	54243.99	64450.93	76192.83	89607.16	104771.55	121769.77

MAXIMUM STAGE IS 928.9

MAXIMUM STAGE IS 932.7

MAXIMUM STAGE IS 934.1

MAXIMUM STAGE IS 935.3

MAXIMUM STAGE IS 937.6

MAXIMUM STAGE IS 939.6

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

SUB-AREA RUNOFF COMPUTATION

SUB AREA-8 RUNOFF

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	10.97	0.00	104.10	0.00	0.000	0	1	0

PRECIP DATA

```
                    SPFE     PMS      R6      R12      R24      R48      R72      R96
                    0.00   21.00   80.00    94.00   106.00   110.00     0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                         LOSS DATA
         LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
             0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                    UNIT HYDROGRAPH DATA
                               TP=  6.21      CP=0.77     NTA=  0

                                       RECESSION DATA
                         STRTQ=   22.00    QRCSN=   22.00    RTIOR= 1.00

           UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG=   6.18 HOURS, CP= 0.76  VOL= 1.00
          58.       207.       395.       591.       761.       862.       880.       816.       662.       488.
         359.       264.       194.       143.       105.        77.        57.        42.        31.        23.
          17.        12.

       0                                 END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  20.05  16.83   3.21   120524.
                                                                             ( 509.)( 428.)(  82.)( 3412.86)


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

                                    COMBINE HYDROGRAPHS

                  COMBINE 2 HYDROGRAPHS AT 600
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           600       2       0       0       0       0       1       0       0

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

                                    HYDROGRAPH ROUTING

                  CHANNEL ROUTE THRU SUB AREA-9
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             9       1       0       0       0       0       1       0       0
                                              ROUTING DATA
                  QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                    0.0   0.000    0.00       1       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             1       0       0   0.000   0.000   0.000     -1.       0
```

```
NORMAL DEPTH CHANNEL ROUTING
----------------------------

      QN(1)    QN(2)    QN(3)    ELNVT    ELMAX    RLNTH      SEL
     0.0800   0.0400   0.0800    911.0    950.0   20500.  0.00040

     CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
       100.00   950.00   700.00   930.00  1200.00   920.00  1210.00   919.00  1250.00   919.00
      1400.00   920.00  1600.00   940.00  3200.00   930.00

 STORAGE       0.00        0.00        0.00        0.00        5.63      197.88      523.77      968.63     1532.45
            3093.73     4359.65     6022.13     8081.16    10536.76    13260.87    16047.24    18893.08    21798.41

 OUTFLOW       0.00        0.00        0.00        0.00        2.65      433.34     1621.15     3547.03     6261.90
           14171.87    20121.23    27854.68    37662.46    49824.82    65863.80    84588.95   105697.48   129114.52

   STAGE     911.00      913.05      915.11      917.16      919.21      921.26      923.32      925.37      927.42
             931.53      933.58      935.63      937.68      939.74      941.79      943.84      945.89      947.95

    FLOW       0.00        0.00        0.00        0.00        2.65      433.34     1621.15     3547.03     6261.90
           14171.87    20121.23    27854.68    37662.46    49824.82    65863.80    84588.95   105697.48   129114.52

MAXIMUM STAGE IS     929.6

MAXIMUM STAGE IS     933.7

MAXIMUM STAGE IS     935.1

MAXIMUM STAGE IS     936.3

MAXIMUM STAGE IS     938.5

MAXIMUM STAGE IS     940.4

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

                              SUB-AREA RUNOFF COMPUTATION

                 SUB AREA-9 RUNOFF
                           ISTAG   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               9       0       0       0       0       0       1       0       0

                                    HYDROGRAPH DATA
               IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                   1       1    7.64    0.00  104.10    0.00   0.000       0       1       0

                                      PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                    0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
```

```
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                  LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                  UNIT HYDROGRAPH DATA
                             TP=  6.88    CP=0.77    NTA=  0

                                  RECESSION DATA
                   STRTQ=   15.00   QRCSN=   15.00   RTIOR= 1.00

           UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG=  6.85 HOURS, CP= 0.76  VOL= 1.00
          32.      116.      224.      340.      448.      524.      554.      542.      474.      376.
         292.      226.      175.      136.      106.       82.       63.       49.       38.       30.
          23.       18.       14.       11.        8.        6.

                                  END-OF-PERIOD FLOW
    MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                            SUM   20.05  16.83   3.21    83934.
                                                                                ( 509.)( 428.)(  82.)( 2376.74)

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

                              SUB-AREA RUNOFF COMPUTATION

               SUB AREA-10 RUNOFF
                        ISTAQ   ICOMP   IECON   ITAPE   JPLT    JPRT   INAME  ISTAGE   IAUTO
                           10       0       0       0      0       0       1       0       0

                                  HYDROGRAPH DATA
             IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                 1       1    9.01    0.00  104.10    0.00   0.000       0       1       0

                                  PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                    0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                  LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                  UNIT HYDROGRAPH DATA
                             TP=  6.60    CP=0.77    NTA=  0

                                  RECESSION DATA
                   STRTQ=   18.00   QRCSN=   18.00   RTIOR= 1.00
```

```
          UNIT HYDROGRAPH 25 END-OF-PERIOD ORDINATES, LAG=   6.62 HOURS, CP= 0.77  VOL= 1.00
      41.      147.      285.      429.      561.      650.      680.      654.      558.      431.
     328.      250.      190.      145.      110.       84.       64.       49.       37.       28.
      21.       16.       12.        9.        7.

     0                                     END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                     SUM  20.05  16.83   3.21    99066.
                                                                         ( 509.)( 428.)(  82.)( 2805.23)


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

                                        COMBINE HYDROGRAPHS

                COMBINE 3 HYDROGRAPHS AT 700
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           700       3       0       0       0       0       1       0       0

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

                                        HYDROGRAPH ROUTING

                CHANNEL ROUTE THRU SUB AREA-11
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            11       1       0       0       0       0       1       0       0
                                             ROUTING DATA
                 QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                   0.0   0.000    0.00       1       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

     QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
    0.0800  0.0400  0.0800   896.0   910.0  11600. 0.00200

     CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
       100.00  910.00  500.00  900.00  750.00  898.00  760.00  896.00  850.00  896.00
       860.00  898.00 1000.00  900.00 1100.00  910.00

STORAGE        0.00      18.38      38.21      60.57     104.31     176.23     272.92     378.77     491.85
             739.70     874.46    1016.46    1165.68    1322.13    1485.81    1656.72    1834.86    2020.22

OUTFLOW        0.00      91.34     294.29     595.09    1040.30    1681.90    2600.59    3790.64    5215.33
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        8755.54    10871.54    13220.88    15806.65    18632.43    21702.20    25020.12    28590.57    32418.07

   STAGE    896.00      896.74      897.47      898.21      898.95      899.68      900.42      901.16      901.89
            903.37      904.10      904.84      905.58      906.32      907.05      907.79      908.53      909.26

   FLOW       0.00       91.34      294.29      595.09     1040.30     1681.90     2600.59     3790.64     5215.33
           8755.54    10871.54    13220.88    15806.65    18632.43    21702.20    25020.12    28590.57    32418.07

MAXIMUM STAGE IS      904.3

MAXIMUM STAGE IS      907.5

MAXIMUM STAGE IS      908.8

MAXIMUM STAGE IS      909.9

MAXIMUM STAGE IS      912.2

MAXIMUM STAGE IS      914.8

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

                                SUB-AREA RUNOFF COMPUTATION

                   SUB AREA-11 RUNOFF
                         ISTAQ    ICOMP    IECON    ITAPE    JPLT    JPRT    INAME  ISTAGE   IAUTO
                           11        0        0        0        0       0       1       0        0

                                       HYDROGRAPH DATA
                 IHYDG    IUHG    TAREA    SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                    1       1      7.57    0.00   104.10    0.00     0.000       0        1        0

                                        PRECIP DATA
                       SPFE     PMS      R6      R12      R24      R48      R72      R96
                       0.00    21.00    80.00   94.00   106.00   110.00    0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                        LOSS DATA
              LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                0     0.00    0.00    1.00    0.00    0.00    1.00    0.10    0.00    0.00    0.00

                                   UNIT HYDROGRAPH DATA
                                TP=  5.99    CP=0.77    NTA=  0

                                      RECESSION DATA
                          STRTQ=    15.00    QRCSN=    15.00    RTIOR= 1.00

                UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG=   5.93 HOURS, CP= 0.76  VOL= 1.00
        43.       159.      305.      455.      574.      630.      621.      532.      405.      300.
       222.       165.      122.       90.       67.       49.       37.       27.       20.       15.
        11.         8.
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0                                   END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  20.05  20.05   0.00    98771.
                                                                             ( 509.)( 509.)(    0.)( 2796.88)

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

                                    SUB-AREA RUNOFF COMPUTATION

                    SUB AREA-12 RUNOFF
                          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             12       0       0       0       0       1       0       0       0

                                         HYDROGRAPH DATA
                 IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                     1       1    8.19    0.00  104.10    0.00   0.000       0       1       0

                                          PRECIP DATA
                       SPFE     PMS      R6     R12     R24     R48     R72     R96
                       0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                           LOSS DATA
             LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                 0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                      UNIT HYDROGRAPH DATA
                                 TP=  6.47      CP=0.77     NTA=  0

                                         RECESSION DATA
                          STRTQ=   16.00     QRCSN=    16.00    RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 8.24 AND R= 3.56 INTERVALS

                UNIT HYDROGRAPH 24 END-OF-PERIOD ORDINATES, LAG=    6.46 HOURS, CP= 0.76  VOL= 1.00
              39.      139.      268.      403.      526.      605.      629.      600.      506.      386.
             291.      219.      165.      124.       94.       71.       53.       40.       30.       23.
              17.       13.       10.        7.

0                                   END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
   1.01   1.00       1   0.01   0.00   0.01       16.        1.02  22.00      46   0.22   0.12   0.10     8439.
   1.01   2.00       2   0.01   0.00   0.01       16.        1.02  23.00      47   0.22   0.12   0.10     7907.
   1.01   3.00       3   0.01   0.00   0.01       16.        1.03   0.00      48   0.22   0.12   0.10     6883.
   1.01   4.00       4   0.01   0.00   0.01       16.        1.03   1.00      49   0.00   0.00   0.00     5638.
   1.01   5.00       5   0.01   0.00   0.01       16.        1.03   2.00      50   0.00   0.00   0.00     4472.
   1.01   6.00       6   0.01   0.00   0.01       16.        1.03   3.00      51   0.00   0.00   0.00     3497.
   1.01   7.00       7   0.02   0.00   0.02       16.        1.03   4.00      52   0.00   0.00   0.00     2732.
```

1.01	8.00	8	0.02	0.00	0.02	16.	1.03	5.00	53	0.00	0.00	0.00	2129.
1.01	9.00	9	0.02	0.00	0.02	16.	1.03	6.00	54	0.00	0.00	0.00	1650.
1.01	10.00	10	0.02	0.00	0.02	16.	1.03	7.00	55	0.00	0.00	0.00	1268.
1.01	11.00	11	0.02	0.00	0.02	16.	1.03	8.00	56	0.00	0.00	0.00	964.
1.01	12.00	12	0.02	0.00	0.02	16.	1.03	9.00	57	0.00	0.00	0.00	729.
1.01	13.00	13	0.06	0.00	0.06	16.	1.03	10.00	58	0.00	0.00	0.00	551.
1.01	14.00	14	0.07	0.00	0.07	16.	1.03	11.00	59	0.00	0.00	0.00	418.
1.01	15.00	15	0.08	0.00	0.08	16.	1.03	12.00	60	0.00	0.00	0.00	317.
1.01	16.00	16	0.21	0.00	0.21	16.	1.03	13.00	61	0.00	0.00	0.00	235.
1.01	17.00	17	0.08	0.00	0.08	16.	1.03	14.00	62	0.00	0.00	0.00	172.
1.01	18.00	18	0.06	0.00	0.06	16.	1.03	15.00	63	0.00	0.00	0.00	122.
1.01	19.00	19	0.01	0.00	0.01	16.	1.03	16.00	64	0.00	0.00	0.00	66.
1.01	20.00	20	0.01	0.00	0.01	16.	1.03	17.00	65	0.00	0.00	0.00	43.
1.01	21.00	21	0.01	0.00	0.01	16.	1.03	18.00	66	0.00	0.00	0.00	28.
1.01	22.00	22	0.01	0.00	0.01	16.	1.03	19.00	67	0.00	0.00	0.00	24.
1.01	23.00	23	0.01	0.00	0.01	16.	1.03	20.00	68	0.00	0.00	0.00	22.
1.02	0.00	24	0.01	0.00	0.01	16.	1.03	21.00	69	0.00	0.00	0.00	20.
1.02	1.00	25	0.15	0.00	0.15	16.	1.03	22.00	70	0.00	0.00	0.00	18.
1.02	2.00	26	0.15	0.01	0.14	16.	1.03	23.00	71	0.00	0.00	0.00	17.
1.02	3.00	27	0.15	0.05	0.10	19.	1.04	0.00	72	0.00	0.00	0.00	16.
1.02	4.00	28	0.15	0.05	0.10	26.	1.04	1.00	73	0.00	0.00	0.00	16.
1.02	5.00	29	0.15	0.05	0.10	39.	1.04	2.00	74	0.00	0.00	0.00	16.
1.02	6.00	30	0.15	0.05	0.10	58.	1.04	3.00	75	0.00	0.00	0.00	16.
1.02	7.00	31	0.43	0.33	0.10	94.	1.04	4.00	76	0.00	0.00	0.00	16.
1.02	8.00	32	0.43	0.33	0.10	161.	1.04	5.00	77	0.00	0.00	0.00	16.
1.02	9.00	33	0.43	0.33	0.10	264.	1.04	6.00	78	0.00	0.00	0.00	16.
1.02	10.00	34	0.43	0.33	0.10	404.	1.04	7.00	79	0.00	0.00	0.00	16.
1.02	11.00	35	0.43	0.33	0.10	573.	1.04	8.00	80	0.00	0.00	0.00	16.
1.02	12.00	36	0.43	0.33	0.10	759.	1.04	9.00	81	0.00	0.00	0.00	16.
1.02	13.00	37	1.46	1.36	0.10	988.	1.04	10.00	82	0.00	0.00	0.00	16.
1.02	14.00	38	1.75	1.65	0.10	1321.	1.04	11.00	83	0.00	0.00	0.00	16.
1.02	15.00	39	2.19	2.09	0.10	1805.	1.04	12.00	84	0.00	0.00	0.00	16.
1.02	16.00	40	5.54	5.44	0.10	2604.	1.04	13.00	85	0.00	0.00	0.00	16.
1.02	17.00	41	2.04	1.94	0.10	3799.	1.04	14.00	86	0.00	0.00	0.00	16.
1.02	18.00	42	1.60	1.50	0.10	5213.	1.04	15.00	87	0.00	0.00	0.00	16.
1.02	19.00	43	0.22	0.12	0.10	6617.	1.04	16.00	88	0.00	0.00	0.00	16.
1.02	20.00	44	0.22	0.12	0.10	7763.	1.04	17.00	89	0.00	0.00	0.00	16.
1.02	21.00	45	0.22	0.12	0.10	8406.	1.04	18.00	90	0.00	0.00	0.00	16.

SUM 20.05 16.83 3.21 89994.
(509.)(428.)(82.)(2548.34)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8439.	7588.	3610.	1246.	89977.
CMS	239.	215.	102.	35.	2548.
INCHES		8.62	16.40	16.98	17.03
MM		218.90	416.56	431.33	432.64
AC-FT		3762.	7160.	7414.	7436.
THOUS CU M		4641.	8832.	9145.	9172.

HYDROGRAPH AT STA 12 FOR PLAN 1, RTIO 1

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.	4.	5.	8.	12.
19.	32.	53.	81.	115.	152.	198.	264.	361.	521.
760.	1043.	1323.	1553.	1681.	1688.	1581.	1377.	1128.	894.
699.	546.	426.	330.	254.	193.	146.	110.	84.	63.
47.	34.	24.	13.	9.	6.	5.	4.	4.	4.
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	1688.	1518.	722.	249.	17995.
CMS	48.	43.	20.	7.	510.
INCHES		1.72	3.28	3.40	3.41
MM		43.78	83.31	86.27	86.53
AC-FT		752.	1432.	1483.	1487.
THOUS CU M		928.	1766.	1829.	1834.

HYDROGRAPH AT STA 12 FOR PLAN 1, RTIO 2

6.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	7.	7.	10.	16.	23.
38.	64.	106.	162.	229.	304.	395.	528.	722.	1042.
1520.	2085.	2647.	3105.	3362.	3376.	3163.	2753.	2255.	1789.
1399.	1093.	852.	660.	507.	386.	292.	221.	167.	127.
94.	69.	49.	26.	17.	11.	10.	9.	8.	7.
7.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3376.	3035.	1444.	498.	35991.
CMS	96.	86.	41.	14.	1019.
INCHES		3.45	6.56	6.79	6.81
MM		87.56	166.62	172.53	173.05
AC-FT		1505.	2864.	2965.	2974.
THOUS CU M		1856.	3533.	3658.	3669.

HYDROGRAPH AT STA 12 FOR FLAN 1, RTIO 3

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.	9.	13.	20.	29.
47.	80.	132.	202.	287.	380.	494.	661.	902.	1302.
1899.	2607.	3309.	3881.	4203.	4220.	3954.	3441.	2819.	2236.
1748.	1366.	1065.	825.	634.	482.	365.	276.	209.	158.
118.	86.	61.	33.	21.	14.	12.	11.	10.	9.
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	4220.	3794.	1805.	623.	44989.
CMS	119.	107.	51.	18.	1274.
INCHES		4.31	8.20	8.49	8.52
MM		109.45	208.28	215.66	216.32
AC-FT		1881.	3580.	3707.	3718.
THOUS CU M		2320.	4416.	4572.	4586.

HYDROGRAPH AT STA 12 FOR PLAN 1, RTIO 4

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.	11.	16.	23.	35.
56.	96.	159.	242.	344.	456.	593.	793.	1083.	1563.
2279.	3128.	3970.	4658.	5043.	5064.	4744.	4130.	3383.	2683.
2098.	1639.	1278.	990.	761.	578.	437.	331.	251.	190.
141.	103.	73.	39.	26.	17.	15.	13.	12.	11.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5064.	4553.	2166.	748.	53986.
CMS	143.	129.	61.	21.	1529.
INCHES		5.17	9.84	10.19	10.22
MM		131.34	249.94	258.80	259.58
AC-FT		2257.	4296.	4448.	4462.
THOUS CU M		2785.	5299.	5487.	5503.

HYDROGRAPH AT STA 12 FOR PLAN 1, RTIO 5

13.	13.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	15.	21.	31.	47.
75.	129.	211.	323.	459.	608.	791.	1057.	1444.	2084.
3039.	4171.	5294.	6210.	6725.	6752.	6326.	5506.	4510.	3577.
2797.	2186.	1703.	1320.	1014.	771.	583.	441.	334.	253.
188.	138.	98.	53.	34.	22.	19.	17.	16.	14.
13.	13.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	13.	13.	13.	13.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6752.	6070.	2888.	997.	71982.
CMS	191.	172.	82.	28.	2038.
INCHES		6.89	13.12	13.59	13.63
MM		175.12	333.25	345.06	346.11
AC-FT		3010.	5728.	5931.	5949.
THOUS CU M		3713.	7065.	7316.	7338.

HYDROGRAPH AT STA 12 FOR PLAN 1, RTIO 6

16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
16.	16.	16.	16.	16.	16.	19.	26.	39.	58.

```
       94.       161.       264.       404.       573.       759.       988.      1321.      1805.      2604.
     3799.      5213.      6617.      7763.      8406.      8439.      7907.      6883.      5638.      4472.
     3497.      2732.      2129.      1650.      1268.       964.       729.       551.       418.       317.
      235.       172.       122.        66.        43.        28.        24.        22.        20.        18.
       17.        16.        16.        16.        16.        16.        16.        16.        16.        16.
       16.        16.        16.        16.        16.        16.        16.        16.        16.        16.

                                PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
                        CFS    8439.     7588.     3610.     1246.         89977.
                        CMS     239.      215.      102.       35.          2548.
                     INCHES                8.62     16.40     16.98         17.03
                         MM              218.90    416.56    431.33        432.64
                      AC-FT               3762.     7160.     7414.         7436.
                 THOUS CU M               4641.     8832.     9145.         9172.


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

                                    COMBINE HYDROGRAPHS

            COMBINE 3 HYDROGRAPHS AT 800
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        800       3       0       0       0       0       1       0       0

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

                                    HYDROGRAPH ROUTING

            CHANNEL ROUTE THRU SUB AREA-13
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         13       1       0       0       0       0       1       0       0
                                              ROUTING DATA
             QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
               0.0    0.000    0.00       1       1       0       0               0

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                          1       0       0   0.000   0.000   0.000     -1.       0


NORMAL DEPTH CHANNEL ROUTING
----------------------------

       QN(1)    QN(2)    QN(3)    ELNVT    ELMAX    RLNTH      SEL
      0.0800   0.0400   0.0800    860.0    880.0    4500. 0.00100

       CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
        100.00  880.00  180.00  870.00  250.00  864.00  265.00  860.00  475.00  860.00
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                        STRTQ=     2.CC     QRCSN=     2.00    RTIOR= 1.00

              UNIT HYDROGRAPH 11 END-OF-PERIOD ORDINATES, LAG=   3.09 HOURS, CP= 0.77  VOL= 1.CO
           21.       7C.      117.      13C.       97.       53.       27.       13.        7.        3.
            2.

        0                                    END-OF-PERIOD FLOW
    MO.DA  HR.MN  PERIOD    RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD    RAIN   EXCS   LOSS     COMP Q

                                                                            SUM  20.05  16.83   3.21     9269.
                                                                                ( 509.)( 428.)(  82.)(  262.47)

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

                                               COMBINE HYDROGRAPHS

                  COMBINE 2 HYDROGRAPHS AT 900
                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               900       2       0       0       0       0       1       0       0

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

                                                HYDROGRAPH ROUTING

                  ROUTE OVER OATKA CREEK DAM
                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               900       1       0       0       0       0       1       0       0
                                                   ROUTING DATA
                     QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       C.0   0.000    0.C0       1       1       0       0               C

                             NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                 1       0       0   0.CC0   0.000   0.C00     -1.       0

    CAPACITY=         0.      230.      310.      390.      470.      55C.      630.      71C.      780.      860.
                    940.     102C.     1100.     1180.     1260.

   ELEVATION=       856.      864.      866.      868.      870.      872.      874.      876.      878.      88C.
                    882.      884.      886.      888.      890.

                          CREL   SPWID    COQW    EXPW   ELEVL    COQL   CAREA    EXPL
                         864.0   16C.0     3.2     1.5     0.0     0.0     0.0     0.0

                                                   DAM DATA
                                         TOPEL    COQD    EXPD  DAMWID
                                         866.0     2.6     1.5     2C.

PEAK OUTFLOW IS     13260. AT TIME  49.00 HOURS
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        500.00   864.00   600.00   878.00   700.00   880.00

STORAGE      0.00      23.41      47.96      73.66     100.52     129.21     160.06     193.05     228.21
           304.91     346.11     389.03     433.69     480.08     528.20     578.06     629.65     684.95

OUTFLOW      0.00     271.60     869.68    1724.96    2827.70    4221.03    5846.80    7701.75    9783.91
         14631.30   17398.63   20388.36   23599.96   27033.45   30689.11   34567.52   38669.46   42712.23

  STAGE    860.00     861.05     862.11     863.16     864.21     865.26     866.32     867.37     868.42
           870.53     871.58     872.63     873.68     874.74     875.79     876.84     877.89     878.95

   FLOW      0.00     271.60     869.68    1724.96    2827.70    4221.03    5846.80    7701.75    9783.91
         14631.30   17398.63   20388.36   23599.96   27033.45   30689.11   34567.52   38669.46   42712.23

MAXIMUM STAGE IS     870.0

MAXIMUM STAGE IS     874.8

MAXIMUM STAGE IS     876.8

MAXIMUM STAGE IS     878.7

MAXIMUM STAGE IS     882.2

MAXIMUM STAGE IS     885.8

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

                              SUB-AREA RUNOFF COMPUTATION

                   SUB AREA-13 RUNOFF
                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          13      0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
                 IHYDG    IUHG   TAREA    SNAF   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                   1        1     0.84    0.00   104.10   0.00   0.000     0       1       0

                                          PRECIP DATA
                      SPFE     PMS      R6     R12     R24     R48     R72     R96
                      0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                           LOSS DATA
           LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
             0      0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                      UNIT HYDROGRAPH DATA
                               TP=  3.11     CP=0.77     NTA=  0

                                         RECESSION DATA
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PEAK OUTFLOW IS    27374. AT TIME  49.00 HOURS

PEAK OUTFLOW IS    34525. AT TIME  49.00 HOURS

PEAK OUTFLOW IS    41720. AT TIME  49.00 HOURS

PEAK OUTFLOW IS    56357. AT TIME  49.00 HOURS

PEAK OUTFLOW IS    71567. AT TIME  49.00 HOURS


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

                                        HYDROGRAPH ROUTING

                      CHANNEL ROUTE THRU SUB AREA-14
                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 14       1       0       0       0       0       1       0       0
                                                  ROUTING DATA
                      QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP                   LSTR
                        0.0   0.000    0.00       1       1       0       0                      0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  1       0       0   0.000   0.000   0.000     -1.       0


NORMAL DEPTH CHANNEL ROUTING
----------------------------

        QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
       0.0800  0.0400  0.0800   835.0   860.0   2100.  0.00700

        CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
          100.00  860.00  250.00  850.00  300.00  840.00  310.00  835.00  350.00  835.00
          360.00  840.00  425.00  850.00  500.00  860.00

  STORAGE        0.00        2.70        5.74        9.11       12.83       17.31       22.75       29.14       36.50
                54.09       64.32       75.68       88.85      103.89      120.81      139.60      160.28      182.83

  OUTFLOW        0.00      199.85      646.89     1300.32     2177.31     3377.34     4830.92     6554.40     8562.52
             13488.67    16433.90    19613.31    23159.36    27173.36    31678.53    36703.05    42276.19    48427.26

    STAGE      835.00      836.32      837.63      838.95      840.26      841.58      842.89      844.21      845.53
               848.16      849.47      850.79      852.10      853.42      854.74      856.05      857.37      858.68

     FLOW        0.00      199.85      646.89     1300.32     2177.31     3377.34     4830.92     6554.40     8562.52
             13488.67    16433.90    19613.31    23159.36    27173.36    31678.53    36703.05    42276.19    48427.26
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MAXIMUM STAGE IS     848.0

MAXIMUM STAGE IS     853.5

MAXIMUM STAGE IS     855.5

MAXIMUM STAGE IS     857.2

MAXIMUM STAGE IS     860.2

MAXIMUM STAGE IS     863.2


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

                                   SUB-AREA RUNOFF COMPUTATION

                    SUB AREA-14 RUNOFF
                              ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                                 14        0        0        0        0        0        1        0        0

                                              HYDROGRAPH DATA
                 IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                     1        1     0.37     0.00   104.10     0.00    0.000        0        1        0

                                                PRECIP DATA
                          SPFE      PMS       R6      R12      R24      R48      R72      R96
                          0.00    21.00    80.00    94.00   106.00   110.00     0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                                 LOSS DATA
             LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
                 0     0.00     0.00     1.00     0.00     0.00     1.00     1.00     0.10     0.00     0.00

                                           UNIT HYDROGRAPH DATA
                                      TP=  2.88     CP=0.77      NTA=  0

                                              RECESSION DATA
                              STRTQ=     1.00     QRCSN=     1.00     RTIOR= 1.00

                UNIT HYDROGRAPH  9 END-OF-PERIOD ORDINATES, LAG=   2.87 HOURS, CP= 0.76  VOL= 1.00
             12.        39.        61.        60.        38.        16.         7.         3.         1.

           0                                 END-OF-PERIOD FLOW
        MO.DA   HR.MN   PERIOD     RAIN    EXCS    LOSS     COMP Q        MO.DA   HR.MN   PERIOD    RAIN    EXCS    LOSS     COMP Q

                                                                                          SUM   20.05   16.83    3.21      4095.
                                                                                              ( 509.)( 428.)(  82.)(  115.96)
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***********    ***********    ***********    ***********    ***********

                    COMBINE HYDROGRAPHS

      COMBINE 2 HYDROGRAPHS AT 1000
           ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
            1000       2       0       0       0       0       1       0       0

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

OPERATION	STATION	AREA	PLAN	RATIO 1 0.20	RATIO 2 0.40	RATIO 3 0.50	RATIO 4 0.60	RATIO 5 0.80	RATIO 6 1.00
HYDROGRAPH AT	1	8.78	1	2033.	4066.	5082.	6099.	8132.	10164.
		(22.74)		(57.56)	(115.13)	(143.91)	(172.69)	(230.26)	(287.82)
HYDROGRAPH AT	1	4.94	1	1259.	2519.	3149.	3778.	5038.	6297.
		(12.79)		(35.66)	(71.33)	(89.16)	(106.99)	(142.65)	(178.32)
2 COMBINED	100	13.72	1	3251.	6502.	8127.	9752.	13003.	16254.
		(35.53)		(92.05)	(184.10)	(230.13)	(276.16)	(368.21)	(460.26)
ROUTED TO	3	13.72	1	3241.	6496.	8135.	9756.	13020.	16283.
		(35.53)		(91.77)	(183.94)	(230.36)	(276.26)	(368.70)	(461.07)
HYDROGRAPH AT	3	5.85	1	1400.	2800.	3500.	4200.	5601.	7001.
		(15.15)		(39.65)	(79.30)	(99.12)	(118.94)	(158.59)	(198.24)
2 COMBINED	200	19.57	1	4641.	9296.	11635.	13957.	18621.	23283.
		(50.69)		(131.42)	(263.24)	(329.48)	(395.20)	(527.29)	(659.31)
ROUTED TO	4	19.57	1	4549.	9160.	11456.	13773.	18461.	23084.
		(50.69)		(128.82)	(259.37)	(324.41)	(390.00)	(522.75)	(653.66)
HYDROGRAPH AT	4	19.66	1	3840.	7679.	9599.	11519.	15358.	19198.
		(50.92)		(108.72)	(217.45)	(271.81)	(326.17)	(434.90)	(543.62)
2 COMBINED	300	39.23	1	8336.	16669.	20835.	24996.	33378.	41730.
		(101.60)		(236.06)	(472.01)	(589.98)	(707.81)	(945.15)	(1181.66)
ROUTED TO	5	39.23	1	6353.	13316.	16759.	20180.	27107.	34130.
		(101.60)		(179.90)	(377.08)	(474.56)	(571.43)	(767.57)	(966.46)
HYDROGRAPH AT	5	22.20	1	5288.	10577.	13221.	15865.	21154.	26442.
		(57.50)		(149.75)	(299.50)	(374.38)	(449.25)	(599.00)	(748.75)
2 COMBINED	400	61.43	1	10302.	21416.	26971.	32520.	43615.	55037.
		(159.10)		(291.72)	(606.44)	(763.74)	(920.86)	(1235.03)	(1558.46)
ROUTED TO	6	61.43	1	6112.	12579.	15267.	18366.	25440.	33229.
		(159.10)		(173.07)	(356.19)	(432.33)	(520.08)	(720.37)	(940.94)
HYDROGRAPH AT	6	21.55	1	4307.	8615.	10769.	12922.	17230.	21537.

		(55.76)		(121.97)(	243.95)(	304.93)(	365.92)(	487.90)(	609.87)(
HYDROGRAPH AT	7	12.58	1	2490.	4980.	6225.	7470.	9961.	12451.
		(32.58)		(70.51)(	141.03)(	176.28)(	211.54)(	282.05)(	352.57)(
3 COMBINED	500	95.54	1	11316.	22835.	28718.	34025.	45423.	57755.
		(247.45)		(320.43)(	646.60)(	813.20)(	963.49)(	1286.23)(	1635.44)(
ROUTED TO	8	95.54	1	9532.	19911.	24588.	29983.	41019.	52773.
		(247.45)		(269.92)(	563.81)(	707.58)(	849.01)(	1161.54)(	1494.38)(
HYDROGRAPH AT	8	10.97	1	2350.	4700.	5876.	7051.	9401.	11751.
		(28.41)		(66.55)(	133.10)(	166.38)(	199.65)(	266.20)(	332.75)(
2 COMBINED	600	106.51	1	10711.	22384.	28279.	34007.	46298.	59304.
		(275.86)		(303.31)(	633.83)(	800.77)(	962.97)(	1311.00)(	1679.30)(
ROUTED TO	9	106.51	1	10049.	20728.	25973.	31254.	42678.	55140.
		(275.86)		(284.57)(	586.96)(	735.46)(	885.00)(	1208.51)(	1561.39)(
HYDROGRAPH AT	9	7.64	1	1514.	3027.	3784.	4541.	6054.	7568.
		(19.79)		(42.86)(	85.72)(	107.15)(	128.58)(	171.44)(	214.30)(
HYDROGRAPH AT	10	9.01	1	1834.	3667.	4584.	5501.	7335.	9169.
		(23.34)		(51.93)(	103.85)(	129.81)(	155.78)(	207.70)(	259.63)(
3 COMBINED	700	123.16	1	11563.	23730.	29907.	36082.	49077.	63168.
		(318.98)		(327.43)(	671.95)(	846.88)(	1021.72)(	1389.72)(	1788.73)(
ROUTED TO	11	123.16	1	11501.	23637.	29763.	35911.	48838.	62886.
		(318.98)		(325.69)(	669.34)(	842.78)(	1016.89)(	1382.92)(	1780.72)(
HYDROGRAPH AT	11	7.57	1	1767.	3534.	4417.	5300.	7067.	8834.
		(19.61)		(50.03)(	100.06)(	125.07)(	150.09)(	200.12)(	250.14)(
HYDROGRAPH AT	12	8.19	1	1688.	3376.	4220.	5064.	6752.	8439.
		(21.21)		(47.80)(	95.59)(	119.49)(	143.39)(	191.18)(	238.98)(
3 COMBINED	800	138.92	1	13258.	27304.	34441.	41607.	56237.	71503.
		(359.80)		(375.43)(	773.15)(	975.27)(	1178.17)(	1592.44)(	2024.74)(
ROUTED TO	13	138.92	1	13252.	27320.	34464.	41640.	56258.	71479.
		(359.80)		(375.25)(	773.62)(	975.91)(	1179.12)(	1593.05)(	2024.07)(
HYDROGRAPH AT	13	0.84	1	275.	551.	688.	826.	1101.	1377.
		(2.18)		(7.80)(	15.60)(	19.49)(	23.39)(	31.19)(	38.99)(
2 COMBINED	900	139.76	1	13275.	27366.	34522.	41710.	56351.	71595.
		(361.97)		(375.91)(	774.93)(	977.55)(	1181.09)(	1595.67)(	2027.34)(
ROUTED TO	900	139.76	1	13260.	27374.	34525.	41720.	56357.	71567.

		(361.97)		(375.48)(	775.15)(	977.64)(	1181.37)(	1595.85)(	2026.54)(
ROUTED TO	14	139.76	1	13256.	27371.	34521.	41730.	56324.	71563.
		(361.97)		(375.38)(	775.05)(	977.52)(	1181.66)(	1594.92)(	2026.44)(
HYDROGRAPH AT	14	0.37	1	128.	257.	321.	385.	513.	642.
		(0.96)		(3.63)(	7.27)(	9.08)(	10.90)(	14.53)(	18.17)(
2 COMBINED	1000	140.13	1	13263.	27384.	34538.	41751.	56351.	71597.
		(362.93)		(375.57)(	775.44)(	978.00)(	1182.24)(	1595.69)(	2027.41)(

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	3241.	1144.7	45.00
0.40	6496.	1146.2	45.00
0.50	8135.	1146.8	45.00
0.60	9756.	1147.3	45.00
0.80	13020.	1148.2	45.00
1.00	16283.	1149.0	45.00

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	4549.	1002.2	45.00
0.40	9160.	1003.8	45.00
0.50	11456.	1004.4	45.00
0.60	13773.	1005.1	45.00
0.80	18461.	1006.0	45.00
1.00	23084.	1006.8	45.00

PLAN 1 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	6353.	956.6	48.00
0.40	13316.	959.4	48.00
0.50	16759.	960.4	48.00
0.60	20180.	961.3	48.00
0.80	27107.	962.8	48.00
1.00	34130.	964.0	48.00

PLAN 1 STATION 6

MAXIMUM MAXIMUM TIME

RATIO	FLOW,CFS	STAGE,FT	HOURS
0.20	6112.	945.3	52.00
0.40	12579.	948.6	51.00
0.50	15267.	949.8	52.00
0.60	18366.	950.8	52.00
0.80	25440.	952.3	51.00
1.00	33229.	953.7	51.00

PLAN 1 STATION 8

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	9532.	928.9	51.00
0.40	19911.	932.7	50.00
0.50	24988.	934.1	50.00
0.60	29983.	935.3	50.00
0.80	41019.	937.6	50.00
1.00	52773.	939.6	50.00

PLAN 1 STATION 9

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	10049.	929.6	52.00
0.40	20728.	933.7	52.00
0.50	25973.	935.1	52.00
0.60	31254.	936.3	52.00
0.80	42678.	938.5	52.00
1.00	55140.	940.4	51.00

PLAN 1 STATION 11

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	11501.	904.3	51.00
0.40	23637.	907.5	51.00
0.50	29763.	908.8	51.00
0.60	35911.	909.9	50.00
0.80	48838.	912.2	51.00
1.00	62886.	914.8	51.00

PLAN 1 STATION 13

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	13252.	870.0	49.00
0.40	27320.	874.8	49.00
0.50	34464.	876.8	49.00

0.60	41840.	878.7	49.00
C.80	56258.	882.2	49.00
1.00	71479.	885.8	49.00

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	856.00	864.00	866.00
STORAGE	0.	230.	310.
OUTFLOW	0.	0.	1448.

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
0.20	872.38	6.38	565.	13260.	42.00	49.00	0.00
0.40	877.47	11.47	762.	27374.	52.00	49.00	0.00
0.50	879.70	13.70	848.	34525.	55.00	49.00	0.00
0.60	881.79	15.79	931.	41720.	56.00	49.00	0.00
0.80	885.70	19.70	1088.	56357.	57.00	49.00	0.00
1.00	889.41	23.41	1236.	71567.	57.00	49.00	0.00

PLAN 1 STATION 14

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	13256.	848.0	49.00
0.40	27371.	853.5	49.00
0.50	34521.	855.5	49.00
0.60	41730.	857.2	49.00
0.80	56324.	860.2	49.00
1.00	71563.	863.2	49.00

```
(0001)  A1      OATKA CREEK DAM
(0002)  A2      HEC-1DB
(0003)  A3      PMF - DAM BREAK ANALYSIS
(0004)  B     90      1      0      0      0      0      0      0      4
(0005)  B1     5
(0006)  J      4      2      1
(0007)  J1    .5    1.0
(0008)  K      0      1      0      0      0      0      1
(0009)  K1      SUB AREA-1 RUNOFF
(0010)  M      1      1   8.78      0  140.1      0      0      0      1
(0011)  F      0   21.0     80     94    106    110
(0012)  T      0      0      0      0      0      0      1    0.1
(0013)  W   5.56    .77
(0014)  X     10     10      1
(0015)  K      0      1      0      0      0      0      1
(0016)  K1      SUB AREA-2 RUNOFF
(0017)  M      1      1   4.94      0  140.1      0      0      0      1
(0018)  F      0   21.0     80     94    106    110
(0019)  T      0      0      0      0      0      0      1    0.1
(0020)  W   4.86    .77
(0021)  X     10     10      1
(0022)  K      2    100      0      0      0      0      1
(0023)  K1      COMBINE 2 HYDROGRAPHS AT 100
(0024)  K      1      3      0      0      0      0      1
(0025)  K1      CHANNEL ROUTE THRU SUB AREA-3
(0026)  Y      0      0      0      1      1
(0027)  Y1     1      0      0      0      0      0     -1
(0028)  Y6   .08    .04    .08   1139   1160  11000   .015
(0029)  Y7   100   1140    300   1150    399   1140    400   1139    405   1139
(0030)  Y7   406   1140    900   1150    950   1160
(0031)  K      0      3      0      0      0      0      1
(0032)  K1      SUB AREA-3 RUNOFF
(0033)  M      1      1   5.65      0  140.1      0      0      0      1
(0034)  F      0   21.0     80     94    106    110
(0035)  T      0      0      0      0      0      0      1    0.1
(0036)  W   5.28    .77
(0037)  X     12     12
(0038)  K      2    200      0      0      0      0      1
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```
(0039)  K1        COMBINE 2 HYDROGRAPHS AT 200
(0040)  K      1       4       0       0       0       0       1
(0041)  K1        CHANNEL ROUTE THRU SUB AREA-4
(0042)  Y      0       0       0       1       1
(0043)  Y1     1       0       0       0       0       0      -1
(0044)  Y6   .08     .04     .08     997    1050   14000    .010
(0045)  Y7   100    1050    1000    1010    1800    1000    1848     997    1875     997
(0046)  Y7  1900    1000    1950    1010    3750    1050
(0047)  K      0       4       0       0       0       0       1
(0048)  K1        SUB AREA-4 RUNOFF
(0049)  M      1       1   19.66       0   104.1       0       0       0       1
(0050)  P      0    21.0      80      94     104     110
(0051)  T      0       0       0       0       0       0       1     0.1
(0052)  W   7.08     .77
(0053)  X     40      40       1
(0054)  K      2     300       0       0       0       0       1
(0055)  K1        COMBINE 2 HYDROGRAPHS AT 300
(0056)  K      1       5       0       0       0       0       1
(0057)  K1        CHANNEL ROUTE THRU SUB AREA-5
(0058)  Y      0       0       0       1       1
(0059)  Y1     1       0       0       0       0       0      -1
(0060)  Y6   .08     .04     .08     949    1000   31000    .001
(0061)  Y7   100    1000    1000     960    1800     950    1850     949    1860     949
(0062)  Y7  1900     950    2150     960    4450     970
(0063)  K      0       5       0       0       0       0       1
(0064)  K1        SUB AREA-5 RUNOFF
(0065)  M      1       1    22.2       0   140.1       0       0       0       1
(0066)  P      0    21.0      80      94     104     110
(0067)  T      0       0       0       0       0       0       1     0.1
(0068)  W   5.32     .77
(0069)  X     44      44       1
(0070)  K      2     400       0       0       0       0       1
(0071)  K1        COMBINE 2 HYDROGRAPHS AT 400
(0072)  K      1       6       0       0       0       0       1
(0073)  K1        CHANNEL ROUTE THRU SUB AREA-6
(0074)  Y      0       0       0       1       1
(0075)  Y1     1       0       0       0       0       0      -1
(0076)  Y6   .08     .04     .08     933     970   46000   .0003
```

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(0077)   Y7    100     970    1750     950    2650     940    2700     933    2750     933
(0078)   Y7   2800     940    3600     950    4500     950
(0079)   K       0       6       0       0       0       0       1
(0080)   K1        SUB AREA-6 RUNOFF
(0081)   M       1       1   21.55       0   104.1       0       0       0       1
(0082)   P       0    21.0      80      94     106     110
(0083)   T       0       0       0       0       0       0       1     0.1
(0084)   W    6.80     .77
(0085)   X      43      43       1
(0086)   K       0       7       0       0       0       0       1
(0087)   K1        SUB AREA-7 RUNOFF
(0088)   M       1       1   12.58       0   104.1       0       0       0       1
(0089)   P       0    21.0      80      94     106     110
(0090)   T       0       0       0       0       0       0       1     0.1
(0091)   W    6.89     .77
(0092)   X      25      25       1
(0093)   K       3     500       0       0       0       0       1
(0094)   K1        COMBINE 3 HYDROGRAPHS AT 500
(0095)   K       1       8       0       0       0       0       1
(0096)   K1        CHANNEL ROUTE THRU SUB AREA-8
(0097)   Y       0       0       0       1       1
(0098)   Y1      1       0       0       0       0       0      -1
(0099)   Y6    .08     .04     .08     918     950   30200   .0007
(0100)   Y7    100     950     700     930    1100     920    1125     918    1175     918
(0101)   Y7   1200     920    2100     940    3000     950
(0102)   K       0       8       0       0       0       0       1
(0103)   K1        SUB AREA-8 RUNOFF
(0104)   M       1       1   10.97       0   104.1       0       0       0       1
(0105)   P       0    21.0      80      94     106     110
(0106)   T       0       0       0       0       0       0       1     0.1
(0107)   W    6.21     .77
(0108)   X      22      22       1
(0109)   K       2     600       0       0       0       0       1
(0110)   K1        COMBINE 2 HYDROGRAPHS AT 600
(0111)   K       1       9       0       0       0       0       1
(0112)   K1        CHANNEL ROUTE THRU SUB AREA-9
(0113)   Y       0       0       0       1       1
(0114)   Y1      1       0       0       0       0       0      -1
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```
(0115)  Y6    .08      .04      .02      911      950    20500    .0004
(0116)  Y7    100      950      700      930     1200      920     1210      919     1250      919
(0117)  Y7   1400      920     1000      940     3200      930
(0118)  K       0        9        0        0        0        0        1
(0119)  K1          SUB AREA-9 RUNOFF
(0120)  M       1        1     7.64        0    104.1        0        0        0        1
(0121)  F       0     21.0       80       94      106      110
(0122)  T       0        0        0        0        0        0        1      0.1
(0123)  W    6.88      .77
(0124)  X      15       15        1
(0125)  K       0       10        0        0        0        0        1
(0126)  K1          SUB AREA-10 RUNOFF
(0127)  M       1        1     9.01        0    104.1        0        0        0        1
(0128)  F       0     21.0       80       94      106      110
(0129)  T       0        0        0        0        0        0        1      0.1
(0130)  W    6.60      .77
(0131)  X      18       18        1
(0132)  K       3      700        0        0        0        0        1
(0133)  K1          COMBINE 3 HYDROGRAPGHS AT 700
(0134)  K       1       11        0        0        0        0        1
(0135)  K1          CHANNEL ROUTE THRU SUB AREA-11
(0136)  Y       0        0        0        1        1
(0137)  Y1      1        0        0        0        0        0       -1
(0138)  Y6    .08      .04      .02      896      910    11600     .002
(0139)  Y7    100      910      500      900      750      898      760      896      850      896
(0140)  Y7    860      898     1000      900     1100      910
(0141)  K       0       11        0        0        0        0        1
(0142)  K1          SUB AREA-11 RUNOFF
(0143)  M       1        1     7.57        0    104.1        0        0        0        1
(0144)  F       0     21.0       80       94      106      110
(0145)  T       0        0        0        0        0        1      0.1
(0146)  W    5.99      .77
(0147)  X      15       15        1
(0148)  K       0       12        0        0        0        1
(0149)  K1          SUB AREA-12 RUNOFF
(0150)  M       1        1     8.19        0    104.1        0        0        0        1
(0151)  F       0     21.0       80       94      106      110
(0152)  T       0        0        0        0        0        0        1      0.1
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```
(0153)  K     6.47      .77
(0154)  X     16        16        1
(0155)  K     3         800       0         0         0         0         1
(0156)  K1              COMBINE 3 HYDROGRAFHS AT 800
(0157)  K     1         13        0         0         0         0         1
(0158)  K1              CHANNEL ROUTE THRU SUB AREA-13
(0159)  Y     0         0         0         1         1
(0160)  Y1    1         0         0         0         0         0         -1
(0161)  Y6    .08       .04       .08       860       880       4500      .001
(0162)  Y7    100       880       180       870       250       864       265       860       475       860
(0163)  Y7    500       864       600       878       700       880
(0164)  K     0         13        0         0         0         0         1
(0165)  K1              SUB AREA-13 RUNOFF
(0166)  M     1         1         .04       0         104.1     0         0         0         1
(0167)  P     0         21.0      80        94        106       110
(0168)  T     0         0         0         0         0         0         1         0.1
(0169)  W     3.11      .77
(0170)  X     2         2         1
(0171)  K     2         900       0         0         0         0         1
(0172)  K1              COMBINE 2 HYDROGRAFHS AT 900
(0173)  K     1         900       0         0         0         0         1
(0174)  K1              ROUTE OVER OATKA CREEK DAM
(0175)  Y     0         0         0         1         1
(0176)  Y1    1         0         0         0         0         0         -1
(0177)  $S    0         230       310       390       470       550       630       710       780       860
(0178)  $S    940       1020      1100      1180      1260
(0179)  $E    858       864       866       868       870       872       874       876       878       880
(0180)  $E    882       884       886       888       890
(0181)  $$    884       160       3.2       1.5
(0182)  $D    880       2.64      1.5       20
(0183)  $B    40        1         858       1         866       879.70
(0184)  $B    80        1         858       1         866       879.70
(0185)  $B    120       1         858       1         866       879.70
(0186)  $B    160       1         858       1         866       879.70
(0187)  K     1         14        0         0         0         0         1
(0188)  K1              CHANNEL ROUTE THRU SUB AREA-14
(0189)  Y     0         0         0         1         1
(0190)  Y1    1         0         0         0         0         0         -1
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```
(0191)  Y6    .08     .04     .08     835     860    2100    .007
(0192)  Y7    100     860     250     850     300     840     310     835     350     835
(0193)  Y7    360     840     425     850     500     860
(0194)  K       0      14       0       0       0       0       1
(0195)  K1         SUB AREA-14 RUNOFF
(0196)  M       1       1     .37       0   104.1       0       0       0       1
(0197)  P       0    21.0      80      94     106     110
(0198)  T       0       0       0       0       0       0       1     0.1
(0199)  W    2.88     .77
(0200)  X       1       1       1
(0201)  K       2    1000       0       0       0       0       1
(0202)  K1         COMBINE 2 HYDROGRAPHS AT 1000
(0203)  K      99
(0204)  A
(0205)  A
(0206)  A
(0207)  A
(0208)  A
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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION       JULY 1978
  LAST MODIFICATION  26 FEB 79
**********************************

RUN  DATE?MON, SEP 17 1979
     TIME?13:41:45

                    OATKA CREEK DAM
                    HEC-1DB
                    PMF - DAM BREAK ANALYSIS

                               JOB SPECIFICATION
      NQ     NHR    NMIN    IDAY     IHR    IMIN   METRC    IPLT    IPRT   NSTAN
      90       1       0       0       0       0       0       0       4       0
                           JOPER     NWT   LROPT   TRACE
                               5       0       0       0

                          MULTI-PLAN ANALYSES TO BE PERFORMED
                             NPLAN= 4 NRTIO= 2 LRTIO= 1
       RTIOS=   0.50   1.00

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

                             SUB-AREA RUNOFF COMPUTATION

        SUB AREA-1 RUNOFF
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         1       0       0       0       0       0       1       0       0

                                 HYDROGRAPH DATA
       IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
           1       1    8.78    0.00  140.10    0.00   0.000       0       1       0

                                   PRECIP DATA
                 SPFE     PMS      R6     R12     R24     R48     R72     R96
                 0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.875

                                   LOSS DATA
 LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
     0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                             UNIT HYDROGRAPH DATA
                         TP=  5.56     CP=0.77     NTA=  0

                                RECESSION DATA
                    STRTQ=   18.00    QRCSN=   18.00    RTIOR= 1.00
```

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      UNIT HYDROGRAPH 21 END-OF-PERIOD ORDINATES, LAG=   5.58 HOURS, CP= 0.77  VOL= 1.00
     59.      211.      401.      592.      731.      780.      738.      597.      432.      312.
    225.      163.      117.       85.       61.       44.       32.       23.       17.       12.
      9.

    0                                  END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  20.21  16.99   3.22    97428.
                                                                              ( 513.)( 431.)(  82.)( 2758.85)

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

                                       SUB-AREA RUNOFF COMPUTATION

                SUB AREA-2 RUNOFF
                         ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                             1        0        0        0        0        0        1        0        0

                                             HYDROGRAPH DATA
             IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                 1        1     4.94     0.00   140.10     0.00    0.000        0        1        0

                                             PRECIP DATA
                     SPFE      PMS       R6      R12      R24      R48      R72      R96
                     0.00    21.00    80.00    94.00   106.00   110.00     0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.875

                                               LOSS DATA
           LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
               0     0.00     0.00     1.00     0.00     0.00     1.00     1.00     0.10     0.00     0.00

                                          UNIT HYDROGRAPH DATA
                                     TP=   4.88      CP=0.77     NTA=  0

                                             RECESSION DATA
                               STRTQ=    10.00     QRCSN=    10.00     RTIOR= 1.00

      UNIT HYDROGRAPH 18 END-OF-PERIOD ORDINATES, LAG=   4.85 HOURS, CP= 0.76  VOL= 1.00
     47.      164.      308.      435.      500.      484.      386.      268.      185.      127.
     88.       61.       42.       29.       20.       14.        9.        7.

    0                                  END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  20.21  16.99   3.22    54775.
                                                                              ( 513.)( 431.)(  82.)( 1551.05)

      **********        **********        **********        **********        **********
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                              COMBINE HYDROGRAFHS

            COMBINE 2 HYDROGRAPHS AT 100
                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    100       2       0       0       0       0       1       0       0

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

                               HYDROGRAPH ROUTING

            CHANNEL ROUTE THRU SUB AREA-3
                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      3       1       0       0       0       0       1       0       0

                              ALL PLANS HAVE SAME
                                  ROUTING DATA
            QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
              0.0   0.000    0.00       1       1       0       0               0

                  NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                      1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

      QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
     0.0800  0.0400  0.0800  1139.0  1160.0  11000. 0.01500

      CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

       100.00 1160.00  300.00 1150.00  399.00 1140.00  400.00 1139.00  405.00 1139.00
       406.00 1140.00  900.00 1150.00  950.00 1160.00

  STORAGE        0.00       1.78      14.63      45.76      95.18     162.90     248.91     353.21     475.80
               775.85     947.53    1126.92    1314.02    1508.84    1711.36    1921.60    2139.55    2365.21

  OUTFLOW        0.00      27.91     170.32     602.69    1465.41    2876.76    4942.88    7761.74   11425.18
             21669.97   29231.83   37915.88   47704.36   58591.05   70576.48   83665.67   97866.36  113188.63

    STAGE     1139.00    1140.11    1141.21    1142.32    1143.42    1144.53    1145.63    1146.74    1147.84
              1150.05    1151.16    1152.26    1153.37    1154.47    1155.58    1156.68    1157.79    1158.89

     FLOW        0.00      27.91     170.32     602.69    1465.41    2876.76    4942.88    7761.74   11425.18
             21669.97   29231.83   37915.88   47704.36   58591.05   70576.48   83665.67   97866.36  113188.63

MAXIMUM STAGE IS     1146.8

MAXIMUM STAGE IS     1149.[illegible]
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MAXIMUM STAGE IS     1146.8

MAXIMUM STAGE IS     1149.0

MAXIMUM STAGE IS     1146.8

MAXIMUM STAGE IS     1149.0

MAXIMUM STAGE IS     1146.8

MAXIMUM STAGE IS     1149.0


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

                                        SUB-AREA RUNOFF COMPUTATION

                         SUB AREA-3 RUNOFF
                                   ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                                       3        0        0        0        0        0        1        0        0

                                                    HYDROGRAPH DATA
                      IHYDG     IUHG    TAREA     SNAF    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                          1        1     5.85     0.00   140.10     0.00    0.000        0        1        0

                                                      PRECIP DATA
                              SPFE      PMS       R6      R12      R24      R48      R72      R96
                              0.00    21.00    80.00    94.00   106.00   110.00     0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.875

                                                       LOSS DATA
                 LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
                     0     0.00     0.00     1.00     0.00     0.00     1.00     1.00     0.10     0.00     0.00

                                                  UNIT HYDROGRAPH DATA
                                           TP=  5.28     CP=0.77     NTA=  0

                                                     RECESSION DATA
                                    STRTQ=    12.00     QRCSN=    12.00     RTIOR= 1.00

                    UNIT HYDROGRAPH 19 END-OF-PERIOD ORDINATES, LAG=    5.27 HOURS, CP= 0.76   VOL= 1.00
                 44.      156.      295.      429.      522.      547.      502.      390.      271.      188.
                131.       91.       63.       44.       31.       21.       15.       10.        7.

            0                                         END-OF-PERIOD FLOW
         MO.DA   HR.MN   PERIOD    RAIN    EXCS    LOSS    COMP Q        MO.DA   HR.MN   PERIOD    RAIN    EXCS    LOSS    COMP Q

                                                                                          SUM   20.21   16.99    3.22    64895.
                                                                                              ( 513.)( 431.)(  82.)( 1837.62)
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***********          ***********          ***********          ***********          ***********

                              COMBINE HYDROGRAPHS

              COMBINE 2 HYDROGRAPHS AT 200
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     200       2       0       0       0       0       1       0       0

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

                              HYDROGRAPH ROUTING

              CHANNEL ROUTE THRU SLB AREA-4
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       4       1       0       0       0       0       1       0       0

                              ALL PLANS HAVE SAME
                                  ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       1       1       0       0               0

                   NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                       1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

          QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
         0.0800  0.0400  0.0800   997.0  1050.0  14000. 0.01000

         CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
           100.00 1050.00 1000.00 1010.00 1800.00 1000.00 1848.00  997.00 1875.00  997.00
          1900.00 1000.00 1950.00 1010.00 3750.00 1050.00

STORAGE        0.00      54.63     234.95     627.40    1232.42    2047.47    3040.87    4203.07    5534.08
            8702.43   10359.80   12545.91   14720.80   17064.48   19576.95   22258.20   25108.23   28127.05

OUTFLOW        0.00     932.37    5156.52   14554.29   30876.01   56235.73   93157.55  140755.88  199678.81
          354601.56  452155.25  564128.00  691271.75  834323.88  994009.25 1171039.75 1366114.50 1579922.25

STAGE        997.00     999.79    1002.58    1005.37    1008.16    1010.95    1013.74    1016.53    1019.32
            1024.89    1027.68    1030.47    1033.26    1036.05    1038.84    1041.63    1044.42    1047.21

FLOW           0.00     932.37    5156.52   14554.29   30876.01   56235.73   93157.55  140755.88  199678.81
          354601.56  452155.25  564128.00  691271.75  834323.88  994009.25 1171039.75 1366114.50 1579922.25
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MAXIMUM STAGE IS    1004.4

MAXIMUM STAGE IS    1006.8

MAXIMUM STAGE IS    1004.4

MAXIMUM STAGE IS    1006.8

MAXIMUM STAGE IS    1004.4

MAXIMUM STAGE IS    1006.8

MAXIMUM STAGE IS    1004.4

MAXIMUM STAGE IS    1006.8

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

                              SUB-AREA RUNOFF COMPUTATION

                 SUB AREA-4 RUNOFF
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          4       0       0       0       0       0       1       0       0

                                    HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1       1   19.66    0.00  104.10    0.00   0.000       0       1       0

                                      PRECIP DATA
                   SPFE     PMS      R6     R12     R24     R48     R72     R96
                   0.00   21.00   80.00   94.00  104.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                       LOSS DATA
           LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
               0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                  UNIT HYDROGRAPH DATA
                              TP=  7.08     CP=0.77     NTA=  0

                                     RECESSION DATA
                      STRTQ=   40.00     QRCSN=   40.00     RTIOR= 1.00

             UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG=   7.02 HOURS, CP= 0.76  VOL= 1.00
          78.      283.      548.      830.     1101.     1302.     1395.     1385.     1252.     1019.
         788.      610.      472.      366.      283.      219.      170.      131.      102.       79.
          61.       47.       36.       28.       22.       17.

    0                                 END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
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                                                  SUM  20.05  16.56   3.49   212576.
                                                     ( 509.)( 421.)(  89.)( 6019.48)

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

                                 COMBINE HYDROGRAPHS

            COMBINE 2 HYDROGRAPHS AT 300
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      300       2       0       0       0       0       1       0       0

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

                                 HYDROGRAPH ROUTING

            CHANNEL ROUTE THRU SUB AREA-5
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        5       1       0       0       0       0       1       0       0

                                 ALL PLANS HAVE SAME
                                     ROUTING DATA
             QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
               0.0   0.000    0.00       1       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

      QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
     0.0800  0.0400  0.0800   949.0  1000.0  31000. 0.00100

      CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
       100.00 1000.00 1000.00  960.00 1800.00  950.00 1850.00  949.00 1860.00  949.00
      1900.00  950.00 2150.00  960.00 4450.00  970.00

STORAGE        0.00     264.94    1063.01    2399.42    4274.22    6995.04   11006.92   16313.49   22896.39
           37208.14   44537.08   51981.38   59541.04   67216.06   75006.48   82912.27   90933.41   99069.91

OUTFLOW        0.00     527.91    2668.51    7024.60   14149.81   24591.08   41161.73   64661.28   97107.48
          195179.56  255859.94  323830.13  398852.88  480746.56  569368.63  664606.13  766367.88  874580.00

STAGE        949.00     951.68     954.37     957.05     959.74     962.42     965.11     967.79     970.47
             975.84     978.53     981.21     983.89     986.58     989.26     991.95     994.63     997.32

FLOW           0.00     527.91    2668.51    7024.60   14149.81   24591.08   41161.73   64661.28   97107.48
```

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   195179.56   255859.94   323830.13   398852.88   480746.56   569368.63   664606.13   766367.88   874580.00
MAXIMUM STAGE IS     960.4
MAXIMUM STAGE IS     964.0
MAXIMUM STAGE IS     960.4
MAXIMUM STAGE IS     964.0
MAXIMUM STAGE IS     960.4
MAXIMUM STAGE IS     964.0
MAXIMUM STAGE IS     960.4
MAXIMUM STAGE IS     964.0

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

                              SUB-AREA RUNOFF COMPUTATION

             SUB AREA-5 RUNOFF
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        5       0       0       0       0       0       1       0       0

                                     HYDROGRAPH DATA
           IHYDG    IUHG   TAREA    SNAF   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
               1       1   22.20    0.00  140.10    0.00   0.000       0       1       0

                                      PRECIP DATA
                  SPFE     PMS      R6     R12     R24     R48     R72     R96
                  0.00   21.00   80.00   94.00  104.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.875

                                       LOSS DATA
         LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
             0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                 UNIT HYDROGRAPH DATA
                              TP=  5.32    CP=0.77    NTA=  0

                                     RECESSION DATA
                     STRTQ=   44.00    QRCSN=   44.00    RTIOR= 1.00

          UNIT HYDROGRAPH 19 END-OF-PERIOD ORDINATES, LAG=   5.32 HOURS, CP= 0.77  VOL= 1.00
        166.       585.      1104.      1611.      1964.      2065.      1910.      1497.      1041.       724.
        503.       350.       243.       169.       118.        82.        57.        40.        27.

      0                                   END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q        MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
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                                                                        SUM   20.21  16.70   3.50   242088.
                                                                           ( 513.)( 424.)(  89.)( 6855.16)

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

                                         COMBINE HYDROGRAPHS

                    COMBINE 2 HYDROGRAPHS AT 400
                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               400       2       0       0       0       0       1       0       0

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

                                         HYDROGRAPH ROUTING

                    CHANNEL ROUTE THRU SUB-AREA-6
                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 6       1       0       0       0       0       1       0       0
                                         ALL PLANS HAVE SAME
                                            ROUTING DATA
                      QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP             LSTR
                        0.0   0.000    0.00       1       1       0       0                0

                             NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                 1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

     QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
    0.0800  0.0400  0.0800   933.0   970.0  46000. 0.00030

     CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
       100.00  970.00 1750.00  950.00 2650.00  940.00 2700.00  933.00 2750.00  933.00
      2800.00  940.00 3600.00  950.00 4500.00  950.00

STORAGE        0.00      131.42      320.04      565.87      920.09     1844.74     3450.11     5736.20     8703.01
           16746.38    24985.97    31555.91    38456.20    45686.85    53247.84    61139.19    69360.89    77912.92

OUTFLOW        0.00      109.55      393.45      869.85     1638.44     2962.67     5059.57     8161.70    12470.73
           26230.09    37743.18    51508.41    67492.28    85686.00   106095.28   128735.09   153626.69   180795.75

  STAGE      933.00      934.95      936.89      938.84      940.79      942.74      944.68      946.63      948.58
             952.47      954.42      956.37      958.31      960.26      962.21      964.16      966.10      968.05
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FLOW      0.00      107.55     393.43     687.83     1030.44    2962.07    3039.31    6161.46    12410.75
     26230.09   37743.18   51508.41   67492.28   85686.00   106095.28  128735.09  153626.69  180795.75

MAXIMUM STAGE IS     949.8

MAXIMUM STAGE IS     953.7

MAXIMUM STAGE IS     949.8

MAXIMUM STAGE IS     953.7

MAXIMUM STAGE IS     949.8

MAXIMUM STAGE IS     953.7

MAXIMUM STAGE IS     949.8

MAXIMUM STAGE IS     953.7

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

                              SUB-AREA RUNOFF COMPUTATION

            SUB AREA-6 RUNOFF
                 ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     6       0       0       0       0       0       1       0       0

                                    HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1       1   21.53    0.00  104.10    0.00   0.000       0       1       0

                                     PRECIP DATA
                  SPFE     PMS      R6     R12     R24     R48     R72     R96
                  0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                      LOSS DATA
       LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
           0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                 UNIT HYDROGRAPH DATA
                             TP=  6.80    CP=0.77    NTA=  0

                                    RECESSION DATA
                      STRTQ=    43.00    QRCSN=    43.00    RTIOR= 1.00

         UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG=   6.79 HOURS, CP= 0.77  VOL= 1.00
       93.      334.      648.      979.     1288.     1502.     1584.     1540.     1337.     1052.
      810.      624.      481.      371.      285.      220.      169.      130.      101.       77.
       60.       46.       35.       27.       21.       16.
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      0                                END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                    SUM  20.05  16.83   3.21   236738.
                                                                       ( 509.)( 428.)(  82.)( 6703.67)

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

                                  SUB-AREA RUNOFF COMPUTATION

               SUB AREA-7 RUNOFF
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             7       0       0       0       0       0       1       0       0

                                      HYDROGRAPH DATA
               IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                   1       1   12.58    0.00  104.10    0.00   0.000       0       1       0

                                       PRECIP DATA
                      SPFE     PMS      R6     R12     R24     R48     R72     R96
                      0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                        LOSS DATA
           LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
               0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                   UNIT HYDROGRAPH DATA
                               TP=  6.89    CP=0.77    NTA=  0

                                      RECESSION DATA
                         STRTQ=    25.00    QRCSN=    25.00    RTIOR= 1.00

             UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG=   6.86 HOURS, CP= 0.76  VOL= 1.00
          53.      190.      368.      558.      736.      861.      912.      891.      781.      620.
         481.      373.      290.      225.      174.      135.      105.       81.       63.       49.
          38.       30.       23.       18.       14.       11.

      0                                END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                    SUM  20.05  16.83   3.21   138226.
                                                                       ( 509.)( 428.)(  82.)( 3914.12)

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

                                    COMBINE HYDROGRAPHS

               COMBINE 2 HYDROGRAPHS AT 500
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         COMBINE 3 HYDROGRAPHS AT 500
                       ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         500       3       0       0       0       0       1       0       0

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

                                    HYDROGRAPH ROUTING

           CHANNEL ROUTE THRU SUB AREA-8
                       ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           8       1       0       0       0       0       1       0       0

                                  ALL PLANS HAVE SAME
                                      ROUTING DATA
             QLOSS     CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
               0.0     0.000    0.00       1       1       0       0               0

                       NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                           1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

     QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
    0.0800  0.0400  0.0800   918.0   950.0  30200. 0.00070

     CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
      100.00  950.00  700.00  930.00 1100.00  920.00 1125.00  918.00 1175.00  918.00
     1200.00  920.00 2100.00  940.00 3000.00  950.00

  STORAGE       0.00      82.96     254.04     590.20    1093.52    1763.99    2601.63    3606.42    4770.84
             7542.47    9149.52   10904.07   12806.11   14894.52   17218.75   19778.97   22575.18   25607.37

  OUTFLOW       0.00     140.29     600.54    1489.81    2915.18    4977.50    7769.48   11378.04   15947.81
            28007.03   35607.34   44333.75   54243.99   64450.93   76192.83   89607.16  104771.55  121769.77

    STAGE     918.00     919.68     921.37     923.05     924.74     926.42     928.11     929.79     931.47
              934.84     936.53     938.21     939.89     941.58     943.26     944.95     946.63     948.32

     FLOW       0.00     140.29     600.54    1489.81    2915.18    4977.50    7769.48   11378.04   15947.81
            28007.03   35607.34   44333.75   54243.99   64450.93   76192.83   89607.16  104771.55  121769.77

MAXIMUM STAGE IS      934.1

MAXIMUM STAGE IS      939.6

MAXIMUM STAGE IS      934.1
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MAXIMUM STAGE IS     939.6

MAXIMUM STAGE IS     934.1

MAXIMUM STAGE IS     939.6

MAXIMUM STAGE IS     934.1

MAXIMUM STAGE IS     939.6


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

                                              SUB-AREA RUNOFF COMPUTATION

                          SUB AREA-8 RUNOFF
                                    ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME  ISTAGE   IAUTO
                                        8        0        0        0        0        0        1       0       0

                                                   HYDROGRAPH DATA
                       IHYDG     IUHG    TAREA     SNAF    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                           1        1    10.97     0.00   104.10     0.00    0.000        0        1        0

                                                     PRECIP DATA
                              SPFE      PMS       R6      R12      R24      R48      R72      R96
                              0.00    21.00    80.00    94.00   106.00   110.00     0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                                      LOSS DATA
                  LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
                      0     0.00     0.00     1.00     0.00     0.00     1.00     1.00     0.10     0.00     0.00

                                                  UNIT HYDROGRAPH DATA
                                           TF=  6.21     CP=0.77     NTA=  0

                                                    RECESSION DATA
                                    STRTQ=    22.00     QRCSN=    22.00     RTIOR= 1.00

                     UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG=    6.18 HOURS, CP= 0.76   VOL= 1.00
                  58.       207.       395.       591.       761.       862.       880.       816.       662.       488.
                 359.       264.       194.       143.       105.        77.        57.        42.        31.        23.
                  17.        12.

        0                                            END-OF-PERIOD FLOW
     MO.DA   HR.MN   PERIOD    RAIN    EXCS    LOSS     COMP Q       MO.DA   HR.MN  PERIOD    RAIN    EXCS    LOSS     COMP Q

                                                                                      SUM   20.05   16.83    3.21    120524.
                                                                                          ( 509.)( 428.)(  82.)( 3412.86)

              **********          **********          **********          **********          **********
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                              COMBINE HYDROGRAFHS

                COMBINE 2 HYDROGRAFHS AT 600
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       600       2       0       0       0       0       1       0       0

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

                              HYDROGRAPH ROUTING

                CHANNEL ROUTE THRU SLB AREA-9
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         9       1       0       0       0       0       1       0       0

                              ALL PLANS HAVE SAME
                                  ROUTING DATA
                 QLOSS   CLOSS     AVG    IRES   ISAME    IOFT    IPMP            LSTR
                   0.0   0.000    0.00       1       1       0       0               0

                     NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                         1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
----------------------------

      QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
     0.0800  0.0400  0.0800   911.0   950.0  20500.  0.00040

      CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
       100.00  950.00  700.00  930.00 1200.00  920.00 1210.00  919.00 1250.00  919.00
      1400.00  920.00 1600.00  940.00 3200.00  930.00

STORAGE      0.00       0.00       0.00       0.00       5.63     197.88     523.77     968.63    1532.45
          3093.73    4359.65    6022.13    8081.16   10536.76   13260.87   16047.24   18893.08   21798.41

OUTFLOW      0.00       0.00       0.00       0.00       2.65     433.34    1621.15    3547.03    6261.90
         14171.87   20121.23   27854.68   37662.46   49824.82   65863.80   84588.95  105697.48  129114.52

STAGE      911.00     913.05     915.11     917.16     919.21     921.26     923.32     925.37     927.42
           931.53     933.58     935.63     937.68     939.74     941.79     943.84     945.89     947.95

FLOW         0.00       0.00       0.00       0.00       2.65     433.34    1621.15    3547.03    6261.90
         14171.87   20121.23   27854.68   37662.46   49824.82   65863.80   84588.95  105697.48  129114.52

MAXIMUM STAGE IS      935.1

MAXIMUM STAGE IS      [illegible]
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MAXIMUM STAGE IS     940.4
MAXIMUM STAGE IS     935.1
MAXIMUM STAGE IS     940.4
MAXIMUM STAGE IS     935.1
MAXIMUM STAGE IS     940.4
MAXIMUM STAGE IS     935.1
MAXIMUM STAGE IS     940.4

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

                                  SUB-AREA RUNOFF COMPUTATION

             SUB AREA-9 RUNOFF
                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            9       0       0       0       0       0       1       0       0

                                       HYDROGRAPH DATA
           IHYDG    IUHG   TAREA    SNAF   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
               1       1    7.64    0.00  104.10    0.00   0.000       0       1       0

                                       PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                    0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                        LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                   UNIT HYDROGRAPH DATA
                                TP=  6.88     CP=0.77     NTA=  0

                                      RECESSION DATA
                        STRTQ=   15.00     QRCSN=   15.00     RTIOR= 1.00

            UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG=   6.85 HOURS, CP= 0.76   VOL= 1.00
          32.       116.       224.       340.       448.       524.       554.       542.       474.       376.
         292.       226.       175.       136.       106.        82.        63.        49.        38.        30.
          23.        18.        14.        11.         8.         6.

      0                                END-OF-PERIOD FLOW
    MO.DA  HR.MN  PERIOD    RAIN    EXCS    LOSS    COMP Q       MO.DA  HR.MN  PERIOD    RAIN    EXCS    LOSS     COMP Q

                                                                              SUM  20.05   16.83    3.21    83934.
                                                                                 ( 509.)( 428.)(  82.)( 2376.74)
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**********          **********          **********          **********          **********

                              SUB-AREA RUNOFF COMPUTATION

          SUB AREA-10 RUNOFF
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       10       0       0       0       0       0       1       0       0

                                     HYDROGRAPH DATA
        IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
            1       1    9.01    0.00  104.10    0.00   0.000       0       1       0

                                       PRECIP DATA
               SPFE     PMS      R6     R12     R24     R48     R72     R96
               0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                        LOSS DATA
      LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                  UNIT HYDROGRAPH DATA
                              TP=  6.60     CP=0.77    NTA=  0

                                     RECESSION DATA
                      STRTQ=   18.00    QRCSN=   18.00    RTIOR= 1.00

       UNIT HYDROGRAPH 25 END-OF-PERIOD ORDINATES, LAG=    6.62 HOURS, CP= 0.77  VOL= 1.00
      41.      147.      285.      429.      561.      650.      680.      654.      558.      431.
     328.      250.      190.      145.      110.       84.       64.       49.       37.       28.
      21.       16.       12.        9.        7.

          0                                 END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                     SUM  20.05  16.83   3.21    99066.
                                                                         ( 509.)( 428.)(  82.)( 2805.23)


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

                                  COMBINE HYDROGRAPHS

          COMBINE 3 HYDROGRAPGHS AT 700
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      700       3       0       0       0       0       1       0       0
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     **********          **********          **********          **********          **********

                                        HYDROGRAPH ROUTING

                    CHANNEL ROUTE THRU SLB AREA-11
                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 11       1       0       0       0       0       1       0       0

                                          ALL PLANS HAVE SAME
                                              ROUTING DATA
                     QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       0.0    0.000    0.00       1       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  1       0       0   0.000   0.000   0.000     -1.       0

NORMAL DEPTH CHANNEL ROUTING
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      QN(1)    QN(2)    QN(3)   ELNVT   ELMAX   RLNTH     SEL
     0.0800   0.0400   0.0800   896.0   910.0  11600. 0.00200

      CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
        100.00  910.00  500.00  900.00  750.00  898.00  760.00  896.00  850.00  896.00
        860.00  898.00 1000.00  900.00 1100.00  910.00

STORAGE        0.00       18.38       38.21       60.57      104.31      176.23      272.92      378.77      491.85
             739.70      874.46     1016.46     1165.68     1322.13     1485.81     1656.72     1834.86     2020.22

OUTFLOW        0.00       91.34      294.29      595.09     1040.30     1681.90     2600.59     3790.64     5215.33
            8755.54    10871.54    13220.88    15806.65    18632.43    21702.20    25020.12    28590.57    32418.07

  STAGE      896.00      896.74      897.47      898.21      898.95      899.68      900.42      901.16      901.89
             903.37      904.10      904.84      905.58      906.32      907.05      907.79      908.53      909.26

   FLOW        0.00       91.34      294.29      595.09     1040.30     1681.90     2600.59     3790.64     5215.33
            8755.54    10871.54    13220.88    15806.65    18632.43    21702.20    25020.12    28590.57    32418.07

MAXIMUM STAGE IS      908.8

MAXIMUM STAGE IS      914.8

MAXIMUM STAGE IS      908.8

MAXIMUM STAGE IS      914.8

MAXIMUM STAGE IS      908.8

MAXIMUM STAGE IS      914.8
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MAXIMUM STAGE IS     908.8

MAXIMUM STAGE IS     914.8

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

                                      SUB-AREA RUNOFF COMPUTATION

                  SUB AREA-11 RUNOFF
                            ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                               11        0        0        0        0        0        1        0        0

                                           HYDROGRAPH DATA
               IHYDG    IUHG   TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                   1       1    7.57     0.00   104.10     0.00    0.000        0        1        0

                                             PRECIP DATA
                        SPFE      PMS       R6      R12      R24      R48      R72      R96
                        0.00    21.00    80.00    94.00   106.00   110.00     0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                              LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00    0.10    0.00    0.00    0.00

                                       UNIT HYDROGRAPH DATA
                                 TF=  5.99     CP=0.77     NTA=  0

                                           RECESSION DATA
                          STRTQ=    15.00     QRCSN=    15.00     RTIOR= 1.00

             UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG=   5.93 HOURS, CP= 0.76  VOL= 1.00
          45.        159.       305.       455.       574.       630.       621.       532.       405.       300.
         222.        165.       122.        90.        67.        49.        37.        27.        20.        15.
          11.          8.

       0                                   END-OF-PERIOD FLOW
 MO.DA   HR.MN   PERIOD    RAIN    EXCS    LOSS     COMP Q        MO.DA  HR.MN  PERIOD    RAIN    EXCS    LOSS     COMP Q

                                                                                   SUM   20.05   20.05    0.00    98771.
                                                                                       ( 509.)( 509.)(    0.)( 2796.88)

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

                                      SUB-AREA RUNOFF COMPUTATION

                  SUB AREA-12 RUNOFF
                            ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                               12        0        0        0        0        1        0        0        0
```

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	8.19	0.00	104.10	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.00	80.00	94.00	106.00	110.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 6.47 CP=0.77 NTA= 0

RECESSION DATA

STRTQ= 16.00 QRCSN= 16.00 RTIOR= 1.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 8.24 AND R= 3.56 INTERVALS

UNIT HYDROGRAPH 24 END-OF-PERIOD ORDINATES, LAG= 6.46 HOURS, CP= 0.76 VOL= 1.00

39.	139.	268.	403.	526.	605.	629.	600.	506.	386.
291.	219.	165.	124.	94.	71.	53.	40.	30.	23.
17.	13.	10.	7.						

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	1.00	1	0.01	0.00	0.01	16.	1.02	22.00	46	0.22	0.12	0.10	8439.
1.01	2.00	2	0.01	0.00	0.01	16.	1.02	23.00	47	0.22	0.12	0.10	7907.
1.01	3.00	3	0.01	0.00	0.01	16.	1.03	0.00	48	0.22	0.12	0.10	6883.
1.01	4.00	4	0.01	0.00	0.01	16.	1.03	1.00	49	0.00	0.00	0.00	5638.
1.01	5.00	5	0.01	0.00	0.01	16.	1.03	2.00	50	0.00	0.00	0.00	4472.
1.01	6.00	6	0.01	0.00	0.01	16.	1.03	3.00	51	0.00	0.00	0.00	3497.
1.01	7.00	7	0.02	0.00	0.02	16.	1.03	4.00	52	0.00	0.00	0.00	2732.
1.01	8.00	8	0.02	0.00	0.02	16.	1.03	5.00	53	0.00	0.00	0.00	2129.
1.01	9.00	9	0.02	0.00	0.02	16.	1.03	6.00	54	0.00	0.00	0.00	1650.
1.01	10.00	10	0.02	0.00	0.02	16.	1.03	7.00	55	0.00	0.00	0.00	1268.
1.01	11.00	11	0.02	0.00	0.02	16.	1.03	8.00	56	0.00	0.00	0.00	964.
1.01	12.00	12	0.02	0.00	0.02	16.	1.03	9.00	57	0.00	0.00	0.00	729.
1.01	13.00	13	0.06	0.00	0.06	16.	1.03	10.00	58	0.00	0.00	0.00	551.
1.01	14.00	14	0.07	0.00	0.07	16.	1.03	11.00	59	0.00	0.00	0.00	418.
1.01	15.00	15	0.08	0.00	0.08	16.	1.03	12.00	60	0.00	0.00	0.00	317.
1.01	16.00	16	0.21	0.00	0.21	16.	1.03	13.00	61	0.00	0.00	0.00	235.
1.01	17.00	17	0.08	0.00	0.08	16.	1.03	14.00	62	0.00	0.00	0.00	172.
1.01	18.00	18	0.06	0.00	0.06	16.	1.03	15.00	63	0.00	0.00	0.00	122.
1.01	19.00	19	0.01	0.00	0.01	16.	1.03	16.00	64	0.00	0.00	0.00	66.
1.01	20.00	20	0.01	0.00	0.01	16.	1.03	17.00	65	0.00	0.00	0.00	43.
1.01	21.00	21	0.01	0.00	0.01	16.	1.03	18.00	66	0.00	0.00	0.00	28.
1.01	22.00	22	0.01	0.00	0.01	16.	1.03	19.00	67	0.00	0.00	0.00	24.
1.01	23.00	23	0.01	0.00	0.01	16.	1.03	20.00	68	0.00	0.00	0.00	22.

1.02	0.00	24	0.01	0.00	0.01	16.	1.03	21.00	69	0.00	0.00	0.00	20.
1.02	1.00	25	0.15	0.00	0.15	16.	1.03	22.00	70	0.00	0.00	0.00	18.
1.02	2.00	26	0.15	0.01	0.14	16.	1.03	23.00	71	0.00	0.00	0.00	17.
1.02	3.00	27	0.15	0.05	0.10	19.	1.04	0.00	72	0.00	0.00	0.00	16.
1.02	4.00	28	0.15	0.05	0.10	26.	1.04	1.00	73	0.00	0.00	0.00	16.
1.02	5.00	29	0.15	0.05	0.10	39.	1.04	2.00	74	0.00	0.00	0.00	16.
1.02	6.00	30	0.15	0.05	0.10	58.	1.04	3.00	75	0.00	0.00	0.00	16.
1.02	7.00	31	0.43	0.33	0.10	94.	1.04	4.00	76	0.00	0.00	0.00	16.
1.02	8.00	32	0.43	0.33	0.10	161.	1.04	5.00	77	0.00	0.00	0.00	16.
1.02	9.00	33	0.43	0.33	0.10	264.	1.04	6.00	78	0.00	0.00	0.00	16.
1.02	10.00	34	0.43	0.33	0.10	404.	1.04	7.00	79	0.00	0.00	0.00	16.
1.02	11.00	35	0.43	0.33	0.10	573.	1.04	8.00	80	0.00	0.00	0.00	16.
1.02	12.00	36	0.43	0.33	0.10	759.	1.04	9.00	81	0.00	0.00	0.00	16.
1.02	13.00	37	1.46	1.36	0.10	988.	1.04	10.00	82	0.00	0.00	0.00	16.
1.02	14.00	38	1.75	1.65	0.10	1321.	1.04	11.00	83	0.00	0.00	0.00	16.
1.02	15.00	39	2.19	2.09	0.10	1805.	1.04	12.00	84	0.00	0.00	0.00	16.
1.02	16.00	40	5.54	5.44	0.10	2604.	1.04	13.00	85	0.00	0.00	0.00	16.
1.02	17.00	41	2.04	1.94	0.10	3799.	1.04	14.00	86	0.00	0.00	0.00	16.
1.02	18.00	42	1.60	1.50	0.10	5213.	1.04	15.00	87	0.00	0.00	0.00	16.
1.02	19.00	43	0.22	0.12	0.10	6617.	1.04	16.00	88	0.00	0.00	0.00	16.
1.02	20.00	44	0.22	0.12	0.10	7763.	1.04	17.00	89	0.00	0.00	0.00	16.
1.02	21.00	45	0.22	0.12	0.10	8406.	1.04	18.00	90	0.00	0.00	0.00	16.
									SUM	20.05	16.83	3.21	89994.
										(509.)	(428.)	(82.)	(2548.34)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8439.	7588.	3610.	1246.	89977.
CMS	239.	215.	102.	35.	2548.
INCHES		8.62	16.40	16.98	17.03
MM		218.90	416.56	431.33	432.64
AC-FT		3762.	7160.	7414.	7436.
THOUS CU M		4641.	8832.	9145.	9172.

HYDROGRAPH AT STA 12 FOR PLAN 1, RTIO 1

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.	9.	13.	20.	29.
47.	80.	132.	202.	287.	380.	494.	661.	902.	1302.
1899.	2607.	3309.	3881.	4203.	4220.	3954.	3441.	2819.	2236.
1748.	1366.	1065.	825.	634.	482.	365.	276.	209.	158.
118.	86.	61.	33.	21.	14.	12.	11.	10.	9.
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	4220.	3794.	1805.	623.	44989.
CMS	119.	107.	51.	18.	1274.
INCHES		4.31	8.20	8.49	8.52
MM		109.45	208.28	215.66	216.32
AC-FT		1881.	3580.	3707.	3718.

```
        THOUS CU M                2320.     4416.     4572.          4586.

                        HYDROGRAPH AT STA    12 FOR PLAN 1, RTIO 2
     16.       16.       16.       16.       16.       16.       16.       16.       16.       16.
     16.       16.       16.       16.       16.       16.       16.       16.       16.       16.
     16.       16.       16.       16.       16.       16.       19.       26.       39.       58.
     94.      161.      264.      404.      573.      759.      988.     1321.     1805.     2604.
   3799.     5213.     6617.     7763.     8406.     8439.     7907.     6883.     5638.     4472.
   3497.     2732.     2129.     1650.     1268.      964.      729.      551.      418.      317.
    235.      172.      122.       66.       43.       28.       24.       22.       20.       18.
     17.       16.       16.       16.       16.       16.       16.       16.       16.       16.
     16.       16.       16.       16.       16.       16.       16.       16.       16.       16.

                              PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
                   CFS       8439.     7588.     3610.     1246.         89977.
                   CMS        239.      215.      102.       35.          2548.
                INCHES                  8.62     16.40     16.98          17.03
                    MM                218.90    416.56    431.33         432.64
                 AC-FT                 3762.     7160.     7414.          7436.
            THOUS CU M                 4641.     8832.     9145.          9172.

PLAN 2 SAME AS PLAN 1
PLAN 3 SAME AS PLAN 2
PLAN 4 SAME AS PLAN 3

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

                                  COMBINE HYDROGRAPHS

           COMBINE 3 HYDROGRAPHS AT 800
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      800       3       0       0       0       0       1       0       0

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

                                  HYDROGRAPH ROUTING

           CHANNEL ROUTE THRU SUB AREA-13
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       13       1       0       0       0       0       1       0       0

                                 ALL PLANS HAVE SAME
                                     ROUTING DATA
            QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
              0.0   0.000    0.00       1       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        1       0       0   0.000   0.000   0.000     -1.       0
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NORMAL DEPTH CHANNEL ROUTING
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      QN(1)    QN(2)    QN(3)    ELNVT    ELMAX    RLNTH     SEL
     0.0800   0.0400   0.0800    860.0    880.0    4500.  0.00100

      CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
        100.00  880.00  180.00  870.00  250.00  864.00  265.00  860.00  475.00  860.00
        500.00  864.00  600.00  878.00  700.00  880.00

   STORAGE      0.00      23.41      47.96      73.66     100.52     129.21     160.06     193.05     228.21
              304.91     346.11     389.03     433.69     480.08     528.20     578.06     629.65     684.95

   OUTFLOW      0.00     271.60     869.68    1724.96    2827.70    4221.03    5846.80    7701.75    9783.91
            14631.30   17398.63   20388.36   23599.96   27033.45   30689.11   34567.52   38669.46   42712.23

     STAGE    860.00     861.05     862.11     863.16     864.21     865.26     866.32     867.37     868.42
              870.53     871.58     872.63     873.68     874.74     875.79     876.84     877.89     878.95

      FLOW      0.00     271.60     869.68    1724.96    2827.70    4221.03    5846.80    7701.75    9783.91
            14631.30   17398.63   20388.36   23599.96   27033.45   30689.11   34567.52   38669.46   42712.23

MAXIMUM STAGE IS      876.8

MAXIMUM STAGE IS      885.8

MAXIMUM STAGE IS      876.8

MAXIMUM STAGE IS      885.8

MAXIMUM STAGE IS      876.8

MAXIMUM STAGE IS      885.8

MAXIMUM STAGE IS      876.8

MAXIMUM STAGE IS      885.8

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

                              SUB-AREA RUNOFF COMPUTATION

                SUB AREA-13 RUNOFF
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        13       0       0       0       0       0       1       0       0

                                         HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1       1    0.84    0.00  104.10    0.00   0.000       0       1       0
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MOORE BUSINESS FORMS, INC., HO... PRINTED IN USA 22

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                                        PRECIP DATA
                     SPFE     PMS      R6      R12      R24      R48      R72      R96
                     0.00    21.00   80.00   94.00   106.00   110.00    0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                         LOSS DATA
          LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
              0   0.00   0.00   1.00   0.00   0.00   1.00   1.00   0.10   0.00   0.00

                                    UNIT HYDROGRAPH DATA
                              TP=  3.11      CP=0.77     NTA=  0

                                       RECESSION DATA
                        STRTQ=     2.00     QRCSN=     2.00     RTIOR= 1.00

            UNIT HYDROGRAPH 11 END-OF-PERIOD ORDINATES, LAG=   3.09 HOURS, CP= 0.77   VOL= 1.00
          21.        70.       117.       130.        97.        53.        27.        13.         7.         3.
           2.

      0                                END-OF-PERIOD FLOW
    MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                           SUM  20.05  16.83   3.21    9269.
                                                                              ( 509.)( 428.)(  82.)( 262.47)

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

                                      COMBINE HYDROGRAPHS

                COMBINE 2 HYDROGRAPHS AT 900
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       900       2       0       0       0       0       1       0       0

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

                                      HYDROGRAPH ROUTING

                ROUTE OVER OATKA CREEK DAM
                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       900       1       0       0       0       0       1       0       0

                                    ALL PLANS HAVE SAME
                                       ROUTING DATA
                QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                  0.0    0.000    0.00       1       1       0       0               0

                     NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                         1       0       0   0.000   0.000   0.000      -1       0
```

```
   CAPACITY=        0.      230.      310.      390.      470.      550.      630.      710.      780.      860.
                  940.     1020.     1100.     1180.     1260.

  ELEVATICN=      858.      864.      866.      868.      870.      872.      874.      876.      878.      880.
                  882.      884.      886.      888.      890.

                           CREL     SPWID      COQW      EXPW     ELEVL      COQL     CAREA      EXPL
                          864.0     160.0       3.2       1.5       0.0       0.0       0.0       0.0

                                                          DAM DATA
                                                 TOPEL     COQD      EXPD    DAMWID
                                                 866.0      2.6       1.5       20.

                                                       DAM BREACH DATA
                                        BRWID        Z      ELBM     TFAIL      WSEL    FAILEL
                                          40.     1.00    858.00      1.00    866.00    879.70

PEAK OUTFLOW IS     34525. AT TIME  49.00 HOURS

BEGIN DAM FAILURE AT 43.00 HOURS

PEAK OUTFLOW IS     71567. AT TIME  49.00 HOURS

                                                       DAM BREACH DATA
                                        BRWID        Z      ELBM     TFAIL      WSEL    FAILEL
                                          80.     1.00    858.00      1.00    866.00    879.70

PEAK OUTFLOW IS     34525. AT TIME  49.00 HOURS

BEGIN DAM FAILURE AT 43.00 HOURS

PEAK OUTFLOW IS     71566. AT TIME  49.00 HOURS

                                                       DAM BREACH DATA
                                        BRWID        Z      ELBM     TFAIL      WSEL    FAILEL
                                         120.     1.00    858.00      1.00    866.00    879.70

PEAK OUTFLOW IS     34525. AT TIME  49.00 HOURS

BEGIN DAM FAILURE AT 43.00 HOURS

PEAK OUTFLOW IS     71566. AT TIME  49.00 HOURS

                                                       DAM BREACH DATA
                                        BRWID        Z      ELBM     TFAIL      WSEL    FAILEL
                                         160.     1.00    858.00      1.00    866.00    879.70

PEAK OUTFLOW IS     34525. AT TIME  49.00 HOURS

BEGIN DAM FAILURE AT 43.00 HOURS
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PEAK OUTFLOW IS    71582. AT TIME  49.00 HOURS

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

                                          HYDROGRAPH ROUTING

                    CHANNEL ROUTE THRU SUB AREA-14
                            ISTAQ   ICCMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               14       1       0       0       0       0       1       0       0

                                         ALL PLANS HAVE SAME
                                             ROUTING DATA
                    QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                      0.0   0.000    0.00       1       1       0       0               0

                            NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                1       0       0   0.000   0.000   0.000    -1.        0

NORMAL DEPTH CHANNEL ROUTING
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     QN(1)     QN(2)     QN(3)     ELNVT    ELMAX    RLNTH     SEL
    0.0800    0.0400    0.0800     835.0    860.0    2100.  0.00700

     CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
      100.00  860.00  250.00  850.00  300.00  840.00  310.00  835.00  350.00  835.00
      360.00  840.00  425.00  850.00  500.00  860.00

 STORAGE       0.00       2.70       5.74       9.11      12.83      17.31      22.75      29.14      36.50
              54.09      64.32      75.68      88.85     103.89     120.81     139.60     160.28     182.83

 OUTFLOW       0.00     199.85     646.89    1300.32    2177.31    3377.34    4830.92    6554.40    8562.52
           13484.67   16433.90   19613.31   23159.36   27173.36   31678.53   36703.05   42276.19   48427.26

   STAGE     835.00     836.32     837.63     838.95     840.26     841.58     842.89     844.21     845.53
             848.16     849.47     850.79     852.10     853.42     854.74     856.05     857.37     858.68

    FLOW       0.00     199.85     646.89    1300.32    2177.31    3377.34    4830.92    6554.40    8562.52
           134  .67   16433.90   19613.31   23159.36   27173.36   31678.53   36703.05   42276.19   48427.26

MAXIMUM STAGE IS      855.5

MAXIMUM STAGE IS      863.2

MAXIMUM STAGE IS      855.5

MAXIMUM STAGE IS      863.2
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MAXIMUM STAGE IS     855.5

MAXIMUM STAGE IS     863.2

MAXIMUM STAGE IS     855.5

MAXIMUM STAGE IS     863.2

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

                                    SUB-AREA RUNOFF COMPUTATION

                    SUB AREA-14 RUNOFF
                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 14       0       0       0       0       0       1       0       0

                                          HYDROGRAPH DATA
                  IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                      1       1    0.37    0.00  104.10    0.00   0.000       0       1       0

                                            PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.00   80.00   94.00  106.00  110.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.868

                                             LOSS DATA
             LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                 0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                        UNIT HYDROGRAPH DATA
                                  TP=  2.88     CP=0.77     NTA=  0

                                           RECESSION DATA
                             STRTQ=     1.00     QRCSN=     1.00     RTIOR= 1.00

                UNIT HYDROGRAPH  9 END-OF-PERIOD ORDINATES, LAG=   2.87 HOURS, CP= 0.76  VOL= 1.00
             12.       39.       61.       50.       38.       16.        7.        3.        1.

           0                               END-OF-PERIOD FLOW
        MO.DA  HR.MN  PERIOD    RAIN    EXCS    LOSS    COMP Q      MO.DA  HR.MN  PERIOD    RAIN    EXCS    LOSS    COMP Q

                                                                                   SUM  20.05   16.83    3.21     4095.
                                                                                      ( 509.)( 428.)(  82.)(  115.96)

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

                                       COMBINE HYDROGRAPHS

                    COMBINE 2 HYDROGRAPHS AT 1000
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COMBINE 2 HYDROGRAPHS AT 1000

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1000	2	0	0	0	0	1	0	0

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

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

RATICS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1 0.50	RATIO 2 1.00
HYDROGRAPH AT	1	8.78	1	5082.	10164.
	(	22.74)	(	143.91)(	287.82)(
			2	5082.	10164.
			(	143.91)(	287.82)(
			3	5082.	10164.
			(	143.91)(	287.82)(
			4	5082.	10164.
			(	143.91)(	287.82)(
HYDROGRAPH AT	1	4.94	1	3149.	6297.
	(	12.79)	(	89.16)(	178.32)(
			2	3149.	6297.
			(	89.16)(	178.32)(
			3	3149.	6297.
			(	89.16)(	178.32)(
			4	3149.	6297.
			(	89.16)(	178.32)(
2 COMBINED	100	13.72	1	8127.	16254.
	(	35.53)	(	230.13)(	460.26)(
			2	8127.	16254.
			(	230.13)(	460.26)(
			3	8127.	16254.
			(	230.13)(	460.26)(
			4	8127.	16254.
			(	230.13)(	460.26)(
ROUTED TO	3	13.72	1	8135.	16283.
	(	35.53)	(	230.36)(	461.07)(
			2	8135.	16283.
			(	230.36)(	461.07)(
			3	8135.	16283.
			(	230.36)(	461.07)(
			4	8135.	16283.
			(	230.36)(	461.07)(
HYDROGRAPH AT	3	5.85	1	3500.	7001.
	(	15.15)	(	99.12)(	198.24)(
			2	3500.	7001.
			(	[illegible]	[illegible]

			3	3500.	7001.	
			(	99.12)(	198.24)(	
			4	3500.	7001.	
			(	99.12)(	198.24)(	
2 COMBINED	200	19.57	1	11635.	23283.	
	(	50.69)	(	329.48)(	659.31)(	
			2	11635.	23283.	
			(	329.48)(	659.31)(	
			3	11635.	23283.	
			(	329.48)(	659.31)(	
			4	11635.	23283.	
			(	329.48)(	659.31)(	
ROUTED TO	4	19.57	1	11456.	23084.	
	(	50.69)	(	324.41)(	653.66)(	
			2	11456.	23084.	
			(	324.41)(	653.66)(	
			3	11456.	23084.	
			(	324.41)(	653.66)(	
			4	11456.	23084.	
			(	324.41)(	653.66)(	
HYDROGRAPH AT	4	19.66	1	9599.	19198.	
	(	50.92)	(	271.81)(	543.62)(	
			2	9599.	19198.	
			(	271.81)(	543.62)(	
			3	9599.	19198.	
			(	271.81)(	543.62)(	
			4	9599.	19198.	
			(	271.81)(	543.62)(	
2 COMBINED	300	39.23	1	20835.	41730.	
	(	101.60)	(	589.98)(	1181.66)(	
			2	20835.	41730.	
			(	589.98)(	1181.66)(	
			3	20835.	41730.	
			(	589.98)(	1181.66)(	
			4	20835.	41730.	
			(	589.98)(	1181.66)(	
ROUTED TO	5	39.23	1	16759.	34130.	
	(	101.60)	(	474.56)(	966.46)(	
			2	16759.	34130.	
			(	474.56)(	966.46)(	
			3	16759.	34130.	
			(	474.56)(	966.46)(	
			4	16759.	34130.	
			(	474.56)(	966.46)(	
HYDROGRAPH AT	[illegible]	[illegible]	1	[illegible]	[illegible]	

HYDROGRAPH AT	5	22.20	1	13221.	26442.
		(57.50)		(374.38)(	748.75)(
			2	13221.	26442.
				(374.38)(	748.75)(
			3	13221.	26442.
				(374.38)(	748.75)(
			4	13221.	26442.
				(374.38)(	748.75)(
2 COMBINED	400	61.43	1	26971.	55037.
		(159.10)		(763.74)(	1558.46)(
			2	26971.	55037.
				(763.74)(	1558.46)(
			3	26971.	55037.
				(763.74)(	1558.46)(
			4	26971.	55037.
				(763.74)(	1558.46)(
ROUTED TO	6	61.43	1	15267.	33229.
		(159.10)		(432.33)(	940.94)(
			2	15267.	33229.
				(432.33)(	940.94)(
			3	15267.	33229.
				(432.33)(	940.94)(
			4	15267.	33229.
				(432.33)(	940.94)(
HYDROGRAPH AT	6	21.53	1	10769.	21537.
		(55.76)		(304.93)(	609.87)(
			2	10769.	21537.
				(304.93)(	609.87)(
			3	10769.	21537.
				(304.93)(	609.87)(
			4	10769.	21537.
				(304.93)(	609.87)(
HYDROGRAPH AT	7	12.58	1	6225.	12451.
		(32.58)		(176.28)(	352.57)(
			2	6225.	12451.
				(176.28)(	352.57)(
			3	6225.	12451.
				(176.28)(	352.57)(
			4	6225.	12451.
				(176.28)(	352.57)(
3 COMBINED	500	95.54	1	28718.	57755.
		(247.45)		(813.20)(	1635.45)(
			2	28718.	57755.
				(813.20)(	1635.45)(
			3	28718.	57755.
				(813.20)(	1635.45)(
			4	28718.	57755.

			4	[illegible]	[illegible]
			(	813.20)(	1635.45)(
ROUTED TO	8	95.54	1	24988.	52774.
		(247.45)	(	707.58)(	1494.38)(
			2	24988.	52774.
			(	707.58)(	1494.38)(
			3	24988.	52774.
			(	707.58)(	1494.38)(
			4	24988.	52774.
			(	707.58)(	1494.38)(
HYDROGRAPH AT	8	10.97	1	5876.	11751.
		(28.41)	(	166.38)(	332.75)(
			2	5876.	11751.
			(	166.38)(	332.75)(
			3	5876.	11751.
			(	166.38)(	332.75)(
			4	5876.	11751.
			(	166.38)(	332.75)(
2 COMBINED	600	106.51	1	28279.	59304.
		(275.86)	(	800.77)(	1679.30)(
			2	28279.	59304.
			(	800.77)(	1679.30)(
			3	28279.	59304.
			(	800.77)(	1679.30)(
			4	28279.	59304.
			(	800.77)(	1679.30)(
ROUTED TO	9	106.51	1	25973.	55140.
		(275.86)	(	735.46)(	1561.40)(
			2	25973.	55140.
			(	735.46)(	1561.40)(
			3	25973.	55140.
			(	735.46)(	1561.40)(
			4	25973.	55140.
			(	735.46)(	1561.40)(
HYDROGRAPH AT	9	7.64	1	3784.	7568.
		(19.79)	(	107.15)(	214.30)(
			2	3784.	7568.
			(	107.15)(	214.30)(
			3	3784.	7568.
			(	107.15)(	214.30)(
			4	3784.	7568.
			(	107.15)(	214.30)(
HYDROGRAPH AT	10	9.01	1	4584.	9169.
		(23.34)	(	129.81)(	259.63)(
			2	4584.	9169.
			(	129.81)(	259.63)(

			(	[illegible] (	[illegible] (
			3	4584.	9169.
			(	129.81)(	259.63)(
			4	4584.	9169.
			(	129.81)(	259.63)(
3 COMBINED	700	123.16	1	29907.	63169.
		(318.98)	(	846.88)(	1788.73)(
			2	29907.	63169.
			(	846.88)(	1788.73)(
			3	29907.	63169.
			(	846.88)(	1788.73)(
			4	29907.	63169.
			(	846.88)(	1788.73)(
ROUTED TO	11	123.16	1	29763.	62886.
		(318.98)	(	842.78)(	1780.72)(
			2	29763.	62886.
			(	842.78)(	1780.72)(
			3	29763.	62886.
			(	842.78)(	1780.72)(
			4	29763.	62886.
			(	842.78)(	1780.72)(
HYDROGRAPH AT	11	7.57	1	4417.	8834.
		(19.61)	(	125.07)(	250.14)(
			2	4417.	8834.
			(	125.07)(	250.14)(
			3	4417.	8834.
			(	125.07)(	250.14)(
			4	4417.	8834.
			(	125.07)(	250.14)(
HYDROGRAPH AT	12	8.19	1	4220.	8439.
		(21.21)	(	119.49)(	238.98)(
			2	4220.	8439.
			(	119.49)(	238.98)(
			3	4220.	8439.
			(	119.49)(	238.98)(
			4	4220.	8439.
			(	119.49)(	238.98)(
3 COMBINED	800	138.92	1	34441.	71503.
		(359.80)	(	975.27)(	2024.74)(
			2	34441.	71503.
			(	975.27)(	2024.74)(
			3	34441.	71503.
			(	975.27)(	2024.74)(
			4	34441.	71503.
			(	975.27)(	2024.74)(
ROUTED T[illegible]	1[illegible]	138.[illegible]	1	[illegible]	[illegible]

ROUTED TO	[illegible]	[illegible]	1	[illegible]	[illegible]
		(359.80)	(	975.91)(	2024.07)(
			2	34464.	71479.
			(	975.91)(	2024.07)(
			3	34464.	71479.
			(	975.91)(	2024.07)(
			4	34464.	71479.
			(	975.91)(	2024.07)(
HYDROGRAPH AT	13	0.84	1	688.	1377.
		(2.18)	(	19.49)(	38.99)(
			2	688.	1377.
			(	19.49)(	38.99)(
			3	688.	1377.
			(	19.49)(	38.99)(
			4	688.	1377.
			(	19.49)(	38.99)(
2 COMBINED	900	139.76	1	34522.	71595.
		(361.97)	(	977.55)(	2027.34)(
			2	34522.	71595.
			(	977.55)(	2027.34)(
			3	34522.	71595.
			(	977.55)(	2027.34)(
			4	34522.	71595.
			(	977.55)(	2027.34)(
ROUTED TO	900	139.76	1	34525.	71567.
		(361.97)	(	977.63)(	2026.55)(
			2	34525.	71588.
			(	977.64)(	2027.14)(
			3	34525.	71566.
			(	977.64)(	2026.53)(
			4	34525.	71582.
			(	977.64)(	2026.97)(
ROUTED TO	14	139.76	1	34520.	71668.
		(361.97)	(	977.51)(	2029.40)(
			2	34521.	71692.
			(	977.52)(	2030.09)(
			3	34521.	71736.
			(	977.52)(	2031.33)(
			4	34521.	71756.
			(	977.52)(	2031.90)(
HYDROGRAPH AT	14	0.37	1	321.	642.
		(0.96)	(	9.08)(	18.17)(
			2	321.	642.
			(	9.08)(	18.17)(
			3	321.	642.
			(	9.08)(	18.17)(
			4	[illegible]	[illegible]

			(	9.08)(	18.17)(
2 COMBINED	1000	140.13	1	34537.	71702.
		(362.93)	(	977.99)(	2030.36)(
			2	34538.	71726.
			(	978.00)(	2031.05)(
			3	34538.	71770.
			(	978.00)(	2032.29)(
			4	34538.	71790.
			(	978.00)(	2032.87)(

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	8135.	1146.8	45.00
1.00	16283.	1149.0	45.00

PLAN 2 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	8135.	1146.8	45.00
1.00	16283.	1149.0	45.00

PLAN 3 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	8135.	1146.8	45.00
1.00	16283.	1149.0	45.00

PLAN 4 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	8135.	1146.8	45.00
1.00	16283.	1149.0	45.00

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	11456.	1004.4	45.00
1.00	23084.	1006.8	45.00

PLAN 2 STATION 4

PLAN 2 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	11456.	1004.4	45.00
1.00	23084.	1006.8	45.00

PLAN 3 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	11456.	1004.4	45.00
1.00	23084.	1006.8	45.00

PLAN 4 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	11456.	1004.4	45.00
1.00	23084.	1006.8	45.00

PLAN 1 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	16759.	960.4	48.00
1.00	34130.	964.0	48.00

PLAN 2 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	16759.	960.4	48.00
1.00	34130.	964.0	48.00

PLAN 3 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	16759.	960.4	48.00
1.00	34130.	964.0	48.00

PLAN 4 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	16759.	960.4	48.00
1.00	34130.	964.0	48.00

PLAN 1 STATION 6

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	15267.	949.8	52.00
1.00	33229.	953.7	51.00

PLAN 2 STATION 6

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	15267.	949.8	52.00
1.00	33229.	953.7	51.00

PLAN 3 STATION 6

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	15267.	949.8	52.00
1.00	33229.	953.7	51.00

PLAN 4 STATION 6

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	15267.	949.8	52.00
1.00	33229.	953.7	51.00

PLAN 1 STATION 8

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	24988.	934.1	50.00
1.00	52774.	939.6	50.00

PLAN 2 STATION 8

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	24988.	934.1	50.00
1.00	52774.	939.6	50.00

PLAN 3 STATION 8

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS

C.50	24988.	934.1	50.00
1.00	52774.	939.6	50.00

PLAN 4 STATION 8

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	24988.	934.1	50.00
1.00	52774.	939.6	50.00

PLAN 1 STATION 9

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	25973.	935.1	52.00
1.00	55140.	94C.4	51.0C

PLAN 2 STATION 9

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	25973.	935.1	52.00
1.00	55140.	94C.4	51.00

PLAN 3 STATION 9

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	25973.	935.1	52.0C
1.00	55140.	940.4	51.00

PLAN 4 STATION 9

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	25973.	935.1	52.00
1.00	5514C.	94C.4	51.00

PLAN 1 STATION 11

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	29763.	908.8	51.00
1.00	62886.	914.8	51.0C

PLAN 2 STATION 11

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	29763.	908.8	51.00
1.00	62886.	914.8	51.00

PLAN 3 STATION 11

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	29763.	908.8	51.00
1.00	62886.	914.8	51.00

PLAN 4 STATION 11

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	29763.	908.8	51.00
1.00	62886.	914.8	51.00

PLAN 1 STATION 13

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	34464.	876.8	49.00
1.00	71479.	885.8	49.00

PLAN 2 STATION 13

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	34464.	876.8	49.00
1.00	71479.	885.8	49.00

PLAN 3 STATION 13

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	34464.	876.8	49.00
1.00	71479.	885.8	49.00

PLAN 4 STATION 13

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	34464.	876.8	49.00
1.00	71479.	885.8	49.00

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	866.00	864.00	866.00
STORAGE	310.	230.	310.
OUTFLOW	1448.	0.	1448.

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
0.50	879.70	13.70	848.	34525.	55.00	49.00	0.00
1.00	883.45	17.45	998.	71567.	50.00	49.00	43.00

PLAN 2 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	866.00	864.00	866.00
STORAGE	310.	230.	310.
OUTFLOW	1448.	0.	1448.

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
0.50	879.70	13.70	848.	34525.	55.00	49.00	0.00
1.00	880.88	14.88	895.	71588.	45.00	49.00	43.00

PLAN 3 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	866.00	864.00	866.00
STORAGE	310.	230.	310.
OUTFLOW	1448.	0.	1448.

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
0.50	879.70	13.70	848.	34525.	55.00	49.00	0.00
1.00	880.16	14.16	866.	71566.	42.00	49.00	43.00

PLAN 4 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	866.00	864.00	866.00
STORAGE	310.	230.	310.
OUTFLOW	1448.	0.	1448.

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
0.50	879.70	13.70	848.	34525.	55.00	49.00	0.00
1.00	880.15	14.15	866.	71582.	39.00	49.00	43.00

PLAN 1 STATION 14

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	34520.	855.5	49.00
1.00	71668.	863.2	49.00

PLAN 2 STATION 14

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	34521.	855.5	49.00
1.00	71692.	863.2	49.00

PLAN 3 STATION 14

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	34521.	855.5	49.00
1.00	71736.	863.2	49.00

PLAN 4 STATION 14

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	34521.	855.5	49.00
1.00	71756.	863.2	49.00

STATION 04230380 OATKA CREEK AT WARSAW, NY

TOTAL D.A. = 41.9 CONTR. D.A. =
GAGE DATUM = 987.15 FT.

WATER YEAR	ANNUAL PEAK DISCH.CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK.FT	CODE	ANNUAL MAX GAGE HT.FT	DATE	CODE
1964	1610	03-05-64			7.03				
1965	772	04-07-65			5.28				
1966	679	02-11-66			5.04				
1967	1760	09-28-67			7.28				
1968	1150	01-30-68					6.05	06-26-68	
1969	1360	04-19-69			6.53				
1970	1120	04-02-70			5.94				
1971	1100	03-15-71			5.89				
1972	4010	06-23-72		1960	9.75				
1973	1490	12-06-72			6.80				
1974	1120	04-02-74			5.36				
1975	1630	01-29-75			5.74				
* 1976	1580	03-03-76			6.61				
* 1977	2020	09-24-77			7.56				

PEAKS MARKED WITH * NOT PASSED TO LOG PEARSON PROGRAM

CARD IMAGES SENT TO LOG PEARSON PROGRAM LISTED BELOW

```
OATKA CREEK AT WARSAW, NY                 1964-75     -020      1204230380PK        (HEADER CARD)
  1610    772    679   1760   1150   1360   1120   1100   4010   149004230380PK      (DATA CARD)
  1120   1630                                                        04230380PK      (DATA CARD)
```

PGM J407 VER 0.4

RUN DATE 2/23/78

U. S. GEOLOGICAL SURVEY
LOG-PEARSON TYPE III FLOOD FREQUENCY ANALYSIS
FOLLOWING WATER RESOURCES COUNCIL GUIDELINES

---- NOTICE --------- NOTICE ----
PRELIMINARY COMPUTATIONS
USER RESPONSIBLE FOR ASSESSMENT
AND INTERPRETATION

STATION ID: 04230380 PK NAME: OATKA CREEK AT WARSAW NY HIST PER 1960-75 CASE NO 38

INPUT DATA SUMMARY

	HISTORIC RECORD	SYSTEMATIC RECORD
NO. OF PEAKS	0	12
YEARS	16	12

SCREENING LEVEL DISCHARGES	
GAGE BASE	0.0
LOW OUTLIER	NONE
HIGH OUTLIER	4000.0

SKEW COEFFICIENT	
GENERALIZED	-0.200E-01
OPTION	WRC WEIGHTED

NO PEAKS WERE LESS THAN GAGE BASE OF 0.0 CFS.

INPUT DATA FOR PEAKS EXCEEDING GAGE BASE DISCHARGE

WATER YEAR	PEAK (CFS)	WATER YEAR	PEAK (CFS)	WATER YEAR	PEAK (CFS)	WATER YEAR	PEAK (CFS)
1	1610.0	4	1750.0	7	1120.0	10	1490.0
2	772.0	5	1150.0	8	1100.0	11	1120.0
3	679.0	6	1360.0	9	4010.0	12	1630.0

1 HIGH OUTLIERS OR HISTORIC PEAKS ABOVE 3999.99 CFS SPECIFIED BY USER.

PGM J407 VER 0.4

RUN DATE 2/23/78

U. S. GEOLOGICAL SURVEY
LOG-PEARSON TYPE III FLOOD FREQUENCY ANALYSIS
FOLLOWING WATER RESOURCES COUNCIL GUIDELINES

---- NOTICE --------- NOTICE ----
PRELIMINARY COMPUTATIONS
USER RESPONSIBLE FOR ASSESSMENT
AND INTERPRETATION

STATION ID: 04230380 PK NAME: OATKA CREEK AT WARSAW NY HIST PER 1960-75 CASE NO 38

EXCEEDANCE PROBABILITIES OF OBSERVED PEAKS
USING WEIBULL PLOTTING POSITIONS

WATER YEAR	PEAK (CFS)	EXCEED PROB SYS	EXCEED PROB HIST	WATER YEAR	PEAK (CFS)	EXCEED PROB SYS	EXCEED PROB HIST	WATER YEAR	PEAK (CFS)	EXCEED PROB SYS	EXCEED PROB HIST
9	4010.0	0.077	0.059	10	1490.0	0.385	0.369	11	1120.0	0.692	0.690
4	1760.0	0.154	0.128	6	1360.0	0.462	0.449	8	1100.0	0.769	0.770
12.	1630.0	0.231	0.209	5	1150.0	0.538	0.529	2	772.0	0.846	0.850
1	1610.0	0.308	0.289	7	1120.0	0.615	0.610	3	679.0	0.923	0.930

PGM J407 VER 0.4

RUN DATE 2/23/78

U. S. GEOLOGICAL SURVEY
LOG-PEARSON TYPE III FLOOD FREQUENCY ANALYSIS
FOLLOWING WATER RESOURCES COUNCIL GUIDELINES

---- NOTICE --------- NOTICE ----
PRELIMINARY COMPUTATIONS
USER RESPONSIBLE FOR ASSESSMENT
AND INTERPRETATION

STATION ID: 04230380 PK   NAME: OATKA CREEK AT WARSAW NY   HIST PER 1960-75   CASE NO 38

INPUT DATA SUMMARY

	HISTORIC RECORD	SYSTEMATIC RECORD
NO. OF PEAKS	0	12
YEARS	14	12

SCREENING LEVEL DISCHARGES	
GAGE BASE	0.0
LOW OUTLIER	NONE
HIGH OUTLIER	4000.0

SKEW COEFFICIENT	
GENERALIZED	-0.200E-01
OPTION	WRC WEIGHTED

NO PEAKS WERE LESS THAN GAGE BASE OF 0.0 CFS.

INPUT DATA FOR PEAKS EXCEEDING GAGE BASE DISCHARGE

WATER YEAR	PEAK (CFS)	WATER YEAR	PEAK (CFS)	WATER YEAR	PEAK (CFS)	WATER YEAR	PEAK (CFS)
1	1610.0	4	1760.0	7	1120.0	10	1490.0
2	772.0	5	1150.0	8	1100.0	11	1120.0
3	679.0	6	1360.0	9	4010.0	12	1630.0

1 HIGH OUTLIERS OR HISTORIC PEAKS ABOVE 3999.99 CFS SPECIFIED BY USER.

PGM J407 VER 0.4

RUN DATE 2/23/76

U. S. GEOLOGICAL SURVEY
LOG-PEARSON TYPE III FLOOD FREQUENCY ANALYSIS
FOLLOWING WATER RESOURCES COUNCIL GUIDELINES

NOTICE --------- NOTICE
PRELIMINARY COMPUTATIONS
USER RESPONSIBLE FOR ASSESSMENT
AND INTERPRETATION

STATION ID: 04230380 PK   NAME: OATKA CREEK AT WARSAW NY   HIST PER 1960-75   CASE NO 38

W R C LOG-PEARSON TYPE III CURVE FITTING

HIGH OUTLIERS AND HISTORIC PEAKS TO BE TREATED BEFORE TREATING LOW OUTLIERS.

HIGH OUTLIERS AND HISTORIC PEAKS WERE NOTED.

NO OUTLIERS BELOW WRC CRITERION OF 435.48 CFS.

ANNUAL FLOOD STATISTICS

	SYSTEMATIC RECORD	WRC ESTIMATES
MEAN	3.1245	3.1137 S
STANDARD DEVIATION	0.1965	0.1815 S
SKEW COEFFICIENTS		
STATION	1.0453	0.9614
GENERALIZED	--	-0.0200
WRC WEIGHTED	--	-0.0200 *
FLOOD BASE (CFS)	0.0	0.0
PROB(PEAK > BASE)	1.0000	1.0000
NUMBER OF PEAKS	12	12
PERIOD (YEARS)	12	16

S - SYNTHETIC
* ADOPTED FOR FINAL COMPUTATIONS

PGM J407 VER 0.4

RUN DATE 2/23/79

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******************************************************
*                                                    *
*            U. S. GEOLOGICAL SURVEY                 *
*  LOG-PEARSON TYPE III FLOOD FREQUENCY ANALYSIS     *
*  FOLLOWING WATER RESOURCES COUNCIL GUIDELINES      *
*                                                    *
******************************************************

---- NOTICE --------- NOTICE ----
|    PRELIMINARY COMPUTATIONS      |
|  USER RESPONSIBLE FOR ASSESSMENT |
|    AND INTERPRETATION            |
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STATION ID: 04230380 PK   NAME: OATKA CREEK AT WARSAW NY   HIST PER 1960-75   CASE NO 38

LOG-PEARSON TYPE III FREQUENCY CURVES

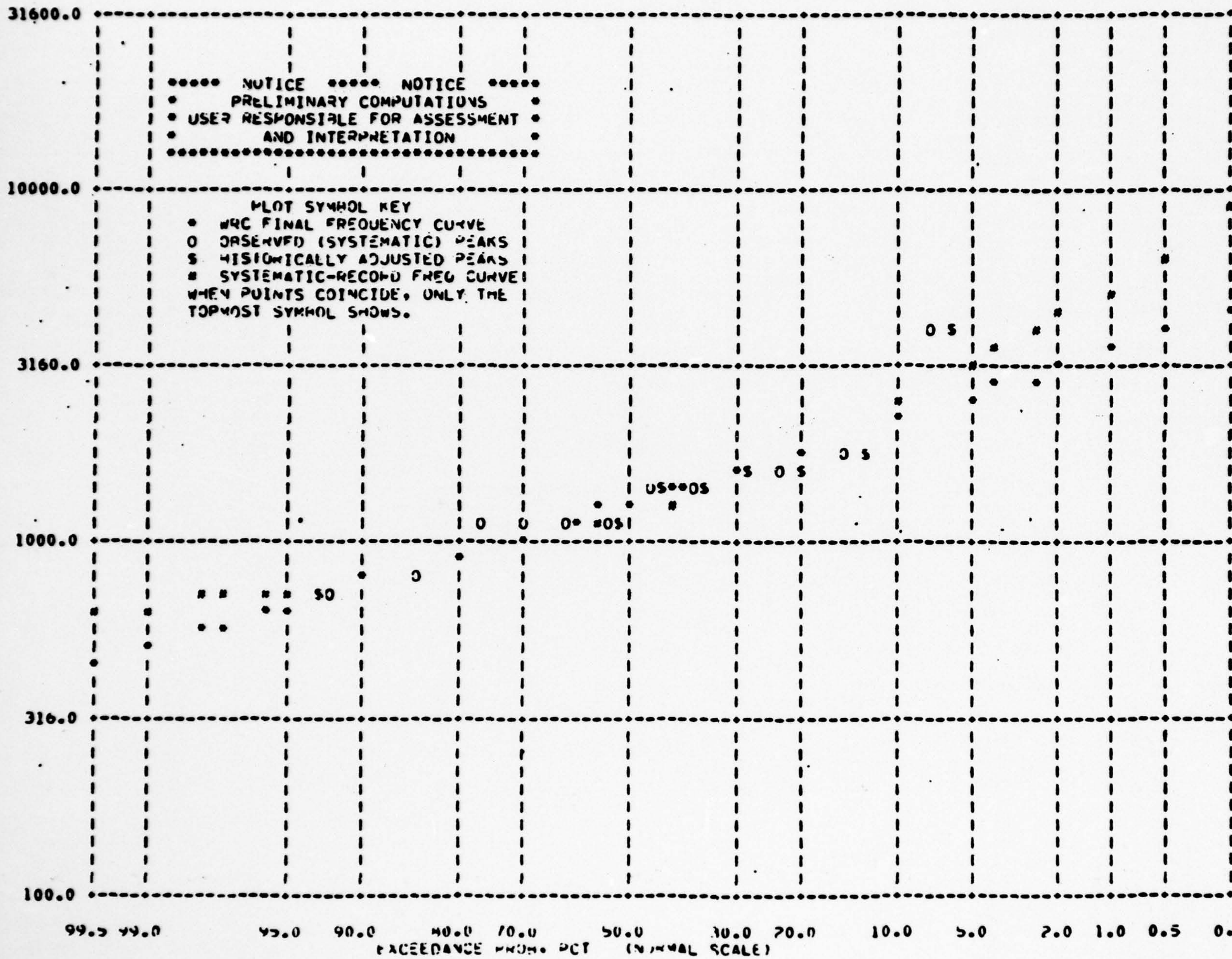
***LP3TAB CANT CALC EXPCTD-PROB DISCHG AT NOMINAL PROB 0.00200. CORRESP PROB ON WRC CURVE IS 8.082E-05

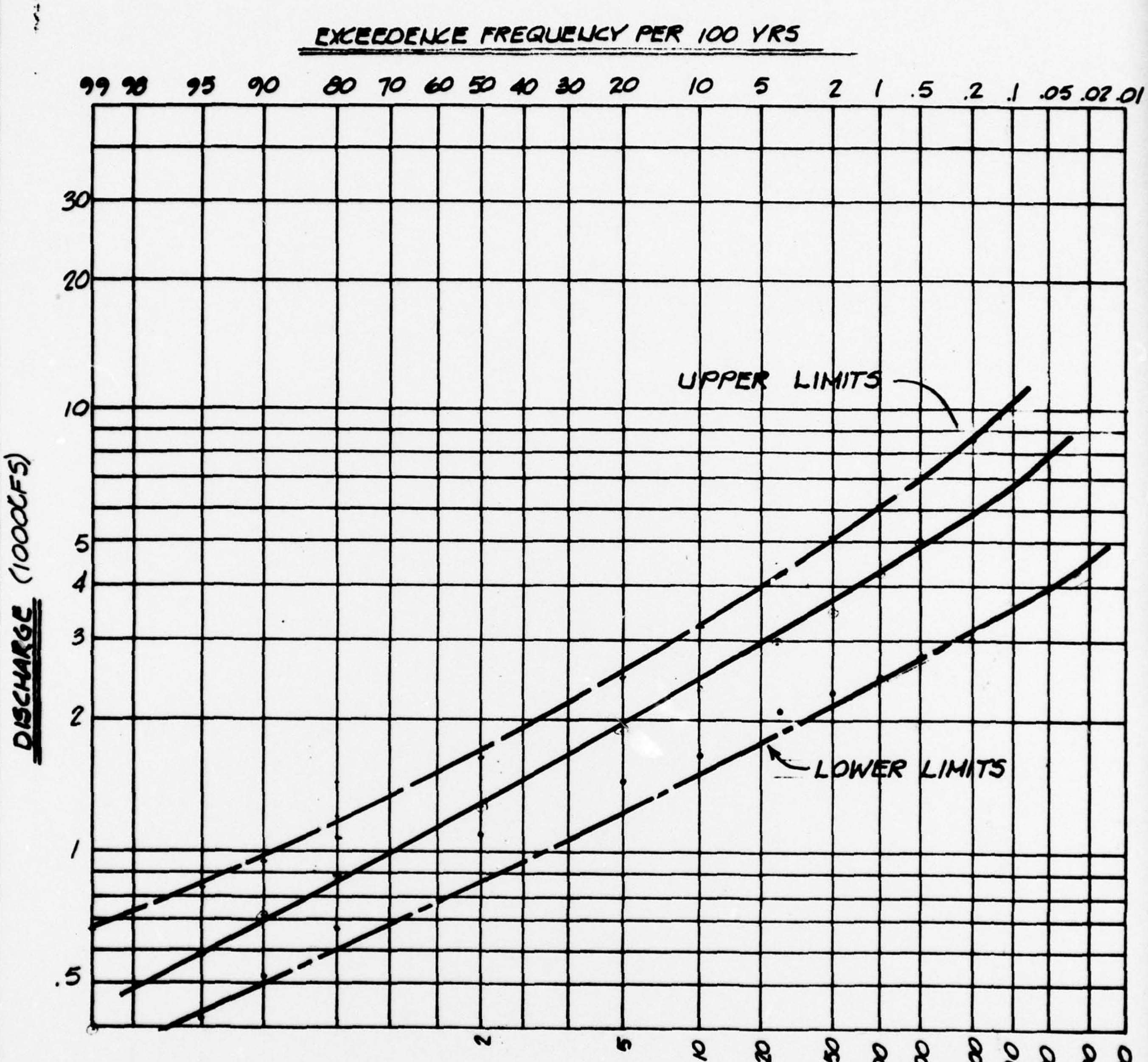
EXCEEDANCE PROBABILITY	DISCHARGES				
	SYSTEMATIC RECORD	WRC ADJUSTED	EXPECTED PROBABILITY	95% CONFIDENCE LIMIT (ONE-SIDED TEST) LOWER	UPPER
0.9950	638.3	439.3	330.3	232.9	611.4
0.9900	658.7	489.5	391.8	272.9	664.4
0.9500	739.7	651.8	590.3	417.9	837.8
0.9000	803.1	759.8	710.0	521.3	952.7
0.8000	906.7	914.3	882.9	675.0	1122.3
0.5000	1232.8	1300.9	1300.9	1052.9	1608.2
0.2000	1672.0	1647.4	1912.1	1505.0	2503.0
0.1000	2443.3	2217.3	2369.6	1764.6	3229.2
0.0400	3372.8	2692.2	2996.0	2079.8	4274.9
0.0200	4244.9	3050.7	3579.5	2301.0	5136.6
0.0100	5298.9	3413.1	4223.2	2515.7	6071.4
0.0050	6573.4	3781.7	4976.2	2725.8	7077.1
0.0020	8676.0	4281.1	********	3003.1	8526.7

BASIN-CHAR FILE INPUT CARDS --

```
2     04230380 75    914 76   1300 77   1850 78   2220 79   2690 80   3050
2     04230380 81   3410 82   3740 83  3.125 84  0.195 85  1.045178   4280
2     04230380179 -0.020180  3.114181  0.161
```

STATION ID: 04230380 PK   NAME: OATKA CREEK AT WARSAW NY   HIST PER 1960-75   CASE NO 38





OATKA CREEK @ WARSAW, N.Y.

USGS GAGE 04230380 PK

DISCHARGE - FREQUENCY CURVE

STETSON • DALE	DATE 8·31·79	DRAWN JPG	OATKA CREEK DAM
	JOB 2305	APP'D	

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 8.20.79

SUBJECT: OATKA CREEK DAM — PROJECT NO. 2305

STAGE-DISCHARGE — DRAWN BY: JPG

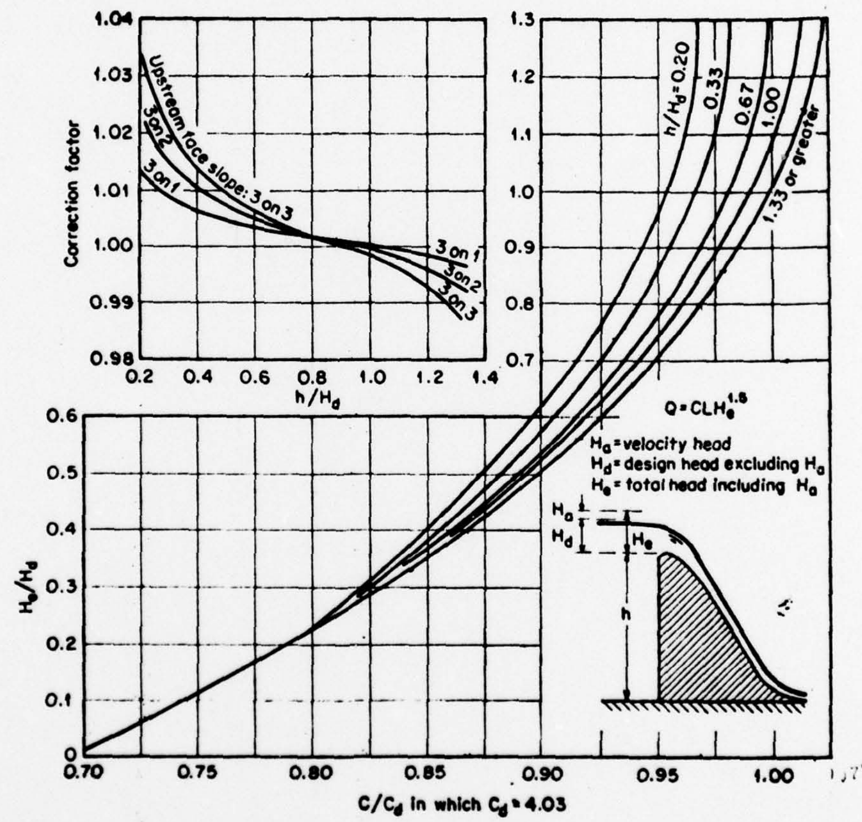


Fig. 14-4. Head-discharge relation for WES-standard spillway shapes.

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PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 8-20-79

SUBJECT: STAGE - DISCHARGE — PROJECT NO. 2305

OATKA CREEK DAM — DRAWN BY: JPG

FREE WEIR FLOW (OGEE SPILLWAY)

SPILLWAY LENGTH - 160 FT

h/Hd = 15/5 = 3 ∴ Cd = 4.03

TOP OF SPILLWAY = 864.00 (USGS)

HEIGHT OF DAM = 15' (h)

Hd = 5' (FROM PLAN DTD 3-13-34 SHT 2 OF 2)

ELEV	He	He/Hd	C/Cd	C	$Q = C\ell He^{1.5}$
864.	0	0	.0	0	0
866	2	.4	.86	3.47	1570
868	4	.8	.96	3.87	4954
870	6	1.2	1.02	4.11	9665
872	8	1.6	1.03	4.15	15026
874	10	2.0	1.03	↓	20997
876	12	2.4	1.03		27602
878	14	2.8	1.03		34782
880	16	3.2	1.03		42496
882	18	3.6	1.03		50708
884	20	4.0	1.03		59390
886	22	4.4	1.03		68518
888	24	4.8	1.03		78070
890	26	5.2	1.03		88029
892	28	5.6	1.03	↓	98380
894	30	6.0	1.03	4.15	109106

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PROJECT NAME ____ DATE ____

SUBJECT Oatka Creek PROJECT NO. ____

DRAWN BY ____

[illegible]

Discharge under Bridge under low flow (Assuming [illegible] Entrance [illegible]) References Fig. [illegible]-12 Design of Small Dams

Q	Q/W	H/D	H
1400 cfs	20	0.35	4.2'
2800	40	0.52	6.2
4200	60	0.68	8.2
5600	80	0.83	10.0
7000	100	0.96	11.5
8400	120	1.08	13.0
9800	140	1.22	14.6
11200	160	1.36	16.3
12 600	180	1.54	18.5
14000	200	1.7	20.4
15400	220	1.9	22.8
16800	240	2.17	26.
18200	260	2.3	27.6

For flows under about 22,000 cfs [illegible] [illegible] governs. For higher flows pressure flow would govern. However for heads H above about 19', water would also be flowing over the bridge.

For flows above ~4700 cfs the spillway will be submerged [illegible] H ≥ 9'

For flows above ~15,000 cfs the bridge will be overtopped

The tailwater rises faster than the [illegible] [illegible] the [illegible] [illegible] starts to [illegible] [illegible] the [illegible] [illegible] [illegible]

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PROJECT NAME ______ DATE ______

SUBJECT Oatka Creek PROJECT NO. ______

DRAWN BY ______

Discharge under Bridge
Assuming Low Tailwater

For Concrete-Box Culverts with square-cornered entrance

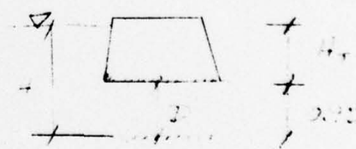
$$C = \left(1 + 0.4\, r^{0.3} + \frac{0.0045L}{r^{1.25}}\right)^{-1/2}$$

L = 57'

$$r = \frac{A}{P} = \frac{70'(12')}{2(70'+12')} = 5.12'$$

$C = 0.77$

$$Q = CA\sqrt{2g\,H_T}$$



$0.9D = 10.8'$

Q	H_T	H
20,000 cfs	14.8'	25.6
30,000	33.4	44.2
40,000	59.4	70
50,000	92.8	103.6
60,000	133.6	144
70,000		
80,000		
90,000		

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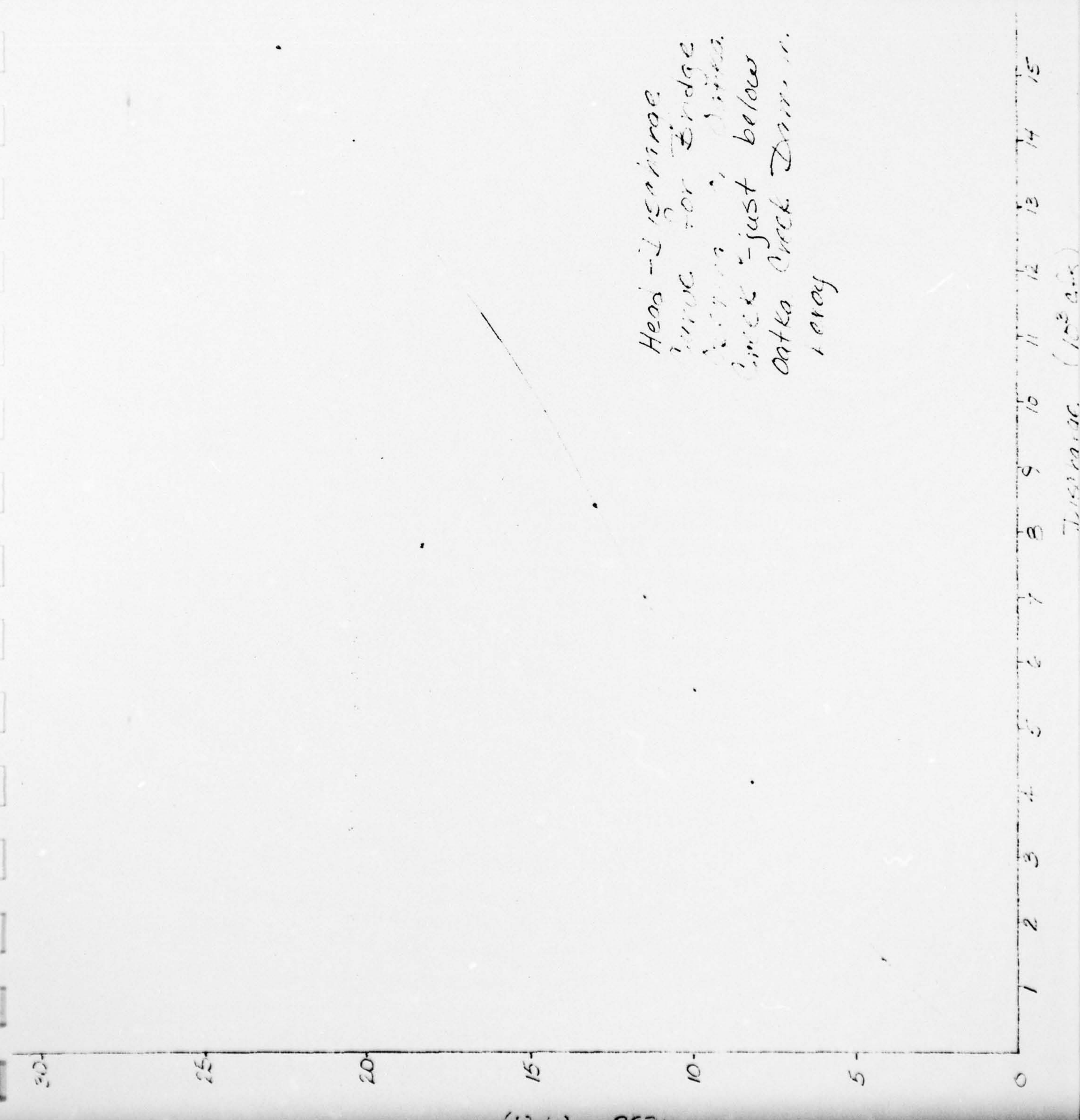
TEL 315•797•5800

PROJECT NAME ______________________ DATE ________

SUBJECT ______________________ PROJECT NO. ________

______________________ DRAWN BY ________



APPENDIX D

STABILITY ANALYSIS

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315•797•5800 **DESIGN BRIEF**

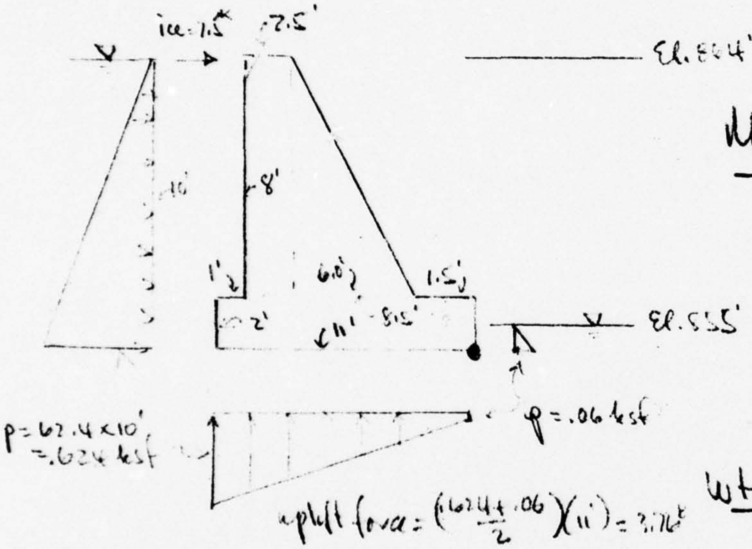
PROJECT NAME: OATKA CREEK DAM, LEROY, N.Y. DATE:

SUBJECT: STABILITY ANALYSIS – OVERTURNING & SLIDING PROJECT NO.:

DRAWN BY:

Analysis Section – Section D-D Adjacent to Gate House

Normal Operations Condition



M_{toe} resisting overturning due to mass of dam

$= (2 \times 11 \times .15)(\frac{11}{2}) + (\frac{1}{2} \times 8 \times 6 \times .15)(1.5 + \frac{2 \times 6}{3})$

$+ (7.5 \times 8 \times .15)(7.5 + \frac{7.5}{2}) =$

$= 15.1 + 19.8 + 26.2 = \underline{64}^{1k}$

Wt. dam $= 3.3 + 3.6 + 3 = \underline{9.9}^{k}$

M_{toe} causing overturning $= (0.624 \times \frac{10}{2} \times \frac{10}{3}) + [(.06 \times 11 \times \frac{11}{2}) + (.564 \times \frac{4}{1})(\frac{2 \times 4}{3})] + (7.5 \times 9)$

$= 10.4^{1k} + (3.6 + 22.8)^{1k} + 67.5^{1k} = 104.3^{1k}$

FS against overturning $= \frac{64^{1k}}{104.3^{1k}} = \underline{0.62}$

Position of resultant is outside of base dimensions

FS against sliding (friction-shear method, using 100 psi bond/shear and $\mu = 0.65$)

$\underline{FS} = \frac{(0.65)(9.9^k - 3.76^k) + (.10 \times 144 \times 11')}{(\frac{1}{2} \times 10 \times .624) + (7.5)} = \frac{162}{10.6} = \underline{15 \pm}$

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315•797•5800 DESIGN BRIEF

PROJECT NAME Oatka Creek Dam DATE

SUBJECT PROJECT NO.

DRAWN BY

Normal operating conditions without ice

$M_{ot} = 104.3^{1-k} - 67.5^{1k} = 36.8^{1-k}$

$M_R = 64^{1-k}$

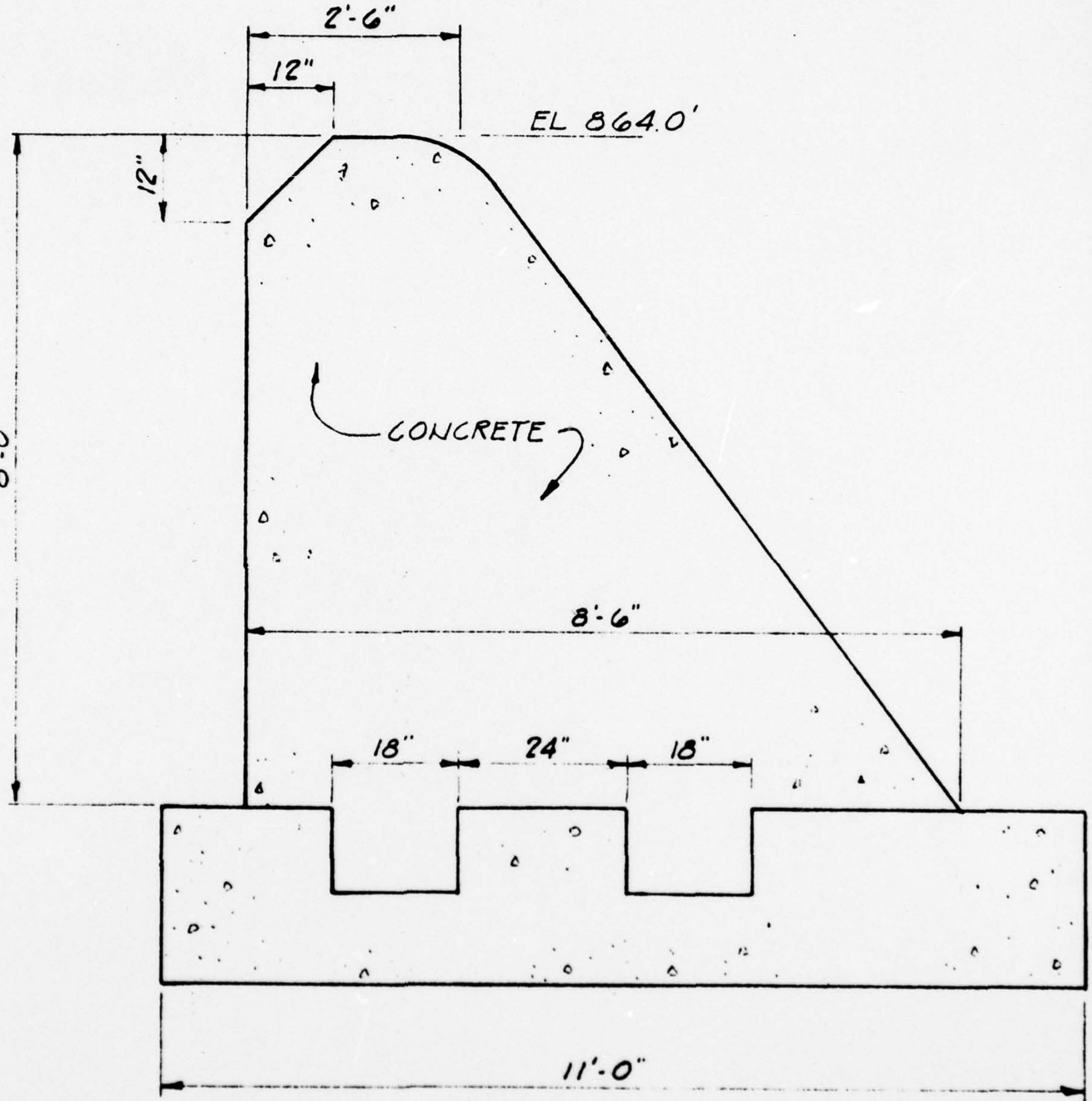
F.S. against overturning $= \frac{64}{36.8} = 1.74$

Position of resultant (from toe)

$= \frac{\Sigma M}{\Sigma V} = \frac{64 - 36.8}{9.9^k - 3.76^k} = 4.4' = 0.4b$ from toe

inside middle 1/3

F.S. against sliding $= \frac{162}{10.6 - 7.5} = 52^{\pm}$



OATKA CREEK DAM

NO SCALE

STETSON • DALE

DATE	DRAWN	
9.14.79	JPG	STRUCTURAL ANALYSIS
JOB	APP'D	
2305		

APPENDIX E

REFERENCES

APPENDIX

REFERENCES

1. Department of the Army, Office of the Chief of Engineers. National Program of Investigation of Dams; Appendix D: Recommended Guidelines for Safety Inspection of Dams, 1976

2. U.S. Nuclear Regulatory Commission: Design Basis Floods for Nuclear Power Plants, Regulating Guide 1.59, Revision 2, August 1977

3. Linsley and Franzini: Water Resources Engineering, Second Edition, McGraw-Hill (1972)

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