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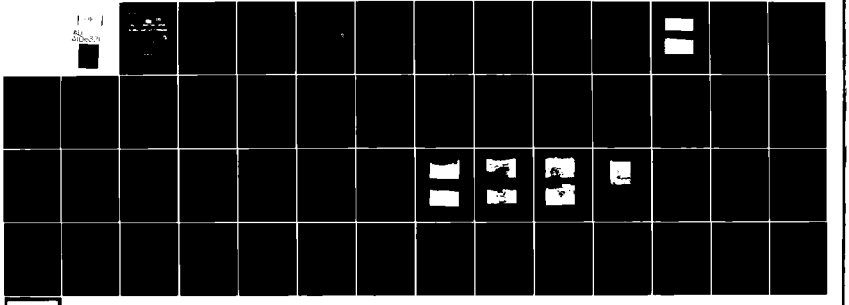

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POTOMAC RIVER BASIN

Name Of Dam: SLEEPER LAKE DAM

Location: LOUDOUN COUNTY, VIRGINIA

Inventory Number: VA. NO. 10710

LEVEL II

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

PREPARED FOR

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

BY

SCHNABEL ENGINEERING ASSOCIATES, P.C.
J. K. TIPPETTS AND ASSOCIATES, INC.

NOV 1981

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Abstract

[illegible] Phase I Inspection Reports are prepared [illegible] guidelines for safety inspection [illegible] Engineers, Washington, D.C. The objective of the Phase I inspection is [illegible] dams [illegible] hydrologic and hydraulic [illegible] The assessment of the general condition of the dam is based [illegible] Visual inspection, available [illegible] investigations, and [illegible] Depending upon the findings of the Phase I investigation, however, the investigation may be extended to identify [illegible]

Because [illegible] at the time of the field inspection and [illegible] engineering data, the Phase I report addresses the [illegible] foundation, embankment, geotechnical, 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 for additional in-depth study where necessary.

Phase I reports include [illegible] of the dam, geotechnical data, [illegible] engineering data, operational procedures, hydraulic/hydrologic data, [illegible] watershed, dam stability, visual inspection report and [illegible] recommended [illegible] remedial measures.

[illegible]

[illegible]

PREPARED FOR
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TABLE OF CONTENTS

	Page
Preface	i
Location and Description of Dam	1
Overview Photos	4
Section 1: PROJECT INFORMATION	5
Section 2: [illegible] DATA	9
Section 3: VISUAL INSPECTION	11
Section 4: OPERATIONAL PROCEDURES	15
Section 5: HYDRAULIC/HYDROLOGIC DATA	16
Section 6: DAM STABILITY	19
Section 7: ASSESSMENT/REMEDIAL MEASURES	23

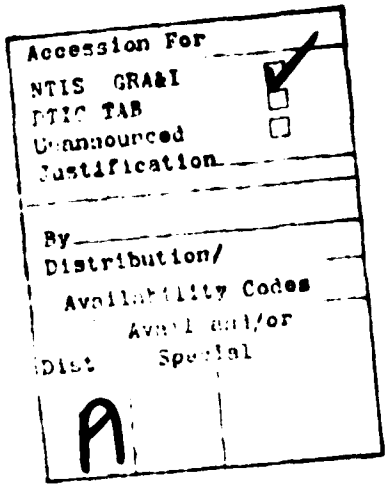
Appendices:

I - Maps and Drawings

II - Photographs

III - Field Observations

IV - References



PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

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

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

[illegible]

[illegible]

[illegible]	[illegible] Lake Dam
[illegible]	[illegible]
[illegible]	[illegible] County
[illegible]	[illegible] Mount Hill
[illegible]	Lat 39° 07.2' Long 77° 45.6'
[illegible]	North fork of Goose Creek
[illegible]	May 4, 1981

[illegible] is an earth fill structure about 1100 ft long and 55 ft high. The principal spillway consists of a 60 ft long [illegible] low weir which discharges into a trapezoidal shaped [illegible] channel with a 12 ft wide bottom. An earth emergency spillway is located at the right abutment with a 140 ft wide bottom and 2H:1V [illegible] slopes. The structure is classified intermediate in size and is assigned a significant hazard classification. The dam is located on the North fork of Goose Creek approximately 1 mile south of Mount Hill, [illegible]. The lake is used for irrigation and recreational purposes. It is owned and maintained by Mr. and Mrs. Charles L. Beeles.

Based on criteria established by the Department of the Army, [illegible] the Corps of Engineers (COE), the appropriate Spillway Design Flood (SDF) is the ½ PMF. During the SDF the dam will be overtopped to a depth of 0.4 ft maximum, at a maximum velocity of 2.7 fps, and will be overtopped for a period of one hour. Flows overtopping the dam during the SDF are not considered detrimental with respect to erosion. The spillway is judged inadequate but not seriously inadequate.

[illegible] probable [illegible] would [illegible] dam is [illegible] stable for normal [illegible] and [illegible] stability analysis is not required.

It is recommended that the owner implement an emergency action plan [illegible] immediately of the date of this report in order to warn downstream [illegible] of any dangers which may be imminent. Also, the dam [illegible] periodically, especially by any precipitation and runoff.

The following routine maintenance and observation functions should be initiated as part of an annual maintenance program:

The grass and weeds on the embankment should be cut at least once a year and preferably twice a year. Maintenance is recommended in the early spring and fall. Existing trees on the dam should be cut to the ground. Trees greater than 3 inches in diameter should have their stumps and root structures removed and resulting holes backfilled.

Eroded areas in the principal spillway discharge channel should be stabilized. Erosion observed at pool level along the upstream slope should be corrected and riprap replaced as necessary. Animal burrows in the embankment should be backfilled.

Iron stained seepage present below the lake drain discharge pipe should be monitored quarterly to detect any flow which may cause piping within the embankment. The chimney drain outlet should be uncovered and flow monitored quarterly. A staff gage should be installed to monitor water levels.

Prepared by:

SCHNABEL ENGINEERING ASSOCIATES, P.C./
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Commander and District Engineer

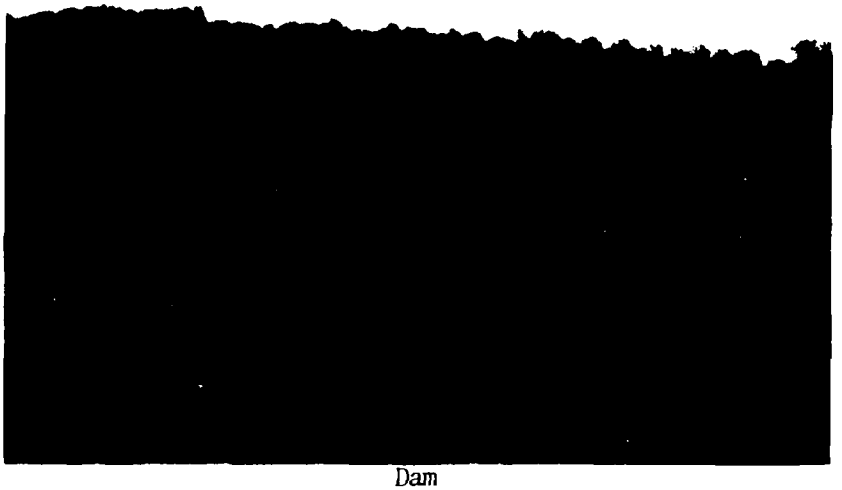
Recommended by:

Original signed by
JAMES A. WALSH

for Jack G. Starr
Chief, Engineering Division

Date: **SEP 1 1 1981**

Sleeter Lake



Dam

Overview Photographs

[illegible]

1.1 [illegible]al:

1.1.1 Authority: [illegible] Law [illegible], 8 [illegible] 1972, [illegible] the Secretary of the Army, [illegible] a national program of safety [illegible] States. [illegible]

1.1.2 Purpose of Inspection: The purpose [illegible] Phase I [illegible] of Dams (see 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: [illegible] earthfill structure approximately [illegible] crest of the dam [illegible] wide, and [illegible] horizontal to 1 vertical [illegible] the downstream [illegible] upstream slope of the dam. The [illegible] of the dam [illegible] The structure includes [illegible] internal drainage [illegible] of the [illegible]

* Height [illegible] the centerline of the stream.

[illegible] consists of a two stage ogee crest flow type [illegible] 1 and 2, Appendix III). The primary stage [illegible], consists of a concrete overflow weir in a rectangular [illegible] configuration. The primary weir is at elevation [illegible] weir crest height from 3 to 4 ft and discharges into [illegible] channel with a 12 ft wide [illegible] slopes. The secondary stage of the principal [illegible] is an earth channel located at the top of the [illegible] channel (elevation 495 msl). The secondary stage [illegible] is a broad crested weir with 2H:1V side slopes. The two stage [illegible] discharges into an earth channel excavated to bedrock. The [illegible] restores the original stream bed at the toe of the [illegible] 36 inch diameter corrugated metal pipe (CMP) through the dam [illegible] at 440± msl is used to drain the lake. The drain [illegible] approximately 350 ft (field sketch 1, [illegible]).

[illegible] spillway (EMS) is located at the right abutment of [illegible] is a trapezoidal earth channel with a 140 ft wide [illegible] section and 2H:1V side slopes. The EMS control [illegible] at elevation 494 msl (field sketch 2, Appendix III).

[illegible] The dam is located on the North Fork [illegible] approximately 1 mile south of Round Hill, Virginia (Plate [illegible], Appendix II).

[illegible] Classification: The dam is classified as an intermediate [illegible] based on its height and maximum lake storage potential [illegible] in Reference 1, Appendix IV.

[illegible]

1.2.[illegible] [illegible] Pebbles of Washington, D. C. All [illegible] attorney, Mr. H. [illegible] 1750 K Street, N. W., Suite 490, Washington, D. C. [illegible].

1.2.6 Purpose: Recreation and [illegible].

1.2.7 Design and Construction: [illegible] constructed under the supervision of [illegible], [illegible], who [illegible] in business. The dam was constructed by [illegible] of Vienna, Virginia and completed in 1967.

1.2.8 Normal Operational Procedures: The principal spillway is ungated, therefore, water rising above the crest of the primary weir is automatically discharged downstream. Normal pool is maintained at elevation 491.1 msl by the crest of the primary weir. Flood discharges which cannot be absorbed by storage in the primary weir, flow over the emergency spillway at pool elevation 494 msl and over the secondary weir of the principal spillway at elevation 491 msl. The 6 inch diameter pipe at elevation 440 msl is manually operated and is used to lower the lake elevation below normal pool for maintenance purposes.

was observed in this area.

The primary and secondary principal spillway weirs indicated no signs of deterioration or erosion (see photographs No. 3 and 4, Appendix II). The discharge channel below the principal spillway exhibited erosion on the side slopes (Photograph No. 6, Appendix II and field sketch 4, Appendix III). The emergency spillway was heavily overgrown with grass and some 2 - 3 inch trees were located below the control section. Intermittent riprap failures were noted along the shoreline as a result of embankment sloughing and wave action.

3.1.3 Reservoir Area: The reservoir area was free of debris and the perimeter was a combination of wooded area, orchard and pasture. The reservoir is located in a valley with side slopes at approximately 10 to 20H:1V. Sedimentation was visible at the south end of the lake near the approach channel to the right emergency spillway.

3.1.4 Downstream Area: The downstream channel consists of a 30 ft wide channel located in a valley with side slopes at approximately 4H:1V (Photograph No. 7, Appendix II). The downstream valley is heavily wooded with dense undergrowth. Approximately ¼ mile downstream, one dwelling exists approximately 15 ft above the stream bed, and two homes are located 4 miles[1] below the dam approximately 10 ft above the stream bed.

3.1.5 Instrumentation: No instrumentation (monuments, observation wells, piezometers, etc.) was encountered for the structure. There is no staff gage.

3.2 Evaluation:

3.2.1 Dam and Spillway: Overall, the dam was in good condition at the time of the inspection. It is recommended that a routine maintenance program be initiated. The embankment, including its crest and slopes and the emergency spillway should be mowed at least once a

year, but more preferably twice a year. The presence of trees on the embankment, particularly those at pool level on the upstream slope, may promote the development of deep rooted vegetation and this type growth can encourage piping within an embankment. All trees growing on the embankment should be cut to the ground. Trees greater than 3 inches in diameter should have their stumps and root structures removed. Subsequent holes should be filled with compacted soil and seeded.

Erosion noted along the upstream slope is due to wave activity. It is recommended this erosion be corrected and that the riprap be replaced as necessary along the upstream slope to provide embankment protection. The animal burrows do not presently create an unsafe condition; however, future burrowing could result in numerous voids in the embankment which could be potentially hazardous under certain conditions. It is recommended that existing burrows be backfilled. The eroded areas observed in the discharge section of the principal spillway should be stabilized.

The seepage and iron staining observed below the discharge pipe is believed to be related to seepage through the dam. The strong upflow observed 115 ft to the right of the discharge pipe is believed to represent discharge from the chimney drain (described by Mr. Ritter) whose outlet is apparently covered with sediment. The iron stained area below the discharge pipe does not present a hindrance to the normal functioning of the dam, however, it is recommended this area be monitored quarterly to detect any flow which may cause piping in the embankment. If flows should occur, a Professional Engineer with expertise in Geotechnical Engineering should be contacted to evaluate the problem and make

recommendations for required corrective measures. It is recommended that the chimney drain discharge pipe be uncovered in order to allow its proper functioning. The marshy, saturated area located below the base of the emergency spillway is believed to be related to surface runoff or spring activity. No special attention is required.

A staff gage should be installed to monitor water levels.

3.2.2 Downstream Area: A breach in the Sleeter Lake Dam during extreme flooding would possibly create a hazard to the downstream dwellings.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures: The normal storage pool is elevation 491.1 msl or 0.1 ft above the crest of the primary overflow weir at the principal spillway inlet. The lake provides an irrigation supply and recreation. Water automatically passes through the primary principal spillway as the water level in the reservoir rises above the spillway crest. Water will also pass automatically through the emergency spillway when the water level in the reservoir reaches elevation 494 msl and through the secondary principal spillway when the pool level reaches elevation 495 msl. A 30 inch CMP outlet at elevation 446 msl is provided to drawdown the reservoir below normal pool.

4.2 Maintenance of Dam and Appurtenances: Maintenance is the responsibility of the owner. Maintenance consists of inspection, debris removal, mowing of vegetative cover and repair, but is not performed routinely.

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

4.4 Evaluation: The dam and appurtenances are in good operating condition, however, maintenance of the dam appeared to be inadequate. Documentation of and a routine maintenance program should be developed for this structure. An emergency operation and warning plan should be developed. It is recommended that a formal emergency procedure 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 - HYDRAULICS/HYDROLOGIC DATA

5.1 Design: Sleeter Lake Dam was designed by Earthworks, Inc. as a multi-purpose dam; however, hydrologic and hydraulic data are not available. According to Mr. Ritter the structure was designed to accommodate the 6 hour precipitation for a 100 year storm.

5.2 Hydrologic Records: There are no records available.

5.3 Flood Experience: The maximum pool elevation observed (according to Mr. John Sleeter) was approximately 2 ft above the emergency spillway or elevation 496 msl.

5.4 Flood Potentials: 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 meterologic and hydrologic conditions that are reasonably possible in the region), or fractions thereof. The Probable Maximum Flood (PMF) and ½ PMF were developed by the HEC-1 method (Reference 5, Appendix IV). Precipitation amounts for the flood hydrograph of the PMF were taken from U. S. Weather Bureau Information (References 6 and 7, Appendix IV). Appropriate adjustments for basin size and shape were accounted for. These hydrographs were routed through the reservoir to determine maximum pool elevation.

5.5 Reservoir Regulations: For routing purposes, the pool at the beginning of flood was assumed to be at elevation 491 msl. Reservoir stage-storage data and stage-discharge data were computed from field sketches and available topographic data. Floods were routed through the reservoir using the primary principal spillway discharge up to a pool storage elevation of 494 msl, a combined primary principal and emergency spillway discharges for pool elevations above 494 msl, and a combined

primary and secondary principal spillways and emergency spillway above elevation 495 msl. Pool elevations above 501 msl were routed over the non-overflow section of the dam.

5.6 Overtopping Potential: The predicted rise of the reservoir pool and other pertinent data were determined by routing the flood hydrographs through the reservoir as previously described. The results for the flood conditions (½ PMF and PMF) are shown in the following Table 5.1:

TABLE 5.1 - RESERVOIR PERFORMANCE

		Hydrograph	
	Normal Flow	½ PMF	PMF
Peak Flow, CFS			
Inflow	1	20,145	40,287
Outflow	1	19,097	40,287
Maximum Pool Elevation, Ft, msl	553	501.4	503.8
Non-overflow Section (Elev 501 msl)			
Depth of Flow, Ft	-	.4	2.8
Duration, Hours	-	1	5
Velocity, fps*	-	2.7	7.3
Tailwater Elevation, Ft, msl	446	461	468

*Critical Velocity

5.7 Reservoir Emptying Potential: A 30 inch diameter CMP at invert elevation 446± msl is capable of draining the reservoir. Assuming that the lake is at normal pool elevation (491 msl) and there is 10 cfs inflow, it would take approximately 10 days to lower the reservoir to elevation 446± msl. This is equivalent to an approximate drawdown rate of 4.5 ft/day based on the hydraulic height measured from normal pool to the invert of the drawdown pipe divided by the time to dewater the reservoir.

5.8 Evaluation: The U. S. Army, Corps of Engineers' guidelines indicate the appropriate Spillway Design Flood (SDF) for an intermediate size, significant hazard dam is the ½ PMF. The spillway will pass 4 percent of the PMF (80 percent of the SDF) without overtopping the crest of the dam. The SDF will overtop the dam a maximum of 0.4 ft at the low point and remain above the dam for one hour with a maximum critical velocity of 2.7 fps.

[illegible]

[illegible] Appendix [illegible] weathering [illegible]

[illegible] within the foundation was apparent [illegible] it was reported that [illegible] trench was [illegible] according to Mr. Potter, the cut [illegible] it was [illegible] down [illegible] from [illegible] ft along the centerline of the dam.

Initial consolidation of underlying soils would be expected during and after placement of fill materials. The underlying soils probably had essentially fully consolidated under the applied load not long after completion of construction. Based upon the performance history of the dam and the materials present in the principal spillway channel, a stable foundation is assumed.

[illegible]

[illegible] Materials: The dam was designed as a homogeneous embankment. The [illegible] materials (CL) encountered on site were placed in the [illegible] and central portion of the dam. However, it is reported that the [illegible] of the embankment was constructed with SC to SM [illegible] Unified Soil Classification). The fill was placed in 12 inch [illegible] loose thickness and compacted to at least 95 percent of maximum [illegible], Standard Proctor. Field density tests were performed by [illegible], Inc. personnel.

[illegible] Seepage: A chimney drain was constructed within the embankment to provide an internal drainage system. Mr. Ritter believes the drain was [illegible] approximately 4 ft thick and constructed with [illegible]. A [illegible] inch perforated CMP was included along the base of the drain to collect seepage and pass it to a single discharge point [illegible] (as best he can recall) to the right of the lake drain [illegible]. The [illegible] flow observed during the field inspection is believed [illegible] from the chimney drain. Mr. Ritter described the [illegible] of a chimney drain outlet in this general area. The end of the [illegible] metal discharge pipe is apparently covered with sediment.

[illegible] staining observed immediately below the lake drain [illegible] pipe is believed to be the result of seepage through the dam. [illegible] was observed. A marshy area was observed along the base of the [illegible] emergency spillway. No iron staining was observed in this area.

[illegible] Stability: A stability analysis was not performed for this [illegible]; however, we understand the embankment slopes were designed based upon individual experience with the Soil Conservation Service and Army Corps of Engineers. The dam is 55 ft high and has a crest width of [illegible]. Side slopes are approximately 3H:1V on the upstream and downstream [illegible] of the dam.

The dam was designed as a homogeneous earth embankment [illegible] with soils generally ranging from [illegible] but includes some CL material in the [illegible]. The dam is susceptible to rapid drawdown because the approximate reservoir drawdown rate of 4.5 ft per day exceeds the critical rate of 0.[illegible] ft per day for earth dams. According to the designer, a stability analysis was not performed for this structure. However, it was reportedly designed according to SCS and U. S. Army Corps of Engineers standards. No apparent instability was detected during the visual inspection. Based upon these facts, the embankment slopes are considered acceptable.

...4 Seismic Stability. The dam is located in Seismic Zone [illegible]. Therefore, according to the Recommended Guidelines for Safety Inspection of Dams, the dam is [illegible] to have no hazard from earthquake induced [illegible]. Should this be unsatisfactory and conventional [illegible].

... Hydrologic and Hydraulic. An adequate check on the stability of this structure cannot be made since there was no stability analysis and laboratory test data available. The U. S. Bureau of Reclamation requirements (Reference ..., Appendix D) are for small dams up to 50 ft in height. Although Sleepy Lake Dam [illegible] ft higher than the maximum small dam height as defined by the Bureau of Reclamation, this difference is not considered great enough to disallow the use of Bureau guidelines in assessing the stability of this structure.

The downstream and upstream embankment slopes agree with the rapid drawdown requirements recommended by the U. S. Bureau of Reclamation; however, the embankment crest is approximately 6 ft too narrow. Overtopping is not considered detrimental to the dam with respect to erosion because of the depth and duration of flood and also the velocity is less than 6 fps, the effective eroding velocity for a vegetated earth embankment.

Based upon the visual inspection, the design and construction information and the performance history of this structure, the foundation is considered stable and a stability analysis is not required. Since no undue settlement, cracking, or seepage was noted at the time of inspection, it appears that the embankment is adequate for control storage at elevation 491 msl.

The marshy saturated area located below the base of the emergency spillway is believed to be the result of either accumulated surface runoff or spring activity. Iron stained areas observed immediately below the lake drain discharge pipe are believed to be related to seepage through the dam along the discharge pipe. This does not necessarily create an unsafe condition; however, these iron stained areas should be monitored periodically in attempt to detect any significant future flow which may result in piping within the embankment. The strong upflow observed 115 ft± to the right of the drain discharge pipe is believed to represent discharge from the chimney drain outlet, which is covered with [illegible]. The outlet should be uncovered and it is recommended that it be maintained in the future to verify proper functioning of the drain.

SECTION 7. ASSESSMENT AND REMEDIAL MEASURES

7.1 Dam Assessment: The [illegible] information to evaluate foundation conditions and embankment stability. The visual inspection revealed no findings that proved the dam to be unsound. A routine maintenance program does not exist. Also, there is no emergency operation and warning plan. Overall, the dam was in good condition at the time of inspection. The dam was designed in accordance with SCS and Army Corps of Engineers standards and a stability check is not required. U. S. Army, Corps of Engineers' guidelines indicate the appropriate Spillway Design Flood (SDF) for this dam is the ½ PMF. The spillway will pass 40 percent of the PMF (80 percent of the SDF) without overtopping the crest of the dam. Flows overtopping the dam at a maximum velocity of 2.7 fps during the SDF are not considered detrimental to the embankment with respect to erosion. The spillway is judged inadequate but not seriously inadequate.

7.2 Recommended Remedial Measures:

7.2.1 Emergency Operation and Warning Plan: It is recommended that a formal emergency procedure be prepared, prominently displayed, and furnished to all operating personnel. This should include:

1) How to operate the dam during an emergency.

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

7.3 Required Maintenance: It is recommended that a regular maintenance operation program be established and documented for future reference. Also, the inspection revealed the following maintenance items that should be scheduled by the owner during a regular maintenance period within the next 12 months.

7.3.1 The grass and weeds on the embankment in the emergency spillway should be cut at least once and preferably twice a year. Maintenance is recommended in the early summer and fall.

7.3.2 All trees and saplings present on the embankment and in the emergency spillway should be cut to ground level yearly during maintenance operations. Trees greater than 3 inches in diameter should have their root structures removed. Subsequent holes should be filled with compacted soil and seeded.

7.3.3 Eroded areas in the principal spillway discharge channel should be stabilized.

7.3.4 Erosion present at pool level along the upstream slope should be corrected and the riprap replaced as necessary.

7.3.5 Animal burrows on the embankment should be backfilled.

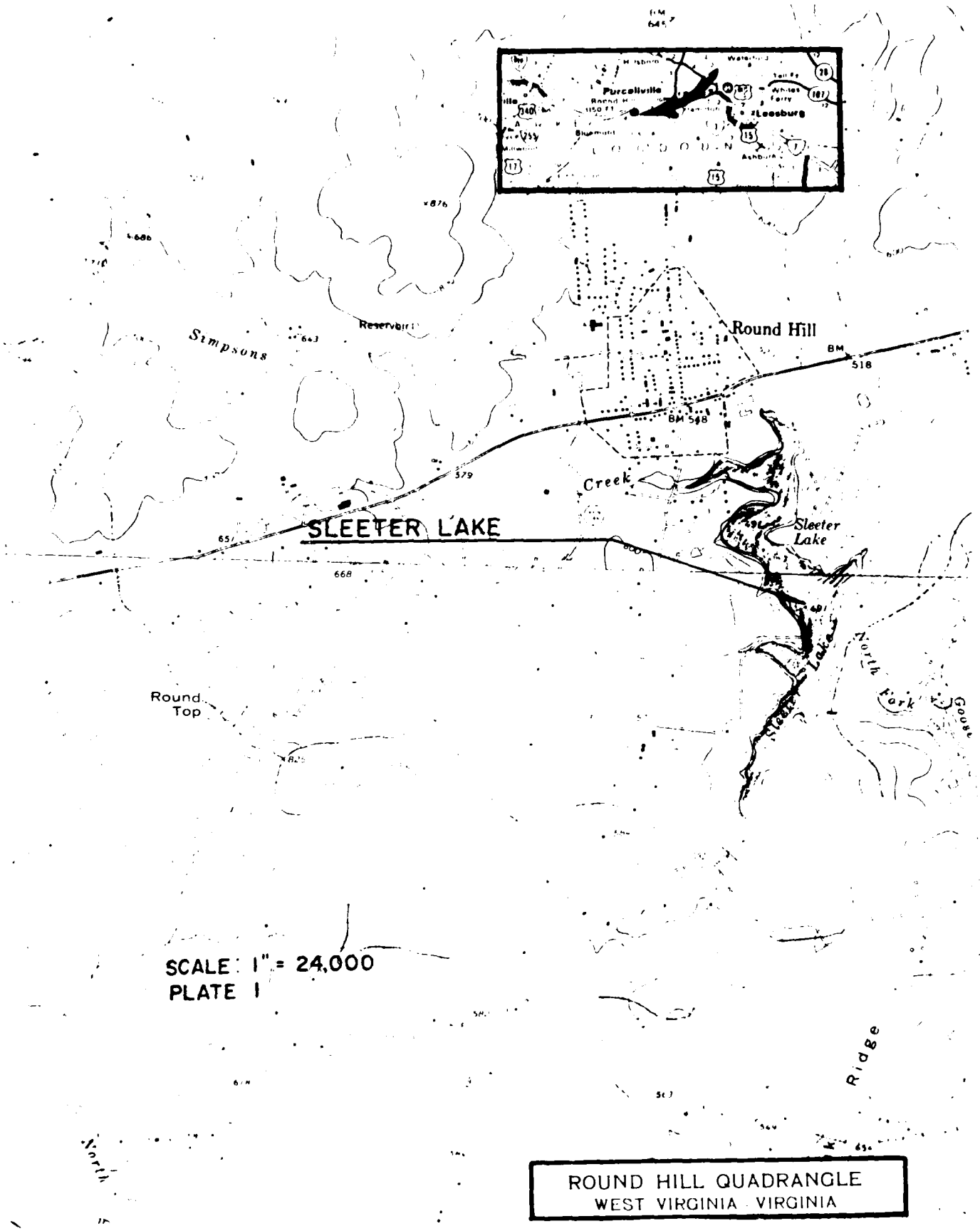
7.3.6 Iron stained seepage present below the lake drain discharge pipe should be monitored quarterly to detect any flow. If flows should occur, a Professional Engineer with expertise in Geotechnical Engineering should be contacted to evaluate the problem and make recommendations for required corrective measures.

7.3.7 Sediment covering the chimney drain outlet should be removed and flows monitored quarterly to verify proper functioning of the drain.

7.3.8 A staff gage should be installed to monitor water levels.

APPENDIX I

MAPS AND DRAWINGS



ROUND HILL QUADRANGLE
WEST VIRGINIA - VIRGINIA

APPENDIX II

PHOTOGRAPHS

Photograph No. 1 - View Along Top of Dam
and Upstream Face.

Photograph No. 2 - Downstream Face of Dam

Photograph No. 3 - Approach Channel and Weir

Photograph No. 4 Discharge Channel

Photograph No. 5 - Emergency Spillway

Photograph No. 6 - Discharge Channel Confluence with the natural stream bed.

Photograph No. 7 - Looking Downstream
from the Outlet Channel.

APPENDIX III

FIELD OBSERVATIONS

Check List
Visual Inspection
Phase I

Name Dam Sleeter Lake County Loudoun State Virginia Coordinates Lat 39° 07.5' Long 77° 45.6'

Date(s) Inspection May 4, 1981 Weather Sunny-Clear Temperature 75°F

Pool Elevation at Time of Inspection 491 msl Tailwater at Time of Inspection 446 msl

Inspection Personnel:

Schnabel Engineering Associates, P.C.
Gilbert T. Seese
Stephen G. Werner
Raymond A. DeStephen, P.E.*

J. K. Timmons & Associates
Robert G. Roop, P.E.
Steve Oddi

State Water Control Board
Hugh M. Gilden, P.E.

Gilbert T. Seese, Recorder

* [illegible] on June 15, 1981.

EMBANKMENT

AREA EXAMINATION OF	CONDITION	REMARKS OR RECOMMENDATIONS
CRACKS	The slopes, crest and abutment [illegible] were inspected and no cracks were noted. Ground [illegible] was low at the time of the inspection.	-
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	No unusual movements were noted on the dam or beyond the downstream toe.	-
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Along the upstream slope there is 1 to 4 ft$^{\pm}$ of vertical erosion above the existing pool level in the form of sloughing riprap and soil. It extends from the right spillway to the left spillway. Most of the sloughing is within 500 ft$^{\pm}$ of the left spillway.	Eroded areas should be repaired and riprap replaced
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	The vertical and horizontal alignment of the dam appeared to be good.	-
RIPRAP FAILURES	Intermittent riprap failures were noted along the shoreline. Failures were in conjunction with 1 - 4 ft$^{\pm}$ of vertical erosion in and above the riprap. As a whole, the riprap was in rather good condition. The riprap consists of 1 to 3 ft$^{\pm}$ blocks of local rock.	Eroded areas should be repaired and riprap replaced in these areas

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	The embankment ties in well with both abutments. The right abutment is vegetated and no rock was exposed. Surface soils are micaceous and appear to range from clayey silts (ML to MH) to silty sands (SM). Variably weathered Marshall Gneiss is exposed in the right abutment along the spillway channel. Foliation strikes N 33E and dips 38 SE. Three joint trends were measured: N70E, 81SE; N50W, 90; and N40E, 90.	
ANY NOTICEABLE SEEPAGE	Iron staining, probably related to seepage, was observed below the lake drawdown discharge outlet. The strong upflow of water (est. 5 gpm±) was observed below water level at three locations.	See Field Sketch, Sheet 3
DRAINS	The lake drawdown valve was closed and there was no flow from the 48 inch pipe. The valve was not visible, apparently under water.	See Field Sketch, Sheet 1
MATERIALS	Reddish brown silt, some clay and fine sand (ML to MH).	
VEGETATION	The upstream and downstream slopes have considerable vegetation in the form of trees, briers, tall grass, etc. Most of the trees range from 1 to 4 inches in diameter and occur primarily along the shoreline on the upstream slope and the upper portion of the downstream slope. Scattered animal burrows were also encountered.	Vegetation should be controlled and animal burrowing backfilled

PRINCIPAL SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
CONTROL SECTIONS	Principal spillway consists of a 40 ft long, 12 ft (bottom width) to 20 ft (top width) wide concrete trapezoidal channel spillway with 5H:1V side slopes. Controlled by a 24 ft by 12 ft (60 ft length) concrete overflow weir 3 to 4 ft high.	No cracks or spalling noted in the concrete.
APPROACH CHANNEL	A 72 ft wide grass secondary principal spillway is located 4 ft above the overflow weir.	In good condition
DISCHARGE CHANNEL	The channel is lined with weathered granite gneiss. The channel meanders where the bedrock is replaced by soil. Considerable erosion has occurred in the soil portions of the discharge channel.	See Field Sketch, Sheet 4. Erosion control needed.
BRIDGE AND PIERS	None	-
EMERGENCY GATE	Drain is 800 ft from emergency spillway. Valve stem is not visible. 30 inch corrugated metal pipe at drain outlet.	-
GATES AND OPERATION	-	-

EMERGENCY SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONTROL SECTIONS	The emergency spillway consists of a 140 ft wide section with 2H:1V side slopes. The control section is 3 ft above pool level.	Well vegetated, but needs maintenance. No erosion noted.
APPROACH CHANNEL	Well-vegetated with grass, few 2 - 3 inch trees particularly along shoreline.	Grass should be cut and trees removed.
DISCHARGE CHANNEL	Well vegetated with grass, many 2 - 3 inch trees.	Grass should be cut and trees removed.
BRIDGE AND PIERS	None	-
MISCELLANEOUS	None	-

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
MONUMENTATION/SURVEYS	None observed	-
OBSERVATION WELLS	None observed	-
WEIRS	Overflow weir in principal spillway	-
PIEZOMETERS	None observed	-
STAFFGAGES	None observed	Should be installed
OTHER	-	-

VISUAL EXAMINATION	OBSERVATIONS	REMARKS AND RECOMMENDATIONS
SLOPES	Wooded on the south end; otherwise, orchards and pastures bound the lake. Slight to moderate slopes (10H-20H:1V). New sewage treatment plant located just beyond the left abutment. The plant discharges into the principal spillway channel. The shoreline is stable with no erosion noted except along the upstream slope. There is a 10 ft wide wave berm below normal pool level. The reservoir area was free of debris.	
SEDIMENTATION	Visible at south end near approach channel to right spillway. Water is clear. No sedimentation noted around the approach to the principal spillway.	

DOWNSTREAM CHARACTERISTICS

VISUAL EXAMINATION OF	OBSERVATIONS	NOTES OF IMPORTANCE
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The downstream channel is a [illegible] with 4H:1V slopes. The channel is heavily wooded with thick underbrush and fallen trees and debris in the channel.	
SLOPES	10H:1V; heavily wooded	
APPROXIMATE NO. OF HOMES AND POPULATION	1 house ¼ mile downstream approximately 15 - 20 ** above stream. 2 houses 4 miles± downstream approximately 10 ** above stream.	

CHECK LIST

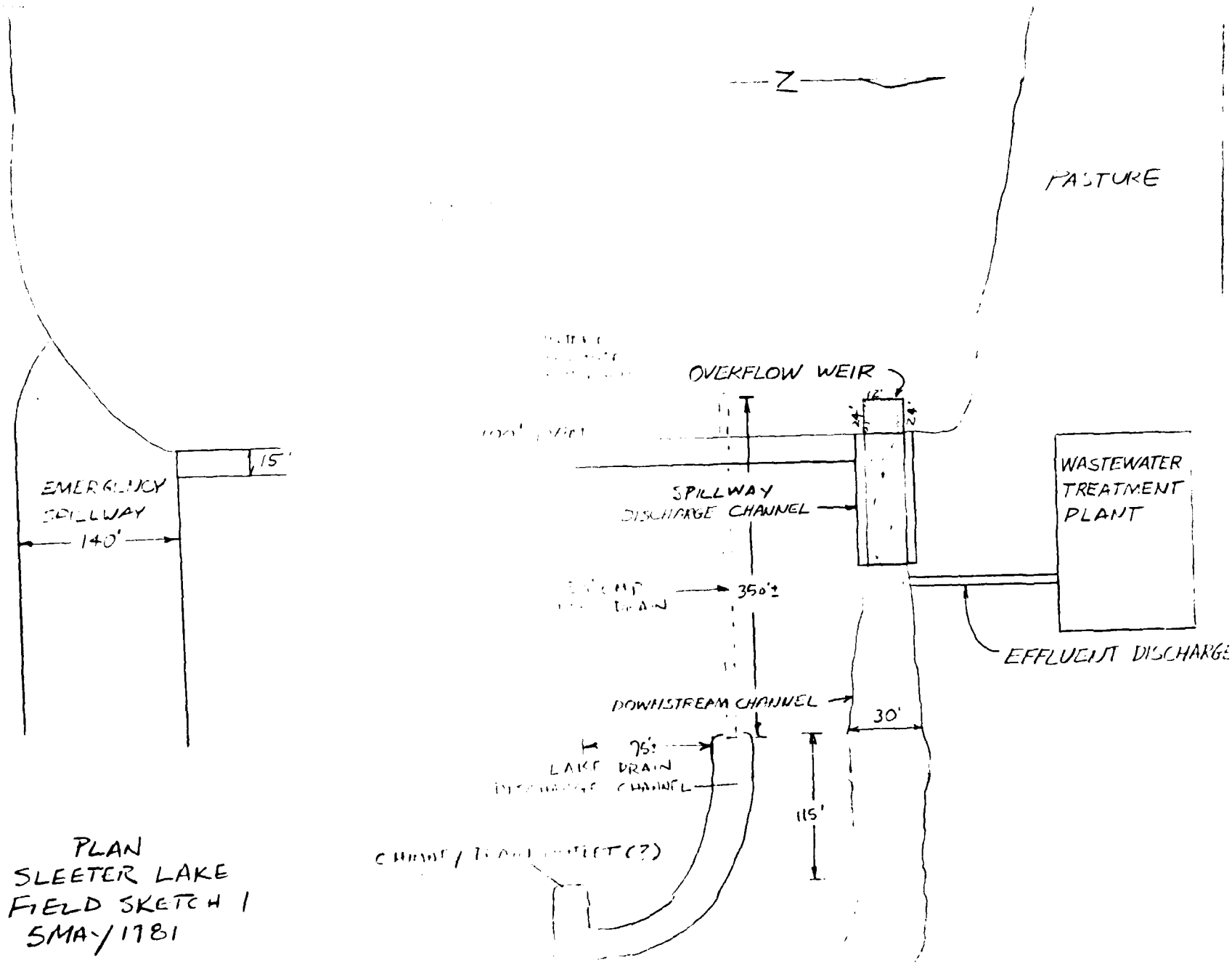
ENGINEERING DATA

DESIGN, CONSTRUCTION, OPERATION

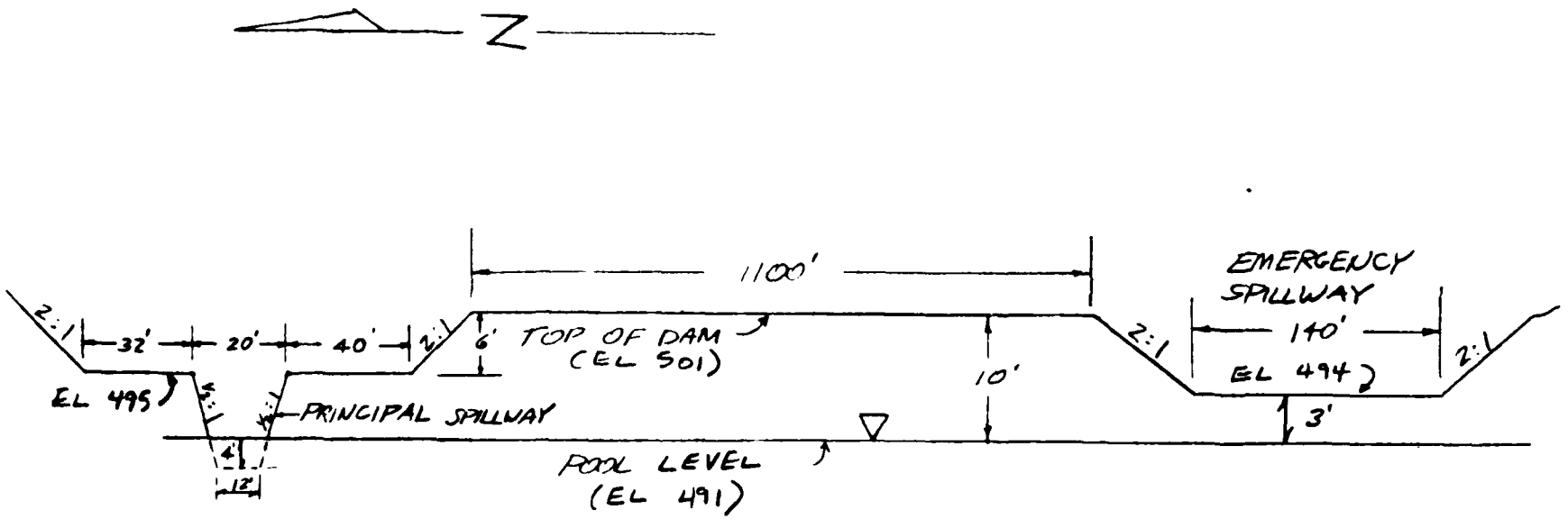
ITEM		REMARKS
REGIONAL VICINITY MAP	Bluemont and Round Hill U.S.G.S. Topographic sheets (7½ minute quadrangles).	-
DESIGN/CONSTRUCTION HISTORY	The dam was designed by Col. Paxton (deceased) of Earthworks, Inc., (no longer in business) and constructed by Lyon Construction Company of Vienna, Virginia. The dam was completed in 19[illegible].	Lyon Company located [illegible] [illegible] the dam.
PLAN OF DAM	None available	See Field Sketch
TYPICAL SECTIONS OF DAM	None available	See Field Sketch
OUTLETS - PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	None available	See Field Sketch
SPILLWAY- PLAN SECTION DETAILS	None available	See Field Sketch
OPERATING EQUIPMENT - PLAN DETAILS	None available	See Field Sketch

ITEM		REMARKS
MONITORING SYSTEMS	None observed	-
RAINFALL/RESERVOIR HIGHPOOL RECORDS	None	-
GEOLOGY REPORTS	Geologic Investigation of the Lincoln and Bluemont Quadrangles, Virginia by E. F. Parker, Virginia Division of Mineral Resources, Reports of Investigations #14	-
BORROW SOURCES	Unknown	-
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY-FIELD TEST DATA	None available	-
HYDROLOGIC/HYDRAULIC DATA	None available	-

ITEM		REMARKS
DESIGN REPORTS	None available	-
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None available	-
POST CONSTRUCTION ENGINEERING STUDIES RECORDS, SURVEYS	None available	-
MODIFICATIONS	Unknown	-
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	According to John Sleeter, some erosion occurred around the principal spillway winewall during filling of the lake in 196[illegible] - 196[illegible]. The erosion was caused by heavy rainfall.	
MAINTENANCE OPERATION RECORDS	None	-



PLAN
SLEETER LAKE
FIELD SKETCH I
5MAY/1981

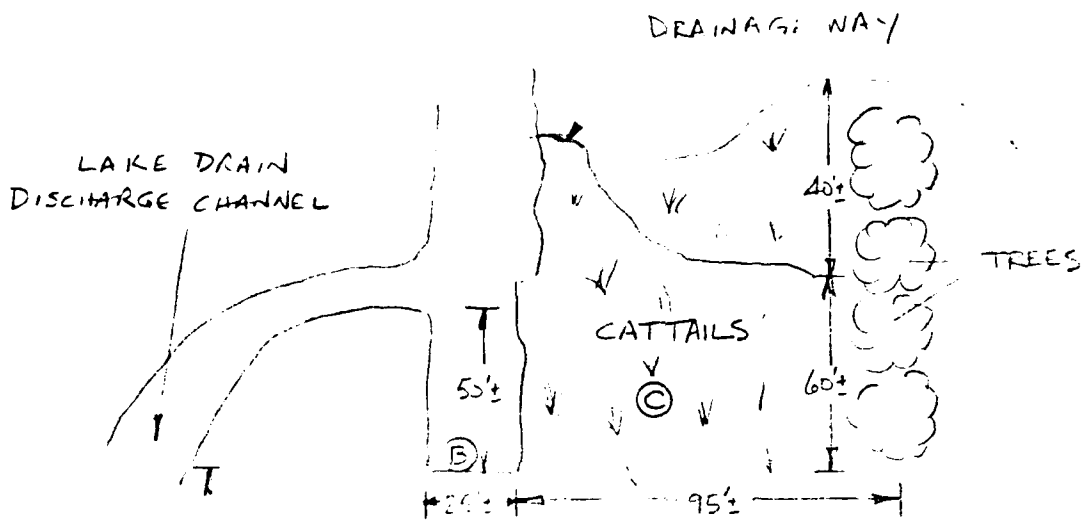


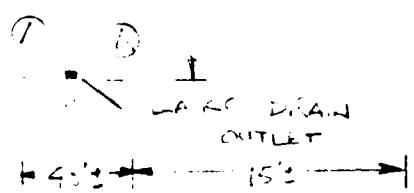
PROFILE
SLEETER LAKE
FIELD SKETCH 2
5 MAY 1981

BY ... DATE ... SUBJECT ... SHEET NO
CHKD BY ... DATE ... JOB NO

SEEPAGE AREAS
SCOTTS LAKE DAM

N



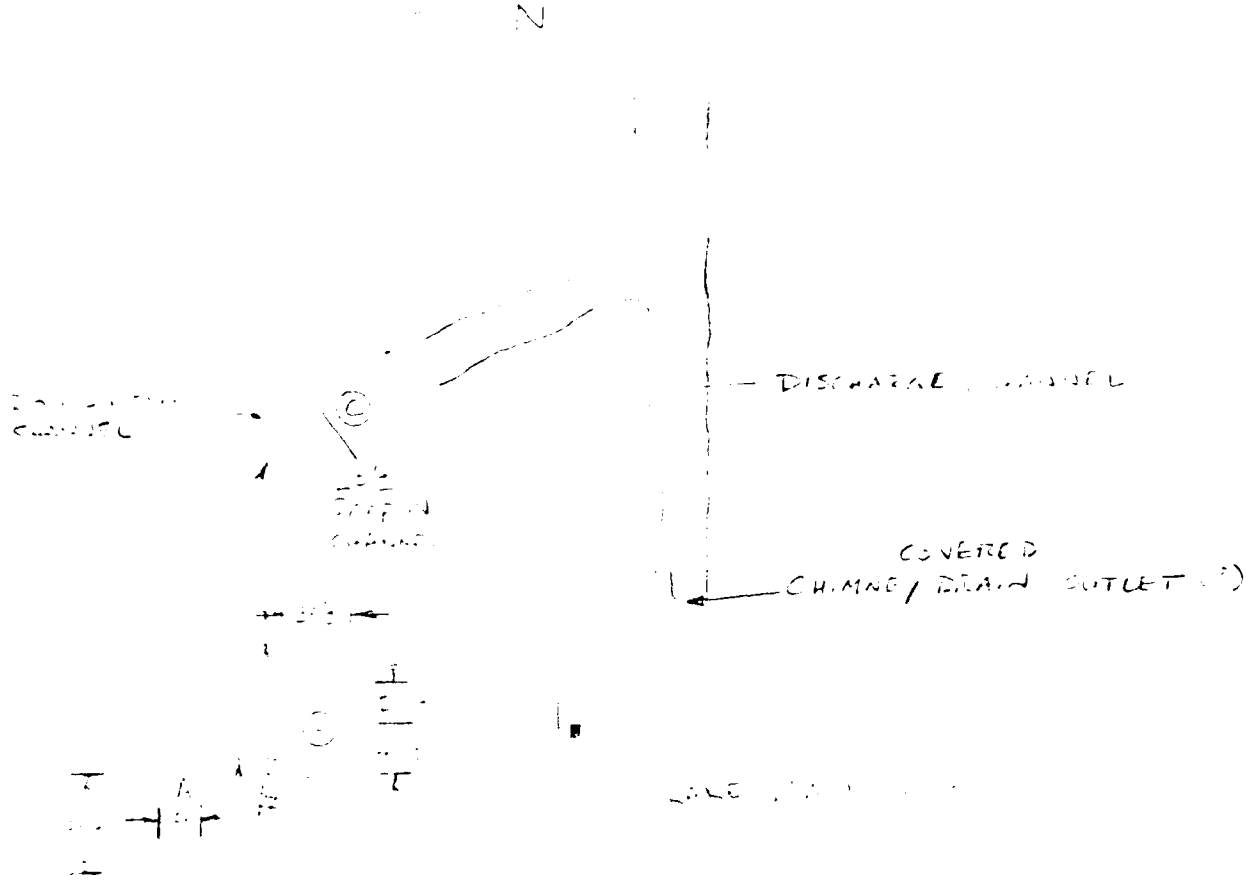


NO SCALE

Ⓐ SCATTERED IRON STAINING

Ⓑ 3 SMALL BOILS WITHIN 4'± DIAMETER AREA, 1½'± BELOW WATER LEVEL. FLOW ESTIMATED @ 5 GPM± FROM EACH. THE WATER WAS CLEAR. THIS MAY BE THE CHIMNEY DRAIN OUTLET

Ⓒ MARSHY, SATURATED AREA LOCATED AT BASE OF RIGHT EMERGENCY SPILLWAY. NO FLOW OR IRON STAINING OBSERVED


N
DISCHARGE
COVERED
CHIMNEY DRAIN OUTLET

APPENDIX IV - REFERENCES

1. Recommended Guidelines for Safety Inspection of Dams, Department of the Army, Office of the Chief of Engineers, 46 pp.

2. National Inventory of Dams, U. S. Department of Interior, Bureau of Reclamation, 1974, 816 pp.

3. Geologic Investigation of The Lincolnia and Bluemont Quadrangles Virginia, by P. E. Parker, Virginia Division of Mineral Resources, Reports of Investigation No. 14, 23 pp.

4. Soil Survey, Loudon County, Virginia, U. S. Department of Agriculture, Soil Conservation Service, 1960, 118 pp.

5. HEC-1 Flood Hydrograph Package (Dam Safety Version), Flood Hydrograph Package, Users Manual (Dam Safety Investigations), the Hydrologic Engineering Center, Corps of Engineers, September, 1978.

6. Hydrometeorological Report No. 33, U. S. Department of Commerce, National Oceanic and Atmospheric Administration, U. S. Department of Army, Corps of Engineers, Washington, D. C., April 1956.

7. Technical Paper No. 40, U. S. Department of Commerce, Weather Bureau, Washington, D. C., May 1961.

END

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