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NATIONAL DAM INSPECTION PROGRAM. NEW DAM (NDI-PA-503), OHIO RIV--ETC(U)
JAN 79 L D ANDERSON, G K WITHERS DACW31-78-C-0049

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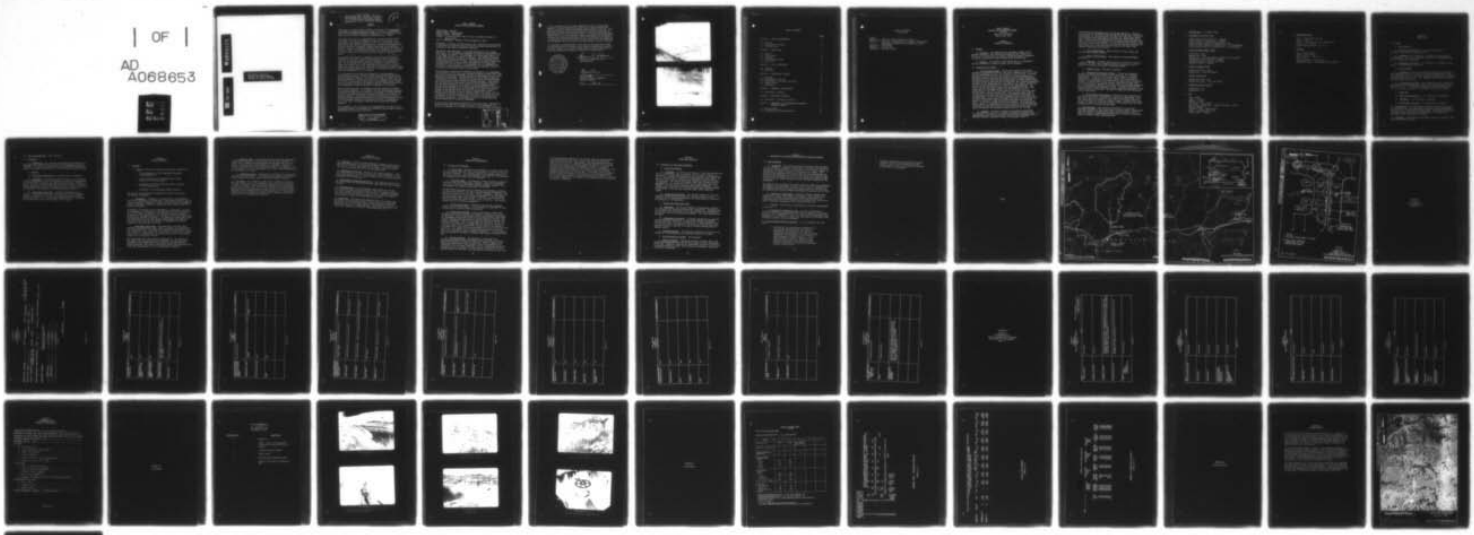

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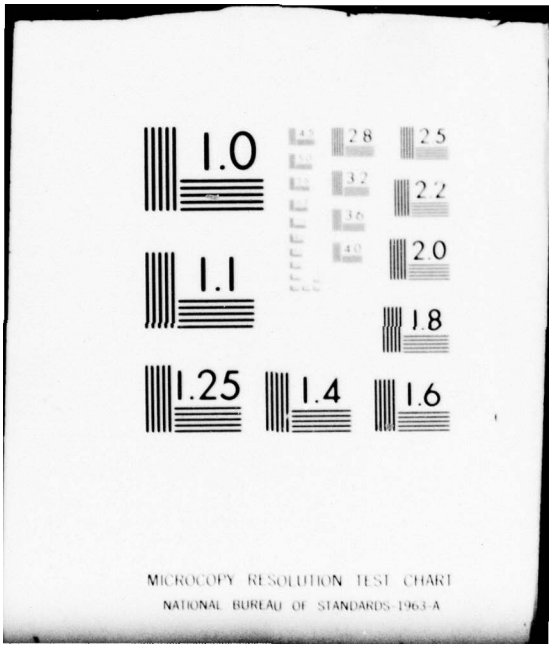
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(6) National Dam Safety Program. New Dam (NDI-PA-503), Ohio River Basin, Tributary of St. Patricks Run, Washington County, Pennsylvania. Phase I Inspection Report, (1)

(11) Jan 79 (12) 54 p.

(15) DACW31-78-C-0049

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 Department of the Army, 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 visual observations and review of available data. Detailed investigation and analyses involving topographic mapping, subsurface investigations, material testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the inspection is intended to identify any need for such studies which should be performed by the owner.

(10) Lawrence D. Anderson G. K. Withers

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 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 the dam depends on numerous and constantly changing internal and external factors which are 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.

The assessment of the conditions and recommendations was made by the consulting engineer in accordance with generally and currently accepted engineering principles and practices.

JOB

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

NAME OF DAM: New Dam
STATE LOCATED: Pennsylvania
COUNTY LOCATED: Washington
STREAM: A tributary of St. Patrick's Run (secondary tributary of Raccoon Creek
DATE OF INSPECTION: November 29 and December 20, 1978

ASSESSMENT: Based on the evaluation of the conditions as they existed on the dates of inspection and as revealed by visual observations, the condition of New Dam is considered to be poor.

The dam has been abandoned. It has been drained and is no longer maintained. All the operating equipment has severely deteriorated and is no longer functional. The embankment is covered with trees 10 to 15 feet high and up to 3 inches in diameter. The spillway discharge channel has also been overgrown and contains debris which may pose a potential for obstruction of flow. The presence of ponded water along the downstream toe of the dam which saturates the toe raises some concern as to the stability of the embankment if the embankment were subjected to normal operating conditions when the reservoir filled to its normal pool elevation after a major storm.

The spillway is classified as inadequate according to the recommended criteria since it will only pass 20 percent probable maximum flood (PMF) and will not pass the recommended spillway design flood of half to full PMF without overtopping. The spillway is not classified as seriously inadequate at this time. Failure of this dam due to overtopping would not significantly increase downstream damage potential. This assessment is based on the observation that the flood discharge capacity of the Old Dam downstream is less than the flood discharge capacity of this dam and, consequently, the downstream damage would be a result of failure of the Old Dam at an earlier stage of a storm and subsequent failure of the New Dam would not likely introduce added losses. However, modifications to the Old Dam may change this rating, such as increasing the spillway capacity of the Old Dam to an extent such that overtopping failure of the downstream dam would be initiated by the overtopping of New Dam. The spillway capacity of the New Dam would then be classified as seriously inadequate.

In view of the deteriorated condition of the outlet works, inadequacies of the spillway, and the uncertain condition of the embankment, the facility is assessed to be unsafe, but not in imminent danger of failure.

It is recommended that the owner immediately retain a professional engineer to evaluate the dam and appurtenances and to prepare and execute a plan for orderly abandonment and breaching of the dam. The plan should include hydrologic and hydraulic studies evaluating the downstream effects of any planned action. If for any reason the owner should decide not to proceed with orderly abandonment and breaching of the dam, the dam and appurtenances should be immediately evaluated by a professional engineer for repairs to the outlet works and embankment and enlargement of the spillway to provide adequate spillway capacity.

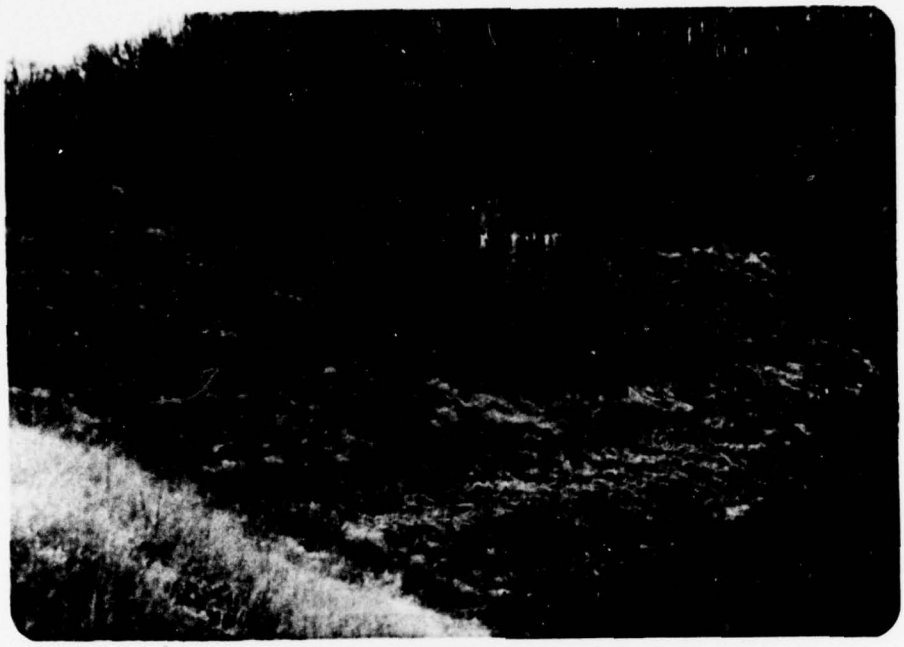
It is further recommended that in the event of unusually high runoff an around-the-clock surveillance plan should be implemented to detect possible problems and a formal warning system should be developed to alert the downstream residents in the event of an emergency.

Lawrence D. Andersen

Lawrence D. Andersen, P.E.
Vice President

G. K. WITHERS
Colonel, Corps of Engineers
District Engineer

DATE: 1 Mar 79



Upstream Face

Downstream Face

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(Continued)

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
NEW DAM
NDI I.D. NO. PA-503
DER I.D. NO. 63-2

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. The inspection was performed pursuant to the authority granted by The National Dam Inspection Act, Public Law 92-367, to the Secretary of the Army, through the Corps of Engineers, to conduct inspections of dams throughout the United States.

b. Purpose. The purpose of this inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Dam and Appurtenances. The New Dam consists of an earth embankment approximately 330 feet long with a maximum height of 37 feet from the downstream toe and a crest width of 32 to 35 feet. The flood discharge facilities for the dam consist of a combined primary and emergency spillway located on the right abutment (looking downstream). The spillway is an earth channel excavated into the right abutment and includes neither an overflow control structure, nor an energy dissipation structure at the downstream end. The width of the channel varies from 30 feet at the upstream end to 20 feet at the downstream end. The channel follows the right abutment for approximately 200 feet, then turns left, and discharges freely over the hillside into the stream valley. The outlet works consist of a 24-inch cast-iron blow-off pipe and a concrete intake tower. The concrete intake tower is located on the upstream side of the dam approximately mid-height of the embankment. All the operating equipment on the intake tower has seriously deteriorated and is no longer functional. The blow-off pipe appears to extend 50 to 100 feet further upstream from the intake tower. No low-level intake structure was visible. Flow through the outlet conduit is controlled by a valve located at the downstream end. The valve was reportedly left open to draw down the lake. This outlet system constitutes the emergency drawdown facility for the dam.

b. Location. The dam is located on an unnamed tributary of St. Patrick's Run, which is a secondary tributary of Raccoon Creek approximately one-half mile upstream from Old Dam on Robinson Creek in Robinson Township, Washington County, Pennsylvania (Plate 1).

Flow from New Dam discharges into the Old Dam reservoir. There are no structures in the reach betwen the New Dam and Old Dam. Downstream from Old Dam, St. Patrick's Run flows under U.S. Route 22 and joins Little Raccoon Creek approximately one-half mile downstream from Old Dam. A mobile home park consisting of 26 mobile homes is located downstream of the Route 22 underpass. It is estimated that failure of New Dam would in turn cause failure of Old Dam and combined discharge will cause large loss of life and property damage in the mobile home community downstream from Old Dam.

c. Size Classification. Small (based on 37-foot height and 200 acre-feet storage capacity).

d. Hazard Classification. High (based on downstream damage potential).

e. Ownership. Allegheny Trails Council, Boy Scouts of America (address: Mr. Carl Lerz, Allegheny Trails Council, Boy Scouts of America, Flag Plaza, Pittsburgh, Pennsylvania 15219).

f. Purpose of Dam. The dam is abandoned.

g. Design and Construction History. The dam was originally designed by Douglas and McKnight, civil engineers, of Pittsburgh, Pennsylvania, in 1914 for the Citizens Water Company of McDonald, Pennsylvania. Although a construction permit for this design was approved by the Commonwealth of Pennsylvania, Water Supply Commission, in 1914, it appears that the dam was not constructed at that time. A revised design was prepared by Gannett, Seeley and Fleming Engineers, Inc., of Harrisburg, Pennsylvania in 1928. It appears that the dam was constructed by West Penn Water Company under the supervision of the design engineers during 1928. The date of completion of construction could not be found.

h. Normal Operating Procedure. The dam has been abandoned with the outlet works open. Therefore, no reservoir is maintained. When the inflow into the reservoir is less than the discharge capacity of the outlet works, the reservoir remains drained. However, when inflow exceeds the capacity of the outlet works, the reservoir will fill and discharge over the uncontrolled spillway.

1.3 Pertinent Data. The elevations referenced to in this and subsequent sections of this report were calculated based on approximate field measurements assuming the spillway crest elevation to be at 1025 feet, which is approximately determined from the U.S. Geological Survey 7.5-minute Clinton quadrangle map.

a. Drainage Area - 1.3 square miles

b. Discharge at Dam Site (cfs)

Maximun known flood at dam site - Unknown
Outlet conduit at maximum pool - Unknown
Gated spillway capacity at maximum pool - N/A
Ungated spillway capacity at maximum pool - 750 (estimated)
Total spillway capacity at maximum pool - 750 (estimated)

c. Elevation (USGS Datum) (feet)

Top of dam - 1031
Maximum pool - 1031
Normal pool - 1025 (approximate spillway crest elevation)
Upstream invert outlet works - Unknown
Streambed at center line of dam - 994+
Maximum tailwater - Unknown

d. Reservoir Length (feet)

Normal pool level - 2500
Maximum pool - 2700 (estimated)

e. Storage (acre-feet)

Normal pool level - 240
Maximum pool level - 353 (top of dam)

f. Reservoir Surface (acres)

Normal pool - 15
Maximum pool - 23

g. Dam

Type - Earth
Length - 330 feet
Height - 37 feet
Top width - 32 to 35 feet
Side slopes - Downstream: 1.8H:1V; Upstream: 2.5H:1V
Zoning - Unknown
Impervious core - Concrete wall
Cutoff - Concrete cutoff wall
Grout curtain - Unknown

h. Regulating Outlet

Type - 24-inch cast-iron pipe
Length - 200± feet
Closure - Gate valve at the downstream end
Access - Not accessible
Regulating facilities - Gate valve

i. Spillway

Type - Earth channel
Length - 20 to 30 feet
Crest elevation - 1025 feet
Gate - None
Upstream channel - Earth channel
Downstream channel - Trapezoidal earth channel

SECTION 2
DESIGN DATA

2.1 Design

a. Data Available

(1) Hydrology and Hydraulics. No design information is available on the hydrology and hydraulics.

(2) Embankment. No information is available on the design of the embankment. Available information consists of correspondence and several construction photographs.

(3) Appurtenant Structures. No information is available on the design of the appurtenant structures.

b. Design Features

(1) Embankment. The only information available on the design of this embankment consists of several construction photographs. These photographs indicate that the dam is an earth embankment with a concrete core extending to top of rock. The embankment was placed in layers and compacted with steam rollers.

(2) Appurtenant Structures. Again indicated by the construction photographs, the outlet pipe was placed into a trench excavated into the natural soil. No indication was found as to whether the outlet pipe was encased in concrete or if seepage collars were provided.

c. Design Data

(1) Hydrology and Hydraulics. No design data is available.

(2) Embankment. No design data is available.

(3) Appurtenant Structures. No design data is available.

2.2 Construction. The correspondence indicates that the construction of the dam was under the supervision of Gannett, Seeley and Fleming Engineers, Inc., of Harrisburg, Pennsylvania. Other than the construction photographs, which were described above, no information was available on the construction of the dam.

2.3 Operation. The dam has been abandoned, and as it presently exists has no operational features.

2.4 Other Investigations. None reported.

2.5 Evaluation

a. Availability. The available information was provided by the Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER). The owner was contacted to obtain additional information. However, no further information was available from the owner's records.

b. Adequacy

(1) Hydrology and Hydraulics. No design data is available.

(2) Embankment. Available information consists of construction progress photographs and some correspondence, which is not considered to be sufficient to evaluate the adequacy of the design. Further, in view of the age of the dam (completed in 1928), it is clear that the design approach and construction techniques are not likely to have been in conformance with currently accepted engineering practices.

(3) Appurtenant Structures. Available information is very limited. No indication was found as to whether the outlet pipe was encased in concrete or if cutoff collars were provided to control seepage along the pipe. The available information is not considered to be sufficient to assess the adequacy of the design.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The on-site inspection of New Dam consisted of:

1. Visual inspection of the embankment, abutments, and embankment toe.

2. Visual examination of the spillway and visual portions of the outlet works.

3. Observation of factors affecting runoff potential of the drainage basin.

4. Evaluation of the downstream hazard potential.

The specific observations are illustrated in Plate 2 and in the photographs in Appendix C.

b. Embankment. In general, the inspection of the embankment consisted of searching for indications of structural distress, such as cracks, subsidence, bulging, wet areas, seeps and boils, and observing general maintenance conditions, vegetative cover, erosion, and other surficial features.

In general, the condition of the embankment is considered to be poor. The embankment is covered with trees and brush 10 to 15 feet high and up to three inches in diameter. The overgrowth prevented adequate inspection of the downstream face of the dam. There is no direct line of sight from abutment to abutment. The presence of ponded water along the downstream toe of the dam suggests underseepage when reservoir levels are high. However, on the date of inspection, no signs of seepage were observed from the ponds.

c. Appurtenant Structures. The appurtenant structures were examined for deterioration, other signs of distress, and obstructions that would limit flow. In general, the structures were found to be in poor condition. The spillway has been partially overgrown and contains debris which is considered to pose restriction to flow. The spillway channel has no erosion protection.

The outlet works have also seriously deteriorated. The concrete in the intake tower has spalled and is crumbling. All the operating equipment in the intake tower has seriously deteriorated and is no longer functional. The valve on the outlet pipe at the downstream side of the dam also appears to be in a deteriorated condition.

d. Reservoir Area. A map review indicates that the watershed is predominantly covered with woodlands and has not been developed. A review of the regional geology (Appendix E) indicates that the side slopes of the reservoir are susceptible to landslides. However, massive landslides which would significantly affect the storage volume of the reservoir or cause overtopping of the dam by displaced water are not considered to be likely.

e. Downstream Channel. Downstream from the dam, the stream flows into the Old Dam reservoir. No conditions were observed in the downstream channel that might present significant hazard to the dam.

3.2 Evaluation. The condition of the dam is considered to be poor. The size of the trees on the embankment, from 10 to 15 feet high and 3 inches in diameter, suggests that the embankment has not been maintained in the recent past. The visible portions of the outlet works have significantly deteriorated, raising concern as to the structural integrity of the remaining portion of the outlet works. The spillway channel has been overgrown and contains debris which may constitute obstruction of flow through the spillway.

SECTION 4
OPERATIONAL FEATURES

4.1 Procedure. The dam has been abandoned, therefore, there are no applicable maintenance or operating procedures. The owner reported that the dam has been drawn down and the valve on the outlet pipe left open to maintain the lake at the drawndown state.

4.2 Maintenance of the Dam. The dam is not being maintained. Trees and brush from 10 to 15 feet high and three inches in diameter on the crest and downstream face of the dam suggest that the dam has not been maintained in the recent past.

4.3 Maintenance of Operating Facilities. The operating facilities on the intake tower have deteriorated to an extent that they are no longer operable.

4.4 Warning System. No formal warning system exists for the dam. The dam is not accessible by automobile. The only access to the site is a path leading from Old Dam to this dam site. Telephone communication facilities are available via homes in the vicinity of Route 22 approximately one-half mile downstream from the dam.

4.5 Evaluation. The dam has been abandoned and is no longer being maintained. The operating facilities, such as the sluice gates and the gate hoists in the intake tower, have deteriorated to such an extent that they are no longer operable. The general maintenance and operational condition of the dam is considered to be poor.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

a. Design Data. New Dam has a watershed of 1.3 square miles and would impound a reservoir with a surface area of 15 acres at the spillway crest elevation. The combined emergency and primary spillway of the dam is located on the right abutment. The capacity of the spillway is determined to be 750 cfs with no freeboard.

b. Experience Data. As previously stated, New Dam is classified as a small dam in the high hazard category. Under the recommended criteria for evaluating emergency spillway discharge capacity, such impoundments are required to pass half to full PMF.

The PMF inflow hydrograph for the reservoir was determined utilizing the Dam Safety Version of the HEC-1 computer program, developed by the Hydrologic Center of the U.S. Army, Corps of Engineers. The data used for the computer input are presented in Appendix D. The PMF inflow hydrograph was found to have a peak of 3134 cfs, while the half PMF inflow hydrograph was found to have a peak of 1567 cfs. The computer outputs are also included in Appendix D.

c. Visual Observations. Portions of the spillway discharge channel are covered with brush. This condition is considered to pose a restriction to flows through the spillway.

d. Overtopping Potential. Various percentages of PMF inflow hydrograph were routed through the reservoir to determine the percent of PMF inflow that the dam can pass without significantly overtopping the embankment, which would result in the breaching of the dam. The computer analyses indicate that the spillway can pass 20 percent PMF without overtopping. For 30 percent PMF, the dam would overtop for a duration of 1.5 hours with a maximum depth of water over the dam of 0.16 foot; while for 40 percent PMF, the dam would be overtopped for a duration of 3.3 hours with a maximum depth of 0.51 foot if failure did not occur. The results of the overtopping analysis are labeled as Step 1 on the computer output included in Appendix D. It is estimated that overtopping of the dam by 6 inches would initiate breaching of the dam.

e. Spillway Adequacy. The spillway is classified to be inadequate according to the recommended criteria because it will not pass the required flow of half to full PMF. However, based on the downstream conditions as they presently exist, the spillway is not considered to be seriously inadequate; that is, downstream damage and potential loss of life would not significantly increase due to overtopping failure of this dam. This assessment is based on the fact that

the flood discharge capacity of the Old Dam, which is located immediately downstream from New Dam, is lower than the flood discharge capacity of the New Dam. Consequently, the downstream dam would fail at an earlier stage of a storm and subsequent failure of the New Dam would not cause significant added damage. However, it should be recognized that modification of the Old Dam, such as enlargement of the spillway capacity or breaching of the dam, may alter the spillway adequacy classification of the New Dam. In the event that the failure of the Old Dam is initiated by the failure of the upstream New Dam, which in turn would result in significant increase to hazard to loss of life further downstream, the spillway of the New Dam would be classified as seriously inadequate.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

(1) Embankment. As discussed in Section 3, the field observations did not reveal major signs of distress, such as cracks, bulges, or subsidence. Although some ponded water was observed on the downstream toe, it appeared that no seepage was associated with these ponds. It should be noted that the reservoir was essentially empty on the date of inspection. The dam was impounding a pond with a surface area of approximately 2 to 3 acres at a level 31 feet below the crest level. Therefore, the dam was not inspected under normal conditions. It is probable that conditions may have been obscured which would otherwise be detectable if the dam were inspected under normal operating stages.

(2) Appurtenant Structures. The visible portions of the outlet works have significantly deteriorated, raising concern as to the condition of the remaining portions of the outlet works as they affect the integrity of the embankment.

b. Design and Construction Data

(1) Embankment. The dam was designed by professional engineers and apparently was constructed under their supervision. Available data on the design and construction of the dam consisted of correspondence and several construction progress photographs. No design drawings were available.

(2) Appurtenant Structures. No design information was available on the appurtenant structures. Construction progress photographs indicate that the outlet pipe was placed into a trench excavated into the natural ground. No indication was found as to whether the outlet pipe was encased in concrete or if cutoff collars were provided for seepage control.

c. Operating Records. The structural stability of the dam is not considered to be affected by the operating features of the dam.

d. Post-Construction Changes. None reported.

e. Seismic Stability. The dam is located in Seismic Zone 1 and visual observations did not indicate major signs of static instability of the dam. Therefore, based on the recommended criteria for evaluation of seismic stability of dams, the structure is presumed to present no hazard from earthquakes.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

a. Assessment. The visual observations indicate that New Dam is in poor condition. Although no major signs of distress were observed to indicate imminent danger of instability, such as cracks, bulges, or subsidence, the overall condition is assessed to be unsafe. The deteriorating condition of the outlet works and the unmaintained condition of the embankment and the fact that the dam was inspected when the reservoir was essentially empty, which removes the normal loading on the structure, create concern as to the continued integrity of the embankment.

The capacity of the spillway (20 percent PMF) was found to be inadequate according to the recommended criteria. But, it was not considered to be seriously inadequate, because overtopping failure of the dam would not significantly increase downstream damage and potential loss of life.

b. Adequacy of Information. Although no design drawings were available for review, the available information, which consisted of construction progress photographs and limited correspondence, in conjunction with visual observations are considered to be sufficient to make a reasonable assessment of the condition of the dam.

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

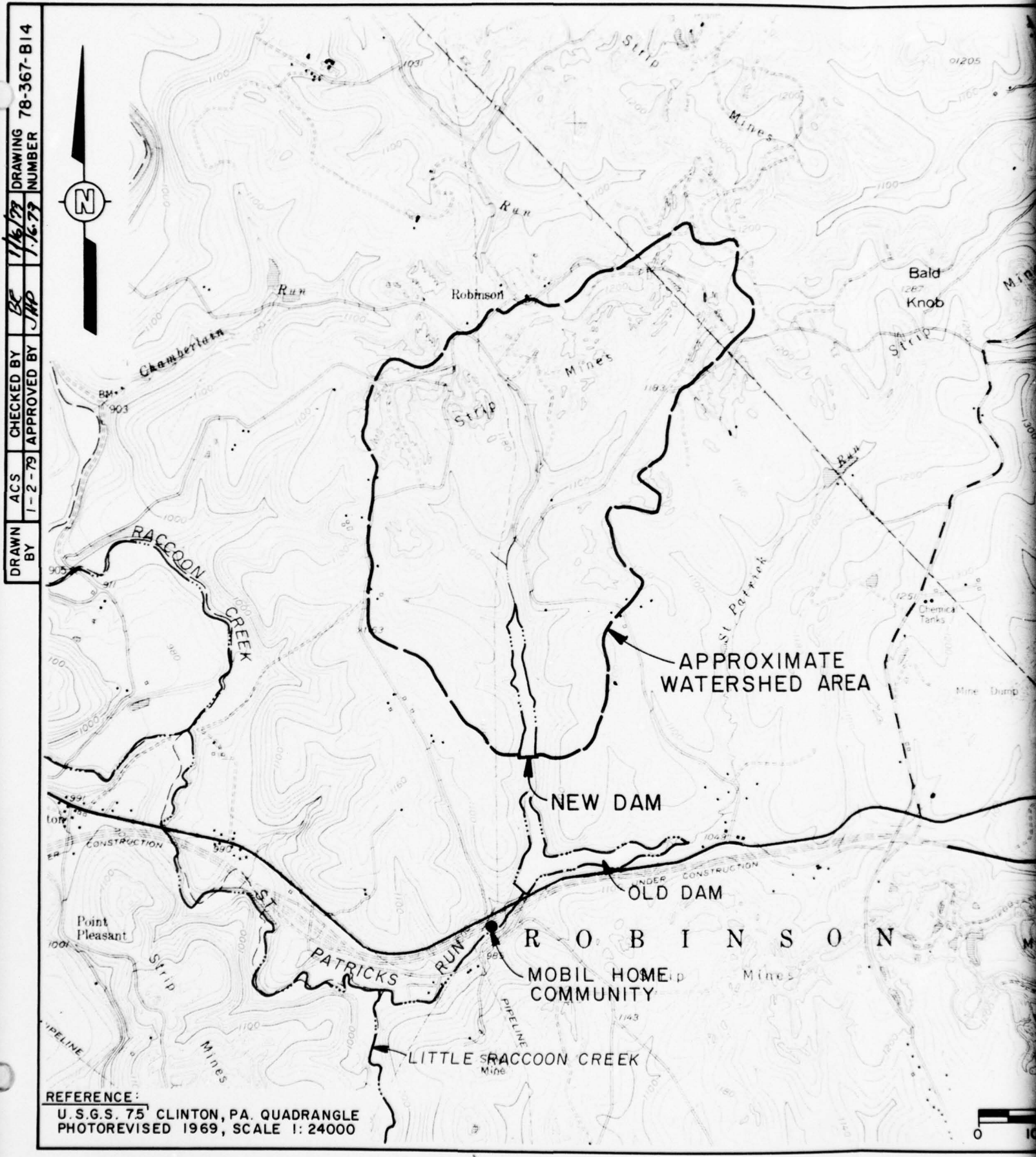
d. Necessity for Additional Data. The dam and appurtenant structures should be evaluated by a professional engineer for implementation of the recommendations which are either orderly abandonment and breaching of the structure or repair and restoration of the outlet works, spillway structures, and the embankment.

7.2 Recommendations/Remedial Measures. It is recommended that the owner:

1. Have the dam and appurtenances evaluated by a professional engineer either for orderly abandonment and breaching of the dam or for repairs and restoration of the outlet works and embankment and enlargement of the spillway to provide adequate spillway capacity. If the owner decides to breach or remove the dam, additional hydrologic and hydraulic studies should be performed to evaluate the downstream effects of this action.

2. Implement around-the-clock surveillance during unusually heavy runoff and develop a formal warning system to alert the downstream residents in the event of an emergency.

PLATES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APPROXIMATE WATERSHED AREA
NEW DAM
OLD DAM
ROBINSON
MOBIL HOME COMMUNITY
LITTLE RACCOON CREEK
RACCOON CREEK
PATRICKS RUN
Robinson
Bald Knob
Point Pleasant
Chamberlain Run
Strip Mines
Chemical Tanks
Mine Dump
PIPELINE
REFERENCE:
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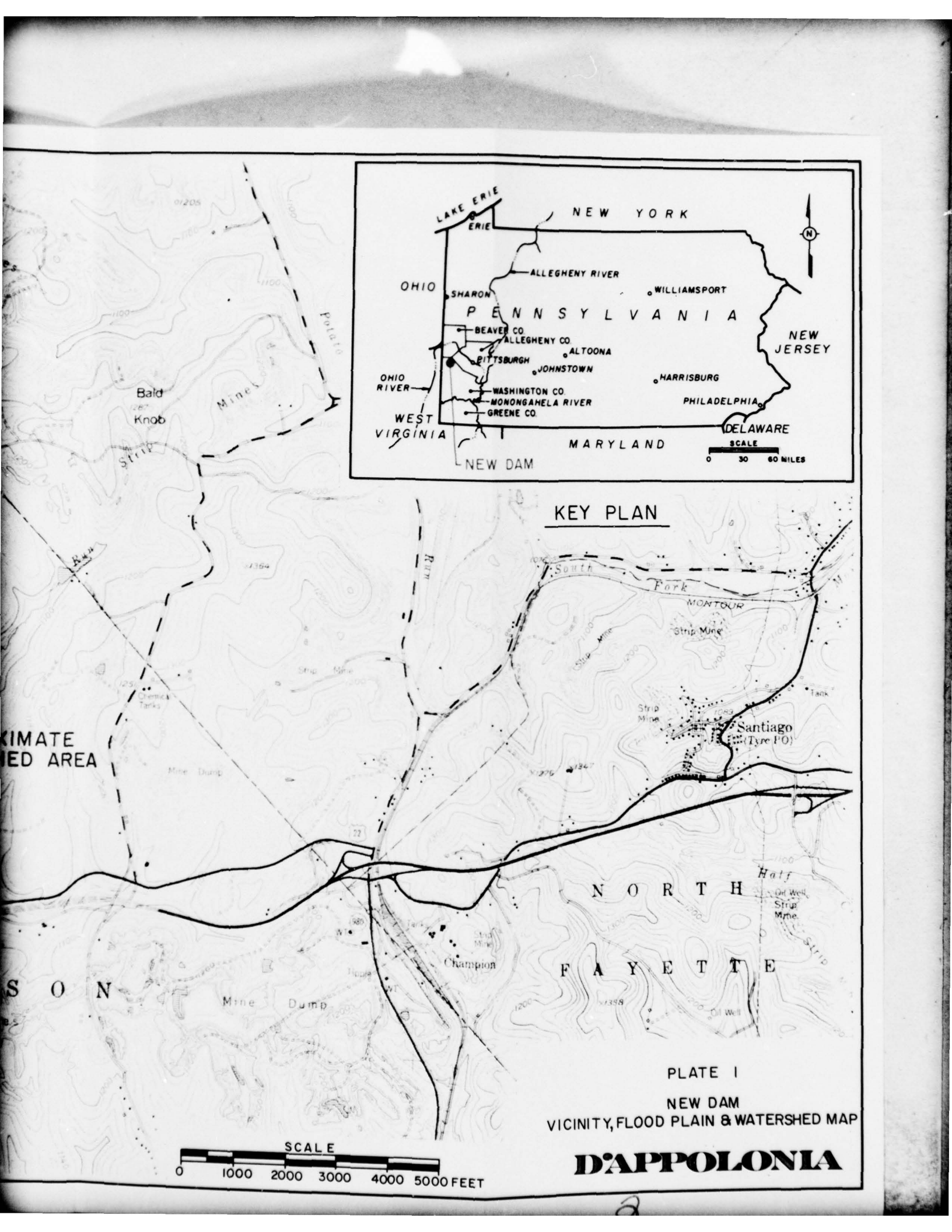
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ERIE
NEW YORK
ALLEGHENY RIVER
OHIO
SHARON
WILLIAMSPORT
PENNSYLVANIA
BEAVER CO.
ALLEGHENY CO.
ALTOONA
PITTSBURGH
JOHNSTOWN
NEW JERSEY
OHIO RIVER
HARRISBURG
WASHINGTON CO.
MONONGAHELA RIVER
PHILADELPHIA
GREENE CO.
WEST VIRGINIA
DELAWARE
MARYLAND
SCALE
0 30 60 MILES
NEW DAM
KEY PLAN
Bald Knob
Strip Mine
Potato
Run
South Fork
MONTOUR
Strip Mine
Chemical Tanks
Tank
Santiago
(Tyre PO)
Mine Dump
Champion
NORTH
FAYETTE
Half
Oil Well
Strip Mine
Oil Well
SCALE
0 1000 2000 3000 4000 5000 FEET
PLATE I
NEW DAM
VICINITY, FLOOD PLAIN & WATERSHED MAP
D'APPOLONIA

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	JMD	
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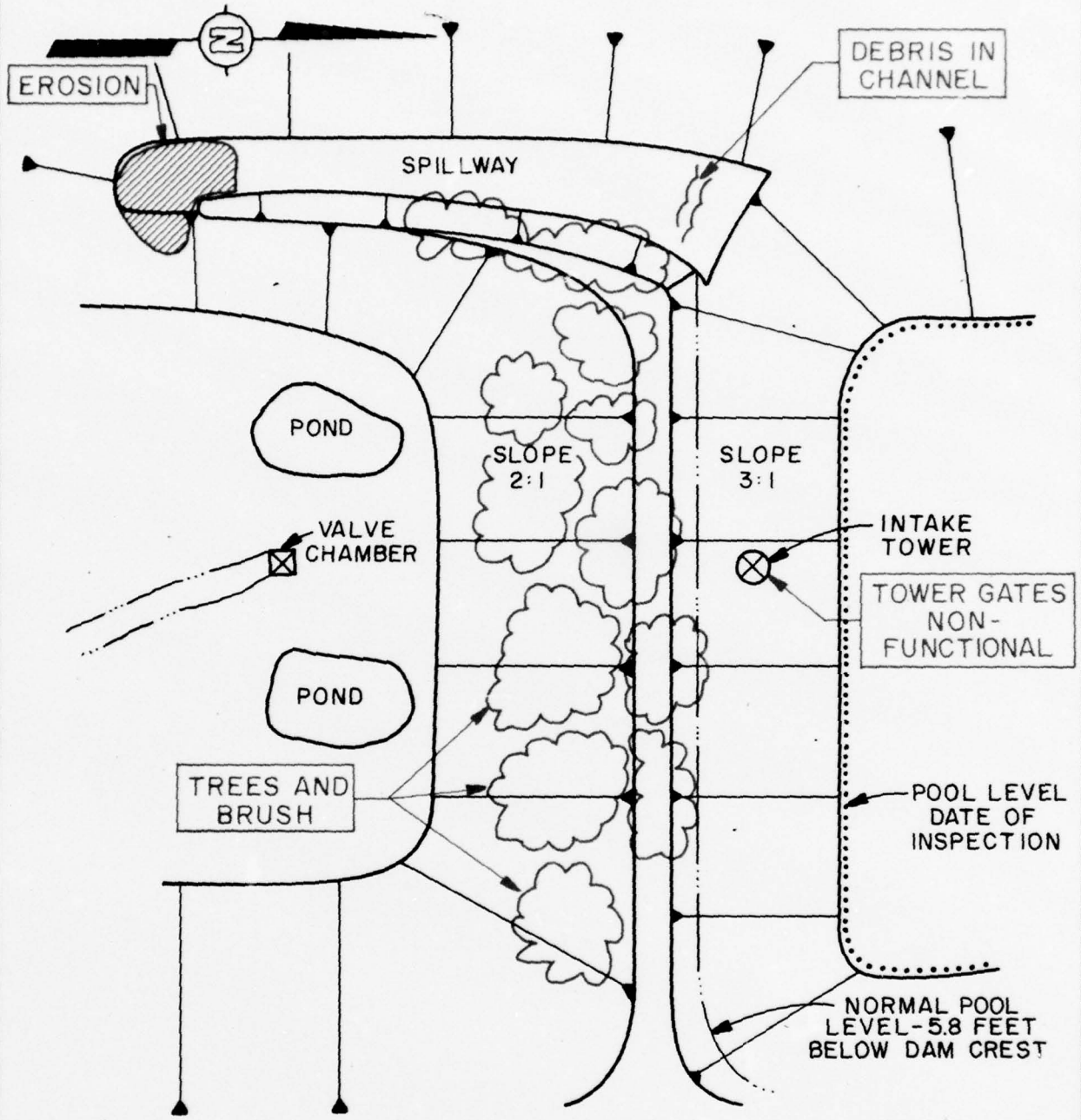


NOTES:

1. SPILLWAY FREE BOARD = 5.8 FEET
2. POOL LEVEL DATE OF INSPECTION: 31 FEET BELOW DAM CREST

NOT TO SCALE

PLATE 2

NEW DAM
GENERAL PLAN
FIELD INSPECTION NOTES
FIELD INSPECTION DATE: NOV. 29, 1978

D'APPOLONIA

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

NAME OF DAM New Dam COUNTY Washington STATE Pennsylvania ID# NDI I.D. NO. PA-303 DER I.D. NO. 63-2

TYPE OF DAM Earh HAZARD CATEGORY High

DATE(S) INSPECTION November 29 and December 20, 1978 WEATHER Cloudy TEMPERATURE 30s

POOL ELEVATION AT TIME OF INSPECTION 1000 M.S.L. TAILWATER AT TIME OF INSPECTION 993 M.S.L.

INSPECTION PERSONNEL:

Bilgin Erel

Wah-Tak Chan

REVIEW INSPECTION PERSONNEL:
(December 20, 1978)

E. D'Appolonia

L. D. Andersen

J. H. Poellot

B. Erel

Bilgin Erel RECORDER

VISUAL INSPECTION
PHASE I
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Crest elevation varies between 6.7 feet and 5.8 feet above spillway crest level. The low spot occurs near the right abutment.	
RIPRAP FAILURES	Riprap is in poor condition.	

VISUAL INSPECTION
PHASE I
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	No signs of distress.	
ANY NOTICEABLE SEEPAGE	Two ponds of water along the downstream toe. No measurable seepage.	Ponded water should be drained.
STAFF GAGE AND RECORDER	None.	
DRAINS	None.	

VISUAL INSPECTION
PHASE I
OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	The outlet conduit is a 24-inch cast-iron pipe. No portion is visible.	
INTAKE STRUCTURE	Concrete intake tower is seriously deteriorated.	Repairs are required.
OUTLET STRUCTURE	Concrete valve chamber. Concrete is seriously deteriorated.	Repairs are required.
OUTLET CHANNEL	Earth channel.	
EMERGENCY GATE	Seriously corroded. Reported to be open.	Repairs are required.

VISUAL INSPECTION
PHASE I
UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	The spillway has no overflow structure.	
APPROACH CHANNEL	Trapezoidal earth channel partially overgrown with brush and contains debris.	Overgrowth and debris should be removed.
DISCHARGE CHANNEL	Partially overgrown with brush.	Overgrowth should be removed.
BRIDGE AND PIERS	None.	

VISUAL INSPECTION
PHASE I
GATED SPILLWAY

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

VISUAL INSPECTION
PHASE I
INSTRUMENTATION

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

VISUAL INSPECTION
PHASE I
RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	No evidence of landslides.	
SEDIMENTATION	Does not appear to be significant.	
UPSTREAM RESERVOIRS	None.	

VISUAL INSPECTION
PHASE I
DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	No significant obstructions.	
SLOPES	No apparent instability.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	Flow from this dam discharges into Old Dam approximately 500 feet downstream. No inhabitable structures in this reach. A community consisting of approximately 26 mobile homes is located downstream from the Old Dam. Population: Approximately 100.	

APPENDIX B

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
AND HYDROLOGIC AND HYDRAULIC
PHASE I

APPENDIX B

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM New Dam

ID# NDI I.D. NO. 303
DER I.D. NO. 63-2

ITEM	REMARKS
AS-BUILT DRAWINGS	Not available.
REGIONAL VICINITY MAP	See Plate 1.
CONSTRUCTION HISTORY	The dam was originally designed by Douglas and McKnight, civil engineers from Pittsburgh, Pennsylvania in 1914. A revised plan was prepared by Gannett, Sealey and Fleming Engineers of Harrisburg, Pennsylvania in 1928. The dam was constructed by West Penn Water Company during 1928.
TYPICAL SECTIONS OF DAM	No plans are available. Construction progress photographs indicate an earth embankment with a concrete core wall.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	No plans available.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	Not available.
DESIGN REPORTS	Not available.
GEOLOGY REPORTS	Not available.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Not available.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Not available.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	None reported.
BORROW SOURCES	Unknown.
MONITORING SYSTEMS	None.
MODIFICATIONS	None reported.
HIGH POOL RECORDS	Not available.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None reported.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None reported.
MAINTENANCE OPERATION RECORDS	Operating records not available.
SPILLWAY PLAN SECTIONS DETAILS	Not available.
OPERATING EQUIPMENT PLANS AND DETAILS	Not available.

CHECKLIST
ENGINEERING DATA
HYDROLOGIC AND HYDRAULIC

DRAINAGE AREA CHARACTERISTICS: 1.3 square miles, wooded

ELEVATION; TOP NORMAL POOL AND STORAGE CAPACITY: 1025 (240 acre-feet)

ELEVATION; TOP FLOOD CONTROL POOL AND STORAGE CAPACITY: 1031 (353 acre-feet)

ELEVATION; MAXIMUM DESIGN POOL: 1031

ELEVATION; TOP DAM: 1031

SPILLWAY:

a. Elevation 1025

b. Type Trapezoidal earth channel

c. Width 20 to 30 feet

d. Length 200+ feet

e. Location Spillover Near right abutment

f. Number and Type of Gates None

OUTLET WORKS:

a. Type 24-inch cast-iron pipe

b. Location Center of embankment

c. Entrance Inverts Unknown

d. Exit Inverts Unknown

e. Emergency Draindown Facilities 24-inch cast-iron pipe

HYDROMETEOROLOGICAL GAGES:

a. Type None

b. Location None

c. Records None

MAXIMUM NONDAMAGING DISCHARGE: Spillway capacity

APPENDIX C

PHOTOGRAPHS

LIST OF PHOTOGRAPHS
NEW DAM
NDI I.D. NO. PA-503
NOVEMBER 29, 1978

PHOTOGRAPH NO.	DESCRIPTION
1	Reservoir.
2	Crest. (Crest is approximately 35 feet wide; motorcycle trail at middle.)
3	Spillway approach channel.
4	Intake tower.
5	Blow-off pipe (downstream end).
6	Blow-off pipe valve at downstream end.

Photograph No. 1

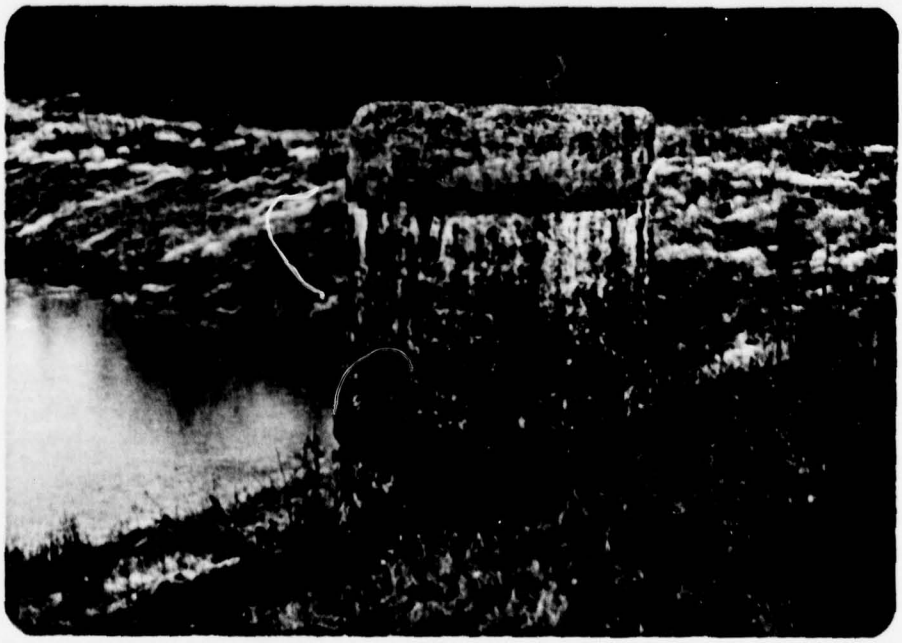
Reservoir.

Photograph No. 2

Crest. (Crest is approximately 35 feet wide; motorcycle trail at middle.)

Photograph No. 3

Spillway approach channel.

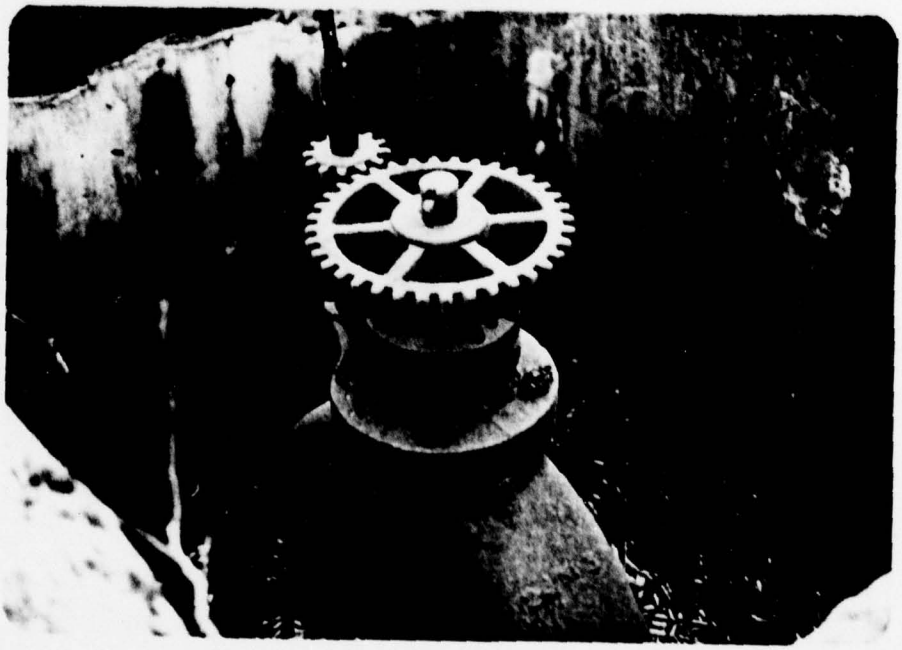


Photograph No. 4

Intake tower.

Photograph No. 5

Blow-off pipe (downstream end).



Photograph No. 6

Blow-off pipe valve at downstream end.

APPENDIX D

CALCULATIONS

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: New Dam (NDI I.D. PA-509)

PROBABLE MAXIMUM PRECIPITATION (PMP) = 24.1 INCHES/24 HOURS[1]

STATION	1	2	3	4	5
Station Description	New Dam	Old Dam	Rt. 22 Culvert of St. Patricks Run		
Drainage Area (square miles)	1.3	3.3	-		
Cumulative Drainage Area (square miles)	1.3	4.6	4.6		
Adjustment of PMF for Drainage Area (%)[2]					
6 Hours	102	102	-		
12 Hours	120	120	-		
24 Hours	130	130	-		
48 Hours	140	140	-		
72 Hours	-	-	-		
Snyder Hydrograph Parameters					
Zone[3]	28	28	-		
C_p/C_t[4]	0.57/1.7	0.57/1.7	-		
L (miles)[5]	1.9	2.5	-		
L_{ca} (miles)[5]	0.9	0.9	-		
$t_p = C_t(L \cdot L_{ca})^{0.3}$ (hours)	1.96	2.123	-		
Spillway Data					
Crest Length (ft)	20	49	-		
Freeboard (ft)	5.8	3.9	-		
Discharge Coefficient	2.65	2.65	-		
Exponent	1.5	1.5	-		

(1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.

(2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.

(3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).

(4) Snyder's Coefficients.

(5) L = Length of longest water course from outlet to basin divide.
L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  11 JAN 79
**********************************
    1              A1              SNYDER UNIT HYDROGRAPH,FLOOD ROUTING,DAM OVERTOPPING ANALYSES
    2              A2              NEW DAM,WASHINGTON COUNTY,NDI-ID.PA509      PROJECT NO.78-367-05
    3              A3              FOR 10%,20%,30%,40%,50%,60%,70%,80%, AND 100% PMF
    4              B     300       0       10       0       0       0       0       0      -4       0
    5              B1      5
    6              J       1       9        1
    7              J1    .10     .20      .30     .40     .50     .60     .70     .80    1.00
    8              K       0       1                                        1
    9              K1       CALCULATION OF INFLOW HYDROGRAPH TO NEW DAM,WASHINGTON COUNTY,PA503
   10              M       1       1      1.3              1.3                                    1
   11              P               24.1     102     120     130     140
   12              T                                                       1.0    0.05            0.018
   13              W   1.960     0.57
   14              X    -1.0     -.05      2.0
   15              K       1       2                                        1
   16              K1       ROUTING FLOW THROUGH NEW DAM RESERVOIR STARTING AT SPILLWAY LEVEL
   17              Y                                       1       1
   18              Y1      1                                                240.0
   19              SS    0.1   240.0    353.0   600.0
   20              SE1000.0   1025.0   1031.0  1040.0
   21              SS1025.0     20.0     2.65     1.5
   22              SD1030.8     3.08      1.5   335.0
   23              K      99
```

COMPUTER INPUT: OVERTOPPING ANALYSIS

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS								
				RATIO 1 .10	RATIO 2 .20	RATIO 3 .30	RATIO 4 .40	RATIO 5 .50	RATIO 6 .60	RATIO 7 .70	RATIO 8 .80	RATIO 9 1.00
HYDROGRAPH AT	1	1.30	1	313.	627.	940.	1254.	1567.	1881.	2194.	2507.	3134.
	(	3.37)	(	8.88)(	17.75)(	26.63)(	35.50)(	44.38)(	53.25)(	62.13)(	71.00)(	88.75)
ROUTED TO	2	1.30	1	238.	511.	836.	1216.	1545.	1860.	2175.	2489.	3116.
	(	3.37)	(	6.74)(	14.46)(	23.67)(	34.45)(	43.75)(	52.68)(	61.59)(	70.47)(	88.23)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1025.00	1025.00	1030.80
STORAGE	240.	240.	349.
OUTFLOW	0.	0.	740.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	1027.72	0.00	291.	238.	0.00	43.17	0.00
.20	1029.53	0.00	325.	511.	0.00	42.83	0.00
.30	1030.96	.16	352.	836.	1.50	42.50	0.00
.40	1031.31	.51	362.	1216.	3.33	41.83	0.00
.50	1031.54	.74	368.	1565.	4.33	41.83	0.00
.60	1031.74	.94	373.	1860.	5.00	41.67	0.00
.70	1031.91	1.11	378.	2175.	6.00	41.67	0.00
.80	1032.08	1.28	383.	2489.	6.67	41.67	0.00
1.00	1032.38	1.58	391.	3116.	7.67	41.67	0.00

SUMMARY OF OVERTOPPING ANALYSIS

APPENDIX E

REGIONAL GEOLOGY

APPENDIX E
REGIONAL GEOLOGY

The New Dam is located upstream from the Old Dam on a tributary of St. Patrick's Run. The rock strata in the vicinity are members of the Upper Conemaugh and Lower Monongahela groups (Upper Pennsylvanian Age) and are composed primarily of interbedded shale and sandstone, with a few coal seams. The dam is located on the northwest portion of the Candor Dome where the strata are nearly horizontal, dipping to the west from zero to 40 feet per mile.

The dam is probably founded on strata of the Morgantown sandstone, a gray massive, coarse-grained sandstone. The strata in the slopes above the dam and reservoir are composed primarily of shale and claystone. The Pittsburgh coal seam occurs on the tops of the hills and defines the base of the Monongahela Group. The strata above the Pittsburgh coal seam consist of gray interbedded sandstone and shale. The dam is approximately 135 feet below the Pittsburgh coal seam.

The strata present in the valley slopes are susceptible to weathering and subsequent movement. Less than 10 percent of the area around the dam and reservoir is covered by slide debris. There is one old slide near the east abutment, as indicated on the U.S. Geological Survey Map of Landslides for Washington County, Pennsylvania, dated 1978.

SCALE

0 1 2 3 4 5 miles

PA 479, PA 482, PA 484, NEW, OLD AND CHERRY VALLEY DAMS

GEOLOGY MAP

REFERENCE

GREATER PITTSBURGH REGION GEOLOGIC MAP COMPILED BY W.R. WAGNER, J.L. CRAFT, L. HEYMAN AND J.A. HARPER, DATED 1975, SCALE 1:125000

DAPPOLONIA

DRAWN BY	ACS	CHECKED BY	BE	2-6-79	DRAWING NUMBER 78 37-A17
	2-5-79	APPROVED BY	JHP	2-6-79	

GROUP	FORMATION		DESCRIPTION
	Alluvium	Qt	Sand, gravel, clay.
	Terrace deposits		Sand, clay, gravel on terraces above present rivers; includes Carmichaels Formation.
DUNKARD	Greene		Cyclic sequences of sandstone, shale, red beds, thin limestones and coals.
DUNKARD	Washington	Pw	Cyclic sequences of sandstone, shale, limestone, and coal; contains Washington coal bed at base.
DUNKARD	Waynesburg	PPw	Cyclic sequences of sandstone, shale, limestone and coal; contains Waynesburg coal bed at base.
MONONGAHELA		Pm	Cyclic sequences of shale, limestone, sandstone and coal; contains Pittsburgh coal bed at base.
P. CONEMAUGH	Casselman	PPc	Cyclic sequence of sandstone, shale, red beds and thin limestone and coal.
P. CONEMAUGH	Ames		
P. CONEMAUGH	Glenshaw	PPcg	Cyclic sequences of sandstone, shale, red beds and thin limestone and coal; several fossiliferous limestone; Ames limestone bed at top.
ALLEGHENY	Vanport		Cyclic sequences of shale, sandstone, limestone, and coal; contains Brookville coal at base and Upper Freeport coal at top; within group are the commercial Vanport limestone and Kittanning and Clarion coals.
ALLEGHENY		Pa	

GEOLOG MAP LEGEND

REFERENCE

GREATER PITTSBURGH REGION GEOLOGIC MAP
COMPILED BY W.R. WAGNER, J.L. CRAFT, L. HEYMAN
AND J.A. HARPER, DATED 1975, SCALE 1:125000