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BAI CONSULTANTS INC MONROEVILLE PA
NATIONAL DAM INSPECTION PROGRAM. ROCKVIEW RESERVOIR DAM. (NDI I--FTC (11)
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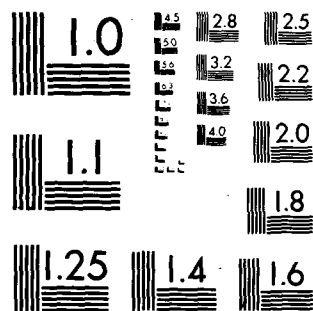
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PREFACE

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 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.

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 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

ABSTRACT

Rockview Reservoir Dam: NDI I.D. No. PA-00472

Owner: Commonwealth of Pennsylvania
Department of Justice

State Located: Pennsylvania (PennDER I.D. No. 14-90)

County Located: Centre

Stream: McBrides Run

Inspection Date: 27 November 1979

Inspection Team: GAI Consultants, Inc.
570 Beatty Road
Monroeville, Pennsylvania 15146

The visual inspection, operational history, and hydrologic/hydraulic analysis indicate that the facility is in good condition.

The size classification of the facility is intermediate and its hazard classification is considered to be high. In accordance with the recommended guidelines, the Spillway Design Flood (SDF) for the facility is considered to be the PMF (Probable Maximum Flood). Results of the hydrologic and hydraulic analysis indicate the facility will pass and/or store about 52 percent of the PMF prior to dam overtopping. Thus, based on criteria contained in the recommended guidelines, the spillway is considered inadequate, but not seriously inadequate.

Deficiencies noted by the inspection team include: (a) an inoperable blowoff conduit, (b) concrete deterioration over much of the exposed surfaces of the dam, (c) lack of formal operations and maintenance manuals and, (d) no formal warning system in effect.

It is recommended that the owner immediately:

- a. Remove the vertical steel pins set in the ogee crest so as to eliminate the potential for debris being retained during high flows and reducing the overall spillway capacity.

b. Restore the design blowoff conduit to full operability in order to provide a means of drawing down the reservoir.

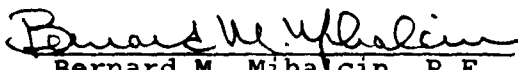
c. Observe and reassess the extensive surface deterioration of the structure in all future inspections and take remedial measures if joint leakage or deep spalling occurs.

d. Develop a formal warning system for the notification of downstream occupants should hazardous dam conditions develop. Included in the plan should be provisions for around-the-clock surveillance of the facility during periods of unusually heavy precipitation.

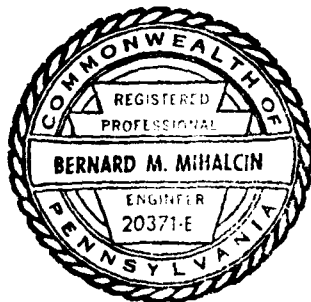
e. Develop formal manuals of maintenance and operation to ensure future proper care of the facility.

GAI Consultants, Inc.

Approved by:


Bernard M. Mihalcin, P.E.

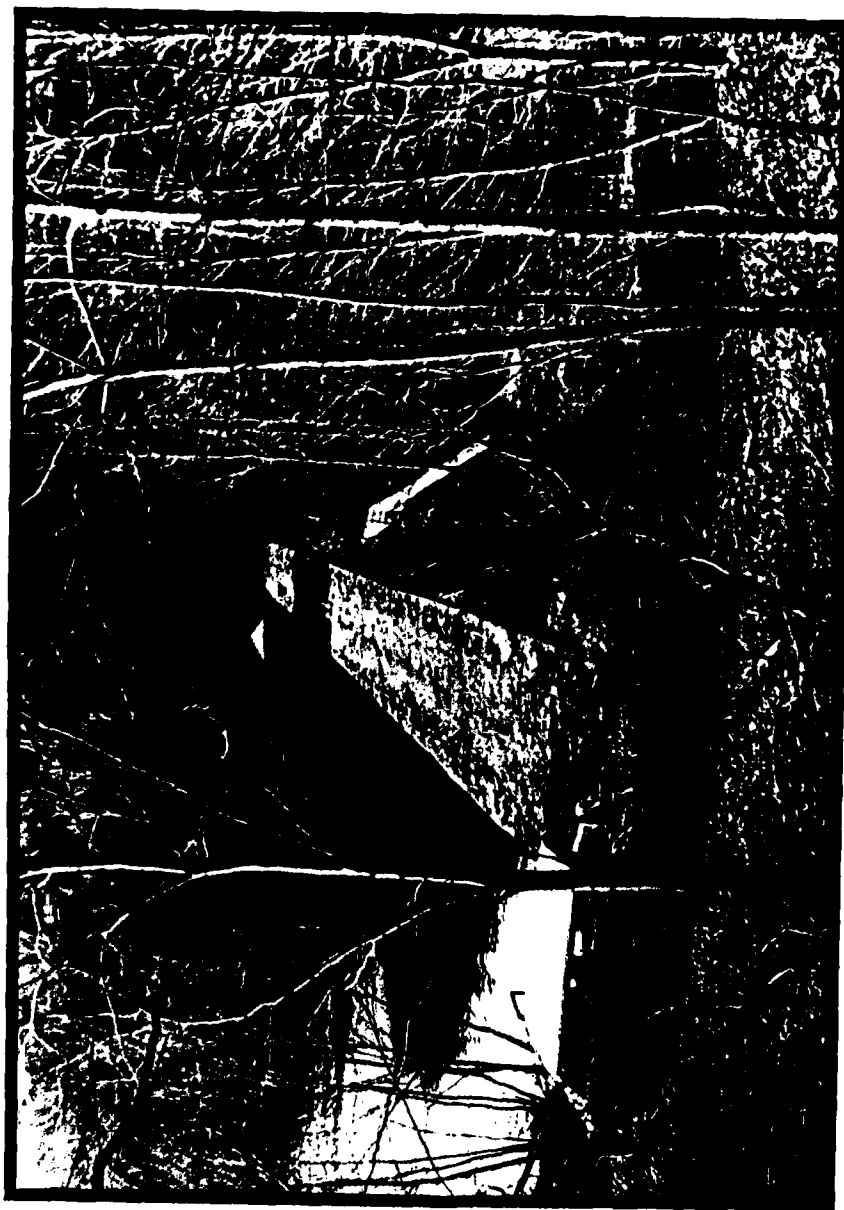

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer



Date 27 March 1980

Date 3 May 1980

DLB:BMM/sam



OVERVIEW PHOTOGRAPH

TABLE OF CONTENTS

	<u>Page</u>
PREFACE	i
ABSTRACT.	ii
OVERVIEW PHOTOGRAPH	iv
TABLE OF CONTENTS	v
SECTION 1 - GENERAL INFORMATION	1
1.0 Authority	1
1.1 Purpose	1
1.2 Description of Project.	1
1.3 Pertinent Data.	2
SECTION 2 - ENGINEERING DATA.	6
2.1 Design.	6
2.2 Construction Records.	7
2.3 Operational Records	7
2.4 Other Investigations.	7
2.5 Evaluation.	7
SECTION 3 - VISUAL INSPECTION	8
3.1 Observations.	8
3.2 Evaluation.	9
SECTION 4 - OPERATIONAL PROCEDURES.	10
4.1 Normal Operating Procedure.	10
4.2 Maintenance of Dam.	10
4.3 Maintenance of Operating Facilities	10
4.4 Warning System.	10
4.5 Evaluation.	10
SECTION 5 - HYDROLOGIC/HYDRAULIC EVALUATION	11
5.1 Design Data	11
5.2 Experience Data	11
5.3 Visual Observations	11
5.4 Method of Analysis.	11
5.5 Summary of Analysis	11
5.6 Spillway Adequacy	12
SECTION 6 - EVALUATION OF STRUCTURAL INTEGRITY.	13
6.1 Visual Observations	13
6.2 Design and Construction Techniques.	13
6.3 Past Performance.	13
6.4 Seismic Stability	14
SECTION 7 - ASSESSMENT AND RECOMMENDATIONS FOR REMEDIAL MEASURES	15
7.1 Dam Assessment.	15
7.2 Recommendations/Remedial Measures	15

TABLE OF CONTENTS

APPENDIX A - VISUAL INSPECTION CHECKLIST AND FIELD SKETCHES
APPENDIX B - ENGINEERING DATA CHECKLIST
APPENDIX C - PHOTOGRAPHS
APPENDIX D - HYDROLOGY AND HYDRAULICS ANALYSES
APPENDIX D-1 - STABILITY CALCULATIONS
APPENDIX E - FIGURES
APPENDIX F - GEOLOGY

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
ROCKVIEW RESERVOIR DAM
NDI# PA-00472, PENNDR# 14-90

SECTION 1
GENERAL INFORMATION

1.0 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.

1.1 Purpose.

The purpose is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Rockview Reservoir Dam is a concrete-gravity type structure approximately 55 feet high and 311 feet long, including spillway. The dam is constructed with an uncontrolled, rectangular, concrete, overflow spillway along its centerline. The ogee-shaped spillway crest is 51 feet long with 4.9 feet of available freeboard. The facility is equipped with a 20-inch diameter blowoff conduit and a 12-inch diameter supply pipe. The blowoff is currently inoperable while the supply line discharges continuously uncontrolled.

b. Location. Rockview Reservoir Dam is located on McBrides Run in Benner Township, Centre County, Pennsylvania. The facility is situated just south of Pennsylvania Route 64 on the grounds of the Rockview State Correctional Institution approximately 7 miles northeast of State College, Pennsylvania. The dam, reservoir, and watershed are contained within the Centre Hall and State College, Pennsylvania U.S.G.S. 7.5 minute topographic quadrangles (see Figure 1, Appendix E). The coordinates of the dam are N 40° 50.0' and W 70° 45.3'.

c. Size Classification. Intermediate (55 feet high, 50 acre-feet storage at top of dam).

d. Hazard Classification. High (see Section 3.1.e).

e. Ownership. Commonwealth of Pennsylvania
Department of Justice
Bureau of Correction
Camp Hill, Pennsylvania
P. O. Box 200
Attn: R. K. Rhodes
Acting Director of Operations

f. Purpose. Water supply.

g. Historical Data. Formal data for Rockview Reservoir Dam is limited to 2 sets of design drawings available from the owner and the PennDER. These drawings indicate that the facility was designed in 1926 by Morris Knowles, Inc. of Pittsburgh, Pennsylvania. The original facility was designed as a concrete-gravity type structure approximately 44 feet high with provisions to raise the structure at a future date (see Figure 4). A second set of drawings, also by Morris Knowles dated 1934 (see Figures 3, 5, 6, 7 and 8), indicate an intent to raise the structure by about 28 feet. Field measurements indicate the dam was eventually raised by approximately 11 feet with some modification to the spillway geometry and again with provisions for future raising of the facility.

1.3 Pertinent Data.

a. Drainage Area (square miles). 2.5.

b. Discharge at Dam Site.

Discharge Capacity of the Outlet Conduit - Discharge curves are not available.

Discharge Capacity of Spillway at Maximum Pool = 2190 cfs (see Appendix D, Sheet 8).

c. Elevation (feet above mean sea level). The following elevations were obtained through field measurements based on the elevation of the base of the spillway at 1385 feet (see Appendix D, Sheet 2, Note 1).

Top of Dam	
Left Abutment	1439.7
Right Abutment	1439.9
Maximum Design Pool	Not known.
Maximum Pool of Record	Pool Level reportedly near top of dam in June, 1972.

	Normal Pool	1434.8
	Spillway Crest	1434.8
	Downstream Base of Spillway	1385
	Upstream Inlet Invert	1390
	Downstream Outlet Invert	Not known.
	Streambed at Dam Centerline	1389
	Maximum Tailwater	Not known.
d.	<u>Reservoir Length (feet).</u>	
	Top of Dam	550
	Normal Pool	500
e.	<u>Storage (acre-feet).</u>	
	Top of Dam	50
	Normal Pool	39
	Design Surcharge	Not known.
f.	<u>Reservoir Surface (acres).</u>	
	Top of Dam	2.6
	Normal Pool	2.2
	Maximum Design Pool	Not known.
g.	<u>Dam.</u>	
	Type	Concrete-gravity.
	Length	311 feet (including spillway).
	Height	55 feet (field measured; crest to downstream base of spillway).
	Top Width	19 feet (field measured).
	Upstream Slope	Vertical.
	Downstream Slope	2H:3V.
	Concrete Type	1:3:6 mix (original structure); 1:2:4 mix (existing structure).

Monolith Joints	Six keyed joints divide dam into 7 monoliths. Joints are spaced, from right abutment to left abutment, at 40 feet, 80 feet, 130 feet (right spillway wingwall), 181 feet (left spillway wingwall), 231 feet, and 271 feet.
Grout Curtain	None indicated.
Cutoff	Figures 4 and 5 indicate the intention to key the structure several feet into rock.
h. <u>Diversion Canal and Regulating Tunnels.</u>	None.
i. <u>Spillway.</u>	
Type	Uncontrolled, rectangular, concrete overflow structure with an ogee-like crest.
Crest Elevation	1434.8 feet.
Crest Length	51 feet.
j. <u>Outlet Conduit.</u>	
Type	20-inch diameter blowoff conduit.
Length	75 feet (estimate).
Closure and Regulating Facilities	The outlet conduit is presently inoperable. The design provided for flow to be controlled near the conduit inlet by a 20-inch diameter

gate valve situated at the base of the concrete control tower that abuts the upstream dam face (see Figures 6 and 7). The valve was operated manually from within the gate house atop the control tower.

Access

The gate house is accessible by foot from the left abutment.

SECTION 2 ENGINEERING DATA

2.1 Design.

a. Design Data Availability and Sources. No formal design reports or calculations are available for any aspect of the facility. Two sets of design drawings by Morris Knowles, Inc. of Pittsburgh, Pennsylvania, dated 1926 and 1934, are available from both the owner and the PennDER. Neither set of plans exactly depicts the geometry of the present structure. The 1926 plans apparently represent the original structure; whereas, the 1934 plans were intended to represent the structure after it had been renovated and raised about 27.5 feet to a height of about 75 feet (see Figure 3; height measured from base of spillway to crest of dam). As indicated by field measurements, the dam apparently was only raised to a height of 55 feet, requiring the inclusion of a ledge in the spillway channel. Shear keys in the present structure (see Photographs 4 and 5) suggest an intent to further raise the facility.

b. Design Features.

1. Dam. According to field measurements and information that can be reasonably inferred from available drawings, the dam is a gravity-type structure originally constructed to a height of about 38 feet, but, subsequently raised a height of about 55 feet. The present dam has a crest width of 19 feet. The upstream face is vertical while downstream face is sloped at 2H:3V (see Figure 5). Available drawings indicate the dam was carried 8 to 12 feet into rock (see Figure 5).

2. Appurtenant Structures.

a) Spillway. The spillway is an uncontrolled, rectangular, concrete overflow structure with an ogee-like crest located 130 feet from each abutment. The crest is 51 feet long and set 4.9 feet below the top of the dam. Discharge over the spillway is interrupted by a horizontal ledge about 12 feet below the crest and then plunges into a rectangular, masonry-lined stilling basin at the downstream dam toe (see Figures 3 and 5, and Photographs 1, 2, 5 and 6).

b) Outlet Works. The outlet works consist of a 20-inch diameter blowoff conduit and a 12-inch diameter supply pipe originating at the base of the control tower

adjacent to the spillway (see Figure 5). The blowoff valve within the gate house is inoperable as are the sluice gates along the face of the control tower (see Figure 7). The supply line discharges continuously uncontrolled. Drawdown can not be accomplished.

c. Specific Design Data and Criteria. No design reports, calculations, or miscellaneous design data are available.

2.2 Construction Records.

No records of any phase of construction are available.

2.3 Operational Records.

No records of present day-to-day operation of the facility are maintained.

2.4 Other Investigations.

No records of any previous investigations are available.

2.5 Evaluation.

The available design drawings together with data gathered by the field team are considered adequate to make a reasonable Phase I assessment of the facility.

SECTION 3
VISUAL INSPECTION

3.1 Observations.

a. General. The general appearance of the facility indicates it to be in good condition.

b. Dam. Visual observations indicate the dam is in good condition. Both the upstream and downstream faces display extensive evidence of concrete deterioration such as spalling, efflorescence and delamination (see Photographs 1, 2 and 3). The dam crest and abutment junctions were observed to be in good condition (see Photograph 4).

c. Appurtenant Structures.

1. Spillway. The spillway is considered to be in good condition. No signs of concrete deterioration were observed although discharge over the weir on the day of the inspection did not afford the field team close inspection of concrete surfaces. Steel pins set vertically in the ogee crest are what remains of flashboards once used at the facility. The stilling basin and discharge channel appear well constructed, in good condition and adequate for typical discharge (see Photographs 1, 2, 5 and 6).

2. Outlet Works. The outlet works are presently in poor condition. None of the original control mechanisms remain within the gate house (see Photograph 7). The controls were reportedly removed for security purposes. Consequently, the blowoff conduit is totally inoperable. The supply line discharges continuously uncontrolled. No provisions for drawing down the reservoir are available.

d. Reservoir Area. The general area surrounding Rockview Reservoir Dam is characterized by steep slopes that are heavily forested (see Photograph 7). No signs of slope distress were observed.

e. Downstream Channel. The spillway at Rockview Reservoir Dam discharges into a steep, narrow valley that increasingly widens as it approaches the institution approximately 1.6 miles downstream. A Pennsylvania State Forestry encampment which is manned 24 hours per day, Monday through Friday, is located near the stream within this reach approximately 0.5 miles below the dam. Twenty to 30 men are reportedly camped at this location on a typical day. Beyond the penitentiary, the stream flows roughly northeast toward the community of Pleasant Gap, Pennsylvania where it passes near the main offices of the Pennsylvania Fish Commission. It is likely that an embankment failure would threaten many

lives and cause substantial economic loss within the 3.5 mile reach between the dam and the Pennsylvania Fish Commission's offices near Pleasant Gap. As a result, the hazard classification of the facility is considered to be high.

3.2 Evaluation.

The overall appearance of the facility suggests it to be in good condition. Concrete deterioration noted on both the upstream and downstream dam faces does not appear to significantly affect the structural integrity of the dam, at this time. However, the condition should continue to be observed in future inspections. The original outlet conduit is presently inoperable and discharge through the supply line can not be controlled. No provisions for drawing down the reservoir are available. The steel pins set vertically in the ogee crest should be removed because they may tend to retain debris and reduce overall spillway discharge.

SECTION 4 OPERATIONAL PROCEDURES

4.1 Normal Operating Procedure.

Rockview Reservoir Dam is essentially a self-regulating facility. Excess inflows are automatically discharged over the uncontrolled spillway. Water is drawn through the supply line continuously. The original outlet conduit is inoperable. No formal operations manual is available.

4.2 Maintenance of Dam.

The dam is maintained on an as-needed basis by the regular institution maintenance staff. No formal maintenance manual is available.

4.3 Maintenance of Operating Facilities.

Maintenance of the operating facilities at Rockview Reservoir Dam is virtually non-existent. All outlet works control mechanisms have been removed from the gate house.

4.4 Warning System.

No formal warning system is in effect.

4.5 Evaluation.

The design of the facility is such that little maintenance is required. The lack of control mechanisms in the gate house reduces even further the number of items requiring periodic maintenance. Maintenance is reportedly performed as-needed by regular institution staff. Formal operations and maintenance manuals need to be developed and a formal warning system put in effect.

SECTION 5
HYDROLOGIC/HYDRAULIC EVALUATION

5.1 Design Data.

No formal design reports, calculations or miscellaneous design data are available.

5.2 Experience Data.

Daily records of reservoir levels and/or spillway discharge are not available.

5.3 Visual Observations.

On the date of inspection, no conditions were observed that would indicate the spillway could not perform satisfactorily during a flood event, within the limits of its design.

5.4 Method of Analysis.

The facility has been analyzed in accordance with the procedures and guidelines established by the U. S. Army, Corps of Engineers, Baltimore District, for Phase I hydrologic and hydraulic evaluations. The analysis has been performed utilizing a modified version of the HEC-1 program developed by the U. S. Army, Corps of Engineers, Hydrologic Engineering Center, Davis, California. Analytical capabilities of the program are briefly outlined in the preface contained in Appendix D.

5.5 Summary of Analysis.

a. Spillway Design Flood (SDF). In accordance with procedures and guidelines contained in the National Guidelines for Safety Inspection of Dams for Phase I Investigations, the Spillway Design Flood (SDF) for Rockview Reservoir Dam is the PMF (Probable Maximum Flood). This classification is based on the relative size of the dam (intermediate), and the potential hazard of dam failure to downstream developments (high). Due to the high potential for damage to downstream structures and possibly loss of life, the SDF for this facility is considered to be the PMF.

b. Results of Analysis. Rockview Reservoir Dam was evaluated under near normal operating conditions. That is, the reservoir was initially at its normal pool or spillway elevation of approximately 1434.8 feet, with the spillway weir discharging freely. The outlet conduit was assumed to be non-functional for the purpose of analysis. In any event, the flow capacity of the outlet conduit is not such that it would significantly increase the total discharge capabilities of the facility. The spillway is a rectangular-shaped concrete channel with discharges controlled by a concrete ogee-like weir. All pertinent engineering calculations relative to the evaluation of this facility are provided in Appendix D.

Overtopping analysis (using the Modified HEC-1 Computer Program) indicated that the discharge/storage capacity of Rockview Reservoir Dam can accommodate about 52 percent of the PMF (SDF) prior to overtopping of the structure (Appendix D, Summary Input/Output Sheets, Sheet D). The discharge/storage capabilities of the dam and reservoir were such that there was no attenuation of the peak PMF inflow of about 4270 cfs (Summary Input/Output Sheets, Sheets C and D). Under the PMF, the dam would be overtopped for approximately 6.5 hours, with a maximum depth of inundation equal to about 1.4 feet above the low top of dam elevation of 1439.7 feet (Summary Input/Output Sheets, Sheet D).

5.6 Spillway Adequacy

Although Rockview Reservoir Dam cannot accommodate its SDF (the PMF), the possible downstream consequences of dam failure due to overtopping were not evaluated. In accordance with Corps directive ETL-1110-2-234, breaching analysis of the dam was not performed, since the facility can pass a flood of at least 1/2 PMF magnitude. Since Rockview Reservoir Dam cannot accommodate a flood of PMF magnitude, its spillway is considered to be inadequate, but not seriously inadequate.

SECTION 6
EVALUATION OF STRUCTURAL INTEGRITY

6.1 Visual Observations.

a. Dam. The visual inspection revealed the dam to be in good condition. Observed concrete deterioration appears to be surficial, at present, and insignificant with respect to the structural integrity of the facility.

b. Appurtenant Structures

1. Spillway. Visual observations indicate the spillway is in good condition although flow surfaces could not be observed due to the substantial discharge at the time of inspection.

2. Outlet Works. The outlet works are in poor condition. The blowoff conduit is reportedly non-functional while the supply line discharges continuously uncontrolled. Reservoir drawdown presently cannot be accomplished via the supply line. The present condition of the outlet works likely has little effect on the structural integrity of the dam. Nevertheless, the facility should be equipped and operated as designed.

6.2 Design and Construction Techniques.

Aside from design drawings, no information is available pertaining to the actual design and/or construction of the facility.

Stability relative to sliding and overturning was analyzed as part of this evaluation (see Appendix D-1, Sheets 1 through 5). Results of the calculations indicate the dam to be sufficiently stable at maximum pool (based on conservative assumptions including the neglecting of imbedment effects) with safety factors equal to 1.4 for sliding and 1.8 for overturning.

6.3 Past Performance.

No records of past performance are available.

6.4 Seismic Stability.

The dam is located within Seismic Zone No. 1 and may be subject to minor earthquake induced dynamic forces. As the facility is considered to be statically stable, it is believed that it can withstand the expected dynamic forces. However, no calculations or investigations were performed to confirm this opinion.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS FOR REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety. The results of this evaluation indicate the facility is in good condition.

The size classification of the facility is intermediate and its hazard classification is considered to be high. In accordance with the recommended guidelines, the Spillway Design Flood (SDF) for the facility is considered to be the PMF (Probable Maximum Flood). Results of the hydrologic and hydraulic analysis indicate the facility will pass and/or store about 52 percent of the PMF prior to dam overtopping. Thus, based on criteria contained in the recommended guidelines, the spillway is considered inadequate, but not seriously inadequate.

Deficiencies noted by the inspection team include: a) an inoperable blowoff conduit, b) surficial concrete deterioration over most of the exposed dam surfaces, c) lack of formal operations and maintenance manuals and, d) no formal warning system in effect.

b. Adequacy of Information. The available data are considered sufficient to make a reasonable Phase I assessment of the facility.

c. Urgency. The following recommendations should be implemented immediately.

d. Necessity for Additional Investigations. No additional investigations are deemed necessary at this time.

7.2 Recommendations/Remedial Measures.

It is recommended that the owner immediately:

a. Remove the vertical steel pins set in the ogee crest so as to eliminate the potential for debris being retained during high flows and reducing the overall spillway capacity.

b. Restore the design blowoff conduit to full operability in order to provide a means of drawing down the reservoir.

c. Observe and reassess the extensive surface deterioration of the structure in all future inspections and take remedial measures if joint leakage or deep spalling occurs.

d. Develop a formal warning system for the notification of downstream occupants should hazardous dam conditions develop. Included in the plan should be provisions for around-the-clock surveillance of the facility during periods of unusually heavy precipitation.

e. Develop formal manuals of maintenance and operation to ensure future proper care of the facility.

C

APPENDIX A
VISUAL INSPECTION CHECKLIST AND FIELD SKETCHES

CHECK LIST VISUAL INSPECTION PHASE 1

NAME OF DAM Rockview Reservoir Dam **STATE** Pennsylvania **COUNTY** Centre
NDI # PA — 00472 **PENNDER #** 14-90
TYPE OF DAM Concrete-gravity **SIZE** Intermediate **HAZARD CATEGORY** High
DATE(S) INSPECTION 27 November 1979 **WEATHER** Sunny & Clear **TEMPERATURE** 40° @ 10:00 a.m.
POOL ELEVATION AT TIME OF INSPECTION 1435.0 **M.S.L.**
TAILWATER AT TIME OF INSPECTION N/A **M.S.L.**

INSPECTION PERSONNEL

B.M. Mihalcin

D.L. Bonk

D.J. Spaeder

OWNER REPRESENTATIVES

Lt. McGill (Utility Plant Supervisor)

OTHERS

RECORDED BY D.L. Bonk

EMBANKMENT

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS	NDI# PA · 00472
SURFACE CRACKS	Good condition. Surficial deterioration including minor cracking, spalling and efflorescence is evident across large portions of both the upstream and downstream faces. Crest is in good condition. Deteriorated surfaces are probably insignificant to overall function of dam but should be observed and reassessed in future inspections.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	Efflorescence and leaching observed at the joints along the downstream face. No leakage through the joints was observed. Surface concrete deterioration somewhat obscures observation of the joints.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Six keyed joints divide the dam into 7 monoliths. Joints are spaced, from right to left, at 40, 80, 130, 181, 231 and 271 feet across the dam crest.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Highly visible across both the upstream and downstream faces. Distribution is fairly uniform.	
RIPRAP FAILURES	Good condition. Left abutment junction is covered with a layer of dumped rock.	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM		

CONCRETE DAM

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS	NDI# PA - 00472
VERTICAL AND HORIZONTAL ALIGNMENT	Good.	
ANY NOTICEABLE SEEPAGE	None observed.	
STAFF GAGE AND RECORDER	None.	
DRAINS	Two 4-inch diameter drains were observed protruding through the downstream dam face to the left of the spillway. The drains are located approximately 10 feet below the crest, 75 and 55 feet from the spillway, respectively.	

OUTLET WORKS

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS	NDI# PA - 00472
INTAKE STRUCTURE	Concrete control tower topped with masonry gate house abuts the upstream dam face to the left of the spillway. Appears structurally sound. Intakes were submerged and not observed.	
OUTLET CONDUIT (CRACKING AND SPALLING OF CON- CRETE SURFACES)	N/A.	
OUTLET STRUCTURE	N/A. Blowoff conduit discharges into stilling basin. Supply pipe discharges into a channel leading to the chlorination house about 700 feet downstream of the embankment.	
OUTLET CHANNEL	Rock-lined, roughly rectangular shaped discharge channel located along the left side of the valley. The channel is approximately 8 to 10 feet wide across the base with 3- to 5-foot high wingwalls.	
GATE(S) AND OPERA- TIONAL EQUIPMENT	All operating mechanisms have been removed from the gate house. Blowoff is reportedly closed. Supply pipe discharges continuously uncontrolled.	

EMERGENCY SPILLWAY

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS	NDI# PA - 00472
TYPE AND CONDITION	Uncontrolled, rectangular, concrete spillway with an ogee-like crest in good condition. No evidence of concrete deterioration was observed.	
APPROACH CHANNEL	N/A.	
SPILLWAY CHANNEL AND SIDEWALLS	N/A.	
STILLING BASIN PLUNGE POOL	Rectangular, masonry-lined stilling basin located at base of spillway along downstream embankment toe.	
DISCHARGE CHANNEL	See "Outlet Channel", page 4 of 8.	
BRIDGE AND PIERS EMERGENCY GATES	None.	

SERVICE SPILLWAY

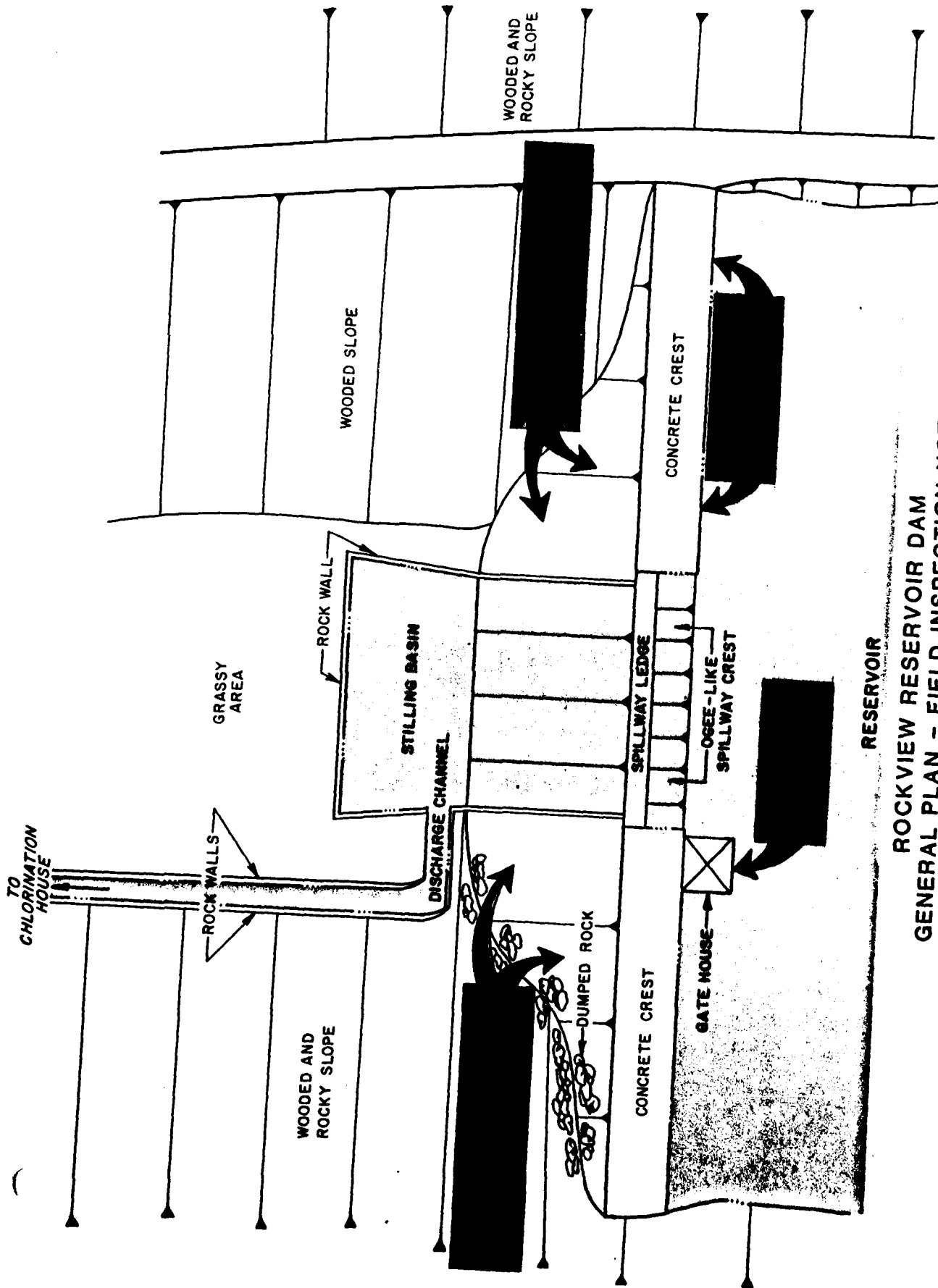
ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS	NDI# PA - 00472
TYPE AND CONDITION	N/A.	
APPROACH CHANNEL	N/A.	
OUTLET STRUCTURE	N/A.	
DISCHARGE CHANNEL	N/A.	

INSTRUMENTATION

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS	NDI# PA - 00472
MONUMENTATION SURVEYS	None.	
OBSERVATION WELLS	Three vertical standpipes were observed by the inspection team. One is located along dam crest to the right of spillway, one at the downstream toe to the right of the spillway, and one along the toe to left of spillway.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHERS		

RESERVOIR AREA AND DOWNSTREAM CHANNEL

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS	NDH# PA - 00472
SLOPES: RESERVOIR	Steep and heavily forested.	
SEDIMENTATION	None observed.	
DOWNSTREAM CHANNEL (OBSTRUCTIONS, DEBRIS, ETC.)	The spillway discharges into a steep, narrow valley that increasingly widens as it approaches the prison approximately 1.6 miles downstream.	
SLOPES: CHANNEL VALLEY	See above.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	A Pennsylvania State Forestry Encampment which is manned 24 hours per day, Monday through Friday, is located near the stream about 0.5 miles below the dam. Twenty to 30 men are reportedly camped at this location on a typical day. Further downstream, about 3.5 miles below the dam, the stream passes by the main offices of the Pennsylvania Fish Commission near Pleasant Gap.	



RESERVOIR
ROCKVIEW RESERVOIR DAM
GENERAL PLAN - FIELD INSPECTION NOTES

ROCKVIEW RESERVOIR DAM

PROFILE OF DAM CREST
FROM FIELD SURVEY

RIGHT
ABUTMENT

ELEV. 439.9

ELEV. 439.7

LEFT
ABUTMENT

SPILLWAY CREST
ELEV. 434.8

130'

51'

130'

SCALE:

VERTICAL: 1" = 4 FT

HORIZONTAL: 1" = 50 FT

APPENDIX B
ENGINEERING DATA CHECKLIST

**CHECK LIST
ENGINEERING DATA
PHASE I**

NAME OF DAM Rockview Reservoir Dam

ITEM	REMARKS	NDI# PA- 00472
PERSONS INTERVIEWED AND TITLE	Lt. Groff - Building Maintenance Supervisor. Lt. McGill - Utility Plant Supervisor.	
REGIONAL VICINITY MAP	See Figure 1, Appendix E.	
CONSTRUCTION HISTORY	Information not available (see Section 1.2.g).	
AVAILABLE DRAWINGS	Two complete drawing sets by Morris Knowles, Inc. of Pittsburgh, Pennsylvania dated 1926 and 1934 are available at the prison and from PenNDER files. Neither set of plans accurately depicts existing conditions.	
TYPICAL DAM SECTIONS	See Figures 2, 3, 4, 5 and 6, Appendix E.	
OUTLETS: PLAN DETAILS DISCHARGE RATINGS	See Figures 4, 5, 6 and 7, Appendix E.	

**CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)**

ITEM	REMARKS	NDI# PA - 00472
SPILLWAY: PLAN SECTION DETAILS	See Figures 2, 3, 4, 5 and 6, Appendix E.	
OPERATING EQUIP- MENT PLANS AND DETAILS	See Figure 7, Appendix E.	
DESIGN REPORTS	None available.	
GEOLOGY REPORTS	None available.	
DESIGN COMPUTATIONS: HYDROLOGY AND HYDRAULICS STABILITY ANALYSES SEEPAGE ANALYSES	None available.	
MATERIAL INVESTIGATIONS: BORING RECORDS LABORATORY TESTING FIELD TESTING	See Figure 2, Appendix E.	

**CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)**

ITEM	REMARKS	NDI# PA - 00472
BORROW SOURCES	N/A.	
POST CONSTRUCTION DAM SURVEYS	None.	
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None.	
HIGH POOL RECORDS	Formal records are not available. Several photographs were taken during the flood of June 1972 and are contained in files at the prison. Discussions with members of the prison staff indicate that the pool level was near top of dam during this flood.	
MONITORING SYSTEMS	Several standpipes were observed at various locations across the dam crest and downstream face. All but one were found clogged and non-functional. One such standpipe is detailed on Figure 8, Appendix E.	
MODIFICATIONS	The dam was apparently raised subsequent to its original construction in 1926, however, not quite in accordance with the dimensions shown on those drawings dated 1934.	

**CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)**

ITEM	REMARKS	NDI# PA. 00472
PRIOR ACCIDENTS OR FAILURES	None recorded. Flood of June 1972 caused damage to channel near chlorination house.	
MAINTENANCE: RECORDS MANUAL	None.	
OPERATION: RECORDS MANUAL	None. Meter located in chlorination house records daily water usage.	
OPERATIONAL PROCEDURES	Self-regulating. Blowoff conduit is inoperable. Control mechanisms formerly within gate house have been removed. Flow through supply conduit can not be regulated. No formal operating procedures.	
WARNING SYSTEM AND/OR COMMUNICATION FACILITIES	No formal program in effect. There is a phone in the chlorination house.	
MISCELLANEOUS		

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**CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA**

NDI ID # PA-00472
PENNER ID # 14-90

SIZE OF DRAINAGE AREA: 2.5 square miles.
ELEVATION TOP NORMAL POOL: 1434.8 STORAGE CAPACITY: 39 acre-feet.
ELEVATION TOP FLOOD CONTROL POOL: - STORAGE CAPACITY: -
ELEVATION MAXIMUM DESIGN POOL: - STORAGE CAPACITY: -
ELEVATION TOP DAM: 1439.7 STORAGE CAPACITY: 50 acre-feet.

SPILLWAY DATA

CREST ELEVATION: 1434.8 feet.
TYPE: Uncontrolled, rectangular, concrete overflow with ogee-like crest.
CREST LENGTH: 51 feet.
CHANNEL LENGTH: N/A.
SPILLOVER LOCATION: Center of dam.
NUMBER AND TYPE OF GATES: None.

OUTLET WORKS

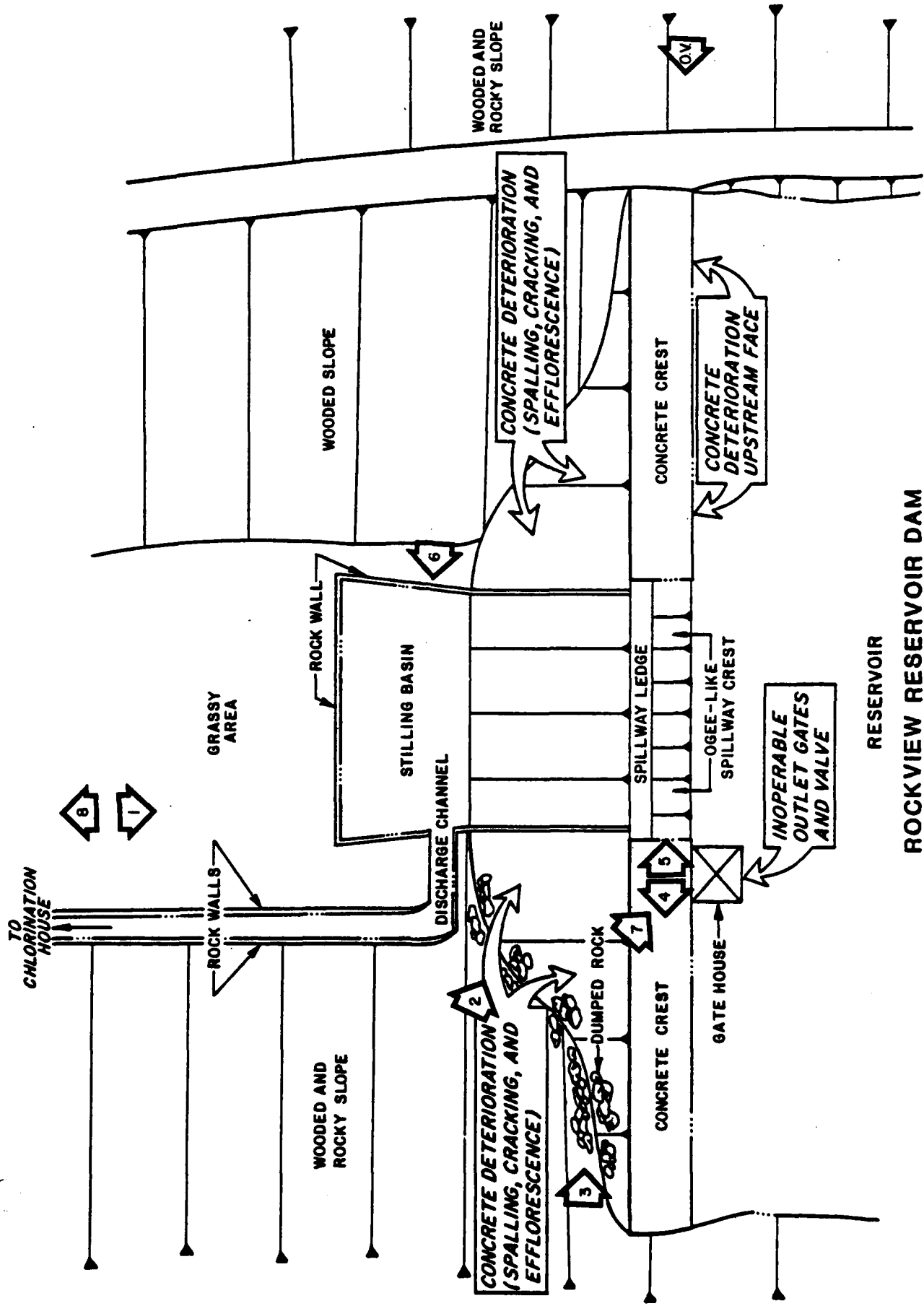
TYPE: 20-inch diameter blowoff; 12-inch diameter supply.
LOCATION: Left of spillway.
ENTRANCE INVERTS: 1390 feet (blowoff).
EXIT INVERTS: Not known.
EMERGENCY DRAWDOWN FACILITIES: Drawdown not possible at present.

HYDROMETEOROLOGICAL GAGES

TYPE: None.
LOCATION: -
RECORDS: -

MAXIMUM NON-DAMAGING DISCHARGE: Not known. Pool in June 1972 estimated to have been near top of dam.

APPENDIX C
PHOTOGRAPHS



RESERVOIR
ROCKVIEW RESERVOIR DAM
PHOTOGRAPH KEY MAP

PHOTOGRAPH 1 View of Rockview Reservoir Dam as seen from several hundred feet downstream.

PHOTOGRAPH 2 View of the downstream dam face as seen from the left abutment toe.

PHOTOGRAPH 3 Close-up view of surficial concrete deterioration along the downstream left abutment face characteristic of both the upstream and downstream dam faces.

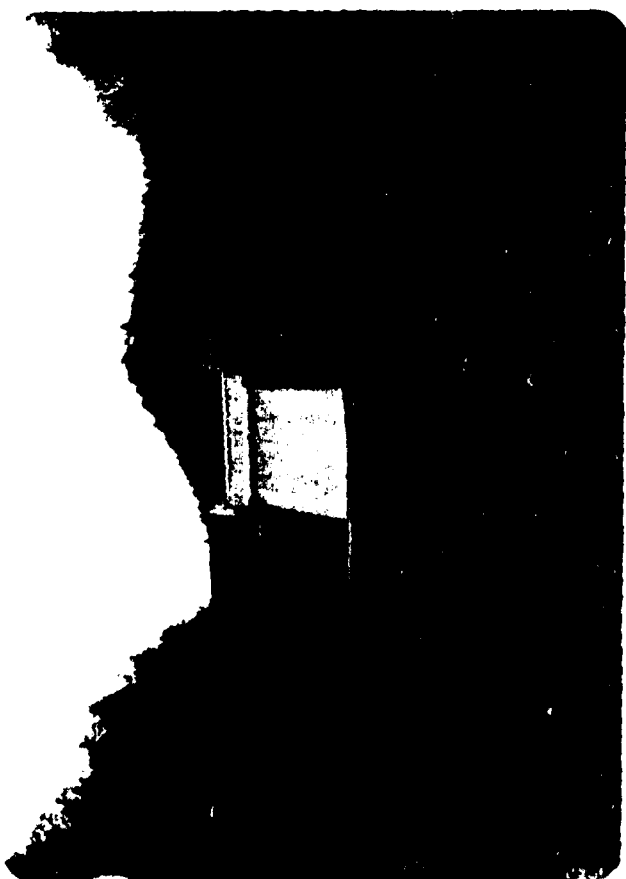
PHOTOGRAPH 4 Close-up view of the dam crest.



2



4



1



3

PHOTOGRAPH 5 View of the spillway crest as seen from the left spillway wingwall.

PHOTOGRAPH 6 View of the stilling basin located at the downstream base of the spillway.

PHOTOGRAPH 7 View of the control tower gate house that abuts the upstream dam face adjacent the left spillway wingwall.

PHOTOGRAPH 8 View of the chlorination house located about 700 feet downstream. The spillway discharge channel is visible in the upper left portion of the view. The channel in the center of the view carries flow from the dam's supply line.



8



6



7



5

APPENDIX D
HYDROLOGY AND HYDRAULICS ANALYSES

PREFACE

The modified HEC-1 program is capable of performing two basic types of hydrologic analyses: 1) the evaluation of the overtopping potential of the dam; and 2) the estimation of the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. Briefly, the computational procedures typically used in the dam overtopping analysis are as follows:

- a. Development of an inflow hydrograph(s) to the reservoir.
- b. Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.
- c. Routing of the outflow hydrograph(s) from the reservoir to desired downstream locations. The results provide the peak discharge(s), time(s) of the peak discharge(s), and the maximum stage(s) of each routed hydrograph at the downstream end of each reach.

The evaluation of the hydrologic-hydraulic consequences resulting from an assumed structural failure (breach) of the dam is typically performed as shown below.

- a. Development of an inflow hydrograph(s) to the reservoir.
- b. Routing of the inflow hydrograph(s) through the reservoir.
- c. Development of a failure hydrograph(s) based on specified breach criteria and normal reservoir outflow.
- d. Routing of the failure hydrograph(s) to desired downstream locations. The results provide estimates of the peak discharge(s), time(s) to peak and maximum water surface elevations of failure hydrographs for each location.

HYDROLOGY AND HYDRAULIC ANALYSIS DATA BASE

NAME OF DAM: ROCKVIEW RESERVOIR DAM

PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.2 INCHES/24 HOURS ⁽¹⁾

STATION	1	2	3
STATION DESCRIPTION	ROCKVIEW RESERVOIR DAM		
DRAINAGE AREA (SQUARE MILES)	(5) 1.5	(6) 1.0	
CUMULATIVE DRAINAGE AREA (SQUARE MILES)	2.5		
ADJUSTMENT OF PMF FOR DRAINAGE AREA LOCATION (%) ⁽¹⁾			
6 HOURS	121		
12 HOURS	131		
24 HOURS	140		
48 HOURS	147		
72 HOURS	149		
SNYDER HYDROGRAPH PARAMETERS			
ZONE (2)	20		
C _p (3)	0.40		
C _t (3)	2.10		
L (MILES) (4)	(5) 2.3	1.3 (6)	
L _{ca} (MILES) (4)	1.2	0.8	
t _p = C _t (L · L _{ca}) ^{0.3} (HOURS)	2.85	2.12	
SPILLWAY DATA			
CREST LENGTH (FEET)	51		
FREEBOARD (FEET)	4.9		

(1) HYDROMETEOROLOGICAL REPORT - 40, U.S. WEATHER BUREAU, 1965.

(2) HYDROLOGIC ZONE DEFINED BY CORPS OF ENGINEERS, BALTIMORE DISTRICT, FOR DETERMINATION OF SNYDER COEFFICIENTS (C_p AND C_t).

(3) SNYDER COEFFICIENTS

(4) L = LENGTH OF LONGEST WATERCOURSE FROM DAM TO BASIN DIVIDE.

L_{ca} = LENGTH OF LONGEST WATERCOURSE FROM DAM TO POINT OPPOSITE BASIN CENTROID.

(5) LEFT SUB-BASIN

(6) RIGHT SUB-BASIN

PROJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
BY DSC DATE 1-7-80 PROJ. NO. 79-203-472
CHKD. BY DLB DATE 1-21-80 SHEET NO. 1 OF 11

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DAM STATISTICS

- HEIGHT OF DAM = 55 FEET (FIELD MEASUREMENT)
- NORMAL POOL STORAGE CAPACITY = 38.6 ACRE-FT (SHEET 4)
- MAXIMUM POOL STORAGE CAPACITY = 50.1 ACRE-FT (SHEET 4)
(AT LOW TOP OF DAM)
- DRAINAGE AREA = 2.5 SQUARE MILES (PLANIMETERED ON U.S.G.S 7.5'
TOPO QUADS: CENTRE HALL, AND
STATE COLLEGE, PA.)
- ELEVATION OF TOP OF DAM (FIELD) = 1439.7
- NORMAL POOL ELEVATION = 1434.8 (SEE NOTE 2)
- UPSTREAM INLET INVERT ELEVATION = 1390.0 (FIGURE 5)
- DOWNSTREAM OUTLET INVERT: NOT KNOWN
- STREAM BED AT DAM CENTERLINE = 1389.0 (FIGURE 2)

PROJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
BY DTS DATE 1-7-80 PROJ. NO. 79-203-472
CHKD. BY DLB DATE 1-21-80 SHEET NO. 2 OF 11



NOTE 1: THE ELEVATION OF THE SPILLWAY CREST WAS ESTIMATED FROM FIELD MEASUREMENTS AND FROM FIGURE 3. THE ELEVATION OF THE TOP OF THE RIGHT ABUTMENT WAS MEASURED TO BE 54.9 FEET ABOVE THE CASE OF THE SPILLWAY, WHICH WAS ASSUMED TO BE AT ELEVATION 1385.0 (FIGURE 3). THUS, THE TOP OF THE RIGHT ABUTMENT IS APPROXIMATELY AT 1385.0 + 54.9, OR 1439.9. THE LEFT ABUTMENT CREST IS APPROXIMATELY 2.2 FEET LOWER, OR AT ELEVATION 1437.7. THE SPILLWAY CREST IS THUS AT ABOUT ELEV. 1434.8, ACCORDING TO FIELD MEASUREMENTS. THIS IS IN CONTRAST TO THE DESIGN DRAWING, FIGURE 3, WHICH INDICATES THAT THE SPILLWAY CREST WAS TO BE AT ELEV. 1453.0. THE TOTAL LENGTH OF THE DAM WAS MEASURED TO BE ABOUT 311 FEET. ON THE CONTOUR PLAN, FIGURE 3, THIS TOTAL LENGTH CORRESPONDS WITH A TOP OF DAM ELEVATION OF ABOUT 1440 FEET, WHICH INDICATES THAT THE ABOVE ASSUMPTIONS ARE REASONABLE. (NOTE: THE ELEVATIONS USED IN THIS ANALYSIS ARE CONSIDERED ESTIMATES AND ARE NOT NECESSARILY ACCURATE.)

DAM CLASSIFICATION

DAM SIZE: INTERMEDIATE (REF 1, TABLE 1)
HAZARD CLASSIFICATION: HIGH (FIELD OBSERVATION)
REQUIRED SDF: PMF (REF 1, TABLE 3)

HYDROGRAPH PARAMETERS

SINCE THE WATERSHED CONSISTS OF TWO DISTINCT BASINS WITH NOTICEABLY DIFFERENT CHARACTERISTICS (DRAINAGE AREA, STREAM LENGTHS), IT WILL BE TREATED AS SUCH IN THE CALCULATION OF INFLOW HYDROGRAPHS. THE TWO HYDROGRAPHS WILL THEN BE COMBINED AND ROUTED THROUGH THE RESERVOIR.

ECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DJS DATE 1-7-80 PROJ. NO. 79-207-472
 CHKD. BY DLB DATE 1-21-80 SHEET NO. 3 OF 11

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FOR BOTH BASINS,

$$\left\{ \begin{array}{l} C_e = \underline{2.10} \\ C_p = \underline{0.40} \end{array} \right\}$$

$\left\{ \begin{array}{l} \text{SUPPLIED BY C.O.E., ZONE 20,} \\ \text{SUSQUEHANNA RIVER BASIN} \end{array} \right\}$

	LEFT-SIDE SUB-BASIN	RIGHT-SIDE SUB-BASIN	
- LENGTH OF LONGEST WATERCOURSE, <u>L</u>	2.3 MILES	1.3 MI.	MEASURED ON U.S.G.S TOPO, STATE COLLEGE AND CENTRE HALL PA
- LENGTH OF LONGEST WATERCOURSE FROM DAM TO A POINT OPPOSITE BASIN CENTROID	1.2 MI.	0.8 MI.	
- DRAINAGE AREA	1.5 SQ. MI.	1.0 SQ. MI.	
- SNYDER'S STANDARD LAG = $C_e (L \cdot L_{CA})^{0.3}$	2.85 HOURS	2.12 HRS	

(NOTE: HYDROGRAPH VARIABLES USED HERE ARE DEFINED IN REFERENCE 2, IN SECTION
 ENTITLED "SNYDER SYNTHETIC UNIT HYDROGRAPH".)

RESERVOIR CAPACITY

RESERVOIR SURFACE AREAS:

RESERVOIR ELEVATION (FT)	SURFACE AREA (ACRES)
1395.0	0.07
1400.0	0.21
1410.0	0.62
1420.0	1.26
1427.5	1.73
1430.0	1.90
1435.0	2.25
1440.0	2.62
1445.0	3.05
1450.0	3.45

(PLANNIMETERED ON CONTOUR PLANS,
 FIGURE 3.)

ECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DJS DATE 1-7-80 PROJ. NO. 79-203-472
 CHKD. BY DLB DATE 1-21-80 SHEET NO. 4 OF 11



ASSUME THAT THE MODIFIED PRISMOIDAL RELATIONSHIP ADEQUATELY MODELS THE RESERVOIR SURFACE AREA - STORAGE RELATIONSHIP.

$$\Delta V_{1-2} = \frac{h}{3} (A_1 + A_2 + \sqrt{A_1 \cdot A_2})$$

WHERE ΔV_{1-2} = INCREMENTAL VOLUME BETWEEN ELEVATIONS 1 + 2, IN AC-FT,
 h = ELEVATION 1 - ELEVATION 2, IN FEET,
 A_1 = SURFACE AREA AT ELEVATION 1, IN ACRES,
 A_2 = SURFACE AREA AT ELEVATION 2, IN ACRES.

ALSO, ASSUME THAT SURFACE AREAS CORRESPONDING TO ELEVATIONS BETWEEN THE GIVEN CONTOURS CAN BE LINEARLY INTERPOLATED.

SINCE THE STORAGE VOLUME AT ELEVATION 1427.5 IS KNOWN, A CORRECTION FACTOR MAY BE APPLIED TO THE CALCULATED VOLUMES IN ORDER TO REPRESENT THE ELEVATION-STORAGE RELATIONSHIP MORE ACCURATELY.

ELEVATION - STORAGE RELATIONSHIP

RESERVOIR ELEVATION (FT)	A_L (ACRES)	ΔV_{1-2} (AC-FT)	INITIAL CALCULATED VOLUME (AC-FT)	FINAL CORRECTED * VOLUME (AC-FT)
1390.0	0	—	—	0
1395.0	0.07	0.1	0.1	0.1
1400.0	0.21	0.7	0.8	0.8
1410.0	0.62	4.0	4.8	4.7
1420.0	1.26	9.2	14.0	13.7
1427.5	1.73	11.2	25.2	24.6
1430.0	1.90	4.5	29.7	29.0
(NORMAL POOL) 1434.8	2.24	1.1	39.6	39.6
1435.0	2.25	0.4	40.0	39.0
1437.0	2.40	4.6	44.6	43.5
1439.0	2.55	4.9	49.5	48.3
(TOP OF DAM) 1439.7	2.60	1.8	51.3	50.1
1440.0	2.62	0.8	52.1	50.8
1441.0	2.71	2.7	54.8	53.5
1442.0	2.79	2.7	57.5	56.1

ECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DJS DATE 1-7-80 PROJ. NO. 79-293-472
 CHKD. BY DLB DATE 1-21-80 SHEET NO. 5 OF 11



ELEVATION - STORAGE RELATIONSHIP (CONT.)

RESERVOIR ELEVATION (FT)	A _L (ACRES)	ΔV ₁₋₂ (AC-FT)	INITIAL CALCULATED VOLUME (AC-FT)	FINAL CORRECTED VOLUME (AC-FT)
1444.0	2.96	5.7	63.2	61.7
1445.0	3.05	3.0	66.2	64.6
1447.0	3.21	6.3	72.5	70.8
1450.0	3.45	10.0	82.5	80.5

* - FINAL CORRECTED VOLUME = $\left(\frac{\text{ACTUAL VOLUME @ 1427.5}}{\text{INITIAL CALC. VOL @ 1427.5}} \right) \times \text{INITIAL CALCULATED VOLUME}$
 $= \left(\frac{24.6 \text{ ACRE-FT}}{25.2 \text{ ACRE-FT}} \right) \times \text{INITIAL CALCULATED VOLUME}$
 $= 0.976 \times \text{INITIAL CALCULATED VOLUME}$

PMP CALCULATIONS

- FROM REFERENCE 9, FIGURE 2, OBTAIN PMP VALUES FOR A BASIN OF DRAINAGE AREA 200 SQUARE MILES, FOR A DURATION OF 24 HOURS:

$\text{PRECIP} = 22.2 \text{ INCHES}$

- FROM REF. 9, FIGURE 1, THE GEOGRAPHIC ADJUSTMENT FACTOR = 103%.
 - AREA CORRECTION FACTOR (REF. 9):

DURATION (HRS):	6	12	24	48	72
FACTOR (%):	117.5	127.0	136.0	142.5	145.0

IJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DJS DATE 1-7-80 PROJ. NO. 79-303-472
 CHKD. BY DLB DATE 1-21-80 SHEET NO. 6 OF 11

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TOTAL CORRECTION FACTOR (1.03 X AREA CORRECTION FACTOR):

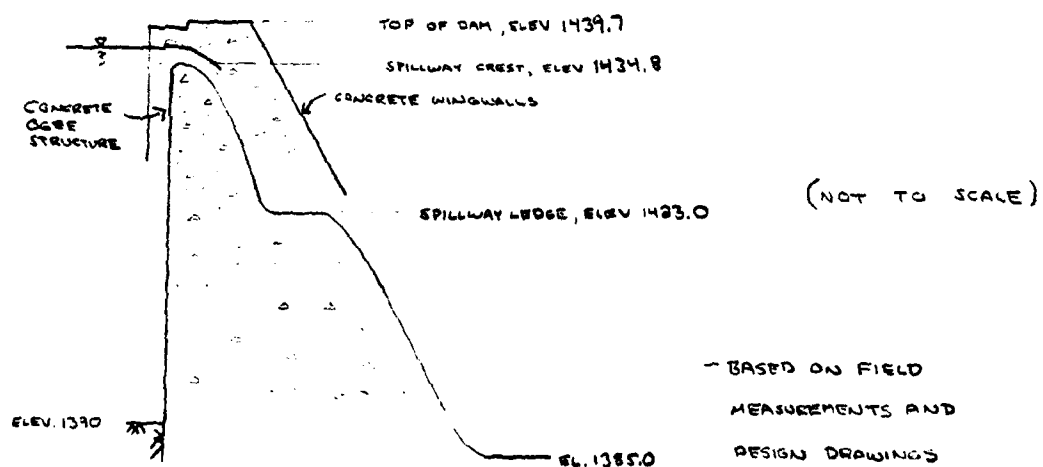
DURATION (HRS):	6	12	24	48	72
FACTOR (%):	121	131	140	147	149

- HOP BROOK FACTOR (ADJUSTMENT FOR BASIN SHAPE AND FOR THE LESSER
 LIKELIHOOD OF A SEVERE STORM CENTERING OVER A SMALL BASIN) FOR A
 DRAINAGE AREA OF 2.5 SQUARE MILES IS 0.80.

(REF 4, p. 48)

SPILLWAY CAPACITY

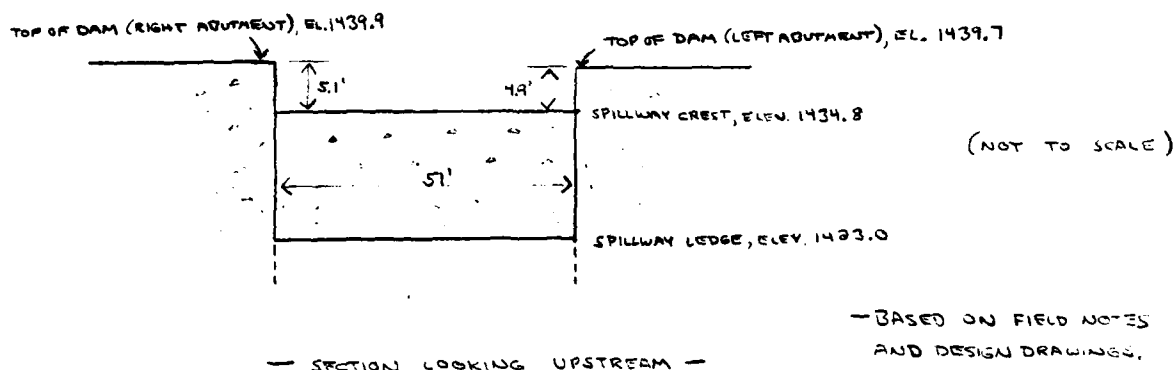
PROFILE OF SPILLWAY:



SUBJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DJS DATE 1-7-80 PROJ. NO. 79-303-472
 CHKD. BY DLB DATE 1-21-80 SHEET NO. 7 OF 11

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SPILLWAY CROSS-SECTION :



THIS SPILLWAY IS AN UNCONTROLLED, RECTANGULAR CHANNEL, WITH DISCHARGES CONTROLLED BY AN OGEE-LIKE CONCRETE WEIR STRUCTURE, 51 FEET LONG. DISCHARGE OVER THE WEIR CAN BE ESTIMATED BY THE RELATION

$$Q = CLH^{3/2} \quad (\text{REF 4, p. 373})$$

WHERE Q = DISCHARGE OVER THE WEIR, IN CFS,
 C = DISCHARGE COEFFICIENT,
 L = LENGTH OF WEIR CREST = 51 FT,
 H = HEAD ON CREST, IN FEET.

THE DESIGN HEAD IS ASSUMED TO BE AT THE TOP OF THE LEFT WINGWALL, OR 4.9 FEET. IT IS ASSUMED THAT THE RELATIONSHIPS IN REFERENCE 4, PAGES 372-382, CAN BE APPLIED TO THIS OGEE-LIKE WEIR. FOR A WEIR HEIGHT OF ABOUT 4.5 FEET, AND DESIGN HEAD 4.9 FEET,

$$C_0 = 3.95 \quad (\text{REF 4, FIG 349, p. 375})$$

PROJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY RTS DATE 1-8-80 PROJ. NO. 79-203-472
 CHKD. BY D&B DATE 1-21-81 SHEET NO. 8 OF 11



AS THE HEAD ON THE WEIR BECOMES SMALL, DISCHARGE IS REDUCED DISPROPORTIONATELY, DUE TO THE ROUGHNESS AND THE CONTACT PRESSURE BETWEEN THE WATER AND THE WEIR SURFACE, THUS, THE DISCHARGE COEFFICIENT (C) TAKES ON A LOWER VALUE THAN THAT OF DESIGN HEAD. THE OPPOSITE TREND OCCURS FOR HEADS GREATER THAN THAT OF DESIGN. THEREFORE, THE DISCHARGE COEFFICIENTS MUST BE MODIFIED APPROPRIATELY, ACCORDING TO FIGURE 250, REF. 4. UPSTREAM AND DOWNSTREAM EFFECTS ARE ASSUMED NEGLIGIBLE HERE.

SPILLWAY RATING TABLE

RESERVOIR ELEVATION (FT)	H (FT)	H/H ₀	① %C ₀	② C	③ Q (CFS)
1434.8	0	—	—	—	0
1435.0	0.2	0.04	0.80	3.16	10
1436.0	1.2	0.24	0.86	3.40	230
1437.0	2.2	0.45	0.91	3.59	600
1438.0	3.2	0.65	0.95	3.75	1090
1439.0	4.2	0.96	0.98	3.87	1700
(TOP OF DAM) 1439.7	4.9	1.00	1.00	3.95	2190
1439.9	5.1	1.04	1.00	3.95	2320
1440.0	5.2	1.06	1.01	3.99	2410
1441.0	6.2	1.27	1.03	4.00	3150
1442.0	7.2	1.47	1.06	4.00	3940
1443.0	8.2	1.67	1.07	4.00	4790
1444.0	9.2	1.88	1.07	4.00	5690
1445.0	10.2	2.08	1.07	4.00	6650

- ① FROM REF 4, FIG 250, p. 375;
 ② $C = \%C_0 \times 3.95$; (UPPER LIMIT 4.00, REF 4, p. 376)
 ③ $Q = CLH^{3/2} = (51.0) CH^{3/2}$

SUBJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DJS DATE 1-8-80 PROJ. NO. 19-203-472
 CHKD. BY DLB DATE 1-21-80 SHEET NO. 9 OF 11



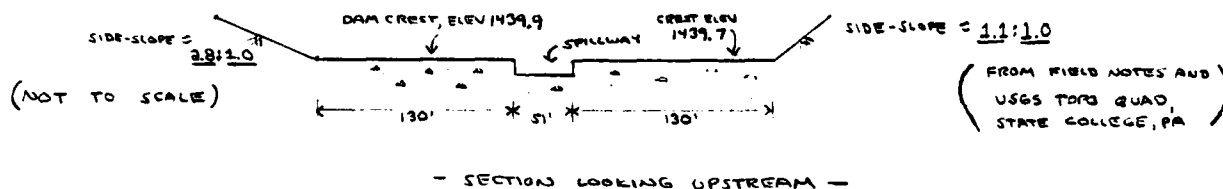
DAM CREST RATING CURVE

- ASSUME THAT THE CREST OF THE DAM BEHAVES ESSENTIALLY AS A BROAD-CRESTED WEIR WHEN OVERTOPPED. THUS, THE DISCHARGE CAN BE ESTIMATED BY THE EQUATION

$$Q = CLH^{3/2} \quad (\text{REF 5, P. 5-23})$$

WITH Q, C, L, H AS DEFINED ON SHEET 7.

THE LENGTH OF THE CREST IS 260 FEET (NOT INCLUDING THE SPILLWAY), AND THE DREADTH IS 19 FEET. THE AVERAGE VALLEY SIDE-SLOPE IMMEDIATELY ADJACENT TO THE DAM IS APPROXIMATELY 2:1.



IT WILL BE ASSUMED THAT THE VELOCITY OF THE FLOW OVER THE SIDE SLOPES IS EQUAL TO THE VELOCITY OVER THE DAM CREST, OR

$$V_s = V_c = \frac{Q_c}{A_c} = \frac{Q_c}{HL_c}$$

WHERE

V_s = VELOCITY OF FLOW OVER SIDE SLOPES (FT/SEC),
 V_c = VELOCITY OF FLOW OVER DAM CREST (FT/SEC),
 Q_c = DISCHARGE OVER DAM CREST (CFS),
 L_c = LENGTH OF CREST = 260 FT,
 H = HEAD (FT),
 A_c = FLOW AREA OVER DAM CREST (FT²).

JECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DJS DATE 1-8-80 PROJ. NO. 79-303-472
 CHKD. BY DLB DATE 1-21-80 SHEET NO. 10 OF 11



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AND $Q_s = A_s V_s$,

WHERE Q_s = DISCHARGE OVER SIDE SLOPES (CFS),
 A_s = AREA OF FLOW OVER SIDE SLOPES (FT²)
 $= (2)(\frac{1}{2})(H)(2H)$
 $= 2H^2$

$\therefore Q_{TC} = Q_c + Q_s$, WHERE Q_{TC} = TOTAL DISCHARGE OVER CREST (CFS).

RATING TABLE FOR CREST OF DAM:

RESERVOIR ELEVATION (FT)	① $\bar{H}$ (FT)	② C	③ Q_c (CFS)	④ A_c (FT ²)	⑤ $V_c = V_s$ (FPS)	⑥ A_s (FT ²)	⑦ Q_s (CFS)	⑧ Q_{TC} (CFS)
1439.7	0	—	0	0	0	0	0	—
1439.9	0.2	2.7	30	26	1.2	0	0	30
1440.0	0.2	2.7	60	52	1.2	0	0	60
1441.0	1.2	2.6	890	312	2.9	3	10	900
1442.0	2.2	2.6	2210	572	3.9	10	40	2250
1443.0	3.2	2.6	3870	832	4.7	20	90	3960
1444.0	4.2	2.6	5820	1092	5.3	35	190	6010
1445.0	5.2	2.6	8020	1352	5.9	54	320	8340

① FOR ELEVATIONS 1440.0 AND ABOVE: SINCE THE RIGHT AND LEFT SECTIONS ARE AT DIFFERENT ELEVATIONS (1439.7, 1439.9), THE AVERAGE HEAD WILL BE ASSUMED TO BE EQUAL TO [RESERVOIR ELEVATION - 1439.8].

② ESTIMATED FROM REFERENCE I, TABLE 5-3.

③ $Q_c = CLH^{3/2}$; AT ELEV 1439.9, $L = 100$ FT (LEFT ADJUTMENT ONLY),
 AT ELEV 1440.0 AND ABOVE, $L = 260$ FT.

④ $A_c = \bar{H}L_c$; SEE NOTE ③, ABOVE

⑤ $V_c = Q_c/A_c$

SUBJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DJS DATE 1-9-80 PROJ. NO. 79-203-472
 CHKD. BY DLB DATE 1-21-80 SHEET NO. 11 OF 11

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$$\begin{aligned} \textcircled{a} A_s &= 2H^2 \\ \textcircled{b} Q_s &= A_s V_s \\ \textcircled{c} Q_{TC} &= Q_c + Q_s \end{aligned}$$

TOTAL FACILITY RATING TABLE

$$Q_{TOTAL} = Q_{SPILLWAY} + Q_{DAM CREST}$$

RESERVOIR ELEVATION (FT)	Q _{SPILLWAY} (CFS)	Q _{DAM CREST} (CFS)	Q _{TOTAL} (CFS)
1434.8	0	-	0
1435.0	10	-	10
1436.0	230	-	230
1437.0	600	-	600
1438.0	1090	-	1090
1439.0	1700	-	1700
(LOW TOP OF DAM) 1439.7	2190	0	2190
1439.9	2320	30	2350
1440.0	2410	60	2470
1441.0	3150	900	4050
1442.0	3940	2250	6190
1443.0	4790	3960	8750
1444.0	5690	6010	11,700
1445.0	6650	8340	14,990

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	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.	42.	43.	44.	45.	46.	47.	48.	49.	50.	51.	52.	53.	54.	55.	56.	57.	58.	59.	60.	61.	62.	63.	64.	65.	66.	67.	68.	69.	70.	71.	72.	73.	74.	75.	76.	77.	78.	79.	80.	81.	82.	83.	84.	85.	86.	87.	88.	89.	90.	91.	92.	93.	94.	95.	96.	97.	98.	99.	100.
1.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.	42.	43.	44.	45.	46.	47.	48.	49.	50.	51.	52.	53.	54.	55.	56.	57.	58.	59.	60.	61.	62.	63.	64.	65.	66.	67.	68.	69.	70.	71.	72.	73.	74.	75.	76.	77.	78.	79.	80.	81.	82.	83.	84.	85.	86.	87.	88.	89.	90.	91.	92.	93.	94.	95.	96.	97.	98.	99.	100.

DAM SAFETY INSPECTION

ROCKVIEW RESERVOIR DAM

BY DJS DATE 1-30-80 PROJ. NO. 79-203-472

CHKD. BY DLB DATE 1-30-80 SHEET NO. B OF D



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[illegible]

PMF	5-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
PMF	1940.	503.	317.	41301.	
	56.	26.	9.	2585.	
	17.34	22.40	23.59	21.59	
	313.19	568.94	599.24	599.24	
	987.	1791.	1886.	1886.	
	1717.	2209.	2327.	2327.	
PMF	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
PMF	1198.	451.	159.	45651.	
	34.	13.	4.	1293.	
	6.17	11.20	11.40	11.40	
	150.69	264.67	299.67	299.67	
	443.	846.	943.	943.	
	608.	1105.	1163.	1163.	
PMF	6-HOUR	24-HOUR	72-HOUR	TOTAL	VOLUME
PMF	1194.	542.	190.	54781.	
	41.	15.	5.	1551.	
	7.40	13.44	14.16	14.16	
	198.03	341.16	359.54	359.54	
	592.	1075.	1132.	1132.	
	730.	1326.	1396.	1396.	

SUB-BASIN 2

MILLER LINDARD, Attorney at Law

ALL INFORMATION CONTAINED
HEREIN IS UNCLASSIFIED
DATE 04-14-2011 BY 60322
UCBAW/SJS

INSTRUMENT	COOPER	PERCIVAL	WILKINSON	JOINT	LEAF	STAGE	TABLE
1	4	5	5	0	1	0	0

	TIME	TRAP A	SNAP	TRSDA	TSPC	RATIO	ESD _{0.9}	ESD _{0.5}	ESD _{0.1}
Time	1	1.00	0.00	1.00	0.00	0.000	0	0	0

[illegible][illegible]

1.00	1.00	147.00	149.00	11.00
------	------	--------	--------	-------

11115 11A7A

STKS RTIOK STRIL CNSTL AL

05' 00' 00" 00' 00" 00' 00"

RECORDED DATA
CP= 40 PLS= 1

7190 10150434

40° 25' N 100° 25' W

444 P. L. IN

UNITED STATES, 1. AG= 2.11 1000's. 112 .40

15. 45. 110. 120.

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13. 12. 12.

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7. 7. 7.

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DAM SAFETY INSPECTION

BY DJS

DATE 1-30-80

PROJ. NO. 79-203-472

CHKD. BY DLB

DATE 1-30-80

SHEET NO. C OF D



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[illegible]

INFLOWS INTO RESERVOIR		SUB-BASIN 2	
PEAK	72-HOUR	PEAK	72-HOUR
1511.	616.	907.	370.
54.	17.	10.	4.
	22.44	13.76	14.26
	23.77	349.57	362.25
	582.61	734.	760.
	1223.	905.	934.
	1563.		
TOTAL		TOTAL	
30663.		36740.	
		1042.	
		14.76	
		362.25	
		760.	
		934.	

COMBINE HYDROGRAPHS

COMBINE HYDROGRAPHS:

INSTAQ	ICOMP	LECON	ITAPE	JPLT	JPRP	INAME	ISTAGE	LAUTO
1	2	0	0	0	0	1	0	0

COMBINE SUB-BASIN INFLOW HYDROGRAPHS
AT RESERVOIR: /

AT RESERVOIR:

[illegible]

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STUDY OF DAM SAFETY ANALYSIS

WAVELENGTH	AMPLITUDE	PHASE	PERIOD	WAVELENGTH	AMPLITUDE	PHASE	PERIOD
1.434.00	1434.00	0.0	0.00	1.434.00	1434.00	0.0	0.00
1.434.50	1434.50	0.0	0.00	1.434.50	1434.50	0.0	0.00
1.435.00	1435.00	0.0	0.00	1.435.00	1435.00	0.0	0.00
1.435.50	1435.50	0.0	0.00	1.435.50	1435.50	0.0	0.00
1.436.00	1436.00	0.0	0.00	1.436.00	1436.00	0.0	0.00
1.436.50	1436.50	0.0	0.00	1.436.50	1436.50	0.0	0.00
1.437.00	1437.00	0.0	0.00	1.437.00	1437.00	0.0	0.00
1.437.50	1437.50	0.0	0.00	1.437.50	1437.50	0.0	0.00
1.438.00	1438.00	0.0	0.00	1.438.00	1438.00	0.0	0.00
1.438.50	1438.50	0.0	0.00	1.438.50	1438.50	0.0	0.00
1.439.00	1439.00	0.0	0.00	1.439.00	1439.00	0.0	0.00
1.439.50	1439.50	0.0	0.00	1.439.50	1439.50	0.0	0.00
1.440.00	1440.00	0.0	0.00	1.440.00	1440.00	0.0	0.00
1.440.50	1440.50	0.0	0.00	1.440.50	1440.50	0.0	0.00
1.441.00	1441.00	0.0	0.00	1.441.00	1441.00	0.0	0.00
1.441.50	1441.50	0.0	0.00	1.441.50	1441.50	0.0	0.00
1.442.00	1442.00	0.0	0.00	1.442.00	1442.00	0.0	0.00
1.442.50	1442.50	0.0	0.00	1.442.50	1442.50	0.0	0.00
1.443.00	1443.00	0.0	0.00	1.443.00	1443.00	0.0	0.00
1.443.50	1443.50	0.0	0.00	1.443.50	1443.50	0.0	0.00
1.444.00	1444.00	0.0	0.00	1.444.00	1444.00	0.0	0.00
1.444.50	1444.50	0.0	0.00	1.444.50	1444.50	0.0	0.00
1.445.00	1445.00	0.0	0.00	1.445.00	1445.00	0.0	0.00
1.445.50	1445.50	0.0	0.00	1.445.50	1445.50	0.0	0.00
1.446.00	1446.00	0.0	0.00	1.446.00	1446.00	0.0	0.00
1.446.50	1446.50	0.0	0.00	1.446.50	1446.50	0.0	0.00
1.447.00	1447.00	0.0	0.00	1.447.00	1447.00	0.0	0.00
1.447.50	1447.50	0.0	0.00	1.447.50	1447.50	0.0	0.00
1.448.00	1448.00	0.0	0.00	1.448.00	1448.00	0.0	0.00
1.448.50	1448.50	0.0	0.00	1.448.50	1448.50	0.0	0.00
1.449.00	1449.00	0.0	0.00	1.449.00	1449.00	0.0	0.00
1.449.50	1449.50	0.0	0.00	1.449.50	1449.50	0.0	0.00
1.450.00	1450.00	0.0	0.00	1.450.00	1450.00	0.0	0.00
1.450.50	1450.50	0.0	0.00	1.450.50	1450.50	0.0	0.00
1.451.00	1451.00	0.0	0.00	1.451.00	1451.00	0.0	0.00
1.451.50	1451.50	0.0	0.00	1.451.50	1451.50	0.0	0.00
1.452.00	1452.00	0.0	0.00	1.452.00	1452.00	0.0	0.00
1.452.50	1452.50	0.0	0.00	1.452.50	1452.50	0.0	0.00
1.453.00	1453.00	0.0	0.00	1.453.00	1453.00	0.0	0.00
1.453.50	1453.50	0.0	0.00	1.453.50	1453.50	0.0	0.00
1.454.00	1454.00	0.0	0.00				

* INTERPOLATED VALUES; OVERTOPPING OCCURS AT APPROXIMATELY 0.52 PMF.

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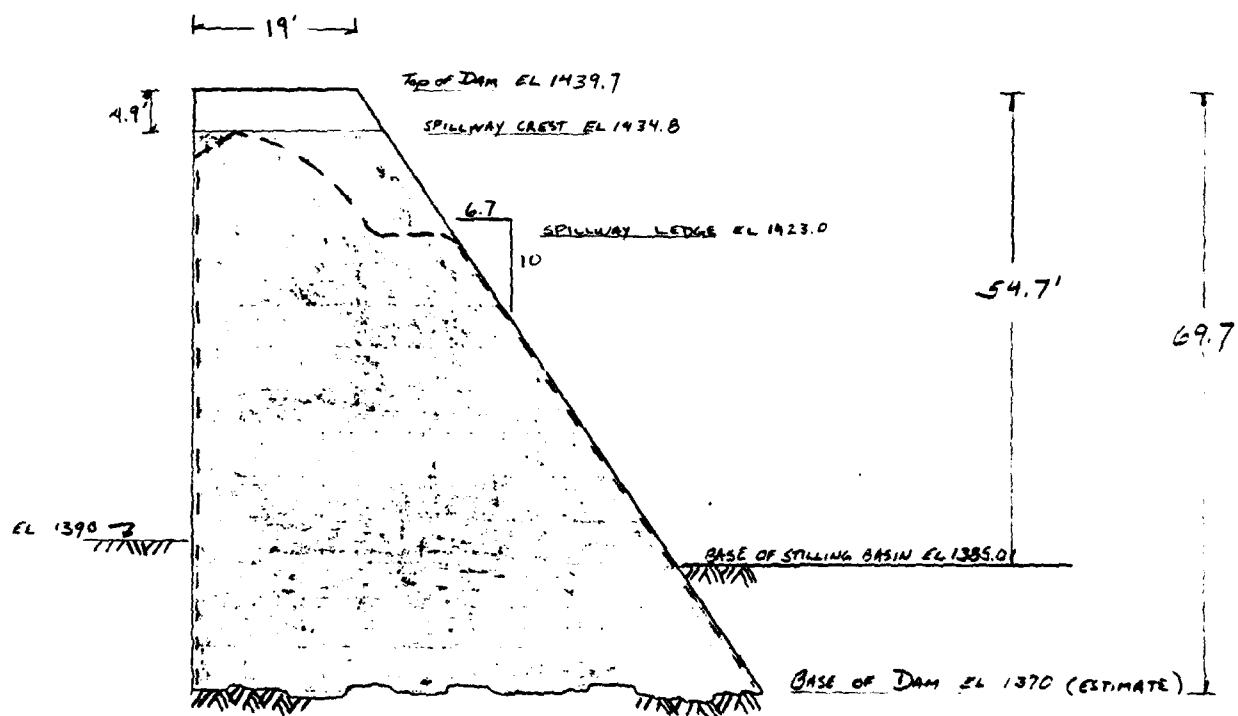
APPENDIX D-1
STABILITY CALCULATIONS

PROJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DLB DATE 1-21-80 PROJ. NO. 79-203-472
 CHKD. BY DJS DATE 2-13-80 SHEET NO. 1 OF 5

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STABILITY ANALYSIS

ANALYZE THE DAM CONSIDERING THE FOLLOWING SECTION.



SCALE 1" = 20'

NOTE: THE SHADED PORTION OF THE ABOVE VIEW WILL BE USED
 IN THE ANALYSIS TO REPRESENT THE SPILLWAY CROSS
 SECTION ROUGHLY DEPICTED BY THE DASHED LINE.

REF: FIGURES 4 AND 5 AND
 FIELD NOTES.

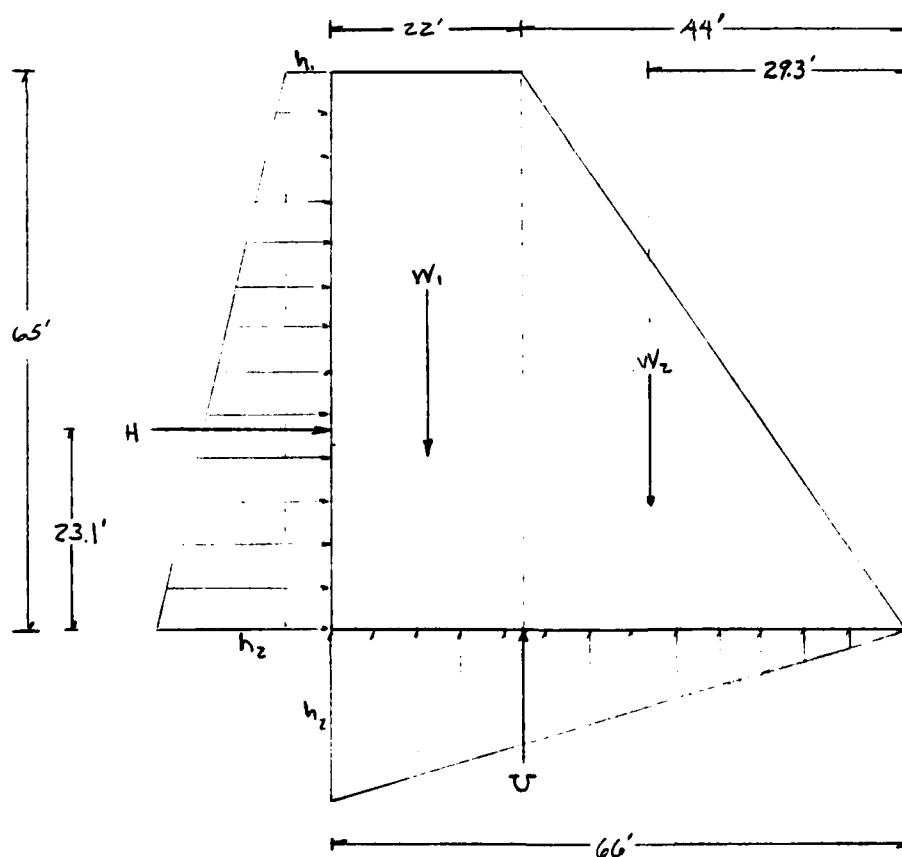
PROJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DLB DATE 2-12-80 PROJ. NO. 79-203-472
 CHKD. BY DJS DATE 2-13-80 SHEET NO. 2 OF 5

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THE FOLLOWING ANALYSIS CONSIDERS THE POOL LEVEL TO BE AT THE TOP OF DAM.

FORCES INCLUDED IN THIS ANALYSIS ARE HYDROSTATIC PRESSURE, UPLIFT PRESSURE, AND WEIGHT OF DAM.

FORCES NOT CONSIDERED INCLUDE, WAVE PRESSURE, ICE PRESSURE, EARTHQUAKE FORCES, FOUNDATION RESISTANCES DUE TO KEYS OR TIES, AND LATERAL EARTH PRESSURES.



ASSUME NO
TAILWATER

SCALE 1in = 20ft

PROJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
 BY DLB DATE 2-12-80 PROJ. NO. 79-203-472
 CHKD. BY DJS DATE 2-13-80 SHEET NO. 3 OF 5



HYDROSTATIC FORCE ON UPSTREAM FACE OF DAM

$$H = \gamma \left(\frac{h_1 + h_2}{2} \right) T$$

WHERE h_1 = HEAD ABOVE SPILLWAY ≈ 5.0 FT
 h_2 = TOTAL HEAD ≈ 70.0 FT
 γ = UNIT WGT OF WATER = 62.4 Lbs/FT^3
 T = UNIT AREA OF APPLIED PRES = 65 FT^2

$$H = (62.4 \text{ Lbs/FT}^3) \left(\frac{5.0 + 70.0}{2} \right) \text{ FT} (65 \text{ FT}^2) = 152,100 \text{ Lbs}$$

UPLIFT FORCE ON BASE OF DAM

$$U = \frac{1}{2} \gamma h_2 T$$

$$= \frac{1}{2} (62.4 \text{ Lbs/FT}^3) (70.0 \text{ FT}) (65 \text{ FT}^2) = 144,144 \text{ Lbs}$$

WEIGHT OF DAM

$$W_1 = \gamma_c h b (1.0 \text{ FT})$$

WHERE h = HEIGHT OF SECTION = 65 FT
 b = WIDTH OF SECTION = 22 FT
 γ_c = UNIT WGT OF CONCRETE = 150 Lb/FT^3

$$W_1 = (150 \text{ Lb/FT}^3) (65 \text{ FT}) (22 \text{ FT}) (1.0 \text{ FT}) = 214,500 \text{ Lbs}$$

$$W_2 = \frac{1}{2} \gamma_c h b (1.0 \text{ FT})$$

$$= \frac{1}{2} (150 \text{ Lbs/FT}^3) (65 \text{ FT}) (44 \text{ FT}) (1.0 \text{ FT}) = 214,500 \text{ Lbs}$$

SUBJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
BY DLB DATE 2-12-80 PROJ. NO. 79-203-472
CHKD. BY DJS DATE 2-12-80 SHEET NO. 4 OF 5



OVERTURNING

INDUCING MOMENTS

$$M_1 = H(23.1 \text{ FT}) + V(44 \text{ FT}) = 9,855,850 \text{ LB-FT}$$

RESISTING MOMENTS

$$M_2 = W_1(55 \text{ FT}) + W_2(29.3 \text{ FT}) = 18,082,350 \text{ LB-FT}$$

FACTOR OF SAFETY AGAINST OVERTURNING

$$\begin{aligned} \text{F.S.} &= \frac{\text{RESISTING MOMENTS}}{\text{INDUCING MOMENTS}} = \frac{M_2}{M_1} \\ &= \frac{18,082,350 \text{ LB-FT}}{9,855,850 \text{ LB-FT}} = 1.8 \end{aligned}$$

SLIDING

INDUCING FORCE

$$H = 152,100 \text{ LBS}$$

RESISTING FORCE

$$F_f = \mu(W_T - U)$$

$$\begin{aligned} \text{WHERE } \mu &= \text{FRICTION FACTOR} = 0.75 \text{ (pg 295, REF 17)} \\ &= (0.75)(429,000 - 144,144) \text{ LBS} = 213,640 \text{ LBS} \end{aligned}$$

SUBJECT DAM SAFETY INSPECTION
ROCKVIEW RESERVOIR DAM
BY DLB DATE 2-12-80 PROJ. NO. 79-203-472
CHKD. BY JJS DATE 2-12-80 SHEET NO. 5 OF 5

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FACTOR OF SAFETY AGAINST SLIDING

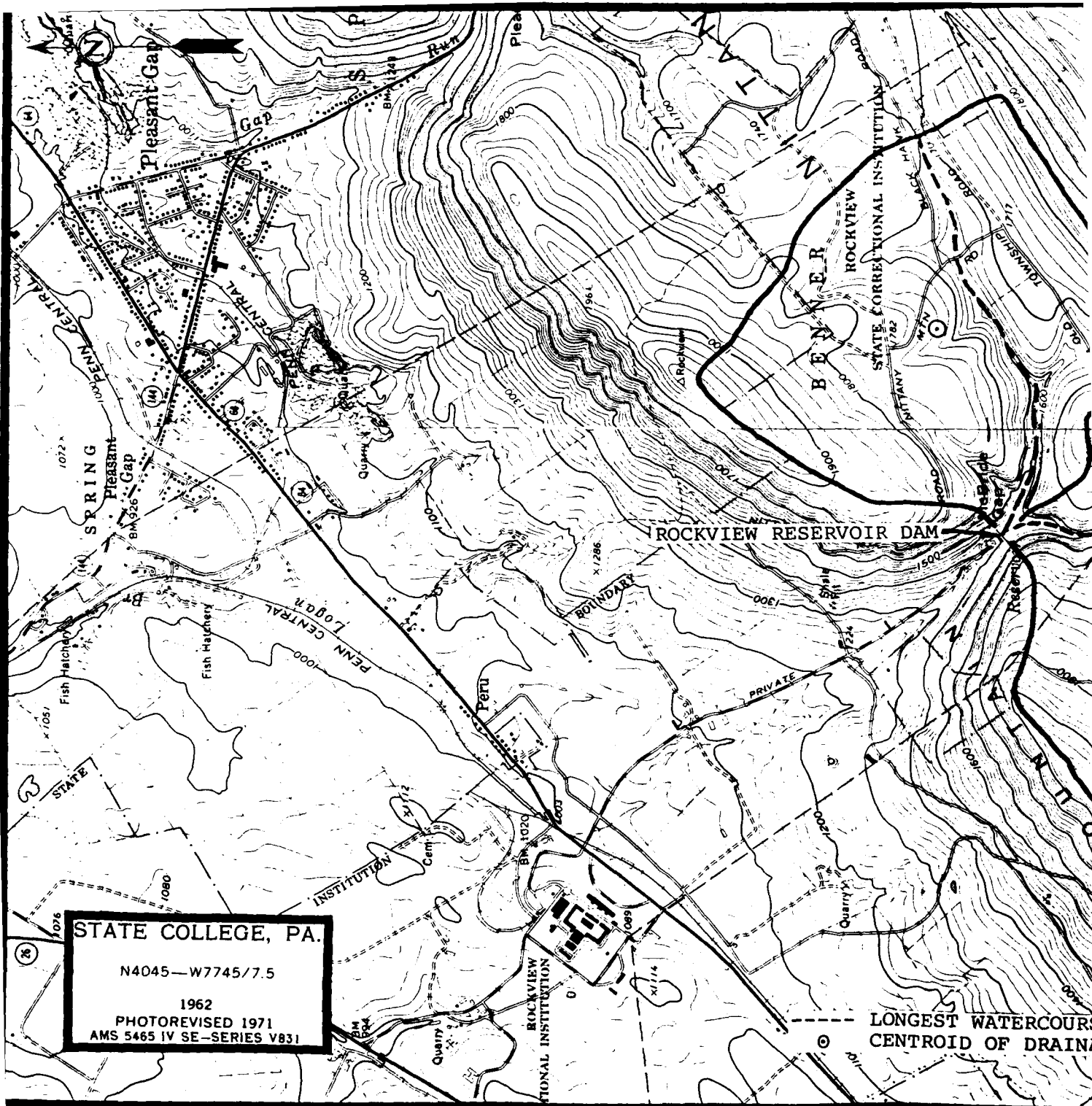
$$\begin{aligned} \text{F.S.} &= \frac{\text{RESISTING FORCE}}{\text{INDUCING FORCE}} = \frac{213,640 \text{ Lbs}}{152,100 \text{ Lbs}} = \\ &= 1.4 \end{aligned}$$

APPENDIX E

FIGURES

LIST OF FIGURES

<u>Figure</u>	<u>Description/Title</u>
1	Regional Vicinity and Watershed Boundary Map
2	General Plan (1926)
3	General Plan (1934)
4	Spillway Cross-Section (1926)
5	Spillway Cross-Section (1934)
6	Dam Plan (1934)
7	Gate House Details (1934)
8	Miscellaneous Details (1934)



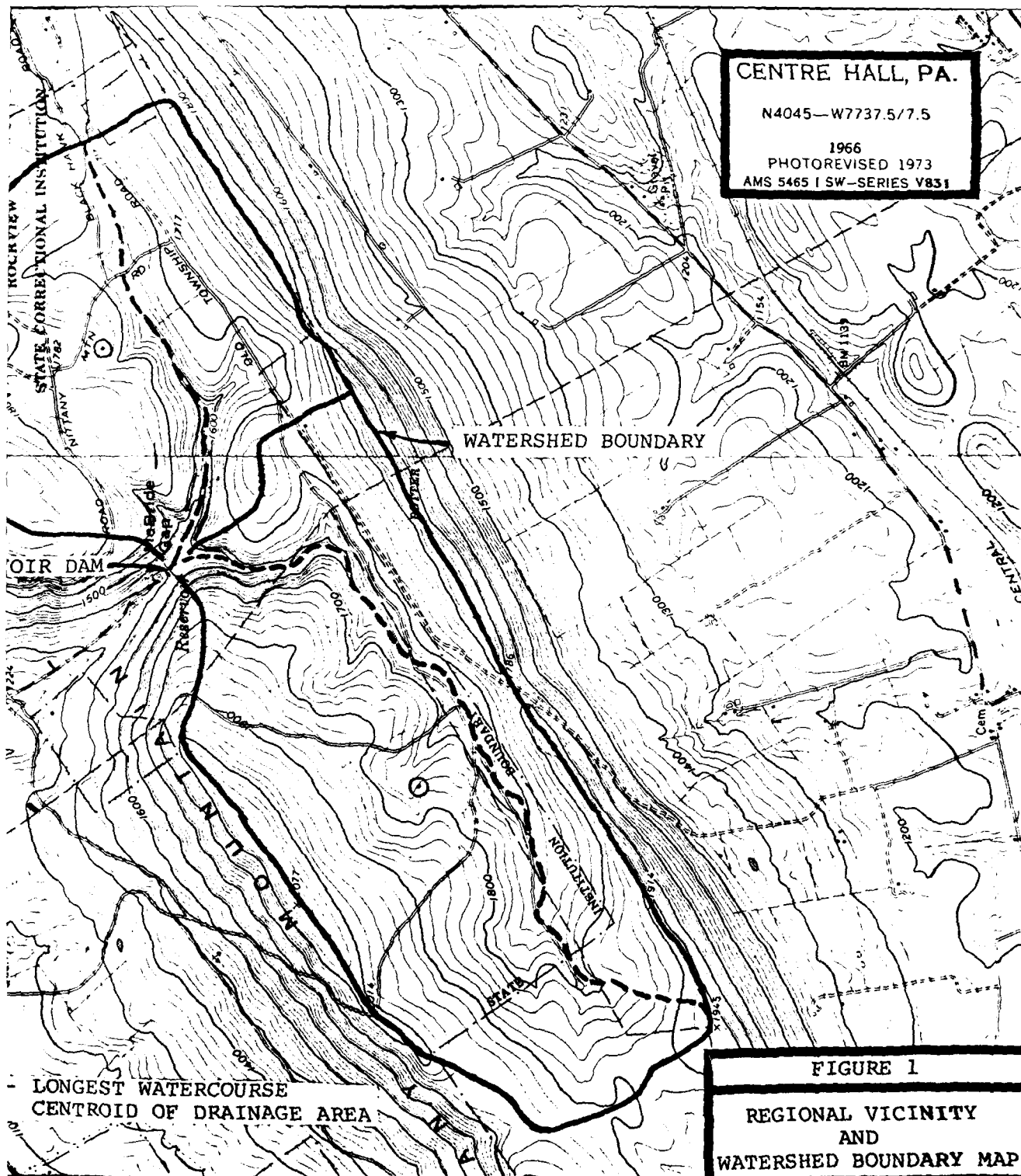
STATE COLLEGE, PA.

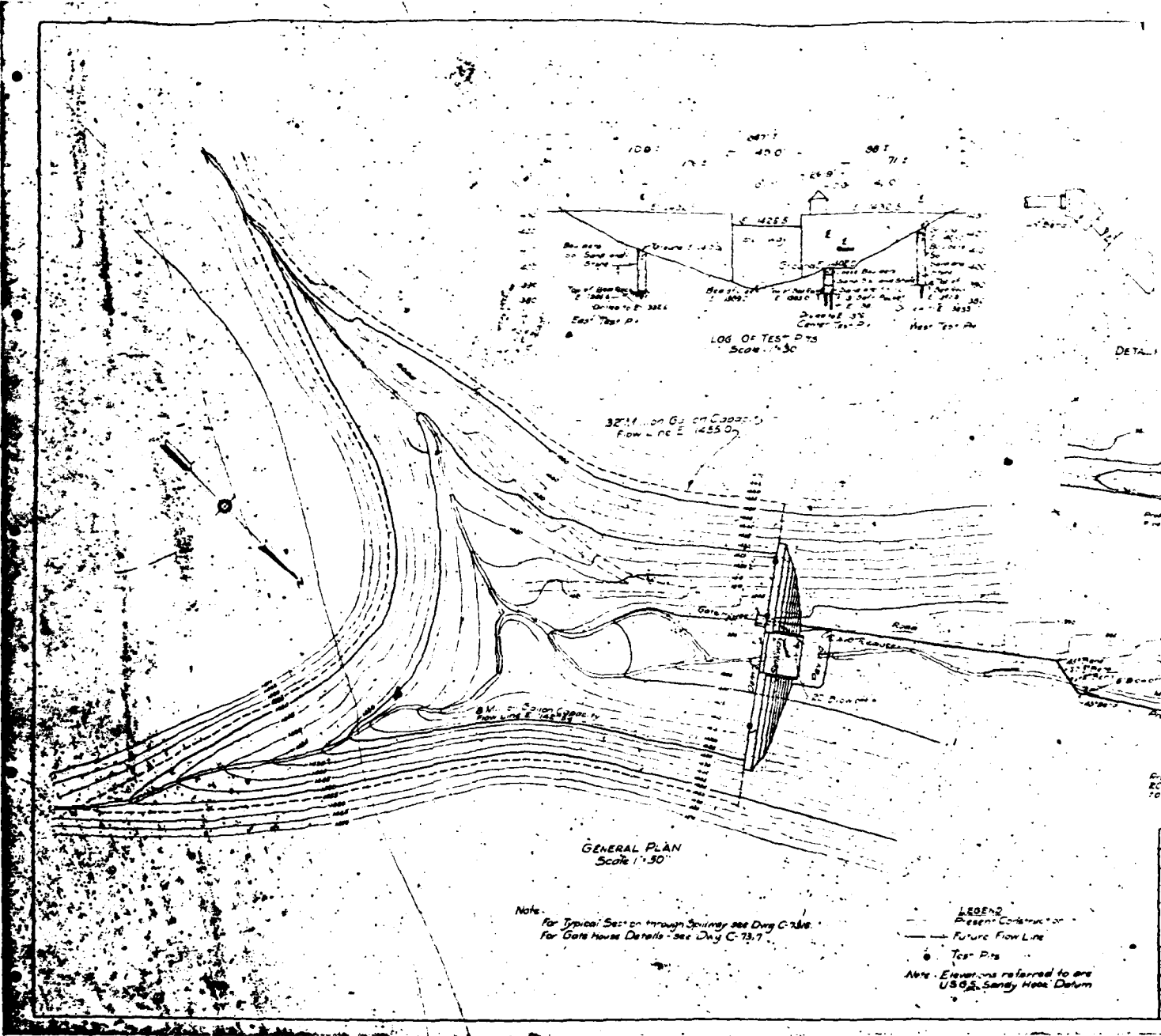
N4045-W7745/7.5

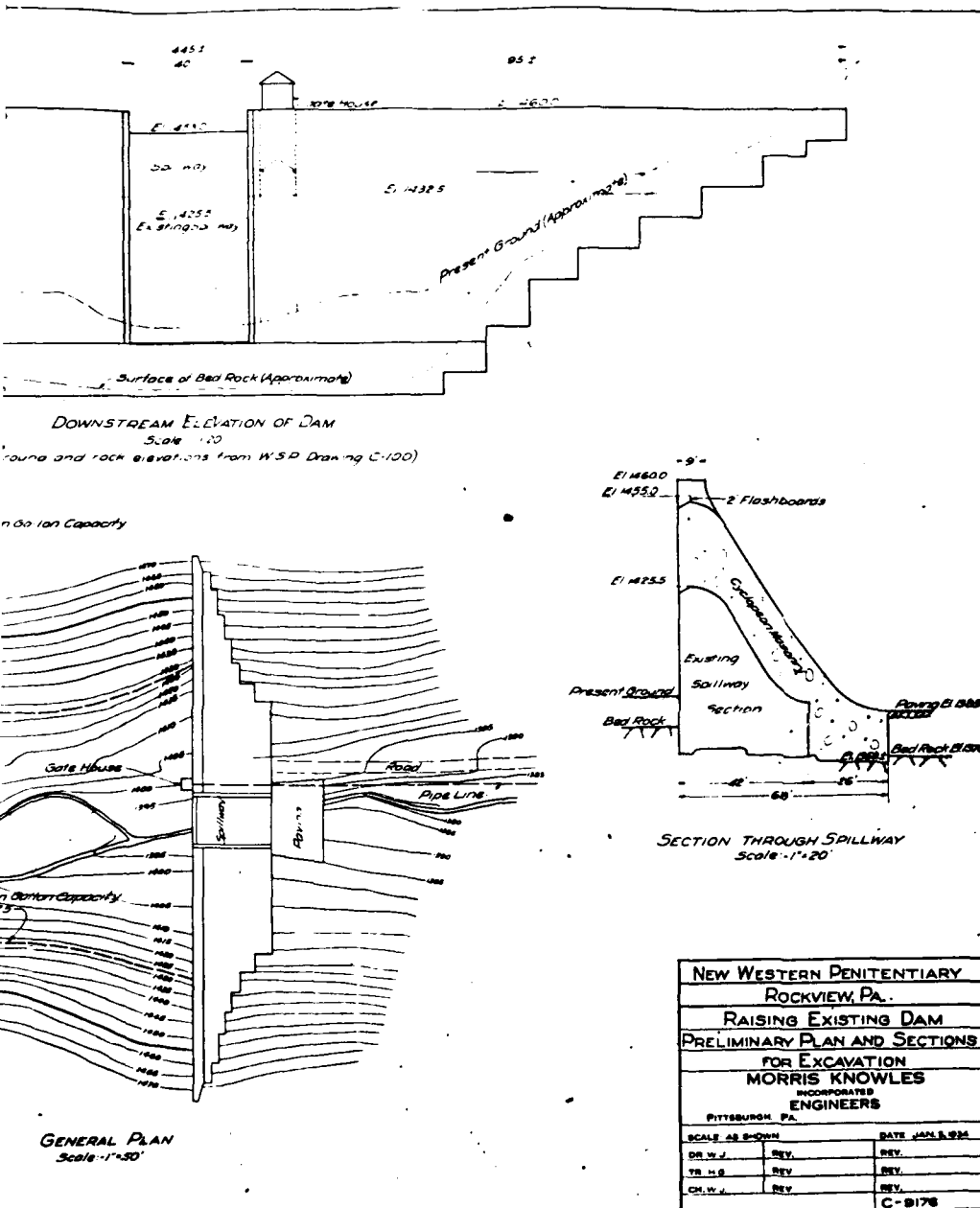
1962

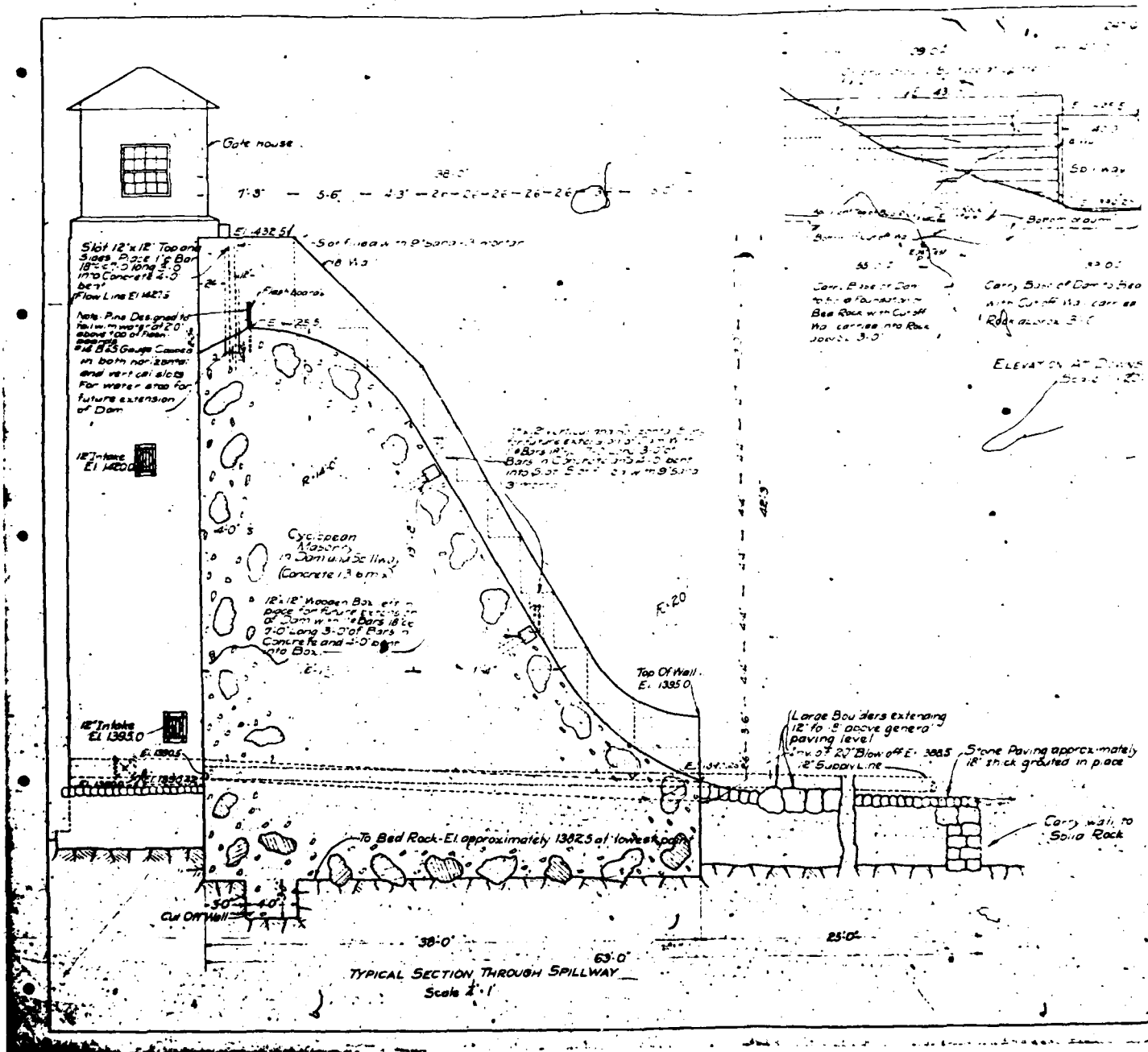
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AMS 5465 IV SE-SERIES V831

LONGEST WATERCOURSE
CENTROID OF DRAINAGE





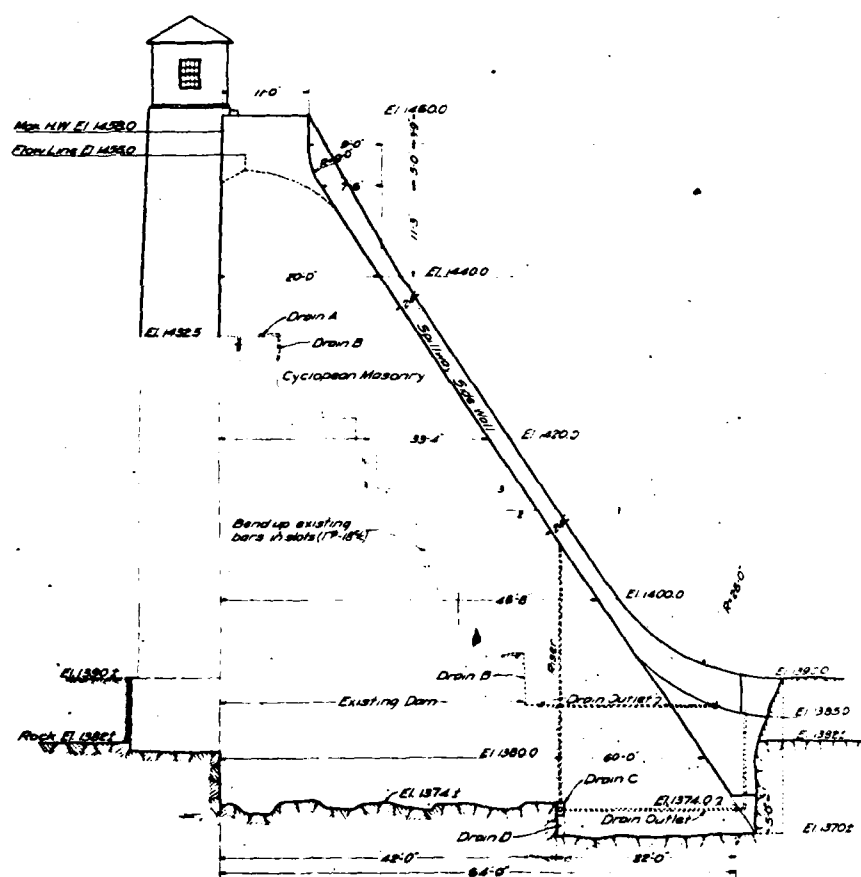






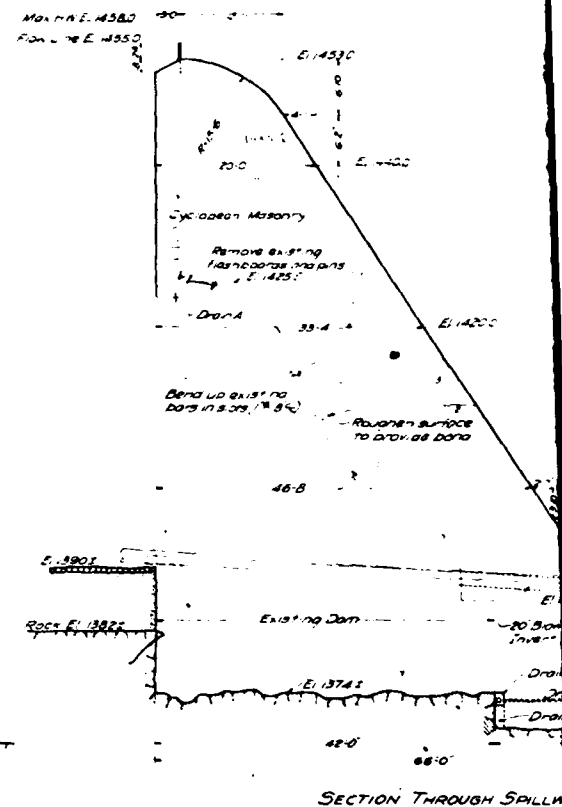
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FIGURE 4



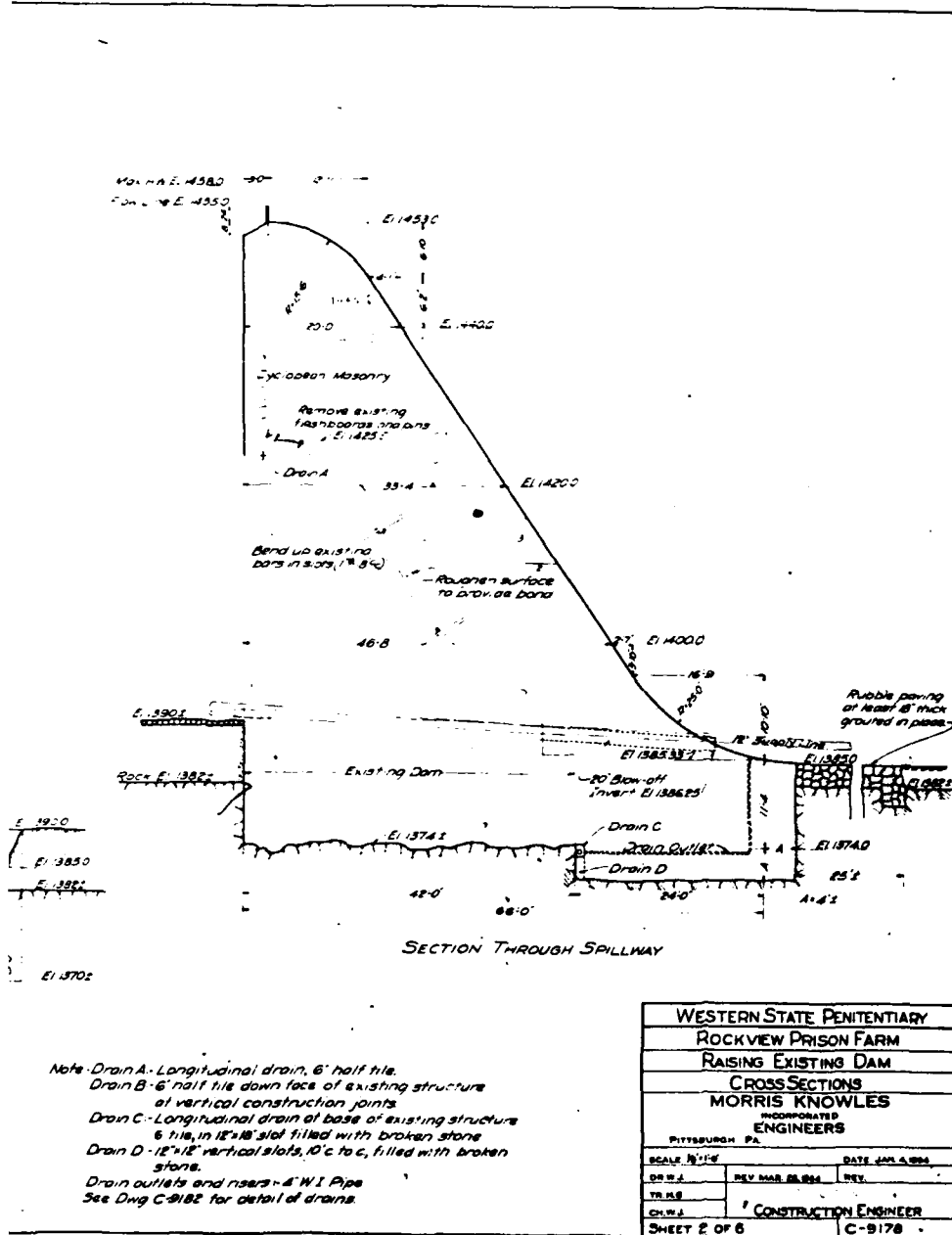
NON-OVERFLOW SECTION

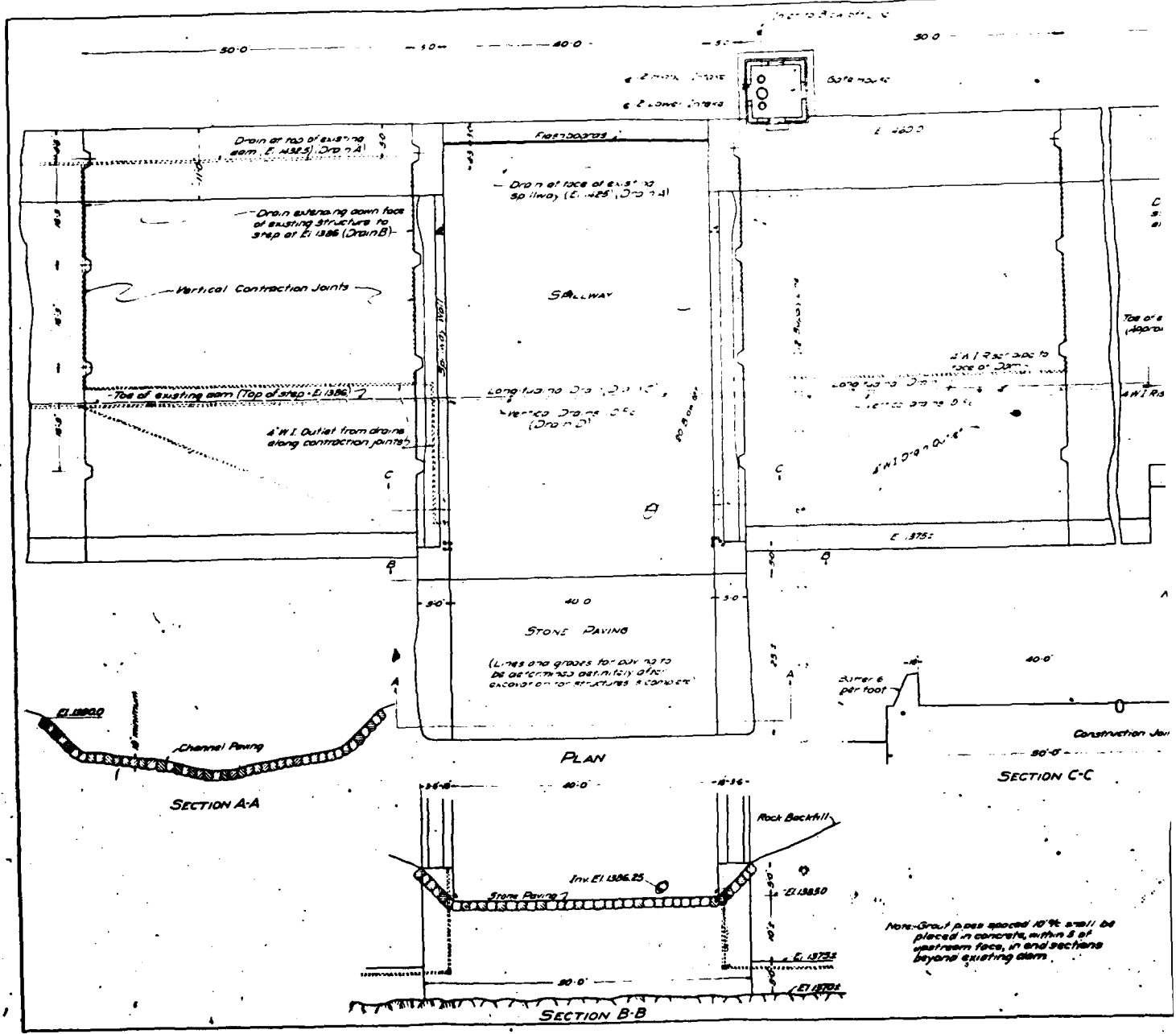
Note - Facing of new structure to be 1:2:4 concrete, at least 24" thick, or limestone masonry. See Dwg C-9182 for detail of masonry facing.



SECTION THROUGH SPILLWAY

Note - Drain A - Longitudinal drain, 6" half tile.
 Drain B - 6" half tile down face of existing structure at vertical construction joints.
 Drain C - Longitudinal drain at base of existing structure 6" tile, in 12"x18" slot filled with broken stone.
 Drain D - 12"x12" vertical slots, 10' c to c, filled with broken stone.
 Drain outlets and risers - 4" W.I. Pipe.
 See Dwg C-9182 for detail of drains.

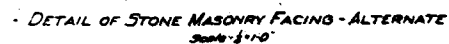
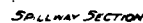






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FIGURE 6





W
PITT
SCALE
DR W J
TR M B
CL W J
SHEET

APPENDIX F

GEOLOGY

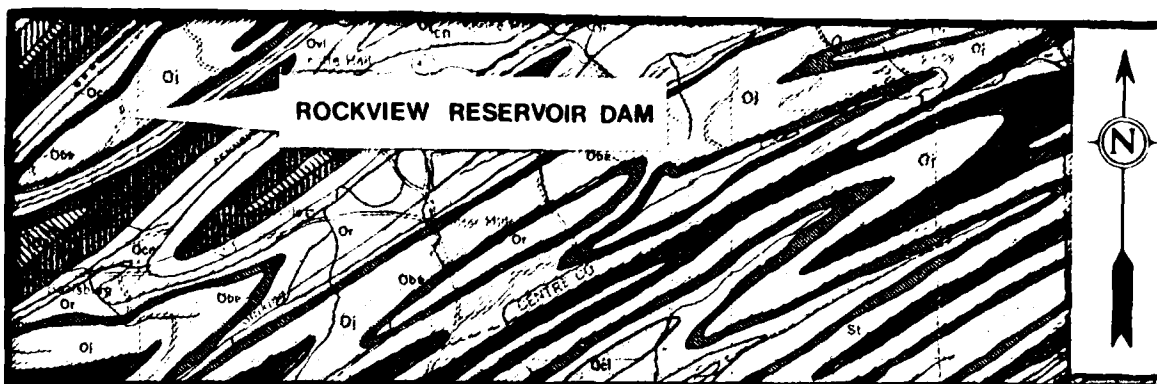
Geology.

Rockview Reservoir Dam is located in McBride's Gap, almost directly over the axial trace of the Nittany Mountain syncline, about one mile southeast of Pennsylvania Route 64. This area is within the Appalachian Mountain section of the Valley and Ridge province of Central Pennsylvania. This section, in the area of the dam and reservoir, is characterized by moderately folded sedimentary rock strata of Silurian and Ordovician age. Major structural axes strike from the southwest to the northeast with flanking strata dipping northwest and southeast, a resultant of intense lateral compression from the southeast.

At the dam site, bedrock varies from 17 to 35 feet below the top of ground. Bedrock is of Upper Ordovician age and is represented by the Oswego sandstone, which is characteristically a "thick-bedded greenish-gray iron speckled, somewhat arkosic sandstone; a little conglomerate." Immediately overlying the Oswego sandstone is the Juniata Formation, typically a "red shale and sandstone, some gray sandstone."

These rock types weather to produce the materials found in test pits excavated at the dam site prior to construction, as indicated on Figure 1, Appendix E. The materials encountered in the three test pits excavated ranged in thickness from 17 to 35 feet, and consisted of "boulders, soil, sand, and stone."

Butts, C., and Moore, E. S., "Geology and Mineral Resources of the Bellefonte Quadrangle, Pennsylvania," Bulletin 855, United States Department of the Interior, 1936.



LEGEND

SILURIAN

Keyser Formation

Dark gray, highly fossiliferous, thick bedded, crystalline to nodular limestone; passes into Manlius, Rondout, and Decker Formations in the east.

Tonnoloway Formation

Gray, highly laminated, thin bedded, argillaceous limestone; passes into Rosmarville and Pozono Island beds in the east.

Wills Creek Formation

Greenish gray, thin bedded, fossil shale with local limestone and sandstone zones; contains red shale and siltstone in the lower part.



Bloomsburg Formation

Red, thin and thick bedded shale and siltstone with local units of sandstone and thin impure limestone; some green shale in places.



Clinton Group

Predominantly Rose Hill Formation - Reddish purple to greenish gray, thin to medium bedded, fossiliferous shale with intertonguing "iron sandstones" and local gray, fossiliferous limestone; above the Rose Hill is brown to white quartzitic sandstone (Keyser) interbedded upward with dark gray shale (Rochester).



Tuscarora Formation

White to gray, medium to thick bedded, fine grained, quartzitic sandstone, conglomeratic in part.

ORDOVICIAN

CENTRAL PENNSYLVANIA



Juniata Formation

Red, fine grained to conglomeratic, quartzitic sandstone with well developed cross-bedding and with interbedded red shale in places.



Bald Eagle Formation

Gray to greenish gray, fine grained to conglomeratic, thick bedded sandstone; often iron-speckled and cross-bedded; some greenish gray shale in places.



Reedsville Formation

Dark gray, olive weathering shale with thin silty to sandy interbeds; black shale of Antes Formation at the base.

Coburn Formation

Dark gray to black, thin bedded limestone with black shale interbeds.

Salona Formation

Dark gray, thin bedded, dense limestone.

Nealmont Formation

Bluish gray, finely crystalline, fossiliferous limestone; lower part grades laterally into Curtin Formation.

Curtin Formation

Gray, impure limestone, bluish gray, fine grained, high calcium limestone with some larger calcite grains (Valentine Member, Ov) at the top.

Benner Formation

Gray, mottled, dolomitic limestone and coarse granular limestone.

Hatter Formation

Dark gray, impure, fossiliferous limestone.

Loysburg Formation

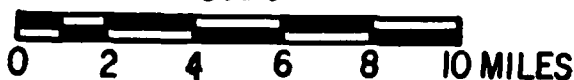
Dense limestone over irregularly banded dolomitic limestone.



Bellefonte Formation

Gray, cream to tan weathering, medium bedded dense dolomite.

Scale



GEOLOGY MAP

REFERENCE:

GEOLOGIC MAP OF PENNSYLVANIA PREPARED BY COMMONWEALTH OF PENNA. DEPT. OF INTERNAL AFFAIRS, DATED 1960, SCALE 1" = 4 MILES

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