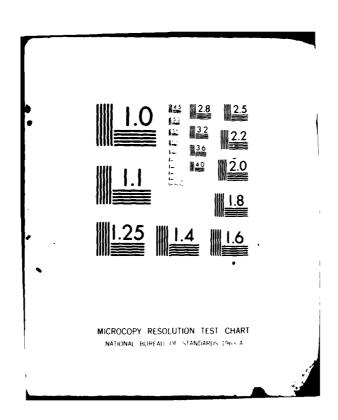
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LAKE CHAMPLAIN BASIN



CHAZY LAKE DAM

NEW YORK



INVENTORY No. NY 236

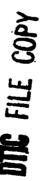


PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM

APPROVED FOR PUBLIC RELEASE;



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NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST 1981

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The structural stability analysis indicates unsatisfactory stability would result from loadings which could occur during normal operation of the dam. The analysis specifically indicates marginal or unsatisfactory stability for sliding for all loading conditions investigated. A structural stability investigation should be commenced within 3 months to determine the properties of the existing dam and foundation and the effect of these characteristics on the stability of the dam. Remedial work should be undertaken depending on the results of this investigation and completed within 18 months.

The inspection also disclosed the presence of longitudinal cracks through the top of the core wall, spillway crest and in the abutment walls of the spillway. Investigations should be undertaken to determine the cause of this cracking and remedial work should be undertaken depending on the results of this investigation. This investigation should be commenced within 3 months and the remedial work should be completed within 18 months of this notification.

Wet areas were found to exist beyond the toe of the embankment near the right abutment of the dam and in an area to the right of the spillway. An investigation should be undertaken to determine the source of these wet areas and remedial measures should be taken depending on the results of this investigation. This investigation should be commenced within 3 months and the remedial work should be completed within 18 months of this 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 aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam: State Located:

County: Watershed:

Stream:

Date of Inspection:

Chazy Lake Dam ID. No. NY 236

New York Clinton

Lake Champlain Basin Great Chazy River

May 22, 1981

ASSESSMENT OF GENERAL CONDITIONS

The examination of documents and visual inspection of the Chazy Lake Dam did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require further investigation and remedial work.

The hydrologic/hydraulic analysis indicates the spillway will pass only 4.2 percent of the PMF and 60 percent of the 1/2 PMF. The dam will be overtopped by 1.7 feet and 0.15 feet during the PMF and 1/2 PMF respectively. The depth of water at the downstream hazard will increase from 5 feet to 11.5 feet due to dam break. The roadway at the river crossing will be topped by 1.5 feet. The nearest residence is approximately 300 feet from the bridge and a few feet higher than the road. Therefore, the dam break analysis indicates that failure of the dam during the 1/2 PMF would not significantly increase the downstream hazard from that which would exist just prior to failure of the dam. The spillway capacity, therefore, is assessed as inadequate.

The structural stability analysis indicates unsatisfactory stability would result from loadings which could occur during normal operation of the dam. The analysis specifically indicates marginal or unsatisfactory stability for sliding for all loading conditions investigated. A structural stability investigation should be commenced within 3 months to determine the properties of the existing dam and foundation and the effect of these characteristics on the stability of the dam. Remedial work should be undertaken depending on the results of this investigation and completed within 18 months.

The inspection also disclosed the presence of longitudinal cracks through the top of the core wall, spillway crest and in the abutment walls of the spillway. Investigations should be undertaken to determine the cause of this cracking and remedial work should be undertaken depending on the results of this investigation. This investigation should be commenced within 3 months and the remedial work should be completed within 18 months of this notification.

Wet areas were found to exist beyond the toe of the embankment near the right abutment of the dam and in an area to the right of the spillway. An investigation should be undertaken to determine the source of these wet areas and remedial measures should be taken depending on the results of this investigation. This investigation should be commenced within 3 months and the remedial work should be completed within 18 months of this notification.

The following deficiencies should be corrected with one year:

- 1. Repair concrete surfaces on the spillway and repair the concrete buttress at the center of the spillway.
- 2. Replace rubble fill behind the face wall where this material has been displaced.
- 3. Re-align the facewall section where vertical displacement has taken place.
- 4. Remove trees and brush from all embankment sections.
- 5. Replace the slope protection on the upstream face of the core wall section of the embankment.
- 6. A formalized inspection system should be adopted to develop data on the conditions and maintenance operations of the facility.
- 7. A flood warning and emergency evacuation plan should be implemented to alert the public should conditions occur which could result in failure of the dam.

Dale Engineering Company

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Approved By: Date: John B. Stetson, President

col. W. M. Smith, Jf.
New York District Engineer

1.0 SEP 1981



1. OVERVIEW OF CHAZY LAKE DAM

PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM CHAZY LAKE DAM I.D. NO. NY 236 LAKE CHAMPLAIN BASIN CLINTON COUNTY, NEW YORK

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 U.S. Army Corps of Engineers.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Chazy Lake Dam and appurtenant structures, owned by the Town of Dannemora, New York, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the U.S. Army Corps of Engineers.

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 Chazy Lake Dam consists of two separate dike sections separated by a 50 foot length of earth knoll. The left portion (core wall section) of the dam is 1,100 feet long and reaches a maximum height of approximately 18 feet. The crest of the dam is 14 feet wide with the upstream slope 1 vertical to 2 horizontal and the downstream slope 1 vertical to 1-3/4 horizontal. The facility is an earthfill structure with a concrete core wall which extends approximately 8 feet below the natural ground level in the area. The top of the core wall extends to the surface of the embankment and is visible throughout the entire length of the structure. A gatehouse is situated about 290 feet from the left abutment of this section of the dam. The spillway is located approximately 520 feet from the left abutment. The right section of the dam (face wall section) is approximately 1,437 feet long. This portion of the facility consists of a concrete face wall which extends approximately 5 feet into the natural

ground surface. The stem of the wall is 18 inches thick. This face wall was constructed to raise the height of the structure approximately 5 feet above an existing earthen dike. The area behind the face wall is backfilled with rubble fill. The crest width of the rubble fill is approximately 5 feet and the downstream slope of the fill is 1 vertical to 1-1/2 horizontal. The spillway is a 30 foot wide broad-crested weir which discharges on a reinforced concrete apron. A single buttress at the center of the spillway provides structural support to the core wall which forms the spillway section. The gatehouse controls three 36 inch diameter pipes with gates which discharge through a 9 foot wide by 6 foot high reinforced concrete culvert. This culvert is splayed to a width of 18 feet at its discharge end. The gates are operated by mechanical controls situated in the gatehouse at the crest of the dam. A 12 foot high trash rack at the inlet to the discharge pipes prevents debris from entering the area near the gates.

The Town of Dannemora operates a recreational facility in the area between the two sections of the dam. The small earth knoll which separtes the two sections provides access to the water and provides a public beach and a boat dock.

b. Location

The dam is located in the Town of Dannemora, Clinton County, New York.

The dam is situated approximately 6.4 miles northwest of Dannemora on N.Y.

Route 374.

c. Size Classification

The maximum height of the dam is approximately 18 feet. The volume of the impoundment is approximately 90,000 acre feet. Therefore, the dam is in the large size classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

Three permanent residences and one mobile home residence are located near the Great Chazy River approximately 2 miles downstream from the facility. Therefore, the dam is in the high hazard classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the Town of Dannemora.

Contact: John Kourofsky, Supervisor

Town of Dannemora

Dannemora New York 12929 Telephone: (518) 492-7541

f. Purpose of the Dam

The dam is used to control the level of Chazy Lake. The prime function of Chazy Lake is for recreational purposes and as a water supply for the Village of Dannemora.

g. Design and Construction History

The original dam at this site is reputed to have been constructed during the late 19th Century. The present facility was constructed from plans dated 1926. No other information is available regarding the design or construction of the facility. The 1926 plans substantially conform to the present configuration of the present facility. No information is available regarding the design or construction history of this dam.

h. Normal Operational Procedures

The water level in Chazy Lake is maintained at the spillway crest elevation during normal run-off conditions. The drainline gates are opened during the winter season to drop the lake level approximately 1 foot in order to minimize ice damage to boat docks on the lake shore. The facility is visited periodically by representatives of the Town of Dannemora who operate a small recreation area near the dam.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of the Chazy Lake Dam is 22.6 square miles.

b. Discharge at Dam Site

No discharge records are available for this site.

Computed discharges:

650 cfs
220 -6-
330 cfs 390 cfs

c. Elevation (feet above MSL)

Top of dam	1,545
Spillway crest	1,541
Stream bed at centerline of dam	1,527

d. Reservoir

Length of normal pool 21,000 ft.

^{*} Discharge through three, 3 foot diameter sluice-gated pipes.

e. Storage

Top of dam
Spillway pool

90,000 acre feet 81,700 acre feet

f. Reservoir Area

Top of dam Spillway pool

1,930 acres 1,818 acres

g. Dam

Type - earth fill
Length - 2,490 feet
Height - 18 feet
Freeboard between normal reservoir and top of dam - 4 feet
Top width - 14 feet
Side slopes- Downstream: 2 horizontal: 1 vertical

Side slopes- Downstream: 2 horizontal: 1 vertical Upstream: 1-3/4 horizontal: 1 vertical

Zoning - Earthfill Impervious core - Concrete extending from top of dam into natural ground Grout Curtain - None

h. Spillway

Type - Uncontrolled, broad crested Length - 30 feet Crest elevation - 1541 feet Gates - None U/S Channel - Reservoir D/S Channel - Natural

i. Regulating Outlets

Three, 3 foot diameter sluice-gated pipes. (Also through water distribution system)

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Geologically, Chazy Lake Dam is located in the northeast sector of the Adirondack physiographic province which is part of the Appalachian Highlands, the major physiographic division. The St. Lawrence Valley physiographic province is located to the north and east of the lake. The area had been subjected to glacial activity, scouring and deposition. The lake is located in and is surrounded by glacial drift. Surrounding the glacial deposits and most likely beneath those deposits is the Precambrian Lyon Mountian granite gneiss. No bedrock exposures were seen in the vicinity of the dam.

The lake, which was present prior to construction of the dam, has a reported depth of about 100 feet and most likely was created by glacial scour.

b. Subsurface Investigations

Plans from 1926 indicate that the spillway and dike were to be keyed into natural ground. The 1899 report indicates the natural material of the bed is clay whereas the 1916 report indicates the material is gravel.

2.2 DESIGN RECORDS

No reports were available from the original design of the dam. The available drawings are included in Appendix G.

2.3 CONSTRUCTION RECORDS

No information was available concerning the original construction.

2.4 OPERATIONAL RECORDS

There are no operational records available for this dam.

2.5 EVALUATION OF DATA

The data presented in this report was obtained from the New York State Department of Environmental Conservation, Dam Safety Section. The information available appears to be reliable and adequate for a Phase I inspection report.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The Chazy Lake Dam was inspected on May 22, 1981. The Dale Engineering Company inspection team was accompanied by John Kourofsky, Supervisor of the Town of Dannemora. During the inspection, the weather was fair. Water level in the impoundment was 1541.25, approximately 3 inches of flow cresting the spillway.

b. Dam

The embankment of the left section of the dam structure is heavily overgrown with trees and brush. Mature trees are situated at the crest and on both slopes of the embankment so as to partially obscure the surface of the ground. The top of the concrete core wall is exposed throughout the entire length of the left section of the dam. Slope protection on the upstream face has deteriorated causing irregularity in the earthen crest elevation. There was no evidence in the field that this irregularity is due to subsidence but rather that it was caused by either general erosion of the crest or that the earthen crest was not constructed to the full The concrete core wall remains height of the top of concrete core wall. in good alignment with no evidence of structural deformation noted in the field. A longitudinal crack down the center of the top of the exposed core wall exists over much of the length of the wall. The cause for this crack is unexplained. Normal forces acting upon such a structure should not result in cracking along the center line of the wall.

The right section of the dam with the concrete face wall is also overgrown with trees and brush on the downstream slope. In many areas, the rubble backfill has been displaced by vandals and is depressed to an elevation 2 to 3 feet below the top of the concrete face wall. The concrete face wall has shown evidence of settlement with some slabs of the wall being depressed 3 to 4 inches below the top of adjacent slabs.

A substantial wet area was detected beyond the toe of slope near the right abutment of the face wall section. This area contained standing water to the depth of 6 to 8 inches and was heavily overgrown with wetland brush and grasses. The dense foiliage in this area precluded close examination to determine whether this was seepage or merely poor drainage beyond the toe of slope. A similar area existed near the right abutment of the core wall section of the dam. In this area, some dumping of debris was found to exist adjacent to the wet area. Rust colored deposits indicative of iron precipitation was found in this area.

c. Spillway

The spillway for the facility is situated in the core wall embankment section. The spillway is 30 feet wide with concrete abutment walls on each side of the spillway retaining the earthfill embankment. There were sizable areas of surface deterioration noted on both wing walls. There was also evidence of cracking longitudinally along the center line of the

wing wall. This cracking again is not explained by the normal forces which would be expected on such a facility. The center buttress which supports the core wall near the center of the spillway also showed some signs of deterioration when viewed through the cascading water.

d. Reservoir Drain

The mechanical equipment, which operates the gates for the reservoir drain, was found to be in operating condition. The representative of the Town of Dannemora who accompanied the inspection team indicated that the gates are operated annually to lower the water surface during the winter months.

e. Reservoir Area

The reservoir area covers approximately 1,800 acres. There are no known areas of slope instability on the reservoir banks.

3.2 EVALUATION

The visual inspection revealed several deficiencies on this structure. The following specific items were noted:

- 1. Longitudinal cracking has taken place along the center of the core wall, spillway crest, and in the abutment walls of the spillway.
- 2. Wet areas have been detected near the right abutment of the face wall section and to the right of the spillway in the core wall section,
- Concrete surfaces on the spillway are deteriorated,
- 4. Rubble fill behind the face wall has been displaced;
- 5. Vertical displacement of the face wall sections has taken place;
- 6. The slopes of the embankment sections are heavily overgrown with trees and brush,
- 7. Slope protection on the core wall section of the embankment has been displaced.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

This reservoir facility is used to maintain a level in Chazy Lake consistent with recreational activities in the impoundment and for water supply purposes. The facility is visited periodically by personnel from the Town of Dannemora. During the summer months, the town operates a recreational facility near the center of the dam.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the Town of Dannemora. Conditions at the site indicate that maintenance activities have been minimal during recent years.

4.3 MAINTENANCE OF OPERATING FACILITIES

The valves controlling the impoundment drain are in operating condition and well maintained.

4.4 DESCRIPTION OF WARNING SYSTEM

No warning system is in effect at present.

4.5 EVALUATION

The following operation and maintenance procedures should be adopted by the Owner:

- 1. A formalized inspection system should be adopted to develop data on the conditions and maintenance operations at the facility.
- 2. A flood warning and emergency evacuation plan should be implemented to alert the public should conditions occur which could result in failure of the dam.
- 3. A program for regular maintenance should be developed and implemented.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Chazy Dam is located in the Town of Dannemora in the northeast corner of the State of New York. The dam has a drainage area of 22.6 square miles of which 2.85 square miles is comprised of Chazy Lake. The watershed is essentially undeveloped, except for the perimeter of Chazy Lake, and is characterized by steeply sloping hills.

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 the watershed and the subsequent routing of the flood through the reservoir and the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration of run-off of a specific location that is considered reasonably possible for a particular drainage area.

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 1/2 the Probable Maximum Flood without overtopping, additional analyses are to be performed on potential dam failures 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, C_t and C_p . Snyder's C_t was estimated to be 2.0 for the drainage area and C_p was estimated to be 0.625.

In this analysis, the reservoir pool was assumed to be at the spillway crest elevation at the start of the storm and outflow through the low level outlet and water transmission system was neglected.

The Probable Maximum Precipitation (PMP) was 15.1 inches according to Hydrometeorological Report (HMR #33) for a 24-hour duration storm, 200 square mile basin, while loss rates were set at 1.0 inches initial abstraction and 0.1 inch/hour continuous loss rate. The loss rate function yielded 82 percent run-off from the PMF. The peak for the PMF inflow hydrograph was 29,128 cfs and the 1/2 PMF inflow peak was 14,564 cfs. The

storage capacity of the reservoir above the spillway reduced these peak flows to 15,322 cfs for the PMF and 1,076 cfs for the 1/2 PMF flow.

5.3 SPILLWAY CAPACITY

The spillway is a broad crested weir with a length of 30 feet and a discharge capacity at the top of dam elevation of 645 cfs.

SPILLWAY CAPACITY

F lood	<u>Peak Discharge</u>	Capacity as % of Flood Discharge
PMF	15,322 cfs	4.2%
1/2 PMF	1,076 cfs	60%

5.4 RESERVOIR CAPACITY

The reservoir storage capacity was obtained from the plans included in Appendix G and USGS mapping. The resulting estimates of the reservoir storage capacity are shown below:

Top of Dam 90,000 Acre Feet Spillway Crest 81,700 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:

<u>Flood</u>	Maximum Depth Over Dam
PMF	1.7 Feet
1/2 PMF	0.15 Feet

A dam break analysis was performed to determine the significance of various dam failures on the downstream hazard. This analysis was performed with the 1/2 PMF assuming the spillway section of the dam to fail at the maximum elevation resulting from the 1/2 PMF. The flood elevations, due to various dam failures and the flood elevations that would exist just before the corresponding dam break induced flood wave, are shown below. These flood elevations are compared where the river crosses Plank Road, which is the area of the downstream hazard.

Flood Elevations @ Plank Road

	Just Prior to Dam Break	Due to Dam Break
Failure Time = 0.1 hrs.	1460.9	1467.4
Failure Time = 0.3 hrs.	1460.9	1467.4
Failure Time = 0.5 hrs.	1460.9	1467.4

The above elevations were estimated from USGS quad sheets. These elevations are not exact and their significance is in the difference between the elevations for the flood levels with and without the dam failure. The worst of these three cases indicates that the flood depth would increase from about 5 feet to 11.5 feet due to a dam failure. The dam break induced flood wave will overtop Plank Road by about 1.5 feet near the river. The closest residence is about 300 feet from the river in this area and a few feet higher than the road level at the river. Therefore, it is unlikely that the downstream hazard will be significantly increased by a dam failure under 1/2 PMF conditions.

5.7 EVALUATION

The hydrologic/hydraulic analysis establishes the spillway capacity as 4.2% of the Probable Maximum Flood (PMF). The dam will be overtopped by 1.7 feet by the PMF and 0.15 feet under the 1/2 PMF. However, the dam break analysis indicates that failure of the dam under the 1/2 PMF will not significantly increase the downstream hazard to loss of life from that which would exist just prior to the dam failure. Therefore, the spillway is assessed as inadequate according to the Corps of Engineers' screening criteria.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The dam structure establishes the northerly boundary of present day Chazy Lake and generally consists of an earthern embankment-concrete core wall section and a concrete faced (lake side) earthern dike section. The embankment core wall section forms the westerly half, approximately, of the dam's total length, and includes the location for the gatehouse and the separate spillway structure. The spillway structure is a 30-foot long buttressed concrete wall with an earthern embankment on the reservoir side. The spillway concrete wall and embankment apparently represent a continuation of the core wall and embankment from the adjacent dam sections.

The field observations indicate the dam retains structural stability. However, the various concrete sections (in the core wall, spillway structure and dike slabs) exhibit various degrees of spalling, cracking and splitting. Erosion of rubble material in the dikes, beneath and behind the concrete slab surfacing, has occurred at some locations. Much of the downstream slope of the earthen embankment portion of the dam is covered with brush and trees, in effect masking some areas, but no indication of embankment sloughing or significant erosion was noted. The upstream embankment zones, completely submerged at the time of the inspection, appear to have some of the riprap cover displaced.

Some ground surfaces adjacent to the downstream toe of the embankment section and dike section have experienced a condition of long-term saturation and presently show some shallow standing water such as the area to the east of the spillway apron and near the easterly limit of the dike section. These areas are lower than the surrounding terrain as well as being lower than the water level in the lake; it could not be ascertained if the condition is the result of surface drainage from the surrounding area or from dam seepage.

Design and Construction Data

Drawings included in Appendix G substantially conform to the existing facility. These plans indicate a total dam length of 2,586 feet, including a dike section 1,437 feet long and an earth embankment-concrete core wall section 1,069 feet long. The embankment-concrete core wall section has a maximum height of 30 feet above natural ground with the core wall penetrating 12 feet below original grade, presumably into soil. The upstream and downstream earthen embankments have a slope of approximately 2 horizontal to 1 vertical. The surface of the upstream embankment is provided with a two foot thickness of rubble and crushed stone. The present dike section, which has been increased to the present size over an older dike section by the placement of rubble material, has a maximum height of 9 feet above natural grade. The vertical concrete face slab protecting the dike's downstream surface penetrates 5 feet below the original ground. The downstream surface of the dike has a slope of 1.5 horizontal to 1 vertical.

The crest of the 30 foot long buttressed spillway is 4 feet below the top of the dam. The concrete abutments/training walls for the spillway extend a slight distance downstream to establish the side limits of the spillways concrete apron.

No information regarding structural stability studies for the spillway structure or embankment and dike sections have been made available. In regard to the dam's natural ground foundation, conflicting data exists: Dam report information dated 1899 indicates clay soils, whereas information dated 1916 indicates a foundation of gravel soil beaneath the spillway.

c. Operating Records

No operating records for the facility are available.

d. Post Construction Changes

There are no indications or documentation of significant post-construction changes.

e. Seismic Stability

known faults exist in the immediate vicinity of the dam. A probable fault trending northwest could be located along the shoreline on the western side of the lake. Such a fault, not yet substantiated, would have a strike length of at least 12 miles.

The area is located within Zone 3 of the Seismic Probability Map. Dozens of earthquakes have been recorded within a radius of 9 miles from the dam site. Many of them having an intensity of IV or more on the Modified Mercalli scale. The earthquake closest to the dam, about one mile distant, occurred in 1943 and had an intensity of IV. Earthquakes of intensity VI occurred in 1934 and 1942. Several dozen earthquakes, many with intensities of IV-V, occurred during the 1970's. The most severe earthquake on record occurred in 1877 and had an intensity of VII.

6.2 STRUCTURAL STABILITY ANALYSIS

Drawings available for review show the plan alignment for the dam and cross sections for the spillway, embankment and dike sections. The available material does not include data on the engineering properties of the foundation and constructed sections, nor stability analysis.

The spillway structure represents a modification to the embankment-core wall section of the dam, consisting of an upstream embankment and core wall buttressed for reinforcement but no downstream embankment zone. Structurally, the spillway is not a gravity section (dam). For this study, a stability evaluation of the spillway has been made. Actual

properties of the spillway materials and foundation were not determined as part of this study; where information on properties was necessary, but lacking, assumptions felt to be practical were made. The stability computations assumed a cross section based upon dimensions indicated by the plans included in this report. It should be considered that, in areas where deterioration or loss of section has occurred, the section dimensions would be less than indicated by the plans; such occurrences could have some adverse effect on stability. Since the spillway section is not a gravity section, stability analysis conventional to gravity structures would not apply. The procedure utilized for evaluating the stability of this project's spillway is based upon an adaptation of the method used for studying thin-section retaining walls and bulkhead structures.

The loading conditions considered in the stability evaluation include:
(1) normal summer-type operation with the lake level at the spillway crest; (2) winter conditions, with the lake level drawn down below the spillway crest but with an ice loading in effect; (3) lake level at the 1/2 PMF elevation; (4) lake level at the PMF level.

The results of the analysis (tabulated below) indicate stability against overturning is retained for all conditions studied, but that marginal or inadequate stability against sliding exists for all cases studied. The condition of seismic effects, in addition to the normal summer loading, would indicate similar stabilities (adequate against overturning, inadequate against sliding). The stability computations are presented in Appendix E.

RESULTS OF STABILITY COMPUTATIONS DAM SPILLWAY

	Loading Condition	Factor of Safety Against Overturning	Factor of Safety Against Sliding
1.	Lake level at spill- way elevation, no ice effects	4.30	1.10
2.	Lake level drawn down below spillway crest, 7.5 kips per lineal foot-acting ice load	2.66	0.90
3.	Lake level at 1/2 PMF elevation	3.95	0.90
4.	Lake level at PMF elevation	3.65	0.83

The type of soil comprising the embankment and foundation zones, and the soil properties, have significant effect on the structural stability of the spillway. Available information concerning the characteristics of these soils is indefinite. Properties applicable to cohesionless soils were assumed in the analysis. If the soils possess cohesion, the spillway's ability to resist overturning and sliding could be different than indicated by the above tabulation.

The analysis indicates marginal to inadequate resistance to sliding for the normal summer operation loading condition and a winter condition which includes the effects of ice. The spillway structure presumably has been subject to these loading conditions for a number of years without complete failure; however, the spillway's concrete wall and abutment sections have experienced an unusual type of cracking/splitting (e.g., vertical cracks parallel to the longitudinal axis of the dam have developed in the spillway wall) which may be related to inadequate structural resistance and a resulting lateral movement.

In considering the effects of winter conditions on the stability of the spillway, ice forces may be less than assumed in the analysis when the reservoir level is a sufficient depth below the spillway crest so to act against the sloping embankment. It was noted that the top of the upstream embankment is below the spillway crest. Concerning the effect of ice forces, benefit could result if riprap were placed to raise the embankment to the level of the spillway crest. It has also been experienced that where a reservoir continuously flows over a spillway ice does not form against that spillway.

Further studies are recommended to more adequately evaluate the stability of the spillway structure. The additional investigation should include determination of the type and properties of the embankment and foundation soils. The condition of the concrete wall and abutment sections similarly requires investigation to evauluate the effects of the cracking discussed previously.

Various sections of the dike structure have had the riprap and rubble material which provide backing to the concrete face slab lost through erosive or other forces. It appears that there has been no significant effect on the structural stability of the dikes. However, the missing material should be replaced to prevent progressive deterioration of the dike section and to insure that structural stability is retained.

The suspected dam seepage indicated for the area near the spillway and in the vicinity of the easterly limit of the diked section does not appear to be having a structural effect on the dam. It is recommended that those areas of low elevation, where surface water and/or seepage do stagnate, be filled and graded to prevent the occurrence of standing water. These areas could then more easily be monitored for continuing signs of ground water seepage. Locations of suspected seepage should be kept under scrutiny, because seepage conditions can change (worsen) and lead to problems with stability and reservoir retention.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

The Phase I inspection of the Chazy Lake Dam did not indicate conditions which constitute an immediate hazard to life or property.

The hydrologic/hydraulic analysis indicates that the spillway will pass only 4.2 percent of the PMF and 60 percent of the 1/2 PMF. The dam will be overtopped by 1.7 feet and 0.15 feet during the PMF and 1/2 PMF, respectively. The depth of water at the downstream hazard will increase from 5 feet to 11.5 feet due to a failure of the spillway. The roadway at the river crossing will be topped by 1.5 feet. The nearest residence is approximately 300 feet from the bridge and a few feet higher than the road. Failure of the dam during the 1/2 PMF would not significantly increase the downstream hazard from that which would exist just prior to the failure of the dam. The spillway capacity, therefore, is assessed as inadequate.

The stability analysis indicates marginal or unsatisfactory stability for sliding under all loading conditions investigated.

The following specific safety assessments are based on the Phase I visual examination, analysis of hydrology/hydraulics and structural stability analysis:

- 1. Longitudinal cracking has taken place along the center of the core wall, spillway crest, and in the abutment walls of the spillway.
- 2. Wet areas have been detected near the right abutment of the face wall section and to the right of the spillway in the core wall section.
- 3. Concrete surfaces on the spillway are deteriorated.
- 4. Rubble fill behind the face wall has been displaced.
- 5. Vertical displacement of the face wall sections has taken place.
- 6. The slopes of the embankment sections are heavily overgrown with trees and brush.
- 7. Slope protection on the core wall section of the embankment has been displaced.
- 8. No formalized inspection system is currently in effect.
- 9. No warning system is presently in effect to alert the public should conditions occur which could result in failure of the dam.

b. Adequacy of Information

The information available is adequate for the Phase I investigation.

c. Urgency

The items set forth in the safety assessment should be addressed by the Owner and appropriate improvements and repairs performed within 18 months of this notification. The recommended investigations should begin within 3 months.

d. Need for Additional Investigation

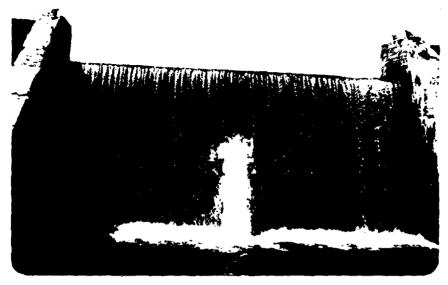
Further investigations relative to the structural stability of the structure should be performed to determine the appropriate measures necessary to provide stability under all loading conditions. Investigations should also be undertaken to determine the source of the wet areas beyond the toe of the embankment near the right abutment and to the right of the spillway section. Investigations to determine the cause of longitudinal cracking through the top of the core wall, spillway crest, and in the abutment walls of the spillway should be conducted. Appropriate remedial measures should be taken depending on the results of these investigations.

7.2 RECOMMENDED MEASURES

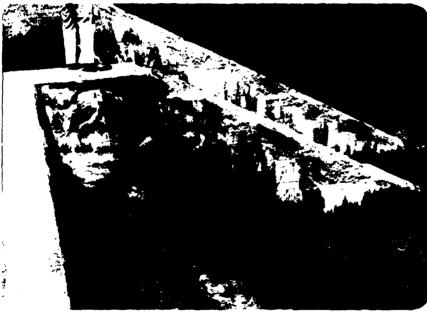
The following is a list of recommended measures to be undertaken to insure safety of the facility.

- 1. Repair concrete surfaces on the spillway and repair the concrete buttress at the center of the spillway.
- 2. Replace rubble fill behind the face wall where this material has been displaced.
- 3. Re-align the face wall section where vertical displacement has taken place.
- 4. Remove trees and brush from all embankment sections.
- 5. Replace the slope protection on the upstream face of the core wall section of the embankment.
- 6. A formalized inspection system should be adopted to develop data on the conditions and maintenance operations of the facility.
- 7. A flood warning and emergency evacuation plan should be implemented to alert the public should conditions occur which could result in failure of the dam.

APPENDIX A
PHOTOGRAPHS



2. PRINCIPAL SPILLWAY.
TOP PORTION OF
CENTER BUTTRESS IS
DETERIORATED



3. SPILLWAY ABUTMENT WALLS NOTE: DETERIORATED CONCRETE SURFACES



CLOSE-UP OF LONGI-TUDINAL CRACK ON LEFT ABUTMENT OF SPILLWAY



5. VIEW TOWARDS LEFT
ABUTMENT OF CORE WALL
SECTION. GATEHOUSE
CONTROLS RESERVOIR
DRAIN.



6. CORE WALL SECTION
NOTE: LONGITUDINAL
CRACK ALONG CENTER
OF EXPOSED CORE WALL



7. VIEW FROM RIGHT
ABUTMENT OF CORE WALL
SECTION. GRASSED AREA
IS PART OF TOWN PARK



VIEW TOWARD LEFT
ABUTMENT OF FACE WALI
SECTION.
NOTE: BOAT DOCK IN
BACKGROUND, PARKING
LOT TO RIGHT



9. VIEW TOWARD RIGHT ABUTMENT OF FACE WALL SECTION



10. FACE WALL SECTION

NOTE: DISPLACEMENT OF FACE WALL SLABS AND RUBBLE BACKFILL



11. WET AREA BEYOND TOE
OF SPILLWAY IN CORE
WALL SECTION
NOTE: DUMPED DEBRIS



12. CLOSE-UP OF 11



13. CLOSE-UP OF AREA
DEPICTED IN 11
SHOWING RUST-COLORED
DEPOSITS



14. WET AREA BEYOND TOE
OF FACE WALL SECTION
TOWARD RIGHT ABUTMENT



15. DOWNSTREAM HAZARD.
BRIDGE OVER RECEIVING
STREAM IN BACKGROUND



16. OPERATING MECHANISM IN GATE HOUSE

APPENDIX B
VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

•	General
	Name of Dam CHAZY LAKE DAM
	Fed. I.D. # NY 236 DEC Dam No.
	River Basin LAKECHAMPUAIN
	Location: Town DRNNEMOZA County CUNON
	Stream Name GREAT CHAZY PIUEIZ
	Tributary of LAKE CHAMPLAIN
	Latitude (N) 44 - 46.3 Longitude (W) 13 - 41.5
	Type of Dam <u>EACTH</u> FILL
	Hazard Category HRH
	Date(s) of Inspection MAY 22, 1981
	Weather Conditions
	Weather Conditions <u>FAR</u> Reservoir Level at Time of Inspection <u>1541.75†</u> (3 inches CREA
	Reservoir Level at Time of Inspection 1541.264 (3 inches CRES
	Reservoir Level at Time of Inspection 1541.76+ (3 inches ORES) Inspection Personnel F.W. RUSZEWSKI, JA. GOMEZ, D.F. MCCARTHY H. MUSKATT. — DALE ENGINEERING CO. J. KOUROFSKY - Suffernson
	Reservoir Level at Time of Inspection 1541.75+ (3 inches ORES) Inspection Personnel F.W. BUSZEWSKI, JA. GOMEZ D.F. MCCARTHY H. MUSKATT. — DALE BAGMERZING CO J. KOUROFSKY - SUPERISOR DANNESSEE.
	Reservoir Level at Time of Inspection 1541.75± (3 inclus ORE) Inspection Personnel F.W. RUSZEWSKI, JA. GOMEZ, D.F. McCARTHY H. MUSKATT. — DAVE ENGAGERANG CO J. KOUROFSKY - Suffernsol, Persons Contacted (Including Address & Phone No.)
	Reservoir Level at Time of Inspection 1541.261 (3 inclus case) Inspection Personnel F.W. RUSZEWSKI, J.A. GOMEZ, D.F. McCARTHY, H. MUSKATT. — DALE BRANKERING, CO. J. KOUROFSKY - SUPERISOR, Persons Contacted (Including Address & Phone No.) . WHE KOUROFSKY, Superisor.
	Reservoir Level at Time of Inspection 1541.281 (3 inclus case) Inspection Personnel F.W.BUSZEWSKI, JA. GOMEZ, D.F. McCARTHY, H. MUSKATT. — DALE BAGMESEWG, CO J. KOUROFSKY - SUPERMSOL, Persons Contacted (Including Address & Phone No.) JOHN KOUROFSKY, Supervisor Town of Danne Mora Telephone - SII - 492-754
	Reservoir Level at Time of Inspection 1541.281 (3 inclus case) Inspection Personnel F.W.BUSZEWSKI, JA. GOMEZ, D.F. McCARTHY, H. MUSKATT. — DALE BAGMESEWG, CO J. KOUROFSKY - SUPERMSOL, Persons Contacted (Including Address & Phone No.) JOHN KOUROFSKY, Supervisor Town of Danne Mora Telephone - SII - 492-754
	Reservoir Level at Time of Inspection 1541.25 (3 inches case) Inspection Personnel F.W. BYSZEWSKI, JA. GOMEZ D.F. McCARTHY H. MUSKATT. — DAUE ENGANGERING CO J. KOUROFSKY - Superusel, Persons Contacted (Including Address & Phone No.) JOHN KOUROFSKY, Superuser Town of Pannemera Telephone - Sil - 492-754 Dannemera N.U. 12929
	Reservoir Level at Time of Inspection 1541.25+ (3 inclus organical inspection Personnel F.W. Ryszeuski, JA. Gomez, D.F. McCherhy, H. Muskatt. — Dave Brankerm, Co. J. Koveofsky - Supermod, Dannermod. Persons Contacted (Including Address & Phone No.) JOHN Koveofsky, Supermore Town of Pannemora Telefame - Sil - 492-754 Dannemora N.U. 12929 History:
	Reservoir Level at Time of Inspection 1541.25+ (3 inclus organical inspection Personnel F.W. Ryszeuski, JA. Gomez, D.F. McCherhy, H. Muskatt. — Dave Brankerm, Co. J. Koveofsky - Supermod, Dannermod. Persons Contacted (Including Address & Phone No.) JOHN Koveofsky, Supermore Town of Pannemora Telefame - Sil - 492-754 Dannemora N.U. 12929 History:

2)	Embankmen :	t

a.	Char	acteristics
	(1)	Embankment Material EacTN FILL - LECT PORTION
		PLEDLE FILL - PIGHT PORTION
	(2)	Cutoff Type CONCRETE CORE WALL
	(3)	Impervious Core Conceste Coce WALL
	(4)	Internal Drainage System NoME
	(5)	Miscellaneous Concrete Face war on 1437/4. of
		PIGHT SIDE OF DAM
b.	Cres	t
	(1)	Vertical Alignment EASTHFILL IS NOT UNIFORM
		CORE WALL GOOD ALIGNOSAT, ROBBLE FILL DISPLACED
	(2)	Horizontal Alignment 600 D No MOUBAGEAST PRIMETED
		SOME SECTIONS. OF FACE WOLL MIS AUGNED VERTEALLY
	(3)	Surface Cracks NONE MOTED IN EASTH SECTION
		CRACE LONGITUDINGUY ALONG CENTER OF CORE WALL
	(4)	Miscellaneous
c.	Upst	ream Slope
	(1)	Slope (Estimate) (V:H) 1:2
	(2)	Undesirable Growth or Debris, Animal Burrows NATURE TREES
		AT TOP OF SLOPE
	(3)	Sloughing, Subsidence or Depressions
		OF EASTH AT UPSTREAM FINE OF EMBANEMENT
		DISPUREMENT OF RUBBLE AT UPSTREAM FACE OF
		CONCESTE FACE WALL

(4)	Slope Protection DISPARED (SEE 3 REGUE)
(5)	Surface Cracks or Movement at Toe No 083EEVATION
Down	stream Slope
(1)	Slope (Estimate - V:H) 1:Z
(2)	Undesirable Growth or Debris, Animal Burrows MATURE
	TREE WROWTH
(3)	Sloughing, Subsidence or Depressions DEPRESSIONS IM
	PUBBLE FILL AT FACE WALL
(4)	Surface Cracks or Movement at Toe NOME OBSERVED
(5)	Seepage POSSIBLE SEEPAGE AT OF BEYOND TOE AT EIGHT OF SPILLING ! NEAR RIGHT ABOTM
(6)	External Drainage System (Ditches, Trenches; Blanket)
(7)	Condition Around Outlet Structure CHANNEL IS FREE Some PONDED WATER TO RIGHT OF SPILLING.
(8)	Seepage Beyond Toe SEE (S) ABOUT
	ments - Embankment Contact No SEEPAGE AT LEFT ABJUMENT POSSIBLE SEEPAGE AT RIGHT ABUTMENT.

93 - 13	7-3(5	700)	
		(1)	Erosion at Contact None district.
		(2)	Seepage Along Contact SEE C.S Above
3)	<u>Dra</u>	inage	System
	a.	Desc	ription of System NOVE
	b.	Cond	ition of System
		·	
	c.	Disc	narge from Drainage System
4)	<u>Ins</u>	trume	ntation (Momumentation/Surveys, Observation Wells, Weirs,
	P1	ezome	HONE
			

5)	Res	<u>ervoir</u>
	a.	Slopes No KNOWN ALEAS OF SLOPE METROILAY.
	ъ.	Sedimentation No KNOWN AREAS OF EXESSIVE
		sediment ation
	c.	Unusual Conditions Which Affect Dam Noue
	_	
6)	Are	a Downstream of Dam
	a.	Downstream Hazard (No. of Homes, Highways, etc.) 2 15000063 +
		ITEMILEZ HOME APPROX ZMILES DOWNSTERMA
	b.	Seepage, Unusual Growth ZALEAS . F SEEPAGE (ROSABLE)
	1) TO ET OF SPILLURY 2.) NEAR RE ABUTHENT
		Evidence of Movement Beyond Toe of Dam NONE ASSESSED
	C.	Evidence of november beyond for of ban parter assessed
	d.	Condition of Downstream Channel OPEN - HEAVY ALDER.
		GEOUTH.
7)	<u>Spi</u>	llway(s) (Including Discharge Conveyance Channel)
		30 ST. WIDE BEAND CEESTED WIFE
	a.	General CONCRETE SUBFACES DETERIORATED.
		SOME RE-BARS EXPOSED.
	b.	Condition of Service Spillway IN SPECATING CONDITION
		SOME CONCRETE CRACKING. NO DISPLACEMENT
		OF ELEMENTS CONCENS HOTED LONGITUDINALLY
		IN CENTER OF ELEMENTS.
		IN CRUING C. SCHOOLS

c.	Condition of Auxiliary Spillway No Auxiliary Spillway
d.	Condition of Discharge Conveyance Channel CPFM FREE FLOWNIA MG EUTDEMOR GF RECENT FROSIGN.
8) <u>Res</u>	servoir Drain/Outlet
	Type: Pipe Conduit Other
	Material: Concrete Metal Other
	Size: 3-36 PAPES Length 617 Concrete 61' Long Invert Elevations: Entrance Reset Plant (SEE Plant (IS21-5) (IS21-5)
	Invert Elevations: Entrance 93.6 Exit 82.5
	Physical Condition (Describe): Unobservable
	Material:
	Joints: Alignment Good
	Structural Integrity: No SIGHS OF STEUCTURAL DAMAGE
	be Daneses.
	Hydraulic Capability: To BE COMPUTED
	Means of Control: Gate Valve Uncontrolled
	Operation: Operable Other
	Present Condition (Describe): 67504750 AMURUY 70
	DROP LAKE LEVEL DORING WINTER MONTHS.

9)

	ctural
(Concrete Surfaces
•	Structural Cracking LONGITUDINAL CRACK IN CENTER O
	
	Exposed top of cold wall.
•	
	Movement - Horizontal & Vertical Alignment (Settlement)
,	NOME OBSERVED AN CAPE WALL SOME
	SETTLEMENT 4-6" AT TOP OF FACE WALL
	Junctions with Abutments or Embankments
	Drains - Foundation, Joint, Face
	Water Passages, Conduits, Sluices
	Seepage or Leakage

3-	15	-3(9	/80)

Joints - Construction, etc. Foundation Abutments Control Gates Approach & Outlet Channels Energy Dissipators (Plunge Pool, etc.) Intake Structures INLET OF COLUMN STRUCTURE IN GOOD COUNTY PAGIFFMENT THROUGH THE UNATED. Stability Miscellaneous	Joints	- Cons	tructio	on, etc.	•	-				
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Intake Structures Trash Rocks ON INLET OF CONTROL STRUCTURE IN GOOD CONDO PAGURENES THROUGH THE WATER. Stability ***	Energy	Dissip	ators ((Plunge	Pool,	etc.) _				
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ASURED THROUGH THE WATER. Stability 12						T 0.14				
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Miscellaneous	Stabil	ity	70							
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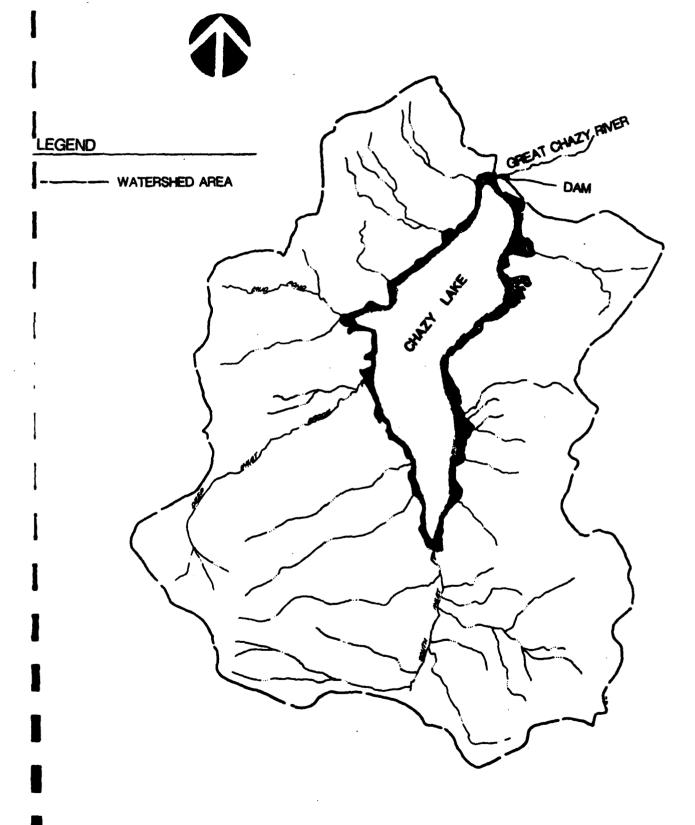
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		rtenant Structures (Power House, Lock, Gatehouse, Other)
	a.	Description and Condition News
1)		ation Procedures (Lake Level Regulation):
1)		•
1)	4	•
1)	w	THE LEUEL IS LOWERED 8-10 1 ft DURNG THE
1)	w	THE LEUEL IS LOWERED 8-10 1 FT DUENG THE
1)	w	THE LEUEL IS LOWERED 8-10 1 ft DURNG THE
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APPENDIX C

HYDROLOGIC/HYDRAULIC, ENGINEERING DATA AND COMPUTATIONS

DRAINAGE BASIN





CT NAME N. Y. S.	Dam Insp	ections 1981	DATE
T_Chazy	Lake Dem		PROJECT NO. 35 50
Subarea	Hydrologi	c Parameters	DRAWN BY FOM
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			0.3
Subarea	Area	Ct L LEA	t = Cell xLen
	1 1 1		
Ι	23.59 mil	2.0 2.4 mi 1.27 mi	7.80 + 0.17 HK = 9.4
:			all and the second of the seco
1			the state of the s
& Adjusted	for travel	time through reservoir	
·			<u>:</u>
t = travel	distance	Vw = 79 Dm g=	32.3 FT/SEC3
V.4	w		4. 1.1
Dm= aver	rage death c	A CELECUOIT	
Dm= 35	FT Y44	= 132,1(35) = 33,6 F1/SE	c
VIII.			
travel d	stonce = 21.	200 F7	entre de la companya
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x = 33,000	6 FPS = 0.17	H& ,	1
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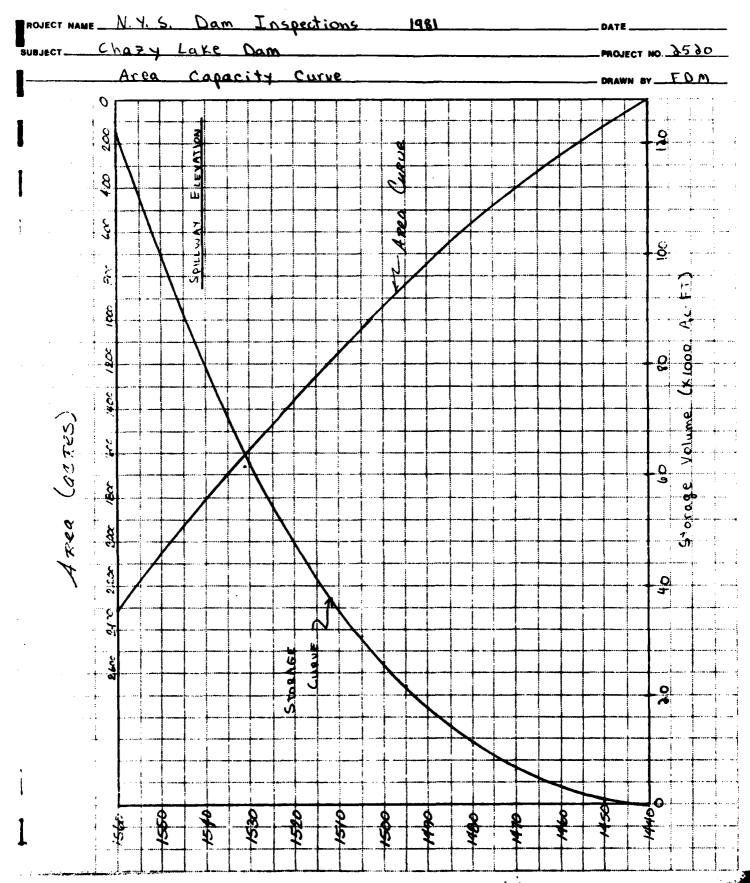


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NAME	Dam In	bection	>1	981		DATE
•	ake Dam					PROJECT NO. 35
Spille	lay Rating			<u></u>		DRAWN BY 1 DA
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STETSON • DALE BANKERS TRUST BUILDING DESIGN BRIEF TEL 315-797-5800

PROJECT NAME N.Y.S. Dam Inspections 1981	DATE
BUECT Chazy Lake Dam	PROJECT NO. 3430
Reservoir Diain Discharge Reting	M. Q T VS NWARD
Bl. 85 Co'x9 wide bax co	H
3 pipes with 3 FT diameters empty into a GX9 box r	alwest Chark 2
cases to see which controls.	C. W. F. C. C. C. C. C.
Entrance: using nomograph an p. 565 - "Design of Small spillway elevation - $H=12.5$ ft. $H=\frac{12.5}{5}=4.167$ $D=36+3$ top of dam- $H=16.5$ FT $H=\frac{16.5}{5}=5.5$ Ft $D=36$ inches	Elo inches
Or fice equation: Q = CAT Day H Assume C=D.6 A=	4
50. Iway: H = 11 Ft Q= 0.6 (7.07) Tennin = 1129 cs top of Dam: H= 15 FT Q= 0.6 (7.07) Tennis = 131.5 cfs	
Friction: "Design of Small Dame" 2.570 1-= [1.555 (1+ke) + 385 64 n L] (D) 2 D=6 FT L= 53 FT.	Assume Ke on
Spinoy: $H_T = 96 - 825 - 096 = 13.5 - 0.9(6) = 8.1 Ft$ $8.1 = \begin{bmatrix} 1.555(1+0.7) & 267.64 & (0.013)^2(53) & (0.0$	



DJECT NAME N.Y.S	. Da	w_	I	ns.	be	+	OV	_کد			198	1_							_ D/	TE_		
UECT Chazy	La	k.e		<u>יסכ</u>	<i>y</i>														PR	OJEC	T NO	3030
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CHECK LIST FOR DAMS HYDROLOGIC AND HYDRAULIC ENGINEERING DATA

AREA-CAPACITY DATA:

		Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1)	Top of Dam	1545	1920	90,000
2)	Design High Water (Max. Design Pool)	_N/A		
3)	Auxiliary Spillway Crest	N/A		
4)	Pool Level with Flashboards	N/A		<u></u>
5)	Service Spillway Crest	1541	1830	81,700

DISCHARGES

		Volume (cfs)
1)	Average Daily	N/A
2)	Spillway @ Maximum High Water (Top of Dam)	645
3)	Spillway @ Design High Water	N/A_
4)	Spillway @ Auxiliary Spillway Crest Elevation	N/A
5)	Low Level Outlet w/ water level at top of dam	390
6)	Total (of all facilities) @ Maximum High Water	10 35
7)	Maximum Known Flood	unknown
8)	At Time of Inspection	AUA

REST:	ELEVATION: 1545
Туре:	
Width:	Length: 3490
Spillover	
Location	
PILLWAY:	
PRINCIPAL	EMERGENCY
N/A	Elevation 1541
	Type broad crested
	Width 30 FT
	Type of Control
	Uncontrolled
	Controlled:
	Туре
	(Flashboards; gate)
	Number
	Size/Length
	Invert Material Concrete
	Anticipated Length of operating serviceN/A
<u>-</u>	Chute Length N/A
	Reight Between Spillway Crest & Approach Channel Invert (Weir Flow)

HYDROMETEROLOGICAL GAGES:
Type: None at present
Location:
Records:
Date
Max. Reading -
FLOOD WATER CONTROL SYSTEM: Warning System: None of present
Method of Controlled Releases (mechanisms):
Three, 3 FT. diameter sluice-gated pipes.
Also, through water distribution system.

INAGE BASIN RUNOFF CHARAC	TERISTICS:
Land Use - Type:	eveloped, mostly forested
Terrain - Relief:	
Surface - Soil: Not	- Known
	ng or planned extensive alterations to existing ce or subsurface conditions)
	on
Potential Sedimentation	problem areas (natural or man-made; present or fu
Un Known	
Potential Backwater prob including surcharg	olem areas for levels at maximum storage capacity
Potential Backwater probincluding surcharg	plem areas for levels at maximum storage capacity ge storage:
Potential Backwater probincluding surcharg	olem areas for levels at maximum storage capacity pe storage: ADMY Flow & non-overflow) - Low reaches along the
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PREVIEW OF SCOUENCE OF STREAM METHURK CALCULATIONS RUNOFF WYDROGRAPH AT 159 ROUTE HYDROGRAPH TO 250 END UP NETHORK

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SUB-AREA RUNDFF COMPUTATION

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UNIT HYDRUGRAPH DATA

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F1108= 1.00 STRIGE

2.96 HOURS, CP= 0.63 VPL= 1.3 059. (28. 411. 1465. UNIT HYDROGRAPH 15 END-OF-PERIOD ORDINATES, LACE 1742. 2230. 1465. 150. 50. 32.

(425.)(348.)(70.)(6978.48) 2507 EXCS SU# 16.72 13.72

HYDROGRAPH ROUTING

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FLOW 315.00	315.00	415.00	: !	19.00	58.60		85.37 779.37	135.90 926.00		132.09 1095.00	161.33 1295.03	192.00 1532.50
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STATION AREA PLAN RATIC 1 RATIO 2 RATIO 3 RATIO 4 RATIC 5 RATIC 5 RATIO 6 RATIO 7.50 3.50 3.50 3.50 1.60 3.50 1.60 3.50 3.50 3.50 3.50 3.50 3.50 3.50 3.5		PEAK FLOW		IRAGE (END FLOWS	AND STORAGE (END OF PERIOD) SURMARY FOR MULTIPLE PLAN-KATED ECCHOMIC COMPUTATIONS FLOWS IN CURIC FEET FER SECOND (CUBIC METERS PER SECOND) AREA IN SQUARE MILES (SQUARE KILOMETERS)	SURMARY FOET :EK SECOUARE MILES	A MULTIFLE IND (COUIC (SQUARE KI	PLAN-KATI METERS PER LOMETERS)	SECOND SECOND	COMPUTATI	: S
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SUPMARY OF DAM SAFETY ANALYSES

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FPEVIEW OF SECTENCE OF STREAM NETWORK CALCULATIONS RUNDER HYDEGRAPH AT 2.3 ROUTE HYDROGRAPH TO 62.3 ROUTE HYDROGRAPH TO 65.00 ROUTE HYDROGRAPH TO 15.00 ROUTE HYDROGRAPH TO 15.00 TAND OF NETHORK

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BEGIN DAM FAILURE AT 51.2 NOURS

END-OF-PERIOD HYDROGRAPH ORDINATES

STATION 2005 PLAN TO WATIO 1

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STORAGE

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1544.6	1544.7	1544.7	1544.7	1544.8	1544.8	1544.8	1544.9	1544.9	1544.9
1544.9	1544.9	1545.0	1545.9	1545.0	1545.0	1545.0	1545.0	1545.0	1545.
1545-9	1545.1	1545.1	1545.1	1545.1-	1545.1	1545.0	1545.0	1545.0	1544.9
1544.4	1544.1	1544.8	1544.8	1544.8	1544.7	1544.7	1544.0	1544.0	1544.6
1544.5	1544.5	1544.5	1544.4	1544.4	1544.4	1544.3	1544.3	1544.3	1544.2
1544.2	1594.1	1544.1	154451	1544.0	1514.0	1544.0	1543.9	1345.9	1543.9
1563.8	1543.8	1543.8	1543.7	1543.7	1543.7	1543.6	1543.6	1543.6	1543.5

PEAK-001FLOW-15-----5120-AT-TIME--51:30-HOURS----

				:		
TOTAL VOLUME		6237.	3.02	76.79	3641.	4491.
72-HOUR	. 25	21.	3.02	76:75	3641.	4491.
24-HOUR	1834	52.	3.02	76.75	3638.	445B.
6-MOUR	4016:	131.	1.93	46.28	2289.	2624.
PEAK	5(149:	143.				
	S40	SWU	INCHES	**	AC-FT	THOUS CU #

IME DAM BREACH HYDROGRAPH WAS DEVELOPED USING A TIME INTERVAL OF C.3C2 HOURS DURING BREACH FORMATION. DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF C.2CO HOURS. TABLE COMPAGES THE HYDROGRAFH FOR DOWNSTREAM CALCULATIONS WITH THE COMPUTED BREACH HYDROGRAPH. INTERMEDIATE FLOWS ARE INTERPOLATED FROM END-UF-PERIOD VALUES.

Chours Chours Cress Cr		TIME	CECHNATES	INTERPOLATED BREACH	COMPUTED BREACH =	ERROR	ACCUMULATED	ACCUMULATED
51.200 792 792 792 793<		(3011011)	CHURCH	HYDROGRAPH	HYDROGRAPH	(000)	FRROR	AL MAN
91.282 6.00 8.7 6.00 8.7 6.00 8.00 <th< td=""><td></td><td>51.250</td><td>007-0</td><td>767</td><td>\sim</td><td></td><td></td><td></td></th<>		51.250	007-0	767	\sim			
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\$1,200 920. 365. 55 123. \$1,200 920. 940. 665. 249. 240. 249. 249. 240. 249. 248. 370. 431. 248. 370. 431. 248. 370. 448. 370. 431. 248. 370. 431. 248. 230. 248. 370. 431. 230. 248. 370. 248. 370. 431. 230. 248. 370. 431. 230. 248. 230. 248. 230. 248. 230. 248. 230. 248. 230. 248. 230. 248.		51.204	9.00%	1	634	3	200	
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DAM BREACH DATA

RRAID Z ELLM TF11L MSEL FAILEL
3C. 9.00.1532.00 0.50-1541.00-1545.07

STATION 2:0. FLAN 2. SATIO 1

END-OF-PERIOD BYDRUGRAPH GRBINALES

BEGI. DAM FAILURE AT 51.20 HOURS

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THE DAY BREACH WIDNOWRAPH WAS DEVELOPED USING A TIME INTERVAL OF FING HOURS DURING SPEACH FURMATIONS.

DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF FIGURES.

THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPARES THE HYDROGRAPH.

INTERREDIATE FLOWS ARE INTERPOLATED FROM END-OF-FEPIOD VALUES.

The second secon

,	1761	BEGINGING	6REACH	EREACH	= ERROR A	ACCUMULATED	ACCUMULATED
	(MCURS)	CHOURS)	(CFS)	HIDROFFER (CFS)	(CFS)	CFS)	CAC-FT)
	51.260	0.00	192.	795.	6	0.	6
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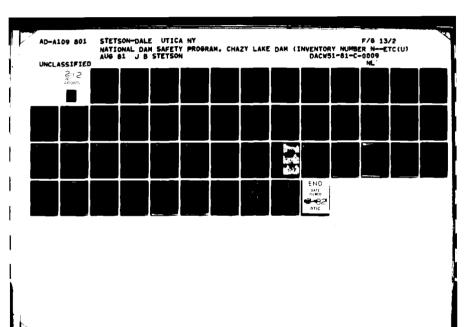
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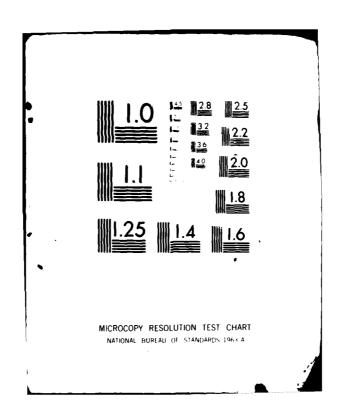
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	547. 726. 726. 4744. 4547. 4152.	ಹಿಂದಿಯ ಚಿನಕ	ကြောင်းလိုင်ငံသိတ်လိမ်းဆိုင်	22.55. 22.55. 22.55. 25
	585. 623. 711. 4677. 4425. 4176.	ရိုင်ကိုင်းကို ခြိတ်ကို	ಸತ್ತಿತ್ವನ್ನಿ ಪ್ರಮತ್ತಿಗೆ ಸಂಪ	7. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.
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ု သစ္စစ်စု ရန်စစ်စုရှိသည်။ အသည်။ ည ငေး ကြို့ သက္ကေတာက်ထုံးကို လက်ကေတာက်တောင်းမောင် မြိမ္မေလမျှန် ကြို့သက်ကေတာက်ထုံးကို လက်ကေတာက်တောင်းမောင် မြိမ္မေလမျှန် ်ကိုက်မှာပြီးများတို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို ကြောက်မြောင်းများတို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို့ မို့တို ್ ರಸ್ತಿಗಳು **ದ**ೆಗೆ ಕೆಟ್ಟಿಗಳು ಬೆಂದಿಗೆ ಕೆಗೆ ಕೆಗೆ **ಕೆಗೆ ಕೆಟ್ಟಿಕ್ಕ**್ಕೆ ်ဂိုင်းကို မိုက်ကိုတို့တို့ကို လိုက်သို့တို့တို့တို့တို့တို့ ကို ကိုမိုက်မျှီးတို့တို့တို့တို့တို့တို့တို့တို့တို့

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APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

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APPENDIX E
STABILITY ANALYSIS

STETSON - DALE BANKERS TRUST BUILDING DESIGN BRIEF TEL 315-797-5800

PROJECT NAME CHAZY LAKE DANSPILLWAY	DATE - CO
HUBJECT SPILLWAY STABILITY ANAYSI'S	PROJECT NO
Assumed Spillway Section	DRAWN BY
El. 1072 PMF Spillway width it center buttress a	30 ft, with
Cl. 100 = PMF Analyze for center	help to a with
Mormal Summer WC 100=7.5/4 (6' (2' (3') _ 50. 96 (81.1)	
RESERVOIT 1.75 Earth Fill H=26 Concrete C	. E1.82'
= \ \ concrete \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	~ide)
EM toespicture to not of conci well, bearing capacity on butters he = (205 ×) 254 + (154x 154x 10 KSF) (54) = = 513 × + 900 × = 1413 Himp.	se (15 (t. section)

ž

UBJECT	DATE
I. WL @ Spillway Crest, plus winter ice and a overturing	polification of land the services of the land the lan
Lat. Parth Pressure 12 12 21.82	2000 X4) 2000 X4) 2000 X4 2

= (1.56 kcfx = 25'x 25') + (0.45 kg . 25'x 25') + (7.5 x 24') + (0.5 x 5 x 5) + (1.56 - 0.75) (= 1/3 kg) = 162.5 + 464 + 180 + 9.4 + 6.8 = 405.6 kg fn 1 ft. w. 246

for 15 ft wide = 5 Mfg = (405.6 kg)(15') = 6084 kg

15 ft wide = 5 Mfg = (405.6 kg)(15') = 6084 kg

= 1413 + 1057 + 270 = 2720 1K

FS agricel overturning = 2770 = 0.45 (unraniche sque es

STETSON - DALE BANKERS TRUST BUILDING DESIGN BRIEF

TEL 315-797-5800

	TEL 315-797-5800
CHAZY	DATE
JBJECT	PROJECT NO
	DRAWN BY
Alternote possibility for state we ka=0.3 kp: 4.0 kcf for state we ka=0.3 kp: 4.0 passive upliff	towards ds, lower section rotates rotates toward upstream rotation about the many matrix soil
Tirces/Prosures acting on structure	for above mode of failure
617 1 T - 4 (a) 14 C 14	- E1, 96' - 50.82' - 50.82' - 50.82' - 70' - 7
Ho Lot Earth Pressure Uplich Purhor	Let. Soil H20 let Pressure pressure
1: Mino causing overturning due to	moment of pressure diagrams @+(b+(c)+(d)+(e)
= (= < 14×0.336 xc/ X17) + (= x15x	moment of pressure diagrams @+(b+(c)-()+(e)
+ (c' 11/2 kef /01) +	(= x 14 x , 874 ket) = 11 +10.6 + 36+ 64.8 - 38.6 - 15.
Zillian causing out due to ice la	ading = 7.5 × 13' = 97.5"
Filhier causing out due to ice lo total Sellier causing out = 15	11"+ 975" = 249 " ±
144	

	IEL 313-794	P3800
PROJECT NAMECV	AZY	DATE
JBJECT		PROJECT NO.
		DRAWN BY
S Utor res	eam lower section + w	passive soil pressure and 420 persons eight dam (neglect who butters, use core on
- 1231. h	(x12,x15,) + (1.54-31) Put X15,)(= x12') +(.874 bsfx12x12)+
+(1.65 - 1874 fit (15 X3 x 15) + (5 + 2	passive soil pressure and 420 years received with dam (neglect who buttures, use core only (3x12x12)+ (3x12') + (.874 bsfx12x12)+ (7x6') (.554 bsfx12x12)+ (7x6') (.554 bsfx12x12)+ (154') (155') = 242+138+634 56+ 181
= 663 18		
-S against	operturning about toe of	buttress = 249 1 = 2.60
H ₂ O	Active SUDING Saturday. 2' SEAL' Paying	
→	saci Parise satisfiente santifications of the sail proctore	H20

- (26x.06) Forces concerned sliding = active earth press + 120 press + ich = 54+21 +75 = 54+7 orien Micting sliding = parsive parth press + H20 + friction at lass = (3.00 bsf x '=') + (0.75 lsf x '=') + (2.5 \chis) - up + (1) - (3) - up + (1) (3) - up + (1) (3) - up + (1) (3) = 30.10

Pu= 1240 = 0.75 451

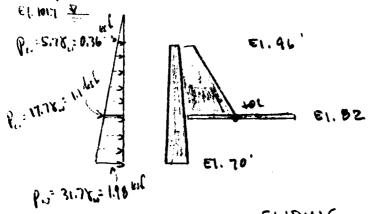
IFS against sliding, no ice effects = 30.1 = 1.11 Fs against sliding, with ice effects = 30.1 = 0.9

STETSON - DALE BANKERS TRUST BUILDING DESIGN BRIEF TEL 315-797-5800

PROJECT NAME CHAZY	DATÉ
JBJECT	PROJECT NO
	ORAWN BY
TI. W. e = PMF Elevation - assume la custan present la present upstream upstream upstream e1.82	teral certh pressure and nountributions of vormal operations; When and pressure changes assume to the vormal operations
6 - 30.5 gm	
ronce: causing stiding = active Earth press + + = (6.1 +) + (20+1/88)(26)	120 pressure = 33.5
Forces resisting sliding = passive earth pressure = 30.1 k + friction on a	
: FS against sliding estimates	
OUZETURNING	
= 11+10.6+36+64.8+25.5	operations (ase = 662) (2) (2) (2) (2) (2) (3) (3) (
1= (000 + 00 = 663 1K = 3	

PROJECT NAME CHAZY	DATE
JBJECT	PROJECT NO
	DRAWN BY

TII. WL @ PMF Elevation - assume laterel earth pressure and downstream unter pressures as for warrant operations, assume uplift as for normal operations



SUDING

FS against sliding = $\frac{30.1}{30.5}$ cases = $\frac{30.1}{30.5}$ buffred to review = $\frac{30.1}{30.5}$ buffred to review = $\frac{30.1}{30.5}$ buffred to review = $\frac{30.1}{30.5}$ = \frac

EU resisting overturning taken as for mormal operations case = 663 12 20 14 10.6 +36 +64.8] + (0.36x14x14) + (1.1-0.36) 14 14 15 = [11 + 10.6 +36 +64.8] + 35.3 + 24.2 = 10.5 14

APPENDIX F

PREVIOUS INSPECTION REPORTS/AVAILABLE DOCUMENTS

COPY FOR CHAZY OFFICE

Chicago, January 6, 1926.

Hr. C. E. Hamilton, Manager,
Heart's Delight Farm.

Chary, Clinton County, New York.

Dear Mr. Hamilton:-

We are ready to send to the New York State Engineer the data for the Chazy Lake Dam as soon as we receive information from you on the following subjects:

The 60" discharge pipe mentioned in the blank form as filled out by you: What is its location, length, concrete enclosure, etc.? A sketch would be helpful.

What is the width of the 12-foot trash rack?

What is the elevation of spillway apron?

Is the reenforcing all of 3/4" rods, 2 feet center each way, as noted on Bundy drawings, or is it different in aprons, waste chamber, and gate-house construction and in concrete facing of old dyxe?

For your information we enclose a print from our drawing as of January 4th; also Mr. Bundy's drawings and our yellow memorandums indicating the points on which information was required in order to make up the drawings.

Sincerely yours,

PBT-NV DRAWING No. CZ - 960 Jan 4,1926

Drawing by Fridish B. Hownsend 1925

Chazy Lake Dam June 8,192



Chazy Lake Dam. The pictudestroyed by decay and ice.
This lake is the soutce of the Big Chazy River.
May 1922



McGregory sawmill beetween the 1st. and loth. of June



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		Underminin	3	ĺ		lement of	Cres	t of Dam
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EVIDANCE OF WAVE ACTION OVERFLOW.

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STATE OF NEW YORK

DEPARTMENT OF

State Engineer and Surveyor

ALBANY

Report of a Structure Impounding Water

To assist in corrying out the provisions of Section as of the Conservation Law being Chapter LXV of the

10 assist in earlying out the provincian of bothom as of and competition and a competition
Consolidated Laws of New York State, relating to safeguarding life and property and the erection, reconstruction,
or maintenance of structures for impounding water, owners of such structures are requested to fill out as completely
as possible this report form for each such dam or reservoir owned within the State of New York for which no plans
or reports relative thereto are on file in this Department, and to return this report form, together with prints or
photographs explanatory thereof to this department.
1. The structure is on the Big Chay River flowing into Lake Champlein in the Town of Lanendra Country of Chiston and
Town of Danemora County of Cluston and
(Give exact distance and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)
(Give exact distiface and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)
2. Is any part of the structure built upon or does its pond flood any State lands? Recot on land of the
3. The name and address of the owner is Will. Miner. Chapy N.
4. The structure is used for a Reserving for Hydro- Electric Power Plant
5. The material of the right bank, in the direction with the current, is last with Concere, at the
spillway crest elevation this material has a top slope of
center line of the structure, a vertical thickness at this elevation offeet, and the top surface extends
for a vertical height offeet above the spillway crest.
6. The material of the left bank is; has a top slope of
to a foot horizontal, thickness oflest and heightlest.
7. The natural material of the bed on which the structure rests is (clay, sand, gravel, boulders, granite, shale,
slate, limestone, etc.)
8. 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. The lead of lands are Clay

14. The maximum known flow of the stream at the structure was		
12. The watershed at the above structure and draining into the pond formed thereby is 22, square miles. 13. The pond area at the spillway crest elevation is 2000 acres and the pond impounds ship in the feet of water. 14. The maximum known flow of the stream at the structure was 2000 acres and the pond impounds ship in the feet per second on 3000 acres and the pond impounds ship in the structure was 2000 acres and the pond of this port? 15. Has the spillway capacity ever been exceeded by a high flow? 16. State if any damage to life or to any buildings, roads or other property could be caused by any possible illure of the above structure. Describe the location, the character and the use of buildings below the structure which might be damaged by any failure of the structure; of roads adjacent to or crossing the stream below the ructure, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the idth of stream openings; and of any embankments or steep slopes that any flood could pass over. Also indicate the character and use made of the ground below the structure. 17. Wastes. The spillway of the above structure is 200 feet long in the clear; the waters are seld at the right end by a concerned. Wall the top of which is 4 feet above the spillway cest, and has a top width of 2 feet above the spillway cest, and has a top width of 2 feet above the spillway crest, and has a top width of 4 feet above the spillway crest, and has a top width of 4 feet above the spillway crest, and has a top width of 4 feet above the spillway crest, and has a top width of 4 feet above the spillway crest, and has a top width of 4 feet above the spillway crest, and has a top width of 4 feet above the spillway crest, and has a top width of 6 feet above the spillway crest, and has a top width of 6 feet above the spillway crest, and has a top width of 6 feet above the spillway crest, and has a top width of 6 feet above the spillway crest, and has a top width of 6 feet above the spillway crest, an	76 .	What is the thickness of the layers:
13. The pond area at the spillway crest elevation is Roma acres and the pond impounds M.C. 14. The maximum known flow of the stream at the structure was 10.35 cubic feet per second on 15. Has the spillway capacity ever been exceeded by a high flow? 15. Has the spillway capacity ever been exceeded by a high flow? 16. State if any damage to life or to any buildings, roads or other property could be caused by any possible filure of the above structure. Describe the location, the character and the use of buildings below the structure high might be damaged by any failure of the structure; of roads adjacent to or crossing the stream below the ructure, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the eight of stream openings; and of any embankments or steep slopes that any flood could pass over. Also indicate the character and use made of the ground below the structure. 17. Wastes. The spillway of the above structure is 20 feet long in the clear; the waters are led at the right end by a Canacard Mall the top of which is feet above the spillway cest, and has a top width of 2 feet; and at the left end by a Canacard Mall the poly which is feet above the spillway cest, and has a top width of 2 feet.	11.	Are there any porous seams of fissures?
14. The maximum known flow of the stream at the structure was	12.	The watershed at the above structure and draining into the pond formed thereby is 221 square miles.
15. Has the spillway capacity ever been exceeded by a high flow? Can any possible flood flow from the pond otherwise than through the wastes noted under 17 and 18 of this eport? If so, give the location, the length and the elevation relative to the spillway crest and the haracter and slopes of the ground of such possible wastes. 16. State if any damage to life or to any buildings, roads or other property could be caused by any possible value of the above structure. Describe the location, the character and the use of buildings below the structure which might be damaged by any failure of the structure; of roads adjacent to or crossing the stream below the tructure, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the richth of stream openings; and of any embankments or steep slopes that any flood could pass over. Also indicate the character and use made of the ground below the structure. 17. Wastes. The spillway of the above structure is		The pond area at the spillway crest elevation is Ross and the pond impounds M. E.C.
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	vhich r tructur vidth of he char 17. eld at 1	wastes. The spillway of the above structure is

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19. APRON. Below the spillway there is an apron built of
20. Has the structure any weaknesses which are liable to cause its failure in high flows?
21. Sketches. On the back of this report make a sketch to scale for each different cross-section of the above structure at the greatest depth; giving the height and the depth from the surface of the foundation, the bottom width, the top width (for a concrete or masonry spillway at two feet below the crest), the elevation of the top in reference to the spillway crest, the length of the section, and the material of which the section is constructed; on the spillway section show a cross section of the apron, giving its width, thickness and material, and show the abutment or wash wall at the end of the spillway, giving its heights and thickness. Mark each section with a capital letter. Also sketch a plan; show the above sections by their top lines, giving the mark and the length of each; the openings by their horizontal dimensions; the abutments by their top width and top lengths from the upstream face of the spillway section; and outline the apron. Also sketch an elevation of each end of the structure with a cross section of the banks, giving the depth and width excavated into the banks. 22. Water Supply. The waters impounded by the above structure have (not) been used for a public water
supply since by Never used for a Untilic Water Supply

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(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

Sheet 199 DAM REPORT
282 Cham
Sept 2 191
4
Conservation Commission,
Division of Inland Waters.
Gentlemen:
I have the honor to make the following report in relation to the structure known as
the Cha Sake Dam.
I have the honor to make the following report in relation to the structure known as the
in the Town of Princeman, Clinton County,
about Omiles from the Village or City of Cleuburg Peast
about from the Village or City of Cleuburg Cent. (State distance) The distance down stream from the dam, to the Lyra MI - Cleuburg road will be (Up or down)
is about 200' (State distance) - White side, Champlain, N.Y., leased to F. Fourniei, The dam is now owned by
The dam is now owned by (Give name and address in full)
and was built in or about the year, and was extensively repaired or reconstructed
during the year and was used to hold back Chazy Lake
As it now stands, the spillway portion of this dam is built of Limber (State whether of manager, concrete or timber)
and the other portions are built of with bank, Toney 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 and under the remaining portions such

foundation bed is ______

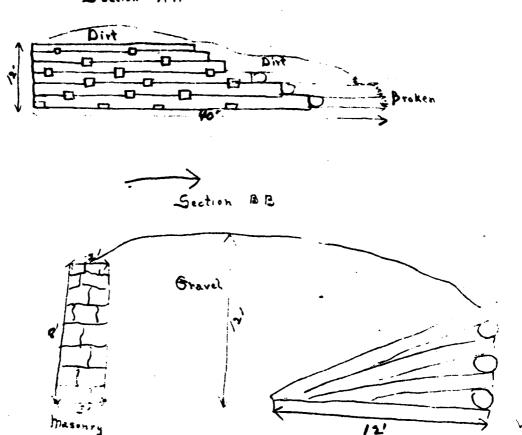
and metal the same of the

(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.) Dam A Spilway Bridge : **B** So Pam

was minimal deposits a service of

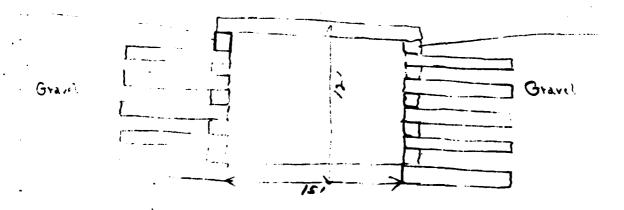
(In the space below, make one sketch showing the form and dimensions of a cross section through the spliway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the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

Suction AA



40.

Section cc



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Contract Institution of the Contract of the Co

T. T. T. C.

The total length of this dam isfeet. The spillway or waste-
weir portion, is aboutfeet long, and the crest of the spillway is
about feet below the top of the dam.
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:
spening broken open
At the time of this inspection the water level above the dam wasftin.
below 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 which you may have observed.)
Earth bank gyrarrently solid. Mason, and Timber buthkeads broken downing graces. Spillway and grice broken and fallen in. Water from the opening
July 15,1920, Report same as given above. Earth ends.
Tichmond & Meyer, Tuxedo, 17.4
Reported by Charles (2. C'ridhon (Address-Street and number, P. O. Bon or R. F. D. route) Syranus M. M. (Name of place)

Fill out a form as complete as possible for each dam in your district and send to State Conservation Commission, Albany, N. Y.

- 1. Name and address of owners Abels of new York.
- 2. Date of construction 1960
- 3. Uses of impounded water....
- 4. Character of foundation bed hard fan
- 5. Material of waste spill
- 6. Length of waste and depth below dam 12' 2' below da ...
- 7. Total length of dam including waste 500'
- 8. Material of dam log vrip rap
- 9. Discharges, size and location.....

Below sketch section of waste and section of dam, with greatest heights and top thickness and bottom thickness. On opposite side sketch general plan of dam and give distance from a bridge or from a tributary stream.

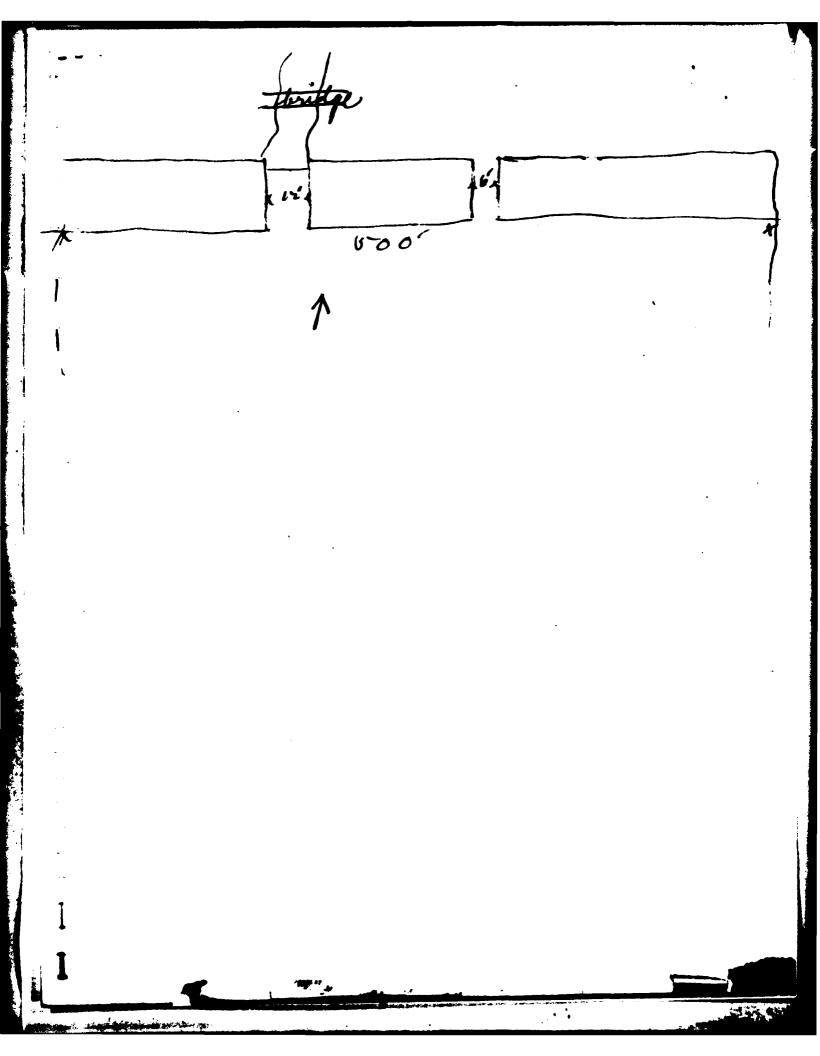
35/1

1 30°

spillall washed out. new dans meded. Trown Chary Lake

(Signature, address and date.)

august 1912.



APPENDIX G
DRAWINGS

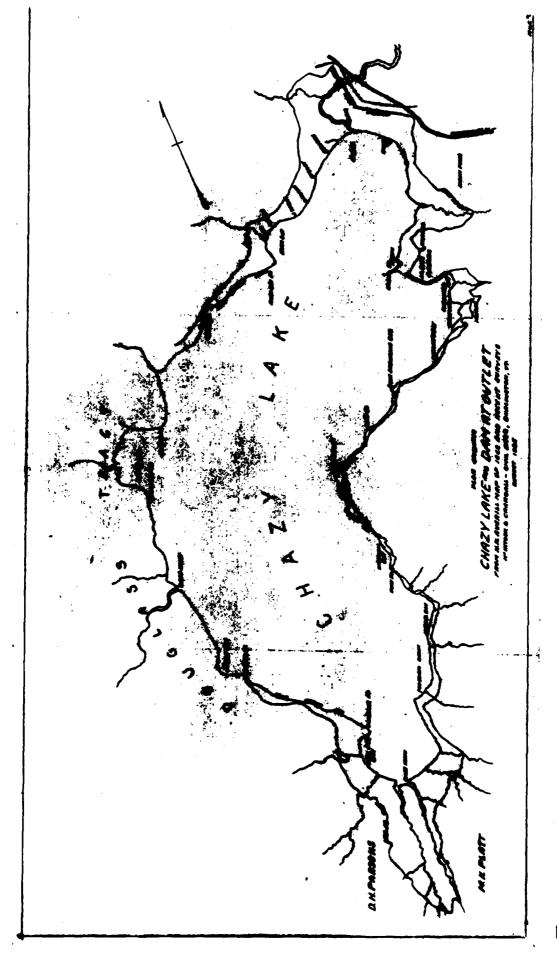


FIGURE 2

W.

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