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NATIONAL DAM SAFETY PROGRAM, DALEY DAM (INVENTORY NUMBER VA 107--ETC(U)
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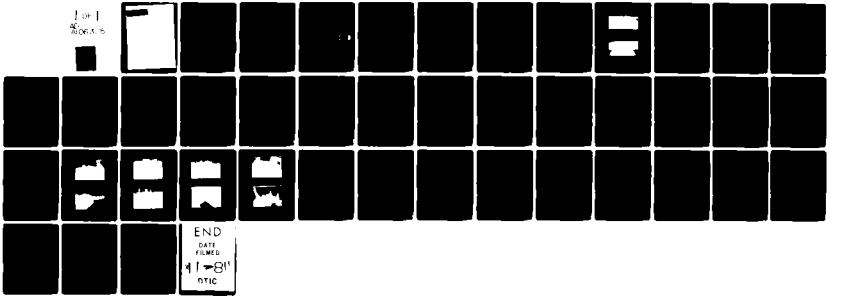

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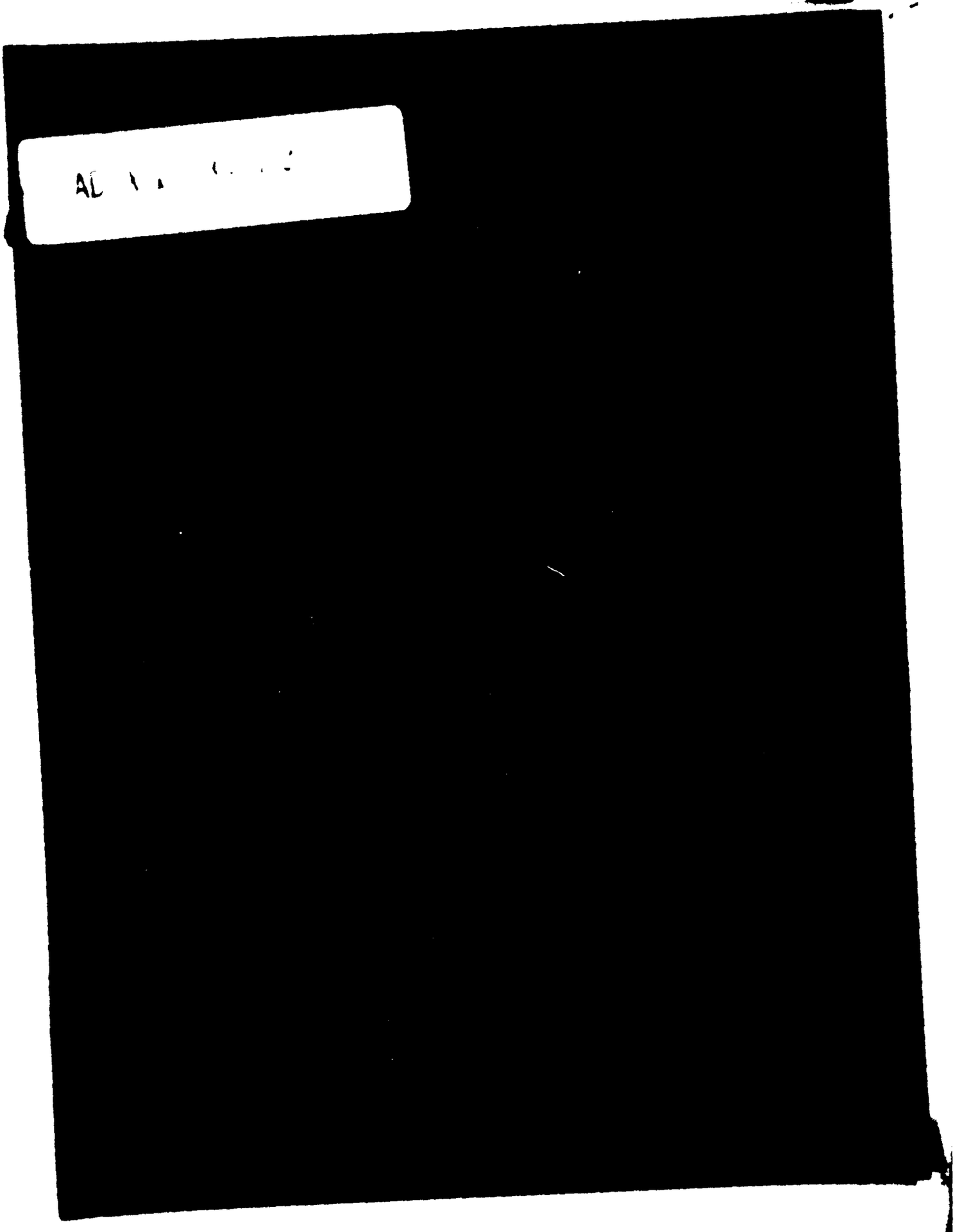

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20. Abstract

Pursuant to Public Law 92-367, Phase I Inspection Reports are prepared under guidance contained in the recommended guidelines for safety inspection of dams, published by the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I Inspection is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspection. 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.

Based upon the field conditions at the time of the field inspection and all available engineering data, the Phase I report addresses the hydraulic, hydrologic, geologic, geotechnic, and structural aspects of the dam. The engineering techniques employed give a reasonably accurate assessment of the conditions of the dam. It should be realized that certain engineering aspects cannot be fully analyzed during a Phase I inspection. Assessment and remedial measures in the report include the requirements of additional indepth study when necessary.

Phase I reports include project information of the dam appurtenances, all existing engineering data, operational procedures, hydraulic/hydrologic data of the watershed, dam stability, visual inspection report and an assessment including required remedial measures.

POTOMAC RIVER BASIN

NAME OF DAM: DALEY DAM
LOCATION: LOUDOUN COUNTY, VIRGINIA
INVENTORY NUMBER: VA 10709

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

National Dam Safety Program. Daley Dam (Inventory Number VA 10709), Potomac River Basin, Loudoun County, Virginia. Phase I Inspection Report.

PREPARED BY
NORFOLK DISTRICT CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VIRGINIA 23510

APRIL 1981

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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 the Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

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

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

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 (flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the design flood should not be interpreted as necessarily posing a highly inadequate condition. The design flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF DAM

Name of Dam:	Daley Dam
State:	Virginia
Location:	Loudoun County
USGS Quad Sheet:	Purceville, Virginia
Stream:	Tributary to Catoctin Creek
Date of Inspection:	30 April 1981

Daley Dam is an earthfill structure about 800 feet long and 29.4 feet high. The dam is owned and maintained by the Mr. John E. Sewell, Mr. James E. Heisel, and Mr. Robert M. Terry. The dam is classified as a small dam with a significant hazard classification. The principal spillway is a drop-inlet located in the reservoir discharges into a stilling basin below the dam. The emergency spillway is an open channel cut in the right abutment. A reservoir drawdown gate is attached to the bottom of the drop-inlet. The reservoir provides recreation.

Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 100-Year Flood. The spillway will pass 25 percent of the PMF or 100 percent of the SDF without overtopping the crest of the dam. The spillways are adjudged as adequate.

The visual inspection revealed an upstream slope failure. Based on U. S. Department of Interior, Bureau of Reclamation guidelines the upstream slope is inadequate. Therefore, the dam is assessed as unsafe, non-emergency.

The "unsafe, non-emergency" classification applied to a dam with a structural deficiency is not meant to connote that the dam is in danger of imminent failure. It ~~does~~ means ~~however~~ that based on an initial screening and preliminary calculations, there appears to be a serious deficiency in the stability of the upstream slope. This could lead to failure of the dam significantly increasing the hazard to life downstream from the dam.

It is recommended that within 2 months from the date of notification to the Governor of the Commonwealth of Virginia, the owners engage the services of a qualified geotechnical engineering firm to perform a stability analysis on the dam and recommend methods of eliminating the danger imposed by the project.

Within 6 months of the notification of the Governor, the geotechnical engineer's report should be completed and the owners should have an agreement with the Commonwealth of Virginia for a reasonable time frame in which all recommendations should be implemented. In the interim, a detailed emergency operations plan and

warning system, should be promptly developed. There is no warning system in effect. This warning system should outline how to operate the dam in an emergency and who to notify, including public officials, in case an evacuation from the downstream area is necessary. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

There is no maintenance operations program. It is recommended that a regular maintenance operations program and inspection program be instituted with provisions for accurate records of all maintenance and inspections performed. Also, the maintenance items listed in Section 7.2 should be accomplished as part of the regular maintenance program within the next 12 months.

Submitted By:

Original signed by:
Carl S. Anderson, Jr.

CARL S. ANDERSON
Acting Chief, Design Branch

Approved:

Original signed by:
Ronald E. Hudson

RONALD E. HUDSON
Colonel, Corps of Engineers
Commander and District Engineer

Date: SEP 11 1981

Recommended By

Original signed by
JAMES A. WALSH

for JACK G. STARR
Chief, Engineering Division

DAM

RESERVOIR

OVERALL VIEWS - DALEY DAM

30 APRIL 1981

SECTION 1

PROJECT INFORMATION

1.1 GENERAL:

1.1.1 Authority: Public Law 92-367, 8 August 1972, authorized the Secretary of the Army, through the Corps of Engineers to initiate a National Program of Safety Inspections of Dams throughout the United States. The Norfolk District has been assigned the responsibility of supervising the inspection of dams in the Commonwealth of Virginia.

1.1.2 Purpose of Inspection: The purpose is to conduct a Phase I inspection according to the Recommended Guidelines for Safety Inspection of Dams (Reference 1, Appendix IV). The main responsibility is to expeditiously identify those dams which may be a potential hazard to human life or property.

1.2 Project Description:

1.2.1 Dam and Appurtenances: Daley Dam is an earthfill structure approximately 800 feet long and 29.4 feet high. The crest of the dam measures 17 feet wide at an elevation of 508.0 feet msl. The upstream slope measures 3 horizontal to 1 vertical (3H:1V) and the downstream slope measures 2.5H:1V. A design drawing shows the crest width to be 14 feet and both slopes to be 2.5H:1V. Riprap is placed along the lower portion of the upstream slope.

According to the design drawing, the dam is keyed into the foundation with a core trench and has a toe drain. It is unknown if there are any foundation drains. There are no embankment or foundation drain outlets.

The principal spillway is a 42-inch corrugated metal pipe (CMP) drop-inlet connecting to a 30-inch CMP running through the dam at low level and discharging into a small stilling basin near the toe of the dam. The crest of the principal spillway is at elevation 500.0

The emergency spillway is an open channel cut into the right abutment. The crest of the emergency spillway is 75 feet wide and at elevation 504.0.

An 12-inch slide gate, located 55 feet into the reservoir, is connected to the drop-inlet at low level and is capable of dewatering the reservoir.

1.2.2 Location: Daley Dam is located on a tributary of the Catoctin Creek about 2 miles northeast of Hillsboro, Virginia in Loudoun County.

1.2.3 Size Classification: The dam is classified as small dam as defined in Reference 1 of Appendix IV.

1.2.4 Hazard Classification: The dam is located upstream of several farms and State Route 611. Should a dam failure occur, the structures on the farms may sustain property damage with a possibility of loss of life. Therefore, a significant hazard classification is given for Daley Dam according to guidelines contained in Section 2.1.1 of Reference 1, Appendix IV. The hazard classification used to categorize a dam is a function of location only and has nothing to do with its stability or probability of failure.

1.2.5 Ownership: Mr. John E. Sewell, Mr. James E. Heisel, and Mr. Robert M. Terry.

1.2.6 Purpose: The reservoir provides recreation and some flood control.

1.2.7 Design and Construction History: Daley Dam was designed and engineered with the assistance of the U. S. Department of Agriculture, Soil Conservation Service and constructed by Hope and Arnold. The dam was completed in 1974.

1.2.8 Normal Operational Procedures: The normal operation of Daley Dam is automatic with water passing into the drop-inlet as the reservoir rises above elevation 500.0 and passing through the emergency spillway when the reservoir reaches elevation 504.0.

1.3 Pertinent Data:

1.3.1 Drainage Area: The dam controls a drainage area of 1.38 square miles.

1.3.2 Discharge at Dam Site: The maximum flood at the dam site is unknown.

Pool level at crest of dam.

Principal Spillway	64 cfs
Emergency Spillway	1560 cfs

1.3.3 Dam and Reservoir Data: Pertinent data on the dam and reservoir are shown in the following table:

TABLE 1.1 DAM AND RESERVOIR DATA

Item	Elevation feet msl	Area Acres	Reservoir Capacity Acre feet	Reservoir Capacity Watershed, Inches	Length, feet
Crest of Dam	508.0	51.5	465	6.3	2900
Emergency Spillway Crest	504.0	37	290	3.9	2650
Principal Spillway Crest	500.0	25.7	193	2.6	2500
Streambed at Downstream toe of dam	478.6±	-	-	-	-

SECTION 2

ENGINEERING DATA

2.1 Design: A design drawing was provided by the U. S. Department of Agriculture, Soil Conservation Service. The drawing provides a typical section through the embankment at the principal spillway including details of the embankment intake structure, outlet pipe, anti-seep collars, and reservoir drains. A Bill of Materials is also provided showing perforated pipe and gravel for a toe drain (See Plate II, Appendix I).

2.2 Construction: There are no known construction records.

2.3 Evaluation: There is insufficient information to evaluate foundation conditions and embankment stability.

SECTION 3

VISUAL INSPECTION

3.1 Findings:

3.1.1 General: The results of the 30 April 1981 inspection are recorded in Appendix III. At the time of the inspection, the weather was overcast. The temperature was 78° F. and the ground conditions were damp. The pool elevation was 500.0 feet msl or normal pool. The tailwater was at elevation 480.0 feet msl. A slight flow was passing through the principal spillway. There are no known prior inspection reports.

3.1.2 Embankment: The embankment is in fair condition. Sketches showing a plan view, a profile and a cross section at the time of the inspection are provided on Plates III & IV, Appendix I. An overall view of the dam is provided at the beginning of the report.

There are no signs of surface cracks, unusual movement, sloughing or misalignment on the crest or downstream face. However, most of the upstream face has experienced slope failure. The failure consists of areas of minor sloughing and areas of large failure surfaces with 4 feet of slip plane exposed. Several footpaths run down both the upstream and downstream faces from the crest. There is minor erosion around the principal spillway outlet pipe. Several animal burrows are located on the downstream face. (See Plate III, Appendix I and Photos No. 2, 3, 4 & 6, Appendix II).

The portions of the upstream slope that have not failed are riprapped. The riprap extends from about 3 feet below pool elevation to about 12 feet up the slope. Evidence of riprap is visible on the slope in the areas of minor sloughing, however, there is no evidence of riprap in the areas of large failure surfaces. Apparently, the whole upstream slope was riprapped but the slope failure carried some of the riprap far enough down the slope, beneath the water surface, to be unobservable (See Plate III, Appendix I).

There is no noticeable sliding or settlement. There are no known foundation drains. The are no foundation drain outlets. There are no rock outcrops in the area.

There is a pile of wet material along the downstream toe from a point about 75 feet left of the principal spillway outlet pipe to the outlet pipe. The area beyond the material up to the road approximately 300 feet downstream of the dam is lower in elevation than the surrounding area and water is ponded therein. The downstream area, to the right of the outlet pipe, is slightly higher in elevation, but is also wet from the toe to the road. A ditch runs down the right hillside about 30 feet downstream of the dam. A patch of cattails is growing in the area where the ditch intersects the base of the hillside. (See Plate II, Appendix I).

The are no known embankment drains.

A material sample taken from the failure surface on the upstream slope was classified as a high plastic, silty clay (CL) with some (34%) fine sand.

The crest is well vegetated with grass. The portions of the upstream slope not involved in the slope failure are well vegetated with grass, shrubs, and saplings. The downstream slope is well vegetated with grass, ground ivy, large shrubs, and scattered trees up to 6 inches in diameter. (See Photos No. 1, 2, 3, 4 & 5, Appendix II).

3.1.3 Principal Spillway A 42-inch CMP serves as a drop-inlet and is the control section for the principal spillway. Rebars are placed across the top of the intake to prevent trash from [illegible] CMP [illegible] located at the end of a wooden walkway extending about 40 feet into the reservoir. The outlet pipe is a 30-inch CMP which passes under the dam and empties at the toe into a stilling basin. The outlet pipe is partially submerged in the stilling basin. (See Photos No. 7 & 8, Appendix II).

3.1.4 Emergency Spillway The emergency spillway is an open cut channel in the right abutment. There are some small pines located in the right portion of the control section. Vegetation is sparse.

3.1.5 Instrumentation There is no instrumentation on the dam.

3.1.6 Reservoir Area The reservoir slopes are gentle pastureland. There are no signs of reservoir slope failure or shoreline erosion. The inspection team was unable to evaluate reservoir sedimentation. An overall view of the reservoir is provided at the beginning of the report.

3.1.7 Downstream Channel The downstream channel is narrow and shallow. Trees line the channel from the stilling basin to the road, about 300 feet downstream. The area slopes are gentle and for the most part treeless. There are two farms downstream of the dam that may sustain damage should an embankment failure occur.

3.2 Evaluation: Overall the dam appears in fair condition. The visual inspection revealed certain preventative maintenance items which should be scheduled as part of an annual maintenance program. These are

a. The footpaths on the face of the dam should be reseeded.

b. The eroded area at the outlet pipe and the animal burrows should be filled with compacted material and reseeded.

c. The wet areas along the toe should be monitored for any flow. If any flow develops, the services of a qualified geotechnical engineer should be obtained to investigate the causes of the flow.

d. The trees, saplings and shrubs on the dam should be cut off at the ground surface. Any tree with a diameter larger than 3 inches should have its root system removed and the subsequent hole filled with compacted material and seeded.

e. The pine trees in the emergency spillway should be cut off at the ground surface to prevent collection of debris, thereby restricting flow, during periods of flow through the emergency spillway.

f. A staffgage should be installed in the reservoir to extend above the crest of the dam.

g. The trees lining the downstream channel from the dam to the road should be cut off at the ground surface.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures: The normal storage pool elevation is 500.0, which is the crest of the drop-inlet (principal spillway). The reservoir provides recreation and some flood control. Water passes automatically through the principal and emergency spillways as the reservoir rises above elevation 500.0 and 504.0, respectively. A drawdown gate located in the reservoir is available to dewater the reservoir.

4.2 Maintenance: There is no maintenance at Daley Dam.

4.3 Warning System: At present time, there is no warning system or evacuation plan for Daley Dam.

4.4 Evaluation: The dam does not require an elaborate operational and maintenance procedure. However, maintenance program should be developed, including documentation. An emergency operation and warning plan should be developed. It is recommended that formal emergency procedures be prepared and furnished to all operating personnel. This should include:

a. How to operate the dam during an emergency.

b. Who to notify, including public officials, in case evacuation from the downstream area is necessary.

SECTION 5

HYDRAULIC/HYDROLOGIC DATA

5.1 Design: The U. S. Department of Agriculture, Soil Conservation Service, provided peak rate discharges from small watersheds for Daley Dam for a 25-year reoccurrence interval.

5.2 Hydrologic Record: None were available.

5.3 Flood Experience: The maximum flood at Daley Dam is unknown.

5.4 Flood Potential: The 100-year flood, 1/2 PMF and PMF were developed and routed through the reservoir by use of the HEC-1DB computer program (Reference 2, Appendix IV) and appropriate unit hydrograph, precipitation and storage-outflow data. Clark's Tc and R coefficients for the local drainage area were estimated from basin characteristics. The rainfall applied to the developed unit hydrograph was obtained from the U. S. Weather Bureau Publications (Reference 3 and 4 of Appendix IV).

5.5 Reservoir Regulation: Pertinent dam and reservoir data are shown in Table 1.1.

Water passes automatically through the principal and emergency spillways as the reservoir rises above elevation 500.0 and 504.0, respectively.

The storage curve was developed based on areas obtained from a U. S. Geological Survey Quadrangle Map. Survey data taken during the inspection was correlated to the Purcellville, Virginia Quadrangle Map to help develop area-storage data. Rating curves for the non-overflow section and the emergency and principal spillways were developed by hand calculations. In routing hydrographs through the reservoir, it was assumed that the initial pool level was at the principal spillway crest (elevation 500.0). Flow through the principal spillway was neglected.

5.6 Overtopping Potential: The probable rise in the reservoir and other information on reservoir performance is shown in the following table:

Table 5.1 RESERVOIR PERFORMANCE

Item	Normal Flow	100 1/ Year	1/2 PMF	PMF 2/
Peak flow c.f.s.				
Inflow	1	1780	4860	9721
Outflow	1	755	4118	9018
Maximum elevation ft. msl	500.0	506.32	508.85	509.9
Non-overflow section (elevation 508.0 ft. msl)				
Depth of flow, ft.	-	-	0.85	1.9
Duration, hrs.	-	-	2.5	4.25
Velocity, fps 3/	-	-	4.2	6.3
Tailwater elevation ft. msl	480.0±	-	-	-

1/ The 100-Year Flood has one chance in 100 of occurring in any given year.
2/ The PMF is an estimate of flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.
3/ Critical Velocity

5.7 Reservoir Emptying Potential: A 12-inch slide gate, located at the bottom of the reservoir, is capable of dewatering the reservoir. With the reservoir at normal pool (elevation 500.0), the pipe is capable of a discharge flow of about 16.2 cfs and essentially dewater the reservoir in about 9 days. This is an equivalent drawdown rate of 2.2 feet per day. This is based on the hydraulic height of the dam divided by the time to dewater the reservoir.

5.8 Evaluation: Based on the size (small) and hazard classification (significant), the recommended Spillway Design Flood (SDF) is the 100-Year Flood to the 1/2 PMF. Because of the risk involved, the 100-Year Flood has been selected as the SDF. The emergency spillway will pass 25 percent of the PMF or 100 percent of the SDF without overtopping the crest of the dam.

Conclusions pertain to present day conditions. The effect of future development on the hydrology has not been considered.

SECTION 6

DAM STABILITY

6.1 Foundation and Abutments: There is no detailed information available on the local geology or the foundation conditions. The dam is located within the Blue Ridge physiographic Province of Virginia. All drainage in the area flows in Goose Creek which drains eastward into the Potomac River. The area is underlain by the Cambrian-Precambrian Catoctin Formation. Locally the Catoctin consists of basic lava flows, schists and gneiss, arkose, conglomerate and phyllite. As noted in the visual inspection, the downstream area is wet. According to the design drawings, the dam is keyed into the foundation by a core trench and has a toe drain. It is unknown if there are any foundations drains. There are no foundation drain outlets. The predominate foundation materials are relatively pervious, stable, fine grained soils.

6.2 Embankment:

6.2.1 Materials: Embankment materials are high plastic silty clays (CL) with some fine sand.

6.2.2 Stability: There are no available stability calculations. The dam is 29.4 feet high and the crest measures 17 feet wide. The upstream slope measures 3.0H:1V and the downstream slope measures 2.5H:1V. The design drawing shows a crest width of 14 feet and both slopes to be 2.5H:1V. The dam is subject to sudden drawdown because of the approximate reservoir drawdown rate of 2.2 feet per day which exceeds the critical rate of 0.5 feet per day for earth dams. The existing pool is at normal pool elevation. It is unknown if the dam has experienced the maximum control storage pool which is at the elevation of the emergency spillway (4.5 feet above normal pool).

According to the guidelines presented in Design of Small Dams, U.S. Department of the Interior, Bureau of Reclamation for small homogenous dams, with a stable foundation, subjected to a sudden drawdown and composed of low plastic fines (CL, ML), the recommended slopes are 3.5H:1V upstream and 2.5H:1V downstream. The recommended width is 16 feet. Based on these guidelines, the dam has an adequate width and downstream slope, but an inadequate upstream slope. This inadequacy is exemplified by the upstream slope failure discussed in Section 3.1.2.

6.2.3 Seismic Stability: The dam is located in Seismic Zone 2. Therefore, according to the Recommended Guidelines for Safety Inspection of Dams, the dam is considered to have no hazard from earthquakes provided static stability conditions are satisfactory and conventional safety margins exist.

6.3 Evaluation: There is insufficient information to adequately evaluate the stability. The visual inspection revealed an upstream slope failure. Also, based on Bureau of Reclamation guidelines, the dam was designed with an inadequate upstream slope. It is recommended that the services of a qualified geotechnical engineering firm be engaged to perform a stability check of the dam.

SECTION 7

ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment: The available engineering data is insufficient to evaluate the foundation conditions and the embankment stability. There is no maintenance operations program or emergency operations and warning plan.

Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 100-Year Flood. The spillway will pass 25 percent of the PMF or 100 percent of the SDF without overtopping the crest of the dam. The spillways are adjudged as adequate.

The visual inspection revealed an upstream slope failure. Also, based on U. S. Department of the Interior, Bureau of Reclamation guidelines the upstream slope is inadequate. Therefore, the dam is assessed as unsafe, non-emergency.

The "unsafe, non-emergency" classification applied to a dam with a structural deficiency is not meant to connote that the dam is in danger of imminent failure. It does mean, however, that based on an initial screening and preliminary calculations there appears to be a serious deficiency in the stability of the upstream slope. This could lead to failure of the dam significantly increasing the hazard to life downstream from the dam.

7.2 Recommended Remedial Measure: It is recommended that within 2 months from the date of notification to the Governor of the Commonwealth of Virginia, the owners engage the services of a qualified geotechnical engineering firm to perform a stability analysis on the dam and recommend methods of eliminating the danger imposed by the project.

Within 6 months of the notification of the Governor, the geotechnical engineer's report should be completed and the owners should have an agreement with the Commonwealth of Virginia for a reasonable time frame in which all recommendations should be implemented. In the interim, a detailed emergency operations plan and warning system should be promptly developed. The warning system should outline how to operate the dam in an emergency and who to notify, including public officials, in case an evacuation from the downstream area is necessary. Also, during periods of unusually heavy precepitation, around-the-dock surveillance should be provided.

It is recommended that a regular maintenance operations program and inspection program be instituted with provisions for accurate records of all maintenance and inspections performed. Also, the inspection revealed the following maintenance items that should be accomplished as part of the regular maintenance program within the next 12 months:

a. The footpaths on the face of the dam should be reseeded.

b. The eroded area at the outlet pipe and the animal burrows should be filled with compacted material and reseeded.

c. The wet areas along the toe should be monitored for any flow. If any flow develops, the services of a qualified geotechnical engineer should be obtained to investigate the causes of the flow.

d. The trees, sapplings and shrubs on the dam should be cut off at the ground surface. Any tree with a diameter larger than 3 inches should have its root system removed and the subsequent hole filled with compacted material and seeded.

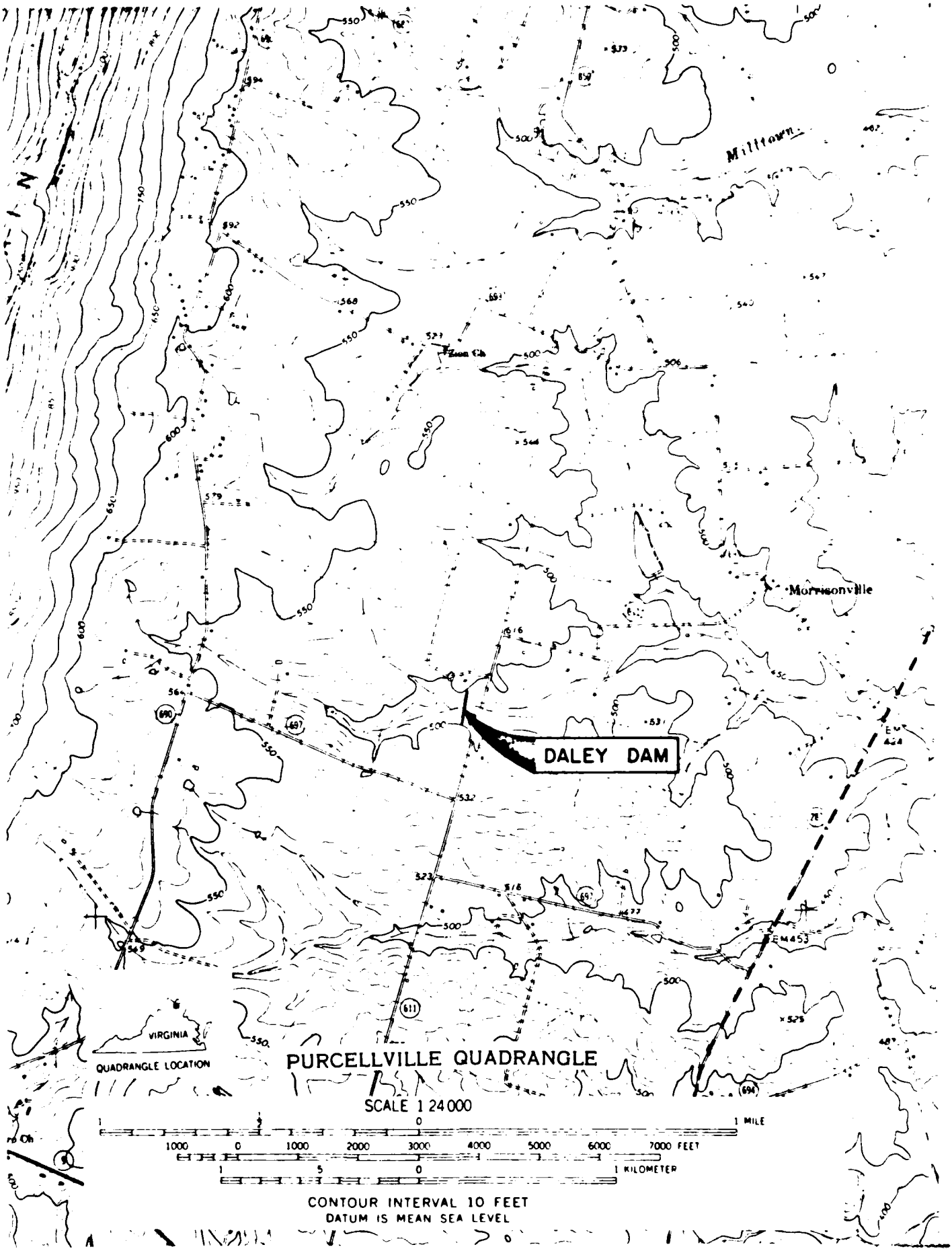
e. The pine trees in the emergency spillway should be removed.

f. A staffgage should be installed in the reservoir to extend above the crest of the dam.

g. The trees lining the downstream channel from the dam to the road should be cut off at the ground surface to prevent collection of debris and restricting flow during periods of flooding.

APPENDIX I

MAPS AND DRAWINGS


DALEY DAM
Millstown
Morrisonville
VIRGINIA
QUADRANGLE LOCATION
PURCELLVILLE QUADRANGLE
SCALE 1 24000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

VA 102 (Rev)
1-12-56

DESIGN DATA

Watershed Area, A = 635 Acres — Length, L = _____ feet

Width, W = (A) _____ x 43560 / (L) _____ = _____ feet — L/W = _____

Average Slope = _____ % — Relief = _____

Typical Soils _____ — Infiltration = _____

Portion in good cover _____ % — Cover = _____

S. Storage = _____

ΣW = _____

_____ = _____ F = _____ N = _____ S = _____

25 = P x F x R x S = 493 c.f.s.

Spillway bottom width = 75 feet — Slope = 2.0 feet

Slope of exit section = 2.4 % — Side Slopes 3:1

GENERAL INFORMATION

Uses for impounded water Recreation

Area at Normal Pool 18 Acres — Maximum depth = 20 feet

Capacity = 0.80 x 18 ac. x 20 feet = 144 acre feet

EARTH QUANTITIES

Embankment	25 690 cu. yds.
Excavation of Cutoff Trench	2933 cu. yds.
Excavation of Stream Channel	_____ cu. yds.
Other Excavation	_____ cu. yds.
Total	_____ cu. yds.

BENCH MARK DESCRIPTION

Nail in Notch of 12" Locust Tree 30' North of Fence Line Assumed Elev. 50.00

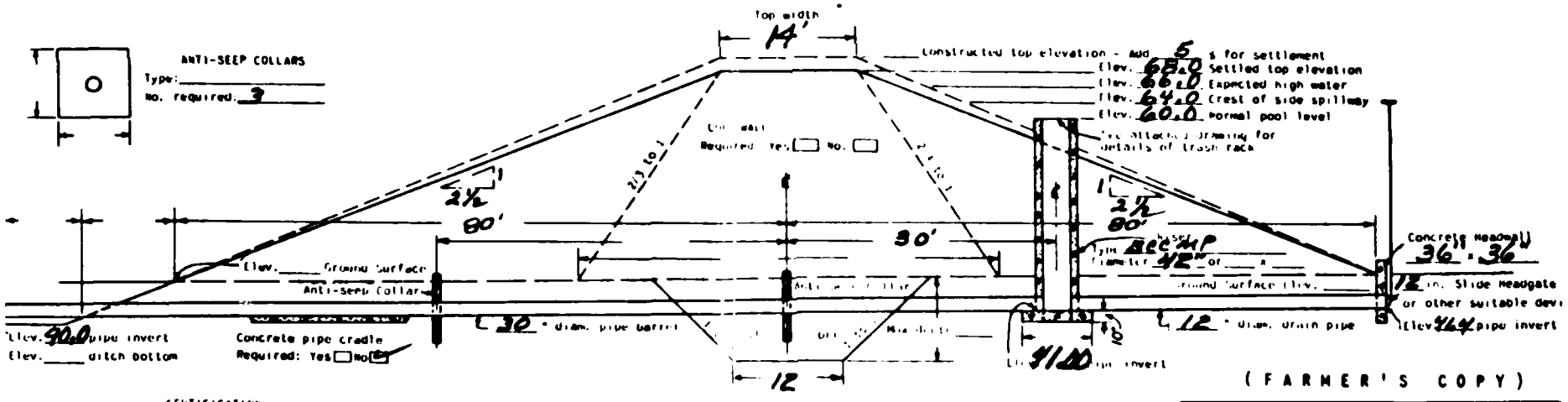
BILL OF MATERIALS

110' of 30" Bituminous Coated Corrugated Metal Pipe
20' of 42" " " " " "
50' of 12" " " " " "
One 12" Slide gate with Control
Suitable Tee to Connect barrel & riser
Trash rack for riser
3-Anti-Seep Collars
40' of 6" BCCMP
220' of 6" Perforated BCCMP
90 Tons gravel for toe drains
Rip Rap for dam
Three 6" Minimum by 24' Poles to support Slide gate Control
Cut Water line a minimum of 3'
Include grass seed, lime, fertilizer etc

ANTI-SEEP COLLARS

Type: _____

No. required: 3



SECTION THROUGH FILL ALONG CONDUIT
STATION _____ ON CENTERLINE

CERTIFICATION

I certify that I have made, or caused to be made, a final inspection of this pond project and that all work related thereto has been completed in accordance with these plans and with all other applicable specifications except as listed on the attached sheet.

(Check here ☐ if no exceptions)

Signed _____ Title _____ Date _____

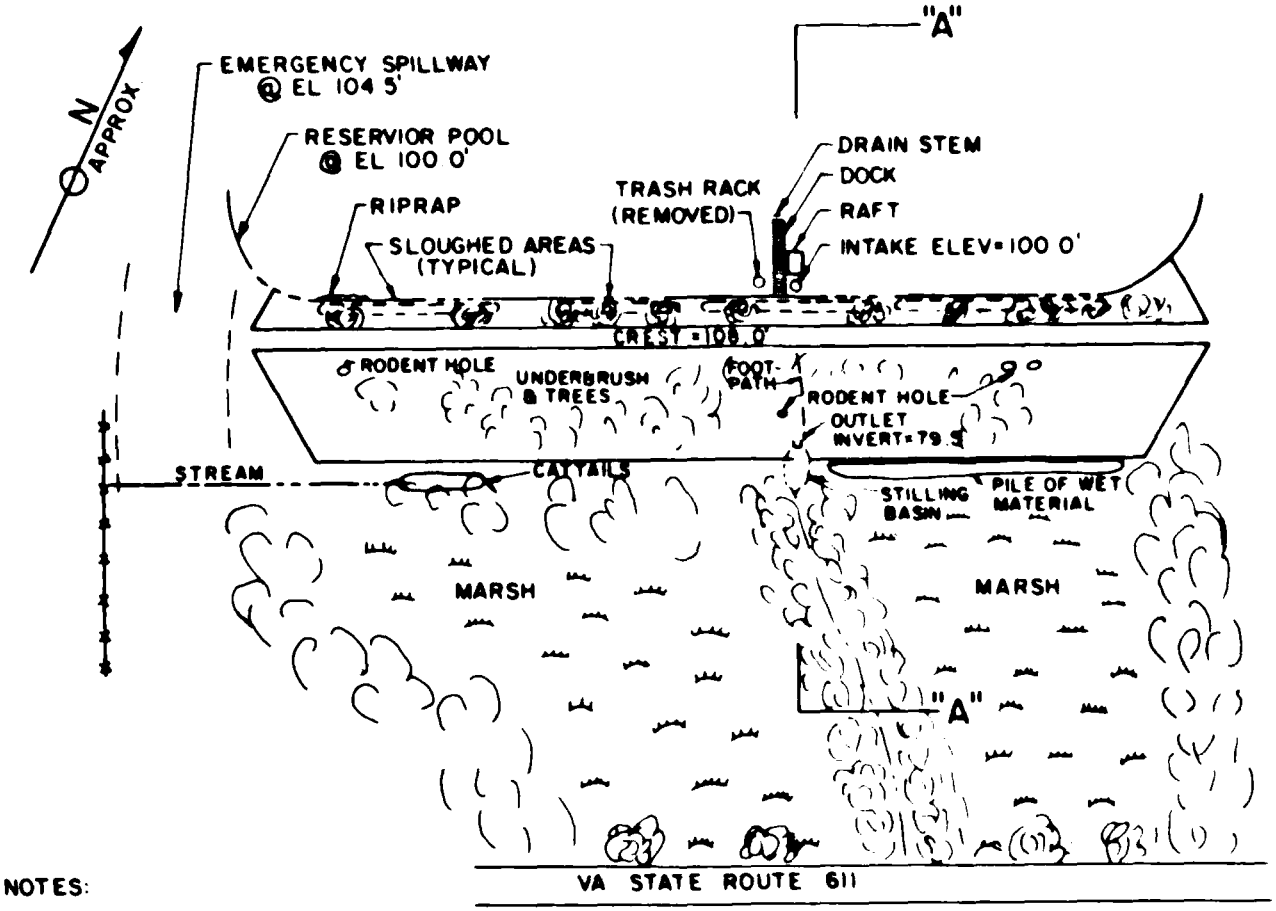
(FARMER'S COPY)

PLAN OF FARM POND
William J. Daley Farm
Loudoun County, Virginia

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed _____ Date _____ Approved by _____
Drawn _____ Title _____

PLATE II



NOTES:

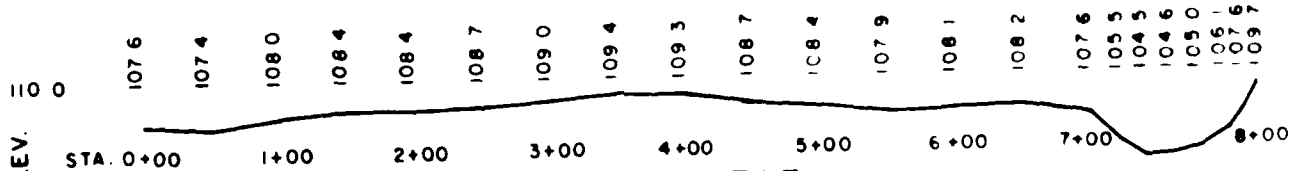
1. SKETCH MADE FROM FIELD NOTES.
2. ELEVATIONS BASED ON TBM OF WATERSURFACE = 100.0 FEET ACTUAL WATERSURFACE = 500.0 FEET MSL.

PLAN VIEW OF DAM

SCALE 1"=100'

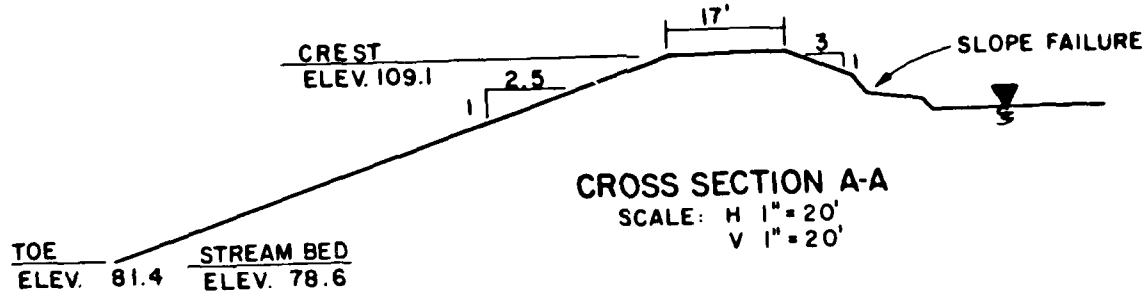
DALEY DAM
LOUDOUN COUNTY, VA
30 APRIL 1981

PLATE III



CREST PROFILE

SCALE: H 1" = 100'
V 1" = 10'



CROSS SECTION A-A

SCALE: H 1" = 20'
V 1" = 20'

NOTES:

1. ELEVATIONS BASED ON TBM OF WATERSURFACE = 100.0 FEET. ACTUAL WATERSURFACE = 500.0 FEET MSL.

DALEY DAM
LOUDOUN COUNT, VIRGINIA
30 APRIL 1981
PLATE IV

APPENDIX II

PHOTOGRAPHS

PHOTO #1 CREST

PHOTO #2 UPSTREAM FACE

PHOTO #3 SLOUGHING / EROSION
ON UPSTREAM FACE

PHOTO #4 SLOUGHING / EROSION
ON UPSTREAM FACE

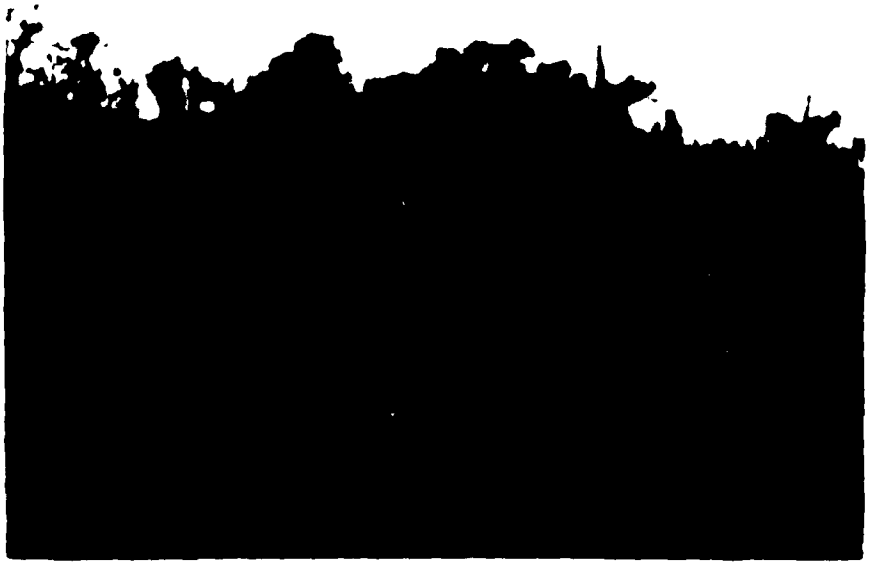


PHOTO #5 DOWNSTREAM FACE

PHOTO #6 ANIMAL BURROW ON
DOWNSTREAM FACE
(ONE OF SEVERAL)

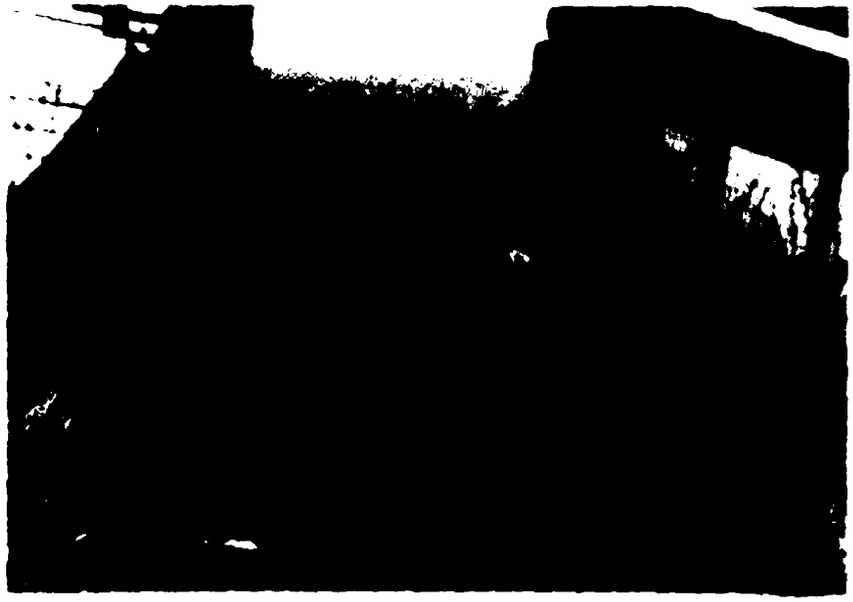


PHOTO #7 PRINCIPAL SPILLWAY INTAKE

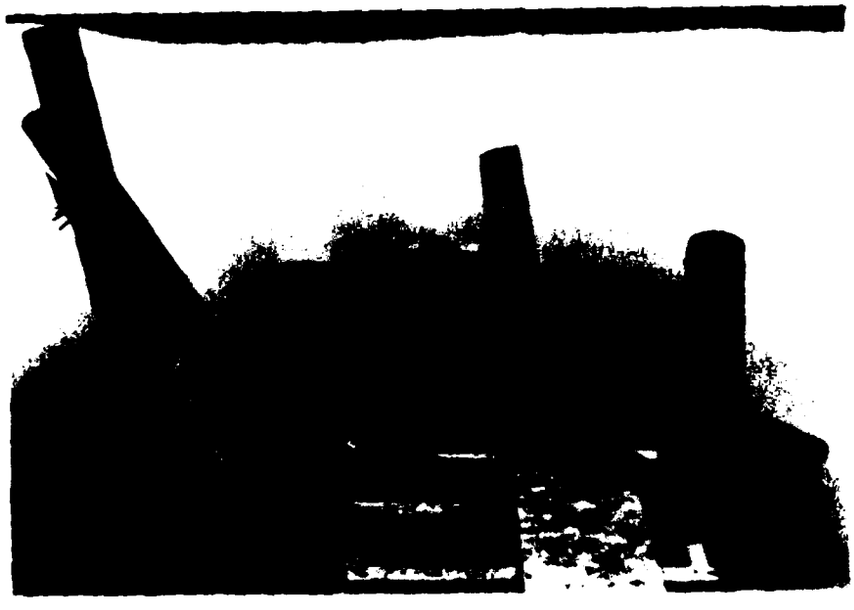


PHOTO #8 RESERVOIR DRAIN OPERATOR

APPENDIX III

FIELD OBSERVATIONS

Check List
Visual Inspection
Phase I

Name Dam: Daley County: Loundoun State: Virginia Coordinaters: Lat 39° 13.2' N
Long 77° 41.4' W

Date of Inspection: 30 April 1981 Weather: Overcast Temperature: 53°F.

Pool Elevation at Time of Inspection: 500.0 ft. msl Tailwater at Time of Inspection: 480.0 ft. msl

Inspection Personnel:

B. O. Taran, Corps of Engineers
Leonard Jones, Corps of Engineers
James Robinson, Corps of Engineers
Daniel Davis, Corps of Engineers
H. Guildea, State Water Control Board
Mr. Jim Heisel, Part Owner

Davis and Robinson, Recorders

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	There are no surface cracks. Ground conditions are wet.	None.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	There are no creep, sloughing, or bearing capacity problems.	None.
SLOUGHING OR EROSION OF EMBNKMENT AND ABUTMENT SLOPES	The embankment has experienced a slope failure along most of the upstream face. The failure consists of areas of minor sloughing and areas of large failure surfaces with 4 feet of slip plane exposed. Several footpaths run down both the upstream and downstream face from the crest. There is minor erosion around the principal spillway outlet pipe. Several animal burrows are located on the downstream face.	The services of a qualified geotechnical engineer should be obtained to run a stability check on the dam. The footpaths should be reseeded. The eroded area at the outlet pipe and the animal burrows should be filled with compacted material and reseeded.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	The crest alignment is straight. There is no noticeable settlement.	None.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
RIPRAP FAILURES	The portions of the upstream slope where the slope failure has not occurred are riprapped. The riprap extends from about 3 feet below pool elevation to about 12 feet up the slope. Evidence of riprap is visible on the slope in the areas of minor sloughing however, there is no evidence of riprap in areas of large failure surfaces.	Apparently, the whole upstream slope was riprapped but the slope failure carried some of the riprap for enough down the slope, beneath the water surface, to be unobservable.
FOUNDATION	The foundation material is generally pervious and appears stable. There is no noticeable sliding or settling. There are no known foundation drains. There are no foundation drain outlets. There are no rock outcrops in the area.	None.
ANY NOTICEABLE SEEPAGE	There is a low pile of material along the downstream toe from a point about 75 feet left of the principle spillway outlet to the outlet pipe. The material is wet. The area beyond the material up to the road (approximately 300 feet from toe) is lower in elevation than the surrounding area and water is ponded therein. The downstream area to the right of the outlet pipe is slightly higher in elevation, but is also wet from the toe to the road. A ditch runs down the right hillside about 30 feet downstream of the dam. A patch of cattails is located where the ditch intersects the valley floor.	The wet areas along the toe should be monitored during periodic inspection for any flow. If any flow develops the services of a qualified geotechnical engineer should be obtained to investigate the causes of the flow.
DRAINS	There are no known embankment drains.	None.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MATERIALS	A material sample taken from the failure surface in the upstream slope was classified as a high plastic silty clay (CL) with some (34%) fine sand.	None.
VEGETATION	The crest is well vegetated with grass. The portions of the upstream slope not involved in the slope failure are well vegetated with grass, shrubs, and sapplings. The downstream slope is well vegetated with grass, ground ivy, large shrubs, and sapplings and scattered trees with diameters up to 6 inches.	The trees, sapplings, and shrubs should be cut off at the ground surface. Any tree with a diameter larger than 3 inches should have its root system removed and the subsequent hole filled with compacted material and seeded.

PRINCIPAL SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
CONTROL SECTIONS	A 42-inch CMP drop-inlet in the reservoir is the control section for the principal spillway. Rebars are placed across the intake to prevent trash from dropping into the pipe. A 54-inch CMP trash guard is located in the reservoir (about 15 feet to the right of the intake).	None.
DISCHARGE CHANNEL	The outlet pipe, a 30-inch CMP which passes under the dam, is partially submerged in the stilling basin.	None.
WOODEN WALKWAY	A wooden walkway extends from the shoreline about 40 feet to the drawdown stem of the emergency gate.	None.
EMERGENCY GATE	A gate stem extends above the water at the end of a wooden pier in the reservoir. The drawdown gate at the bottom of the reservoir is a 12-inch slide gate.	None.

EMERGENCY SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
CONTROL SECTIONS	The control section is an open channel cut in the right abutment. Some small pine trees have been planted in the right portion of the control section. The vegetation is sparse.	The pine trees should be cut off at the ground surface before they grow large enough to obstruct flows through the spillway.
APPROACH CHANNEL	The approach channel is the mildly sloped area between the reservoir and control section of the emergency spillway.	None.
DISCHARGE CHANNEL	The discharge channel is the area along the contact between the embankment and the right abutment.	None.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
MONUMENTATION/SURVEYS	There are no known monuments in the immediate area.	None.
OBSERVATION WELLS	There are no observation wells.	None.
WEIRS	There are no weirs.	None.
PIEZOMETERS	There are no piezometers.	None.
STAFFGAGES	There are no staffgages.	A staffgage should be installed in the reservoir to extend above the crest of the dam.

RESERVOIR

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	The reservoir slopes are gentle pasture lands. No slope failures or shoreline erosion around the reservoir were observed. The perimeter of the drainage area is heavily wooded.	None.
SEDIMENTATION	The inspection team was unable to evaluate sedimentation in the reservoir.	None.

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The downstream channel is narrow and shallow. Trees line the channel from the stilling basin to the road, about 300 feet downstream.	Cut off trees lining the downstream channel at the ground surface.
SLOPES	The area slopes are gentle and for the most part treeless.	None.
APPROXIMATE NO. OF HOMES AND POPULATION	There are two farms downstream of the dam that may sustain damage should an embankment failure occur.	None.

APPENDIX IV

REFERENCES

REFERENCES

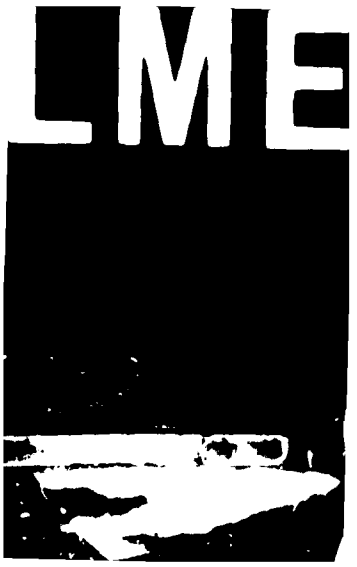
1. Recommended Guidelines for Safety Inspection of Dams, Office of the Chief of Engineers, Department of the Army, Washington, D. C.

2. HEC-1DB Flood Hydrograph Package, (Hydrologic Engineering Center, U. S. Army Corps of Engineers, September 1978.)

3. "Probable Maximum Precipitation Estimates, United States East of the 105th Meridian," Hydrometeorological Report No. 51, (U. S. Weather Bureau, June 1978).

4. "Rainfall Frequency Atlas of the Unites States", Technical Paper No. 40, (U.S. Weather Bureau, May 1961).

5. "Design of Small Dams", Technical Publication of United States Department of the Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1977.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