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NATIONAL DAM INSPECTION PROGRAM. KINTZ CREEK DAM, NDI-PA-00415,--ETC(U)
MAY 79

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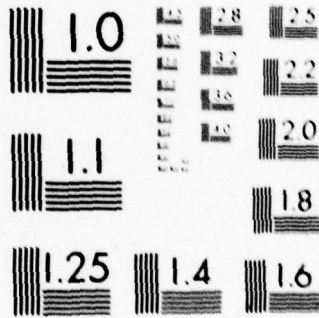
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DELAWARE RIVER BASIN
KINTZ CREEK, PIKE COUNTY

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PENNSYLVANIA

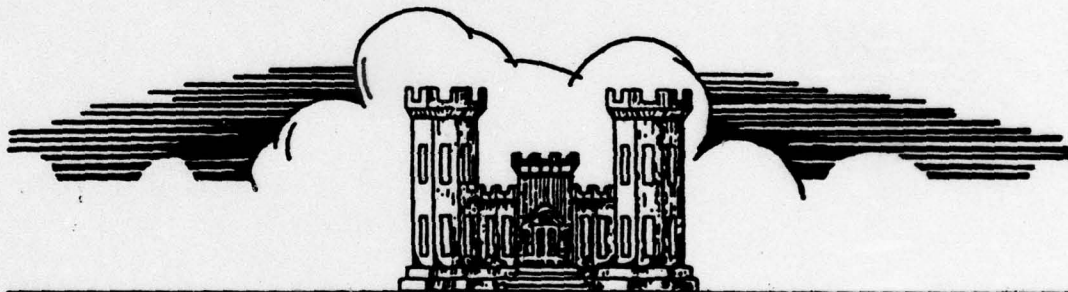
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KINTZ CREEK DAM

NDI - PA 00415
PA DER 52-159
SCS PA-439

LEVEL

PHASE I INSPECTION REPORT NATIONAL DAM INSPECTION PROGRAM



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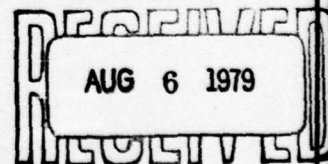
Prepared By



O'BRIEN & GERE

Justin & Courtney Division
PHILADELPHIA, PENNSYLVANIA
19103

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AUG 6 1979

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FOR
DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT CORPS OF ENGINEERS
BALTIMORE, MARYLAND
21203

MAY 1979

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DELAWARE RIVER BASIN

Name of Dam: Kintz Creek Dam

County and State: Pike County, Pennsylvania

Inventory Number: PA 00415

PHASE I INSPECTION REPORT

⑥ NATIONAL DAM INSPECTION PROGRAM

National Dam Inspection Program, Kintz Creek Dam, NDI-PA-00415, PA-DER-52-159, SCS-PA-439, Delaware River Basin, Kintz Creek, Pike County, Pennsylvania. Phase I Inspection Report.

⑩ May 79

Prepared by:

O'BRIEN & GERE ENGINEERS, INC.
JUSTIN & COURTNEY DIVISION

⑫ 72 p.

⑮ DACW31-79-C-0010

For:

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

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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 investigations, 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 design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design 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 REPORT

NATIONAL DAM INSPECTION PROGRAM

Name of Dam: Kintz Creek Dam ID # PA 00415
State Located: Pennsylvania
County Located: Pike
Stream: Kintz Creek
Coordinates: Latitude 41° 16.9' Longitude 75° 14.0'
Date of Inspection: December 5, 1978

ASSESSMENT

Kintz Creek Dam is a zoned compacted earth embankment approximately 1,180 feet long and 36 feet high at its maximum section. The dam has a two stage, drop inlet, closed conduit spillway (Principal Spillway), and a grass covered spillway (Emergency Spillway) which is located at the left (looking downstream) abutment. The primary purpose of the structure is flood control.

Examination of the results of the hydrologic and hydraulic analyses indicates that the spillway system is capable of passing approximately 58 percent of the Probable Maximum Flood (PMF) without the dam being overtopped. The Spillway Design Flood (SDF) for this "High" hazard structure is the PMF. Therefore, the capacity of the spillway system is classified as "Inadequate".

Based on visual observations and review of the information obtained from the Pennsylvania Department of Environmental Resources, Kintz Creek Dam appears to be in fair condition. However, certain items require further investigation:

1. Engage a professional engineer experienced in the design and construction of dams to analyze the Zone V material and perform stability analyses. **If warranted, specific corrective action should be identified and taken.**
2. Low areas along the top of the dam, that appear to be the result of maintenance traffic or poor grading, should be restored to the design top of dam elevation as required.
3. The downstream area near the Emergency Spillway outlet channel and the area along the downstream toe of the earth embankment should be regraded to prevent ponding of water.

4. A maintenance program, independent of the yearly inspection reports, should be developed and implemented. This program should include cutting the grass on a regular basis to enhance visual inspection of the embankment.
5. A warning system should be developed. During periods of heavy rainfall, the dam should be monitored and downstream residents alerted in the event of an impending failure.

O'BRIEN & GERE ENGINEERS, INC.
JUSTIN & COURTNEY DIVISION

Will M. Heiser

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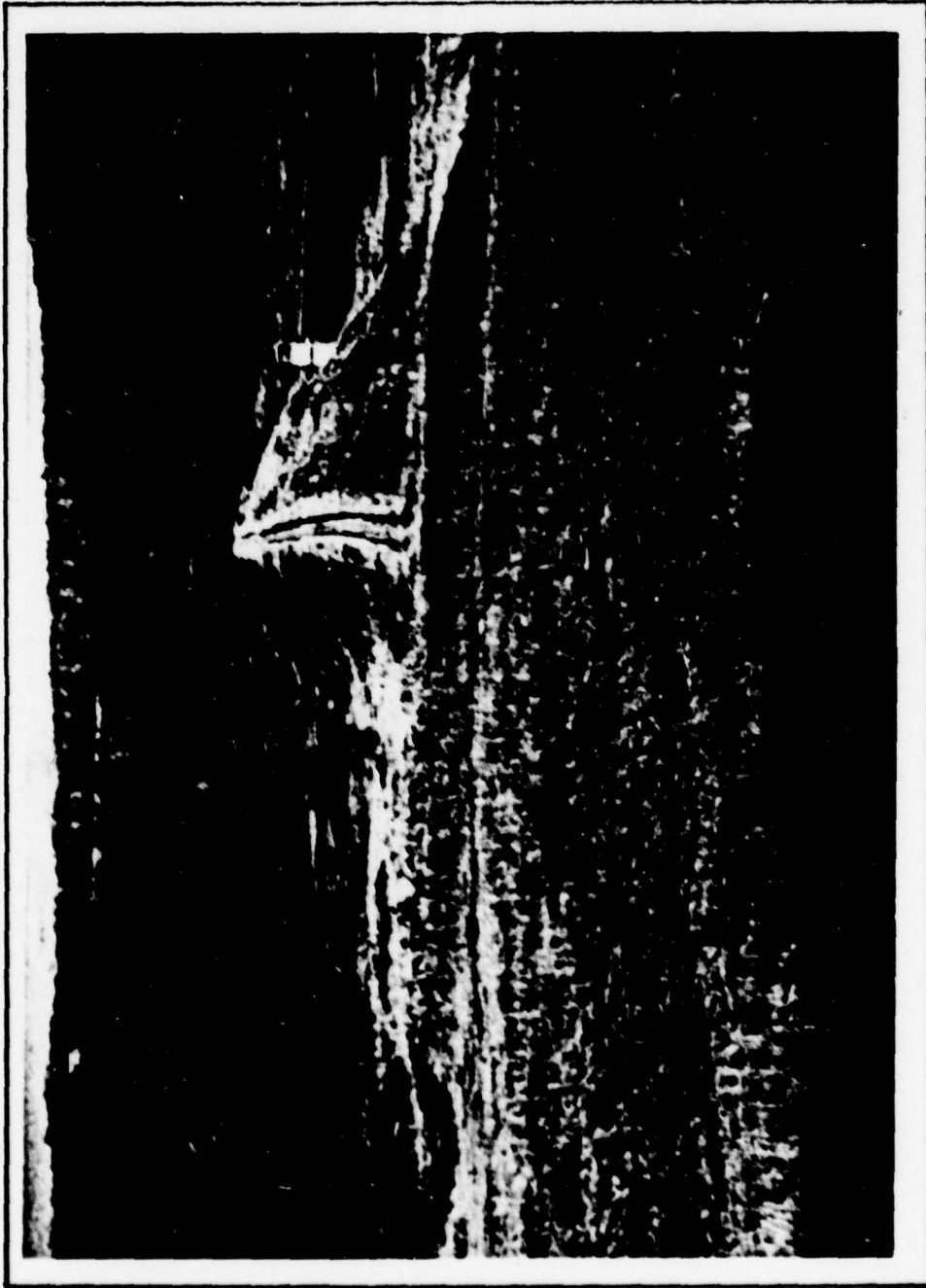


Date: JUNE 8, 1979

James W. Peck
Approved By

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 16 July 1979



OVERVIEW
KINTZ CREEK DAM
PIKE COUNTY, PENNSYLVANIA

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PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
KINTZ CREEK DAM
NDI I.D. NO. 00415
DER # 52-159

SECTION 1

PROJECT INFORMATION

1.1 General

- a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.
- b. Purpose. The purpose of this inspection is to evaluate the structural and hydraulic conditions at Kintz Creek Dam, and to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project (Supplemented by information obtained from the Pennsylvania Department of Environmental Resources (DER), Division of Dam Safety, Harrisburg, Pennsylvania, and the Soil Conservation Service (SCS), State Office, Harrisburg, Pennsylvania).

- ABSTRACT →
- a. Dam and Appurtenances. Kintz Creek Dam is a zoned earth embankment, approximately 1,180 feet in length with a maximum height of 36 feet. The top of the dam is 14 feet wide at Elevation 1626.2. The earth embankment side slopes are 3 horizontal to 1 vertical (3H:1V) upstream and 2H:1V downstream. According to the as-built plans, the embankment has a central core with 1H:1V side slopes to Elevation 1620 and a cutoff trench approximately 6 feet in depth with a 12 foot base width. The central core and cutoff trench are composed of Zone I material (silty material, classified as ML). The downstream shell to Elevation 1620 consists of Zone II material (sandy silt, classified as SP-SM). Zone III material (gravel, classified GM) forms the upstream shell and cap over the core material, and is also used as an 8-foot thick downstream filter between the Zone I and Zone II material to a minimum Elevation of 1608. A layer of Zone V material (spoil material and boulders in excess of 6 inches) covers the downstream face to Elevation 1620. A 10-foot wide berm is provided along the upstream face from Elevation 1596.8 to 1597.8. According to the as-built plans, six relief wells are spaced at 50 feet along the downstream toe. Flow from the wells enters a 4-foot wide drain trench that terminates at the Principal Spillway outlet (impact basin). The drain trench lies beneath a 15-foot wide berm with a slope of 10H:1V.

According to the as-built plans, the Principal Spillway consists of a two-stage drop inlet riser, a 36-inch diameter prestressed reinforced concrete pipe and a reinforced concrete impact basin outlet structure. The riser is 22 feet high and has inside dimensions 9 feet long and 3 feet wide. A low stage (normal pool) inlet is located on the upstream end wall at Elevation 1596.8 and consists of a 3-foot by 2-foot weir. This weir serves as a control structure for low flow which passes over the weir and through a 2.25 foot wide by 2-foot high orifice (invert Elevation 1594.0) located in the upstream end wall of the riser. High stage inlets are located on both sidewalls at Elevation 1616.0 and consist of rectangular openings. Each opening has a 9-foot long weir and a vertical dimension of 18 inches. Anti-vortex walls are incorporated into the top of the riser.

The Principal Spillway pipe rests on a concrete bedding through the base of the embankment. There are five reinforced concrete anti-seep collars at intervals of approximately 23 feet along the length of the pipe. Flow from the pipe discharges into a reinforced concrete impact basin outlet structure. Flow from the outlet structure empties into a trapezoidal channel which has a bottom width of 14 feet, 2H:1V side slopes, and is riprap lined for the initial 20 feet of its length. The centerline of the Principal Spillway is approximately 450 feet from the right abutment.

The Emergency Spillway which is located at the left abutment is a 200-foot wide trapezoidal channel with 3H:1V side slopes. The spillway was formed by excavation of the natural material at the left abutment. There is a 30-foot long level section located just downstream from the centerline of the dam. The forebay channel, about 300 feet in length, slopes upward to the level section on a 2 percent grade. The downstream channel slopes away from the level section on a 2 percent grade before blending with the natural ground about 200 feet downstream from the level section. The elevation of the level section is 1622.0.

An earth dike with 3H:1V side slopes and a 14-foot top width separates the vegetated, earth cut, spillway channel from the earth embankment for a distance of about 50 feet upstream and 150 feet downstream.

- b. Location. Kintz Creek Dam is located on Kintz Creek in Greene Township, Pike County. The dam is approximately 25 miles southeast of Scranton. The dam site is shown on the USGS Quadrangle entitled "Promised Land, Pennsylvania" at coordinates N 41^o 16.9', W 75^o 14.0'. A regional location plan of Kintz Creek Dam is enclosed as Plate 1, Appendix E.
- c. Size Classification. Based on the storage capacity to the top of the dam of 1,166 acre-feet, Kintz Creek Dam is classified in the "Intermediate" size category.

- d. Hazard Classification. There are approximately 5 homes along the shores of Wynooska Lake, into which Kintz Creek drains, located about a mile downstream of the dam. The topography is such that flood waters would be directed towards these homes resulting in probable loss of life and extensive property damage. Therefore, Kintz Creek Dam is considered a "High" hazard dam.
- e. Ownership. Kintz Creek Dam is owned by the Pike County Commissioners, County Courthouse, Milford, Pennsylvania, 18337.
- f. Purpose of Dam. The primary purpose of the dam is flood control.
- g. Design and Construction History. Kintz Creek Dam was designed by the engineering staff of the Soil Conservation Service (SCS) of the United States Department of Agriculture and was constructed by the Triple V Construction Company. Construction began in June of 1968 and was completed in June of 1970. There is no record of subsequent modifications to the structure.
- h. Normal Operating Procedure. Kintz Creek Dam is essentially a "Dry Dam", since the reservoir is normally at the level of the low stage weir. All hydraulic features of the Principal Spillway and Emergency Spillway are uncontrolled (no gates).

1.3 Pertinent Data.

a. Drainage Area

Square Miles	4.20
--------------	------

b. Discharge at Dam Site (cfs.)

Maximum Principal Spillway Low Stage Weir Capacity. (Reservoir surface at high stage weir level, Elev. 1616.0)	108
Maximum Principal Spillway Capacity. (Reservoir surface at Emergency Spillway crest, Elev. 1622.0)	162
Maximum combined Spillway Capacity (Reservoir surface at the top of the Dam, Elev. 1626.2)	4,500

c. Elevation (Feet above MSL)

Normal Pool	1597.0
Top of Dam	1626.2
Emergency Spillway Crest	1622.0
Principal Spillway Low Stage Inlet	1596.8
Principal Spillway High Stage Inlet	1616.0
Principal Spillway Pipe Invert (Inlet)	1594.0
Principal Spillway Pipe Invert (Outlet)	1591.5
Streambed Elevation at Dam Centerline	1590.0

d. Reservoir (Miles)

Length of Normal Pool	0.18
Length of Maximum Non-overtopping Pool	0.64

e. Storage (Acre-feet)

Normal Pool, Elev. 1596.8 (Design assumption is that 50 years of sedimentation will reduce storage at elevation 1596.8 to 0)	12
Riser High Stage Inlet, Elev. 1616.0	560
Emergency Spillway Crest (100-yr. storm), Elev. 1622.0	896
Top of Dam, Elev. 1626.2	1,166

f. Reservoir Surface Area (Acres)

Normal Pool, Elev. 1596.8	8.5
Riser High Stage Inlet, Elev. 1616.0	50.0
Emergency Spillway Crest, Elev. 1622.0	61.0
Top of Dam, Elev. 1626.2	68.5

g. Dam Data

Type	Compacted Earth Embankment
Length	1,180 feet
Height	36 feet (maximum)
Top Width	14 feet
Side Slopes	3H:1V (upstream) 2H:1V (downstream)
Zoning	Yes, refer to Section 1.2.a.
Impervious Core	A central core of relatively impervious silty material classified as ML.
Cutoff	A cutoff trench of core material.
Grout Curtain	No

h. Diversion and Regulating Tunnel

Does not apply to this site.

i. Spillways

1. A Principal Spillway which consists of a two-stage reinforced concrete drop inlet riser which outlets into a 36-inch diameter prestressed reinforced concrete pipe through the base of the embankment.

Length of Weir	18 feet (high stage) 7 feet (low stage)
Crest Elevation	Low Stage: 1596.8; High Stage: 1616.0
Gates	None

Upstream Channel
Downstream Channel

None
Trapezoidal channel approximately 150 feet long with 14-foot bottom width, and 2H:1V side slopes which are riprap lined for the initial 20 feet. Approximately 150 feet long.

2. Trapezoidal grass covered spillway with a 30-foot long level section.

Width 200 feet
Crest Elevation 1622
Gates None
Upstream Channel

Downstream Channel

A curved channel about 300 feet in length slopes up on a 2 percent grade to the level section on a 2 percent grade. A straight channel about 200 feet in length slopes away from the level section on a 2 percent grade and terminates in the open valley downstream of the dam.

SECTION 2
ENGINEERING DATA

2.1 Design

- a. Data Available. The information available in the DER main office files in Harrisburg, Pennsylvania, for review of Kintz Creek Dam, includes the following:
- 1) Application, Report upon the Application, and Permit to construct Kintz Creek Dam.
 - 2) Complete set of as-built plans including location and contour maps and soil boring logs.
 - 3) Yearly inspection reports.
 - 4) Construction progress photographs and reports.
 - 5) Miscellaneous correspondence, memoranda, and additional information obtained from the SCS, State Office, Harrisburg, Pennsylvania, included design calculations.
- b. Design Features. The design features are described in Section 1.2.a and shown on the Plates in Appendix E.

2.2 Construction

Based on the field investigation and the information available in the construction reports, the dam appears to have been constructed in general conformance with the design drawings.

2.3 Operation

There are no mechanical control features for Kintz Creek Dam. Refer to section 1.2.g.

2.4 Evaluation

- a. Availability. The engineering data utilized in this report were provided by DER and SCS.
- b. Adequacy. The material provided by DER and SCS is considered adequate for a Phase I investigation.
- c. Validity. There is no reason to question the validity of the data available from DER and SCS.

SECTION 3
VISUAL INSPECTION

3.1 Findings

- a. General. The field inspection of Kintz Creek Dam took place on December 5, 1978. At the time of the inspection, the reservoir surface was slightly above the crest of the low stage weir. No underwater areas were inspected. The observations and comments of the field inspection team are in the checklist which is Appendix B of this report. The appearance of the facility indicates that the dam and its appurtenances are marginally maintained.
- b. Dam. On the date of the inspection, the upstream face of the embankment appeared to be in good condition. However, on the downstream face there are numerous holes, exposed boulders, depressions, and bulges (refer to Plate D2). Variations of several feet were observed in localized areas and there was evidence of soil erosion around the boulders. A survey of the top of the dam revealed variations in ground elevations of nearly a foot. Several depressions in the top of the dam correspond to areas of animal burrowing in the downstream face. The top of the dam also has tire ruts (up to 6 inches deep) with standing water.

Standing water, 6 inches to a foot deep, is evident in a low area (75-foot by 25-foot) downstream of the embankment along the earth dike which separates the Emergency Spillway from the downstream face of the earth embankment. Two other areas (+ 2-foot by 2-foot) of standing water are located along the downstream toe of the embankment. None of this water appears to be a result of seepage through the embankment, since the reservoir level is well below the elevation of the standing water.

The top of the dam and side slopes are covered by a thick overgrowth of grass which could conceal minor surface problems.

- c. Appurtenant Structures. The visible portions of the Principal Spillway system appear to be in good condition with no signs of spalling, cracking or deterioration of the concrete.

The Emergency Spillway has an established grass cover and appears to be in good condition. There are minor undulations across its width, which should not have a significant affect on the hydraulic efficiency of the spillway.

- d. Reservoir Area. There are a number of trees standing in the upstream end of the reservoir. The slopes along the right side of the reservoir are relatively flat and wooded; those along the left side are much steeper, but show no signs of instability.
- e. Downstream Channel. The channel downstream of the Principal Spillway outlet structure is trapezoidal in shape for a distance of about 150 feet before converging into the natural stream channel. The first 20 feet of the channel downstream of the impact basin is lined with riprap.

During periods of high flow there is potential for loss of life and extensive property damage along the shores of Wyooska Lake about one mile downstream of Kintz Creek Dam. There are approximately 5 homes along the shores of Wyooska Lake.

SECTION 4

OPERATIONAL FEATURES

- 4.1 Procedures. There are no operational procedures associated with Kintz Creek Dam.
- 4.2 Maintenance of the Dam. The dam is maintained by the Pike County Commissioners. The only records of maintenance performed are reports on the completion of required maintenance following the yearly inspections. From 1972 through 1975, required maintenance consisted of grass cutting and removal of debris from the reservoir area, Principal Spillway inlet, and outlet channel. However, the 1976 and 1977 inspection reports stated that the dam was not in need of any repair or maintenance.
- 4.3 Maintenance of Operating Facilities. Removal of debris from the Principal Spillway inlet was reported to be performed periodically through 1975. There is no record of any such maintenance in the past four years.
- 4.4 Warning Systems in Effect. There is no evidence of a formal warning system or procedures to be followed during periods of heavy rainfall.
- 4.5 Evaluation of Operational Adequacy. According to inspection reports, maintenance of Kintz Creek Dam was adequate through the year 1975. Inspection reports after 1975 were very brief. Maintenance procedures were reported to be in compliance with inspection reports. However, the condition of the site during the visual inspection (December 5, 1978) revealed that current maintenance is only marginal. As stated in Section 4.1 there are no operational (mechanical) features associated with Kintz Creek Dam.

The dam is not readily accessible under all weather conditions for inspection and emergency action.

SECTION 5

HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

- a. Design Data. The complete hydrologic and hydraulic design was obtained from SCS. Refer to Sheet 10 of Appendix C for the SCS hydrologic and hydraulics summary.

Kintz Creek Dam has a drainage area of 4.20 square miles and impounds a reservoir with a floodwater storage capacity of 896 acre-feet. The combined spillway system has a discharge capacity of 4,590 cfs.

- b. Experience Data. There are no known records of rainfall or reservoir level.
- c. Visual Observations. On the date of the inspection, there appeared to be no adverse conditions that would restrict the proper functioning of the hydraulic features of the dam. Further observations are given in Appendix B.
- d. Overtopping Potential. The Spillway Design Flood (SDF) for an Intermediate size, "High" hazard structure is the full PMF. The corresponding peak inflow and outflow rates are 9,320 cfs. and 9,290 cfs. respectively. Based on the hydrologic analyses, the combined spillway system is capable of discharging 58 percent of the PMF without overtopping of the embankment (See Appendix C for computations).
- e. Spillway Adequacy. The Kintz Creek Dam spillway system is classified as "Inadequate" since it is incapable of discharging the SDF (the full PMF).

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

- a. Visual Observations. The riser and impact basin of the Principal Spillway appear to be in good structural condition with no visible signs of concrete deterioration. The upstream face of the earth embankment shows no visible signs of instability. However, the deteriorated condition of the downstream face of the embankment (refer to Section 3.1.b. and Plate D2) is a potential source of instability. The areas of ponded water referred to in Section 3.1.b. appear to be the result of improper grading.
- b. Design and Construction Data. The design and construction data available from DER & SCS include slope stability and seepage computations. The dam was constructed as a zoned earth embankment with a downstream face consisting of "exposed rock surface covered with spoil material to assist in establishing vegetation" (Zone V). This layer is the portion of the embankment that is a potential source of instability. The Zone V material does not appear in the design drawings.
- c. Operating Records. There are no mechanical operating facilities for Kintz Creek Dam.
- d. Post Construction Changes. There is no record or visible evidence of any post construction changes.
- e. Seismic Stability. Kintz Creek Dam is located in Zone 1 on the Seismic Zone Map of Contiguous States. A dam located in Seismic Zone 1 is generally considered to be safe under any expected Zone 1 earthquake loading conditions if it is stable under static loading conditions.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

- a. Safety. The visual inspection and review of available information indicate that the Kintz Creek Dam is in fair condition.

The spillway system is capable of discharging 58 percent of the PMF without overtopping of the embankment. The SDF is the full PMF for this structure. Therefore, the spillway system is classified as "Inadequate".

The area on the downstream face of the embankment, referred to as Zone V on the as-built drawings, consists of numerous holes (2 holes were approximately 2.5 foot in depth), exposed boulders with signs of soil erosion around the boulders, bulges, and overgrown vegetation. The layer of Zone V material does not appear in the design drawings. The grass cover on the upstream face of the earth embankment and on the Emergency Spillway appears to be in good condition while the grass cover on the downstream slope of the embankment appears to be in poor condition.

Several localized depressions along the top of the dam correspond to areas of animal burrowing on the downstream face. Other areas of ponded water (refer to Section 3.1.b) appear to be the result of poor drainage due to improper grading or maintenance traffic.

- b. Adequacy of Information. A complete set of as-built plans are available from DER and extensive hydraulic, hydrologic, and structural calculations were obtained from SCS. This information is adequate for a Phase I investigation.
- c. Urgency. The remedial measures recommended in Section 7.2 should be implemented as soon as possible.
- d. Necessity for Further Investigation. In light of the condition of "Zone V" further investigation should be performed to determine if the downstream slope is safe under assumed design loading.

7.2 Recommendations and Proposed Remedial Measures

- a. Facilities. The following recommendations are made for Kintz Creek Dam:
1. Engage a professional engineer experienced in the design and construction of dams to analyze the Zone V material and perform

stability analyses. If warranted, specific corrective action should be identified and taken.

2. Low areas along the top of the dam, that appear to be the result of maintenance traffic or poor grading, should be restored to the design top of dam elevation as required.
3. The downstream area near the Emergency Spillway outlet channel and the area along the downstream toe of the earth embankment should be regraded to prevent ponding of water.

b. Operation and Maintenance Procedures.

1. The grass cover on the earth embankment should be cut on a regularly scheduled basis to permit visual inspection of the embankment.
2. A maintenance program, independent of the yearly inspection reports, should be developed and implemented.
3. A warning system should be developed. During periods of heavy rainfall, the dam should be monitored and downstream residents alerted in the event of an impending failure.

APPENDIX

A

Check List Engineering Data
Design, Construction, Operation
Phase I

NAME OF DAM KINTZ CREEK
ID # 00415

Sheet 1 of 4

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

REMARKS
A COMPLETE SET OF AS
BUILT PLANS WERE AVAILABLE
FROM POER.

SEE PLATE 1

CONSTRUCTION PROGRESS REPORTS
AND PHOTOGRAPHS WERE OBTAINED FROM
POER.

SEE PLATES

SEE PLATES

NONE AVAILABLE

ITEM

AS-BUILT DRAWINGS

REGIONAL VICINITY MAP

CONSTRUCTION HISTORY

TYPICAL SECTIONS OF DAM

OUTLETS - PLAN

DETAILS

CONSTRAINTS

DISCHARGE RATINGS

RAINFALL/RESERVOIR RECORDS

ITEM

REMARKS

MONITORING SYSTEMS

NONE AVAILABLE.

MODIFICATIONS

NO KNOWN MODIFICATIONS.

HIGH POOL RECORDS

NO RECORDS AVAILABLE.

POST CONSTRUCTION ENGINEERING
STUDIES AND REPORTS

NO SUCH REPORTS AVAILABLE.

PRIOR ACCIDENTS OR FAILURE OF DAM
DESCRIPTION
REPORTS

NO PRIOR ACCIDENTS OR FAILURES.

MAINTENANCE
OPERATION
RECORDS

YEARLY INSPECTION REPORTS AND
REQUIRES MAINTENANCE COMPLETION RECORDS WERE
AVAILABLE FROM POER.

ITEM

REMARKS

SPILLWAY PLAN

SECTIONS

DETAILS

SEE PLATES

OPERATING EQUIPMENT
PLANS & DETAILS

NO OPERATING EQUIPMENT

MISCELLANEOUS

APPENDIX

B

Check List
Visual Inspection
Phase I

CHECK LIST
VISUAL INSPECTION
PHASE I

Sheet 1 of 11

Name Dam KINTZ CREEK DAM County PIKE State PENNA. National ID # 00415
Type of Dam EARTH Hazard Category HIGH
Date(s) Inspection DEC. 5, 1978 Weather SUNNY Temperature 45°

Pool Elevation at Time of Inspection 1597 H.S.L. Tailwater at Time of Inspection _____ H.S.L.

Inspection Personnel:

MR. GEORGE ELIAS MR. THOMAS AHN
MR. DAVID CAMPBELL MR. DANA PIZAKKO
MR. ROBERT BOWERS _____
_____ MR. DAVID CAMPBELL Recorder

Remarks:

CONCRETE/MASONRY DAMS

Sheet 2 of 11

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

ANY NOTICEABLE SEEPAGE

N/A

STRUCTURE TO
ABUTMENT/EMBANKMENT
JUNCTIONS

N/A

DRAINS

N/A

WATER PASSAGES

N/A

FOUNDATION

N/A

CONCRETE/MASONRY DAMS

Sheet 3 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N/A	
STRUCTURAL CRACKING	N/A	
VERTICAL AND HORIZONTAL ALIGNMENT	N/A	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	N/A	

EMBANKMENT

Sheet 4 of 11

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

SURFACE CRACKS

GAPS AND LARGE HOLES WERE NOTED IN DOWNSTREAM FACE.

DOWNSTREAM SURFACE LAYER SHOULD BE REMOVED AND REPLACED WITH COMPACTED FILL.

UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE

NONE NOTED.

SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES

EROSION OF SPOIL MATERIAL WAS EVIDENT BETWEEN BOULDERS ON DOWNSTREAM FACE

REPLACEMENT OF LAYER IS RECOMMENDED.

VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST

CREST UNDULATIONS WERE NOTED, WITH APPARENT AREAS OF DEPRESSION NEAR THE LEFT ABUTMENT.

A DETAILED SURVEY WITH RESTORATION TO DESIGN ELEVATION IF NECESSARY IS RECOMMENDED.

RIPRAP FAILURES

NO RIPRAP.

OUTLET WORKS
(PRINCIPAL SPILLWAY)

Sheet 6 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	NONE OBSERVED.	
INTAKE STRUCTURE	THE RISER STRUCTURE APPEARED TO BE IN GOOD CONDITION.	
OUTLET STRUCTURE		THE IMPACT BASIN APPEARED TO BE IN GOOD CONDITION.
OUTLET CHANNEL		THE OUTLET CHANNEL DISCHARGES INTO THE ORIGINAL STREAM ABOUT 150 FEET DOWNSTREAM OF THE GATE. THE CHANNEL APPEARED TO BE IN GOOD CONDITION.
EMERGENCY GATE		NONE.

GATED SPILLWAY

Sheet 8 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	N/A	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE AND PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A	

INSTRUMENTATION

Sheet 9 of 11

REMARKS OR RECOMMENDATIONS

OBSERVATIONS

VISUAL EXAMINATION

MONUMENTATION/SURVEYS

NONE .

OBSERVATION WELLS

NONE .

WEIRS

NONE .

PIEZOMETERS

NONE .

OTHER

NONE .

RESERVOIR

VISUAL EXAMINATION OF SLOPES OBSERVATIONS REMARKS OR RECOMMENDATIONS

THE RIGHT RESERVOIR
SCOPE IS GENTLE AND
WELL VEGETATED. THE LEFT
RESERVOIR SCOPE IS STEEP
AND ROCKY.

SEDIMENTATION

THE INTAKE STRUCTURE WAS
DESIGNED FOR 50 YEARS OF
SEDIMENTATION. THE LOW STAGE
INLET WAS ABOVE THE SEDIMENTATION
LEVEL ON THE DATE OF THE
INSPECTION.

DOWNSTREAM CHANNEL

Sheet 11 of 11

VISUAL EXAMINATION OF OBSERVATIONS REMARKS OR RECOMMENDATIONS

CONDITION
(OBSTRUCTIONS,
DEBRIS, ETC.)

THE DOWNSTREAM CHANNEL
APPEARED TO BE UNOBSTRUCTED.

SLOPES

THE AREA DOWNSTREAM OF THE
DAM IS EXTREMELY FLAT AND THE
DOWNSTREAM CHANNEL GRADE BETWEEN THE
DAM AND WYNOOSKA LAKE IS ONLY 0.5%.

APPROXIMATE NO.
OF HOMES AND
POPULATION

THERE ARE APPROXIMATELY 5
HOMES ALONG THE LEFT SHORE OF WYNOOSKA
LAKE, WHICH IS ABOUT A MILE DOWNSTREAM
OF KINTZ CREEK DAM.

APPENDIX

C

Hydrologic & Hydraulic Data

SUBJECT	SHEET	BY	DATE	JOB NO.
KINTZ CREEK DAM				

TABLE OF CONTENTS APPENDIX C

HYDROLOGIC & HYDRAULIC DATA

PMP CALCULATIONS	SHEET	1
SNYDER COEFFICIENTS	SHEET	1
SPILLWAY DISCHARGE	SHEETS	2-3
HEC-1 DAM SAFETY VERSION	SHEETS	4-9
COMPUTER OUTPUT		
SCS DESIGN SUMMARY	SHEET	10

HYDROLOGY CALCS.

DRAINAGE AREA : 4.20 SQUARE MILES

PMP CALCULATIONS (HMS REPORT 33)

AREA IS IN ZONE 1

24 HR., 200 SQ MI. RAINFALL = 22"

<u>HR.</u>	<u>%</u>	<u>RAINFALL</u>	<u>Δ RF</u>
6	111	24.4"	24.4"
12	123	27.1"	2.7"
24	133	29.3"	2.2"
48	142	31.2"	1.9"

SNYDER COEFFICIENTS

FROM INFO. PROVIDED BY COE,
FOR THE DELAWARE RIVER BASIN, ZONE 1 :

$C_p = 0.45$

and $C_t = 1.23$

$t_p = C_t (L \cdot L_{ca})^{0.3}$

$L = 2.3$ miles

$L_{ca} = 1.1$ miles

$t_p = 1.23 (2.3 \cdot 1.1)^{0.3} = 1.62$ HR.

DISCHARGE AT DAMSITE VALUES (TAKEN FROM DESIGN CALCULATIONS BY SCS)

HIGH-STAGE WEIR ELEVATION (EL. 1616) → MAX. LOW STAGE FLOW = 96 CFS

EMERGENCY SPILLWAY CREST ELEVATION (EL. 1622) → MAX. HIGH STAGE FLOW = 181 CFS

TOP OF DAM ELEVATION (EL. 1626.2) → MAX. EMERGENCY SPILLWAY FLOW = 4589 CFS

SCS DESIGN CALCULATION ASSUMPTIONS DIFFER FROM AS BUILT PLANS, SO:
LOW STAGE DISCHARGE

WEIR CREST EL. = 1596.8, ORIFICE EL. = 1595

WEIR → $Q_w = CLH_w^{3/2}$ $C = 3.1, L = 7'$ $Q_w = 21.7 H_w^{3/2}$

ORIFICE CONTROL → $Q_o = CA\sqrt{2gH_o}$ $C = 0.65, A = 4.5', \sqrt{2g} = 8.03$

$Q_o = 23.5 H_o^{3/2}$

<u>ELEV.</u>	<u>H_w</u>	<u>H_o</u>	<u>Q_w</u>	<u>Q_o</u>
1596.8	0	—	0	0
1597	.2	2	2	33
1598	1.2	3	29	41
1600	3.2	5	155*	53
1602	5.2	7	—	62
1604	7.2	9	—	71
1606	9.2	11	—	78
1608	11.2	13	—	85
1610	13.2	15	—	91
1612	15.2	17	—	97
1614	17.2	19	—	102
1616	19.2	21	—	108

* - ORIFICE CONTROLLED ABOVE EL. 1598.4

HIGH STAGE DISCHARGE

WEIR CREST EL. = 1616

BAFFLE BLOCK CONTROL ELEVATION = 1596.5

WEIR → $Q_w = CLH_w^{3/2}$ $C = 3.1, L = 18'$

$Q_w = 55.8 H_w^{3/2}$

PIPE → $Q_p = KA \sqrt{2g H_p}$ $K = .565$ (FROM SCS)

$Q_p = 32.06 H_p^{1/2}$

ELEV.	H_w	H_p	Q_w	$Q_w + Q_p$	Q_p
1616	0	19.5	0	108	112
1616.5	.5	20	20	129	143
1617	1	20.5	55.8	166*	145
1618	2	21.5	—	—	149
1619	3	22.5	—	—	152
1620	4	23.5	—	—	155
1621	5	24.5	—	—	159
1622	6	25.5	—	—	162

* - PIPE CONTROLS ABOVE ELEV. 1616.7

EMERGENCY SPILLWAY (FROM SCS CALCULATIONS)

ELEV.	H_{es}	Q_{es}	Q_p	Q_{TOTAL}
1622	0	0	162	162
1623.6	1.6	1009	167	1176
1624.65	2.65	2029	170	2199
1625.39	3.39	3057	172	3229
1626.04	4.04	4092	174	4266
1627.14	5.14	6183	177	6360
1628.14	6.14	8296	180	8476

SHEET 4

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 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1976
 LAST MODIFICATION 25 SEP 78

LINE NO.	AL	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27
1																											
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											
11																											
12																											
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22																											
23																											
24																											
25																											
26																											
27																											

NATIONAL DAM INSPECTION PROGRAM
 KINTZ CREEK DAM
 PMF HYDROGRAPH

LINE NO.	15	1	4.20	111	123	133	1	1.0	0.05
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0

RUNOFF TO RESERVOIR

LINE NO.	1598	1620	29	155	876	1622	1597	1618	2	149	560	1616	3.1
1	1600	1602	1606	1610	1614	1616	1616.5	1628.14	129	108	129	6360	8476
2	1622	1623.6	1624.65	1625.39	1626.04	1627.14	1628.14	1628.14	102	108	129	6360	8476
3	53	52	78	91	102	108	129	102	108	129	6360	8476	4266
4	162	1176	2199	3229	4266	6360	8476	4266	6360	8476	4266	6360	8476
5	1166	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2
6	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
7	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
8	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
9	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
10	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
11	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
12	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
13	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
14	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
15	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
16	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
17	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
18	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
19	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
20	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
21	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
22	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
23	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
24	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
25	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
26	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
27	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622

ROUTING THROUGH RESERVOIR

LINE NO.	1598	1620	29	155	876	1622	1597	1618	2	149	560	1616	3.1
1	1600	1602	1606	1610	1614	1616	1616.5	1628.14	129	108	129	6360	8476
2	1622	1623.6	1624.65	1625.39	1626.04	1627.14	1628.14	1628.14	102	108	129	6360	8476
3	53	52	78	91	102	108	129	102	108	129	6360	8476	4266
4	162	1176	2199	3229	4266	6360	8476	4266	6360	8476	4266	6360	8476
5	1166	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2
6	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622	1626.2	1622
7	1622	1626.2	1622	1626.2	1622	1626.2	162						

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 FLOOD HYDROGRAPH PACKAGE (MEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 25 SEP 78

RUN DATE 06/09/79.
 TIME 09.57.39.

NATIONAL DAM INSPECTION PROGRAM
 KINTZ CREEK DAM
 PMF HYDROGRAPH

NO	NHR	NMIN	IDAY	IMR	IMIN	METRC	IPLI	IPRT	NSTAN
300	0	15	0	0	0	0	0	0	0
		JOPER	NAT	LROPT	TRACE				
		5	0	0	0				

MULTI-PLAN ANALYSES TO BE PERFORMED

NPLAN= 1 NRTIO= 1 LRTIO= 1
 RTIOS= .20 .30 .40 .50 .60 .70 .80 .90 1.00

.....

SUB-AREA RUNOFF COMPUTATION

RUNOFF TO RESERVOIR

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IMYDG	IUMG	TAREA	SNAP	TRSDA	TMSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	4.20	0.00	4.20	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.00	111.00	123.00	133.00	0.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .600

LOSS DATA

LKOPT	STKR	DLTK	RTIOL	ERAIN	STPKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.62 CP= .45 NTA= 0

RECESSION DATA

STRT0= -1.50 ORCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH	59	END-OF-PERIOD	ORDINATES,	LAG=	1.62	HOURS,	CP=	.45	VOL=	1.00
39.	147.	299.	469.	622.	723.	756.	717.	651.	591.	
536.	487.	442.	401.	364.	331.	300.	273.	248.	225.	
204.	185.	168.	153.	139.	126.	114.	104.	94.	86.	
78.	70.	64.	58.	53.	48.	43.	39.	36.	33.	
30.	27.	24.	22.	20.	18.	17.	15.	14.	12.	

11. 10. 9. 8. 7. 6. 5. 4. 3. 2. 1. 0. 10. 9. 8. 7. 6. 5. 4. 3. 2. 1. 0.

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

SUM 23.41 21.55 1.06 235399.
 (595.)(547.)(47.)(6665.76)

.....

HYDROGRAPH ROUTING

ROUTING THROUGH RESERVOIR

| | | | | | | | | |
|--------------|-------|-------|-------|-------|-------|-------|--------|-------|
| ISTAG | ICOMP | IECON | ITAPE | JPLT | JPR1 | INAME | ISTAGE | IAUTO |
| A2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| ROUTING DATA | | | | | | | | |
| QLOSS | AVG | IPRES | ISAME | IOPT | IPMP | LSTR | | |
| 0.0 | 0.00 | 1 | 1 | 0 | 0 | 0 | | |
| MSTPS | | | | | | | | |
| 1 | 0 | LAG | AMSK< | X | TSK | STORA | ISPRAT | |
| | | 0 | 0.000 | 0.000 | 0.000 | -1. | -1 | |

| | | | | | | | | | |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| STAGE | 1596.80 | 1597.00 | 1598.00 | 1600.00 | 1602.00 | 1606.00 | 1610.00 | 1614.00 | 1616.50 |
| | 1617.00 | 1618.00 | 1620.00 | 1622.00 | 1623.60 | 1624.65 | 1625.39 | 1626.04 | 1628.14 |
| FLOW | 0.00 | 2.00 | 29.00 | 53.00 | 62.00 | 78.00 | 91.00 | 102.00 | 108.00 |
| | 145.00 | 149.00 | 155.00 | 162.00 | 1176.00 | 2199.00 | 3229.00 | 4266.00 | 6360.00 |
| CAPACITY= | 0. | 560. | 896. | 1166. | | | | | |
| ELEVATION= | 1597. | 1616. | 1622. | 1626. | | | | | |

| | | |
|------|-------|------|
| COOL | CAREA | FXPL |
| 0.0 | 0.0 | 0.0 |

DAM DATA
 TOPEL 1626.2
 COOD 3.1
 EXPD 1.5
 DAMWID 1180.

PEAK OUTFLOW IS 157. AT TIME 25.75 HOURS

PEAK OUTFLOW IS 1139. AT TIME 21.00 HOURS

PEAK OUTFLOW IS 2476. AT TIME 19.50 HOURS

PEAK OUTFLOW IS 3736. AT TIME 19.00 HOURS

PEAK OUTFLOW IS 4983. AT TIME 18.50 HOURS

PEAK OUTFLOW IS 6234. AT TIME 18.00 HOURS

PEAK OUTFLOW IS 7371. AT TIME 17.50 HOURS

SHEET 7

PEAK OUTFLOW IS 8361. AT TIME 17.50 HOURS

PEAK OUTFLOW IS 9291. AT TIME 17.50 HOURS

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SHEET 8

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

| OPERATION | STATION | AREA | PLAN | RATIOS APPLIED TO FLOWS | | | | | | | | |
|---------------|---------|------------------|------|-------------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | | | | RATIO 1 | RATIO 2 | RATIO 3 | RATIO 4 | RATIO 5 | RATIO 6 | RATIO 7 | RATIO 8 | RATIO 9 |
| | | | | .20 | .30 | .40 | .50 | .60 | .70 | .80 | .90 | 1.00 |
| HYDROGRAPH AT | A1 | 4.20
(10.88) | 1 | 1864.
(52.79) | 2797.
(79.19) | 3729.
(105.58) | 4661.
(131.98) | 5593.
(158.38) | 6525.
(184.77) | 7457.
(211.17) | 8390.
(237.57) | 9322.
(263.96) |
| | A2 | 4.20
(10.88) | 1 | 157.
(4.43) | 1139.
(32.26) | 2476.
(70.12) | 3736.
(105.79) | 4983.
(141.11) | 6234.
(176.53) | 7371.
(208.73) | 8361.
(236.75) | 9291.
(263.10) |

SHEET 9

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

| RATIO OF PHF | ELEVATION STORAGE OUTFLOW | INITIAL VALUE | SPILLWAY CREST | TOP OF DAM | MAXIMUM STORAGE AC-FT | MAXIMUM OUTFLOW CFS | DURATION OVER TOP HOURS | TIME OF MAX OUTFLOW HOURS | TIME OF FAILURE HOURS |
|--------------|---------------------------|---------------|----------------|------------|-----------------------|---------------------|-------------------------|---------------------------|-----------------------|
| .20 | 1620.43 | 1596.00 | 1596.00 | 1626.20 | 608. | 157. | 0.00 | 25.75 | 0.00 |
| .30 | 1623.54 | 0. | 0. | 1166. | 495. | 1139. | 0.00 | 21.00 | 0.00 |
| .40 | 1626.85 | 0. | 0. | 4571. | 1079. | 2476. | 0.00 | 19.50 | 0.00 |
| .50 | 1625.71 | | | | 1134. | 3736. | 0.00 | 19.00 | 0.00 |
| .60 | 1626.33 | | | | 1174. | 4983. | 1.00 | 18.50 | 0.00 |
| .70 | 1626.60 | | | | 1191. | 6234. | 2.25 | 18.00 | 0.00 |
| .80 | 1626.79 | | | | 1204. | 7371. | 3.00 | 17.50 | 0.00 |
| .90 | 1626.95 | | | | 1214. | 8361. | 3.50 | 17.50 | 0.00 |
| 1.00 | 1627.08 | | | | 1223. | 9291. | 4.00 | 17.50 | 0.00 |

PA 439

6/30/67
2085

U. S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

| Element of Structure | Determining Factor | Elevation | Surface Area Acres | Storage | | Inflow | | Peak Outflow c.f.s. |
|-----------------------------|--|-----------|--------------------|------------|--------|---------------|-------------|---------------------|
| | | | | Acres-Feet | Inches | Volume Inches | Rate c.f.s. | |
| INVERT OF ORIFICE | 50 YEAR SEDIMENT ACCUMULATION | 1596.8 | 8.5 | 0 | 0 | — | — | — |
| CREST OF RISER | 12 Hr. DELAY FOR 100 Yr. 6 Hour STORM MOISTURE CONDITION III | 1616.0 | 50.0 | LL
560 | 2.5 | — | — | 96 |
| CREST OF EMERGENCY SPILLWAY | 4" STORAGE GREATER THAN 100 YEAR FREQUENCY STORM | 1622.0 | 61.0 | LL
896 | 4.0 | — | — | 181 |
| DESIGN HIGH WATER | BELOW EMER. SPW. CURVE - USING I. X VALUE FROM 55-1020 SH 2 of 5 and ALG. 11. No DATA COMPUTED | — | — | — | — | — | — | — |
| Top of DAM | PA. DEPARTMENT OF FOREST & WATERS "C" CURVE | 1626.2 | 68.5 | LL
1166 | 5.2 | — | — | 4589 |

** REFER TO HYDROLOGIC CRITERIA IN NATIONAL MEMORANDUM SCS-27

LL DOES NOT INCLUDE 12.5 AC-Ft. SEDIMENT STORAGE

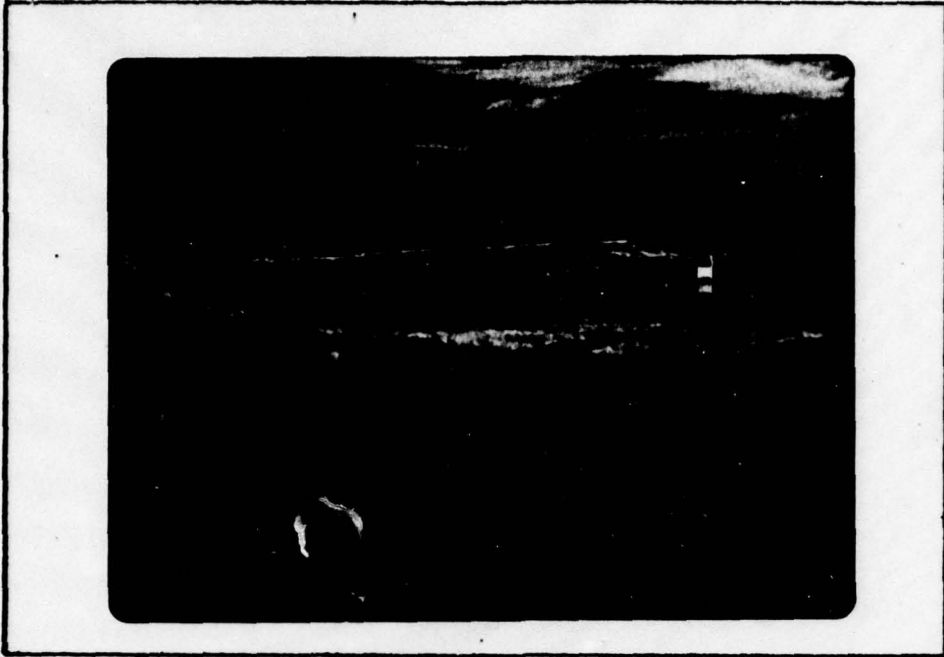
LL TOTAL INCLUDES PIPE FLOW

HYDRAULICS & HYDROLOGY DESIGN SUMMARY

APPENDIX

D

Photographs



*UPSTREAM FACE OF THE DAM
WITH THE RISER IN THE BACKGROUND*



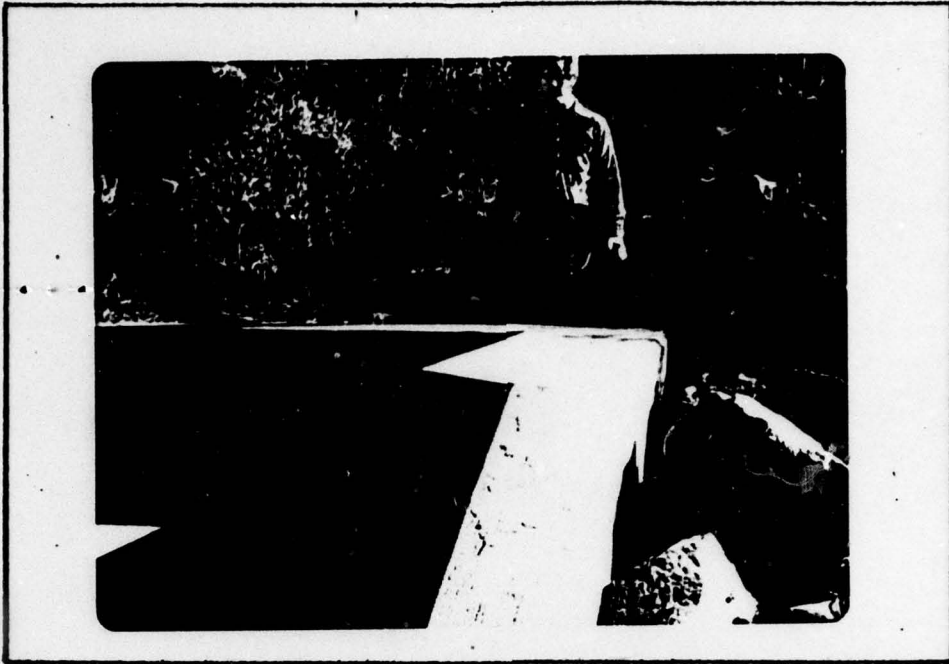
*RISER SHOWING DETAILS OF BOTH
THE HIGH STAGE AND LOW STAGE INLETS*



***DIFFERENTIAL SETTLEMENT IN THE
DOWNSTREAM FACE OF THE DAM***



***LARGE HOLES AND BOULDERS IN THE
DOWNSTREAM FACE OF THE DAM***



*DEPRESSED AREA ALONG THE UPSTREAM SIDE
OF THE IMPACT BASIN*



*PRINCIPAL SPILLWAY IMPACT BASIN OUTLET
AND OUTLET CHANNEL*

APPENDIX

E

Drawings

| | | | | | |
|---------|-----------------------|-------|----|------|--------|
| SUBJECT | <i>Lutz Creek Dam</i> | SHEET | BY | DATE | JOB NO |
|---------|-----------------------|-------|----|------|--------|

APPENDIX E Table of Contents

| | | |
|--|--------------|----------------|
| <i>Regional Vicinity Map</i> | <i>_____</i> | <i>Plate 1</i> |
| <i>Plan of Structural Works</i> | <i>_____</i> | <i>" 2</i> |
| <i>Fill Placement</i> | <i>_____</i> | <i>" 3</i> |
| <i>Principal Spillway</i> | <i>_____</i> | <i>" 4</i> |
| <i>Cut-Off Trench Details</i> | <i>_____</i> | <i>" 5</i> |
| <i>General Plan Drawing (Showing <u>Problem Areas</u>)</i> | <i>_____</i> | <i>" 6</i> |
| <i>Top of Dam Profile</i> | <i>_____</i> | <i>" 7</i> |

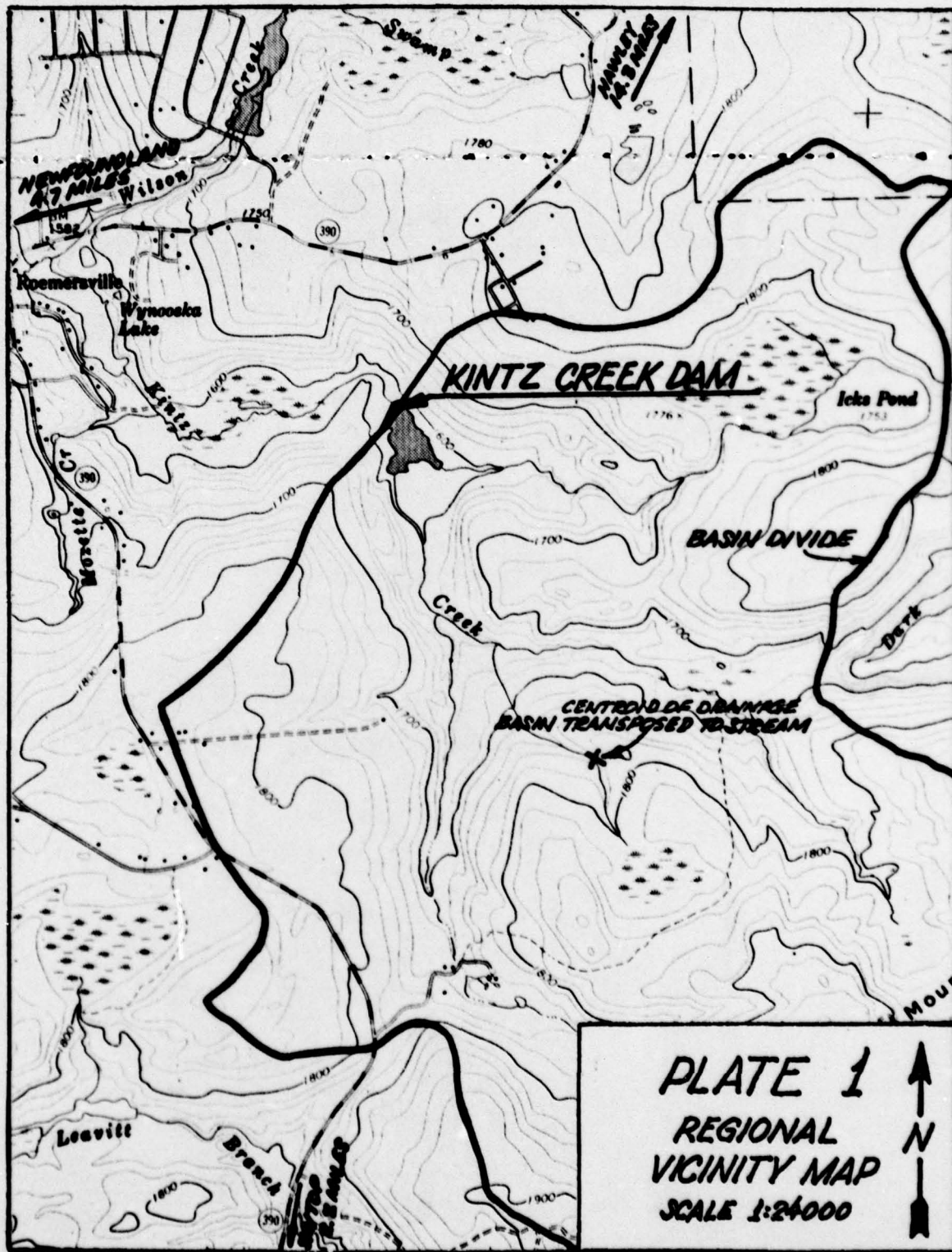
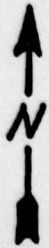
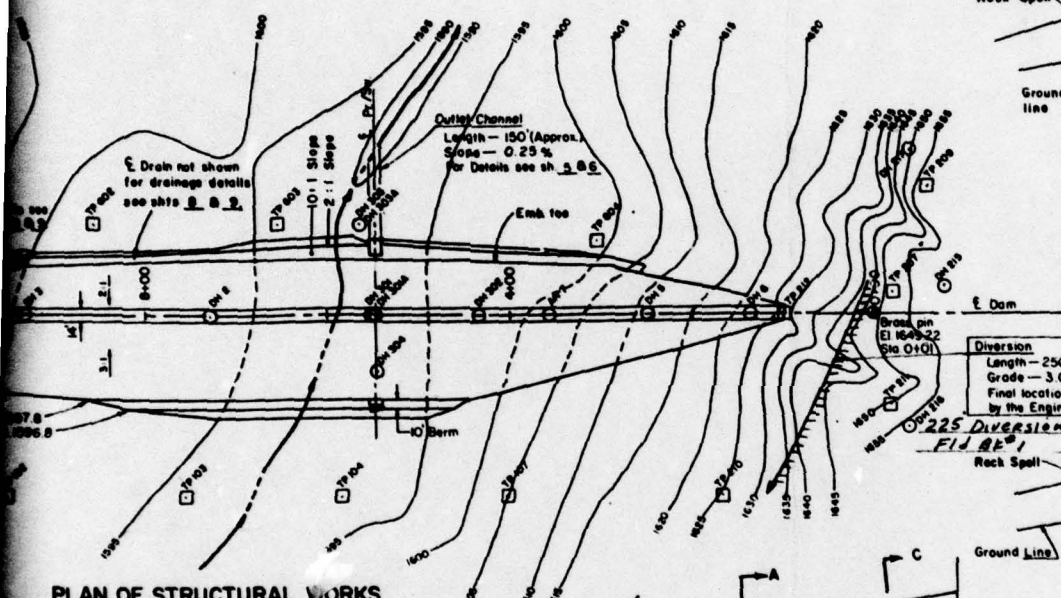


PLATE 1
REGIONAL
VICINITY MAP
SCALE 1:24000

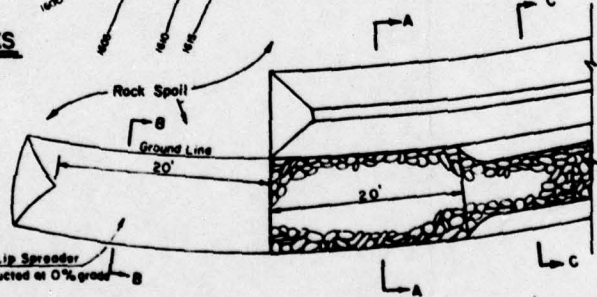




PLAN OF STRUCTURAL WORKS

Scale in Feet

0 50 100 200



TYPICAL PLAN OF DIVERSION & OUTLET

DIVERSION DETAILS

Not to Scale

CONSTRUCTION NOTES:

- 1 - For logs of drill holes & test pits see sheets 18 thru 21.
- 2 - Dam - Cutoff Trench
- 3 - Riprap bedding shall meet fine drain fill gradation shown on sheet 9.
- 4 - Fill gullies with approved spoil before building diversion.

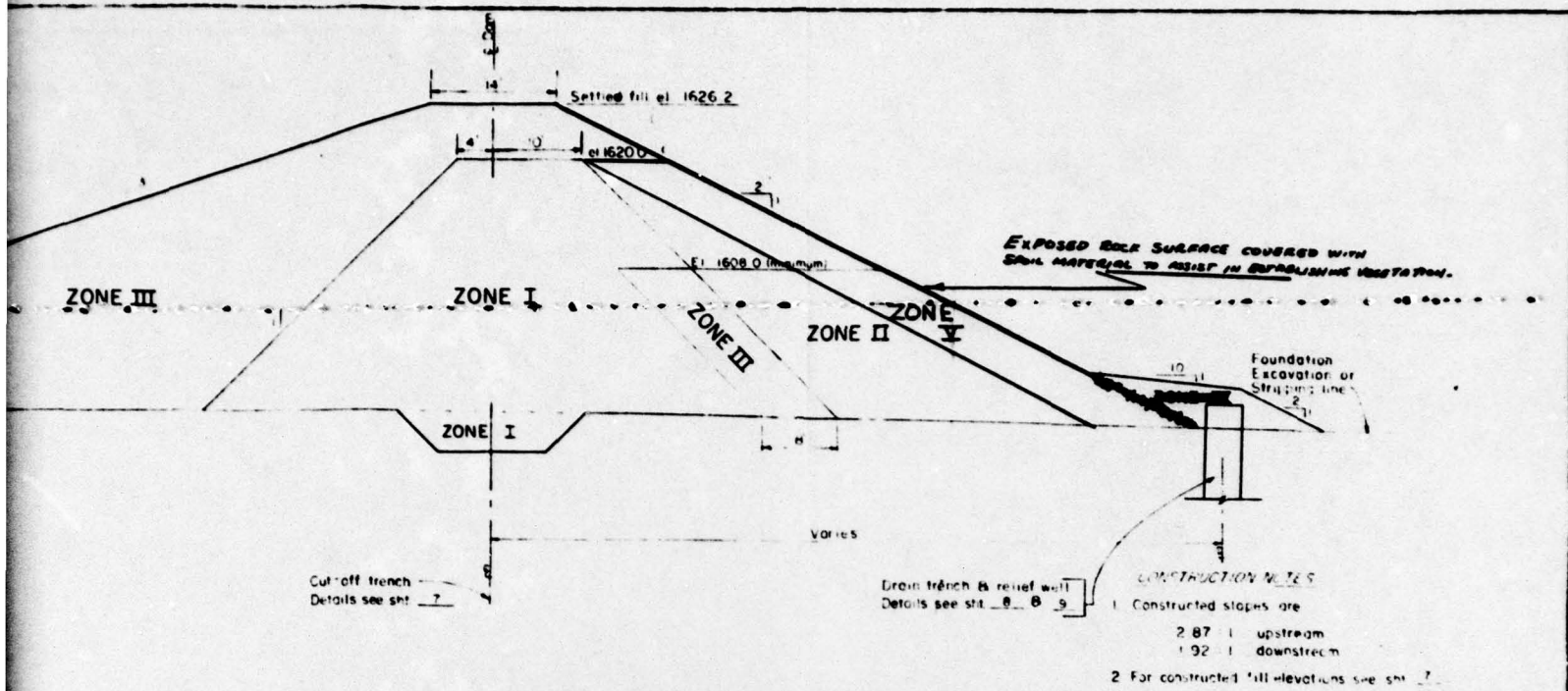
2

PLATE 2

AS BUILT PLANS

As Built Plans 9-70 w/w

| | | | |
|--|-------------|-------------|----------|
| <p>GREENE-DREHER WATERSHED
 FLOODWATER RETARDING DAM, PA-439
 PIKE COUNTY, PENNSYLVANIA</p> | | | |
| <p>PLAN OF STRUCTURAL WORKS</p> | | | |
| <p>U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE</p> | | | |
| Designed by | D. Shatley | Date | Aug '67 |
| Checked by | J. J. Ayers | Date | 8-67 |
| Drawn by | | Date | |
| Scale | | Sheet No. | 3 |
| | | Project No. | PA-439-P |



TYPICAL SECTION OF DAM (FROM DAM STA 2+00 TO STA 11+80 (APPROX.))

| ZONE | MATERIAL | MAX. ROCK SIZE | MAX. LIFT | REQ'D WATER CONTENT | CONSTRUCTION | |
|------|--|----------------|-----------|---------------------|--------------|---|
| | | | | | Class | Definition |
| I | Material as represented by TP 106.1, depth 14.2' classified as ML; by TP 101.1, depth 1-17.5' classified as "L". | 6" | 4' | Optimum + 2% | A | 95% max. density by ASTM 618 Method "A" |
| II | Material as represented by III 213.0, depth 1-8'; classified as SP-SM | 6" | 7' | Optimum ± 2% | A | 95% max. density by ASTM 618 Method "A" |
| III | Material as represented by TP 207.1, depth 1-9.5'; classified as GH | 6" | 9' | Optimum ± 2% | A | 95% max. density by ASTM 618 Method "A" |
| V | Gravel-Stones - Boulders in excess of 6" removed from Emergency Embankment | 24" | 30" | See Spec 5 | T | See Spec 5 |

1. Maximum permissible lift thickness before compaction.
 2. Water content of fill matrix at time of compaction.
 3. For typical compaction curves see sheet 22

AS BUILT PLANS



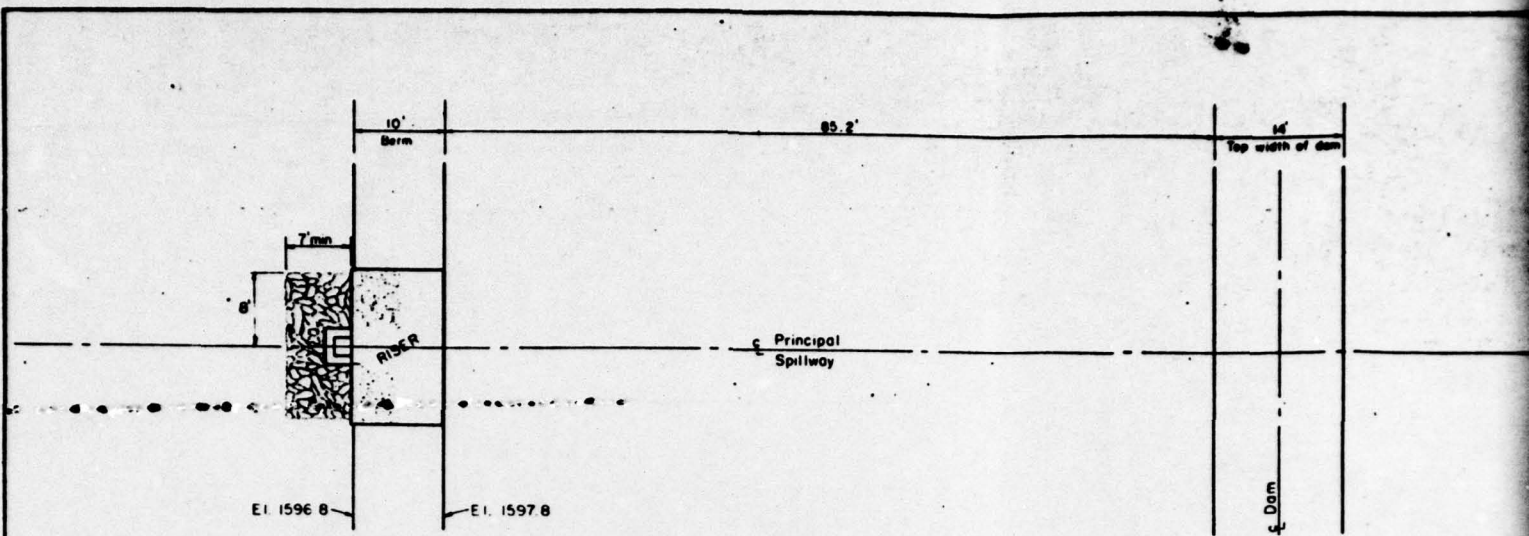
2
PLATE 3

GREENE-DREHER WATERSHED
 FLOODWATER RETARDING DAM, PA-439
 PIKE COUNTY, PENNSYLVANIA

FILL PLACEMENT
 U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

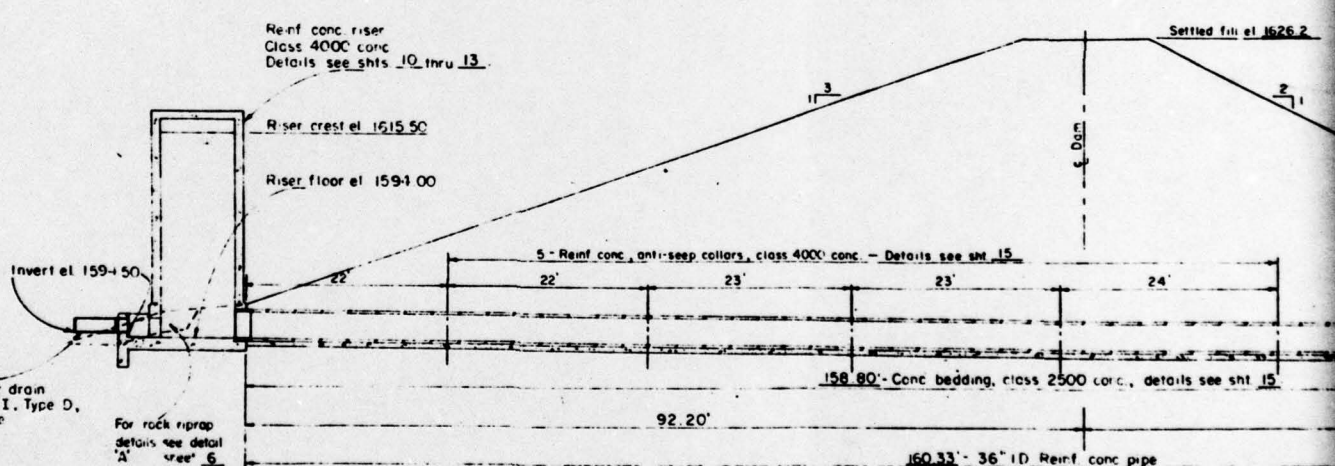
Small & Wideman 8-57
 C. CRISE 8-57

PA-439-P



CONSTRUCTION DETAILS

- 1 Outlet end of pipe to be finished so that no metal is exposed.
- 2 Pipe layout data will be finished by the Engineer
- 3 Riprap bedding shall meet fine drain fill gradation limits (See sht 9.)



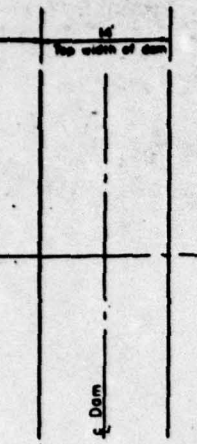
AS BUILT
36" ID PIPE JOINT DATA

| JOINT | Dist. FROM RISER WALL | INVERT EL. |
|--------|-----------------------|------------|
| J-1 | 0.33 | 1594.00 |
| J-2 | 8.33 | 1594.00 |
| J-3 | 16.33 | 1594.00 |
| J-4 | 24.33 | 1593.99 |
| J-5 | 32.33 | 1593.97 |
| J-6 | 40.33 | 1593.95 |
| J-7 | 48.33 | 1593.91 |
| J-8 | 56.33 | 1593.88 |
| J-9 | 64.33 | 1593.80 |
| J-10 | 72.33 | 1593.72 |
| J-11 | 80.33 | 1593.65 |
| J-12 | 88.33 | 1593.54 |
| J-13 | 96.33 | 1593.51 |
| J-14 | 104.33 | 1593.28 |
| J-15 | 112.33 | 1593.09 |
| J-16 | 120.33 | 1592.86 |
| J-17 | 128.33 | 1592.65 |
| J-18 | 136.33 | 1592.40 |
| J-19 | 144.33 | 1592.10 |
| J-20 | 152.33 | 1591.80 |
| OUTLET | 160.33 | 1591.50 |

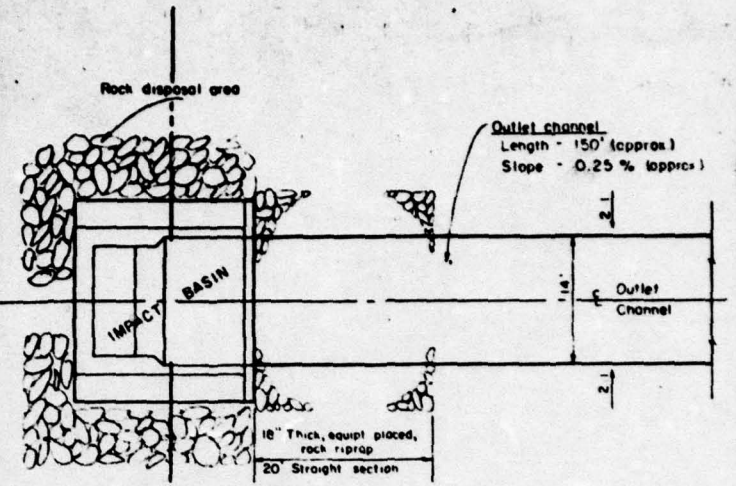
AS BUILT
COLLAR DATA FOR 36" ID. PIPE

| COLLAR | DIST. FROM RISER WALL | INVERT EL. |
|--------|-----------------------|------------|
| 1 | 22 | 1593.09 |
| 2 | 44 | 1593.91 |
| 3 | 67 | 1593.76 |
| 4 | 90 | 1593.50 |
| 5 | 114 | 1593.09 |

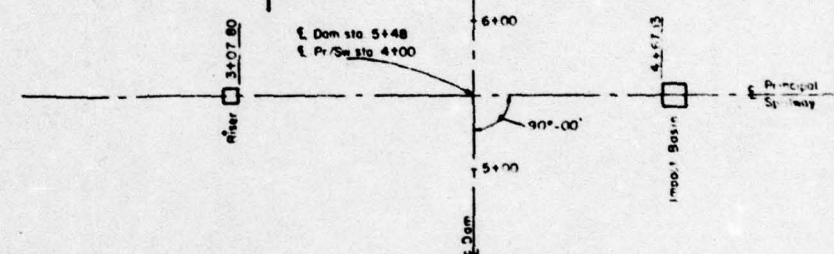
36" ID. Reinf. Conc. Pipe
 160' - Straight
 - Spigot & Pressure Load
 Min 3' e
 0.0
 0.0
 160.33' - Tot



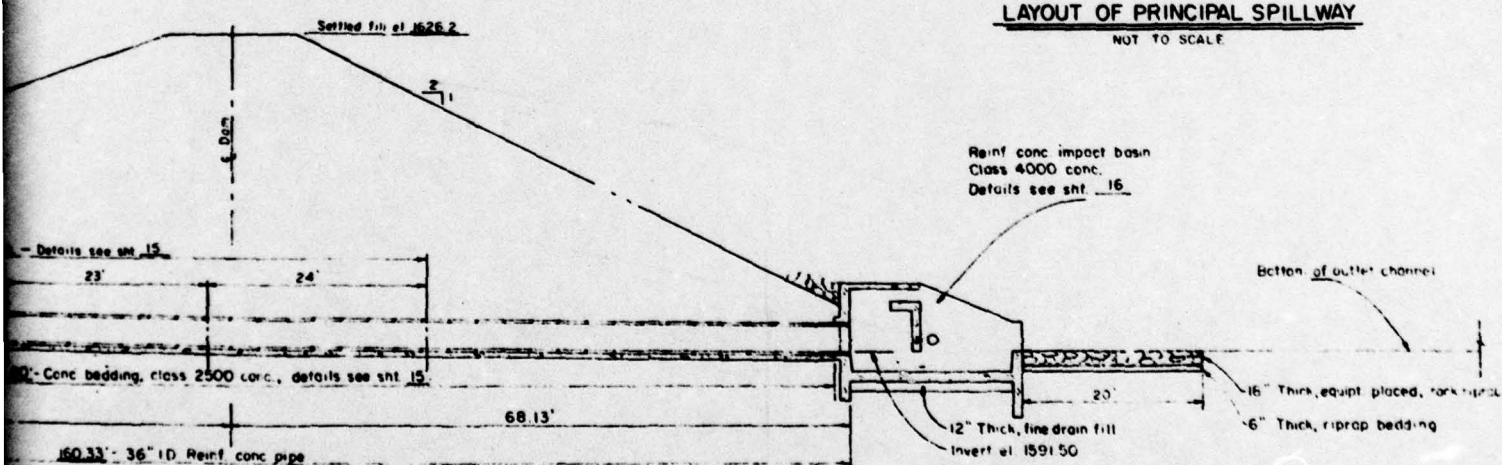
PLAN VIEW
SCALE IN FEET



Drain trench & relief walls
Details see shts. 8 & 9



LAYOUT OF PRINCIPAL SPILLWAY
NOT TO SCALE



PROFILE ALONG E
SCALE IN FEET

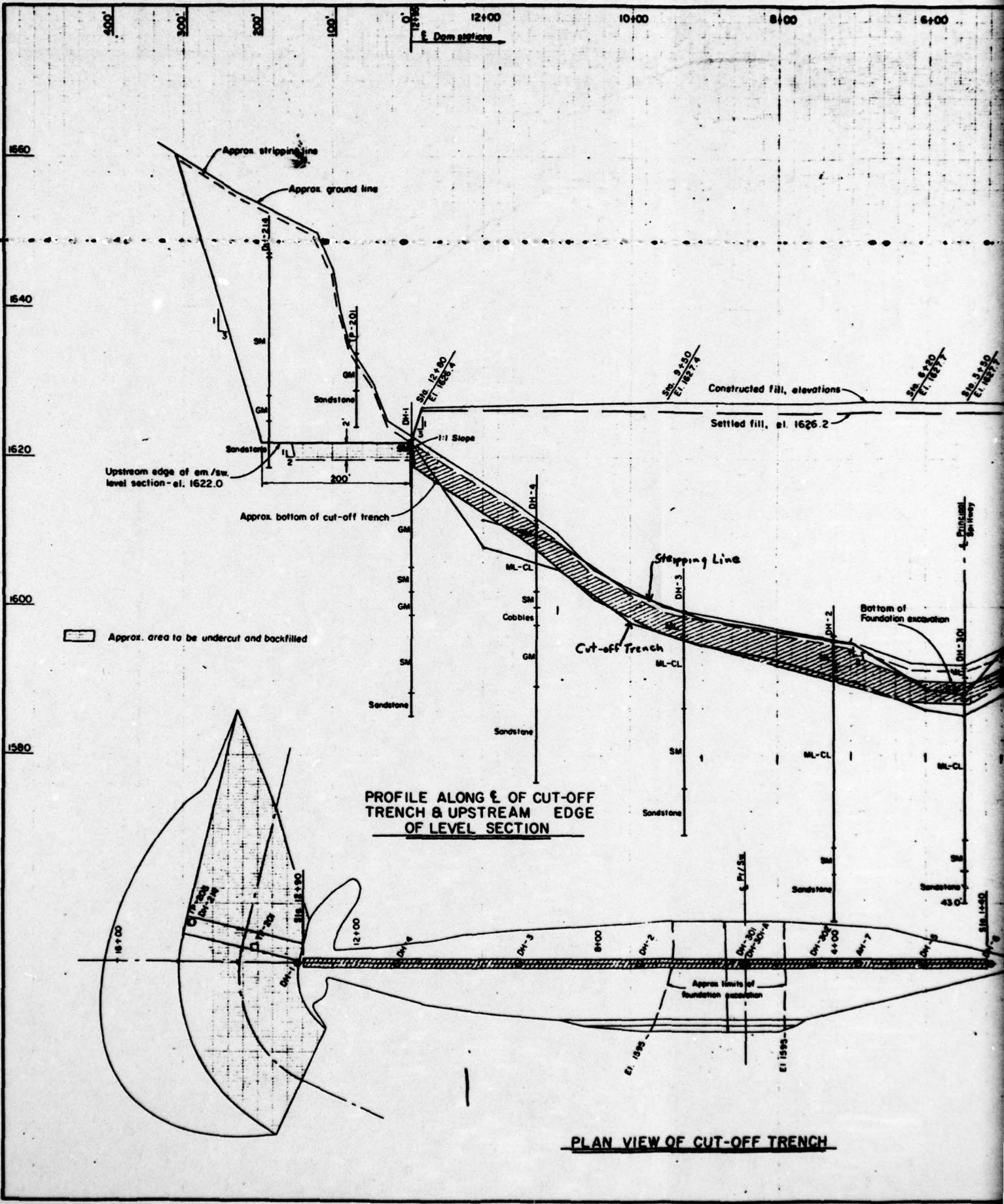
- 36" ID. Reinforced concrete pressure pipe spillway conduit
- 160' - Straight sections
- Spigot ring wall fitting (for 12" wall)
- Pressure head = 29'
- Load = 27,919 lbs per lin ft, based on O.D. of 367'
- Min 3 edge bearing strength for:
 - 0.01" Crack non-prestressed pipe = 13,551 lbs per lin ft
 - 0.001" Crack prestressed pipe = 10,189 lbs per lin ft
- 160.33' - Total length

AS BUILT PLANS

GREENE-DREHER WATERSHED
FLOODWATER RETARDING DAM, PA-439
PIKE COUNTY, PENNSYLVANIA
PRINCIPAL SPILLWAY
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Checked by *[Signature]* 8-27
C. CRISE 9-67

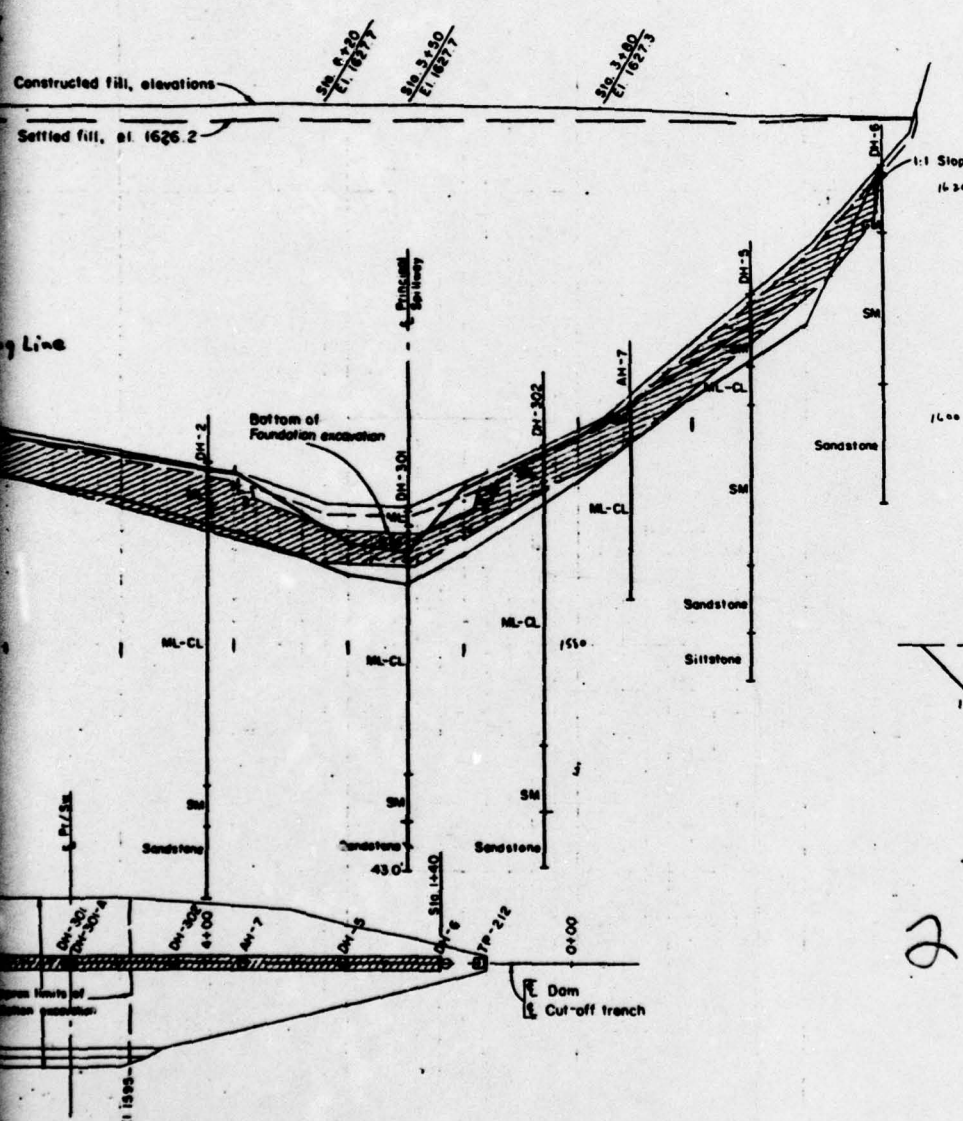
PA-439-P



8+00 6+00 4+00 2+00 0+00

CONSTRUCTION NOTES

1. For logs of test holes see shs. 18 thru 21



CUT-OFF TRENCH

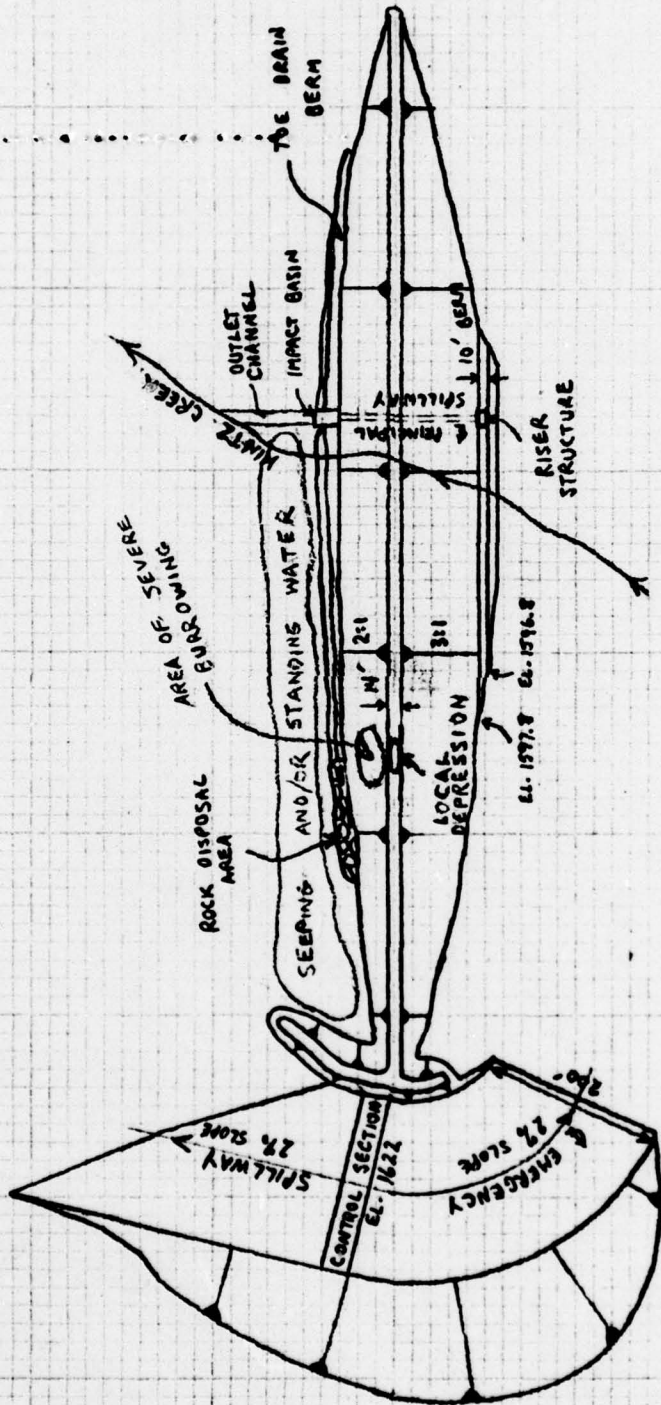
PLATE 5

AS BUILT PLANS
As Built Plans 7-69 W.W.

GREENE-DREHER WATERSHED
FLOODWATER RETARDING DAM, PA-439
PIKE COUNTY, PENNSYLVANIA

CUT-OFF TRENCH DETAILS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

| | |
|-----------------------------------|----------------|
| Designed: <i>Donald R. Shaddy</i> | Date: 7-67 |
| Drawn: C. CRISE | 8-67 |
| Checked: <i>J. J. ...</i> | 9-67 |
| Project: PA-439-P | Sheet: 5 of 22 |

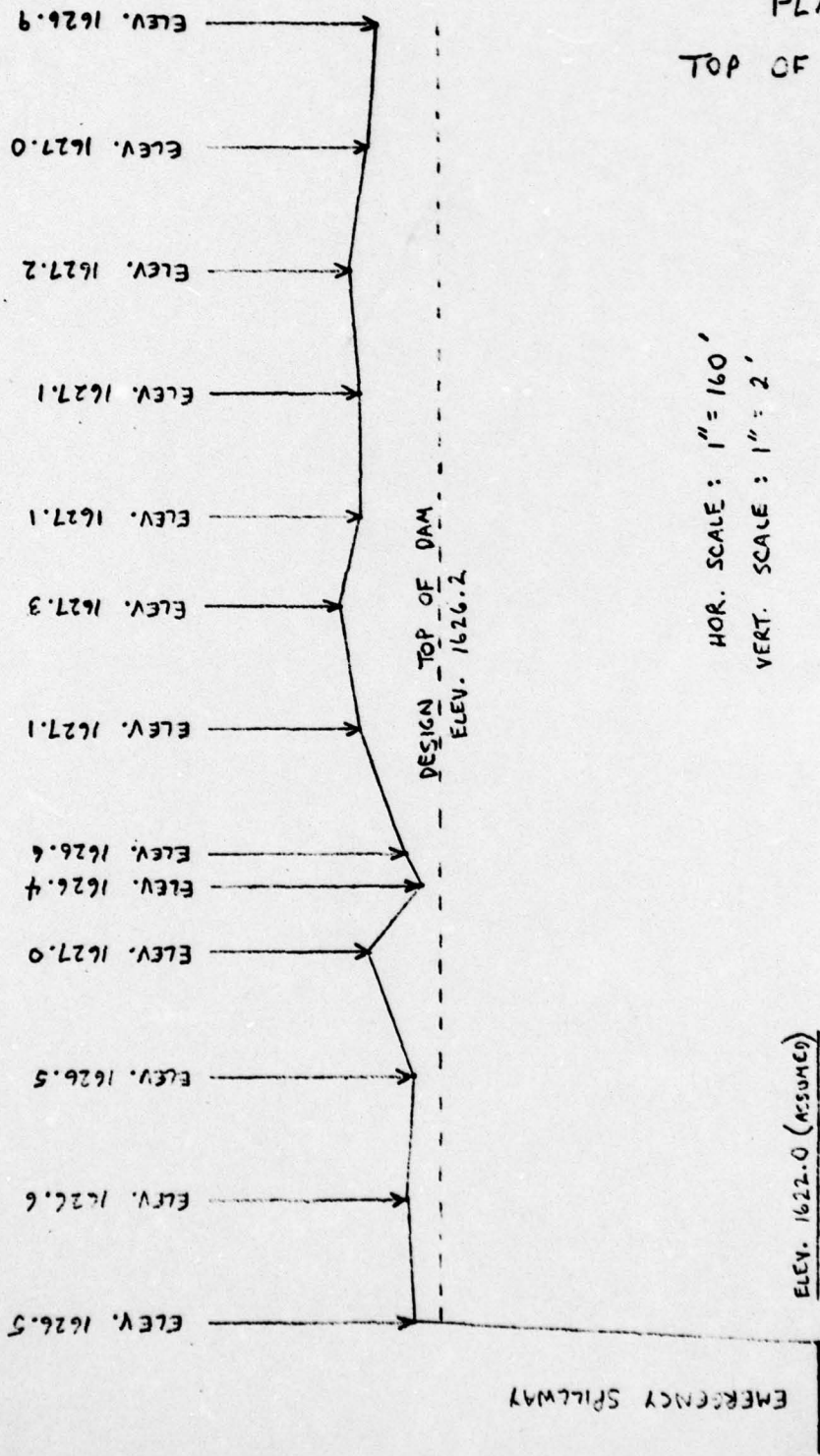


SCALE: 1" = 200'

PLATE 6
GENERAL PLAN
DRAWING

| | | | | |
|----------------------------|-------|----|------|--------|
| SUBJECT
KINTZ CREEK DAM | SHEET | BY | DATE | JOB NO |
|----------------------------|-------|----|------|--------|

PLATE 7
TOP OF DAM PROFILE



APPENDIX

F

Site Geology

SITE GEOLOGY
KINTZ CREEK DAM

Kintz Creek Dam is situated in Pike County and within the limits of the Eastern Glaciated section of the Appalachian Plateau physiographic province. Thick deposits of glacially derived rock debris cover the nearly horizontally bedded, red, gray and green shale and sandstone units of the Devonian Catskill group continental sediments. Modification of the glacial deposits during the Pleistocene epoch by natural damming downstream of the Kintz Creek Dam site provided granular kame and fine grained, varved lacustrine deposits in the present dam and lake area. These features, where encountered in the dam foundation, were suitably addressed by the dam designers.

No known faults or major structural defects are known to exist in the bedrock units in the vicinity of the lake and dam.

