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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 aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.
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<td>Michael Baker III</td>
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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 investigation 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 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.

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 and 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.
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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NAME OF DAM: GREENE ACRES
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Greene Acres
State: Virginia
County: Greene
Stream: Tributary of South River
Date of Inspection: 27 November 1978

BRIEF ASSESSMENT OF DAM

Greene Acres Dam, an earthen dam approximately 37 feet high and 900 feet long, is owned by the First American Group of Companies and was designed by R. M. Bartenstein and Associates. The visual inspection and review of available engineering data indicate no deficiencies requiring immediate attention.

The emergency spillway will pass 56 percent of the Probable Maximum Flood without overtopping the dam which is considered adequate for the "small" size-"high" hazard classification of Greene Acres Dam. Visual observations during the inspection indicated no evidence of embankment instability or piping of an emergency nature. However, an area of sloughing along the crest was observed, and it is recommended that further visual inspection and a stability analysis be conducted.

It is recommended that riprap be placed along the embankment at the waterline to protect against wave erosion. Riprap should also be placed in the channel from the overflow pipe to prevent further erosion. The downstream channel should be improved to allow normal drainage away from the toe of the dam. An annual maintenance and inspection program should be instituted at which time minor maintenance items could be accomplished including removing small trees and brush from the embankment, and filling and seeding bare areas and erosion gullies on the embankment and in the emergency spillway.

MICHAEL BAKER, JR., INC.

Michael Baker, III, P.E.
Chairman of the Board and Chief Executive Officer

SUBMITTED:

James A. Walsh
Chief, Design Branch

RECOMMENDED:

Zane M. Goodwin
Chief, Engineering

APPROVED:

Douglas L. Haller
Colonel, Corps of Engineers
District Engineer

Date MAR 13 1979

NAME OF DAM: GREENE ACRES
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. The main responsibility is to expeditiously identify those dams which may be a potential hazard to human life or property.

1.2 Description of Project

1.2.1 Description of Dam and Appurtenances: Greene Acres Dam is a homogeneous earthfill dam approximately 37 feet high and 900 feet long. Side slopes of the dam are approximately three horizontal to one vertical (3:1) on the upstream side and 2:1 on the downstream side. The crest width of the dam is 17 feet. Seepage control is provided by a cutoff trench and toe drain.

The principal spillway consists of 24 inch diameter C.M.P. extending approximately 70 feet through the embankment about 200 feet from the right abutment. This overflow structure has a 5 foot vertical section of pipe in the reservoir with a crest elevation of 95.0 feet P.D.* The pipe, with an exit invert of 88.0 feet P.D., empties into a concrete-lined channel which extends along the abutment beyond the toe of the dam and into an open channel near the toe.

* P.D. = Plan datum is approximately 630+ feet above U.S.G.S. datum.
The emergency spillway; a 170 foot wide, earth, side-channel type; is located in the left abutment area of the dam and has a crest elevation of 97.0 feet P.D.

The toe drain consists of 6 inch diameter perforated B.C.C.M.P. with granular backfill. The toe drain extends approximately 150 feet right and 200 feet left of the reservoir drainpipe.

The reservoir is used solely for recreation as part of the Greene Acres Development Area. The homes around the lake are both summer homes and permanent homes. The reservoir has a drain at the toe near the center of the dam. The drain is operated by a 10 inch gate valve.

1.2.2 Location: Greene Acres Dam is located on a tributary to the South River approximately 2 miles northwest of Standardsville, Virginia. The dam is located off State Route 637 about 1.4 miles northwest from its intersection with State Route 230. A Location Plan is included in this report.

1.2.3 Size Classification: The maximum height of the dam is 37 feet and the reservoir storage capacity to the top of dam elevation is 341 acre-feet. Therefore, the dam is in the "small" size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

1.2.4 Hazard Classification: Several homes are located in the area immediately downstream from the dam. Due to the possible loss of life in the event of a failure, the dam is considered in the "high" hazard category as defined by Section 2.1.2 of the Recommended Guidelines for Safety Inspection of Dams. The hazard classification used to categorize dams is a function of location only and has nothing to do with its stability or probability of failure.

1.2.5 Ownership: The dam is owned by the First American Group of Companies of Fallingwaters, West Virginia. Currently, Greene Acres Property Owners Association is investigating purchase of the property.

NAME OF DAM: GREENE ACRES
1.2.6 **Purpose of Dam:** The dam is used solely for recreational purposes.

1.2.7 **Design and Construction History:** The dam was designed by R. M. Bartenstein and Associates of Warrenton, Virginia in 1969. The dam, completed in 1970, was constructed by Kibler Construction Company of Luray, Virginia.

Letters and memorandums (Appendix V) between the designer, project geologists, and contractor indicate partial construction history and information.

According to the correspondence, the contractor encountered solid bedrock at less than a 6 foot depth while excavating for the cutoff depth. The design plans specified the drainpipe as 10 inch diameter cast-iron; however, reports indicate that 20 inch diameter, 1/4 inch thick, steel, gas pipe was approved as a substitute at the request of the contractor. Excavated material from the spillway borrow area was indicated to be used along the upstream toe as a blanket material since it was highly impervious and the least stable.

1.2.8 **Normal Operating Procedures:** No formal operating procedures are followed for this dam. Normal pool is maintained by the vertical section of 24 inch C.M.P. with a crest elevation of 95.0 feet P.D. Excess flows are diverted past the dam through the emergency spillway with a crest elevation of 97.0 feet P.D. The reservoir drain (10 inch gate valve) is not operated periodically.

1.3 **Pertinent Data**

1.3.1 **Drainage Area:** The drainage area of Greene Acres Dam is 0.64 square miles.

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

**Principal Spillway:**
- Pool level at emergency spillway crest: 22 c.f.s.
- Pool level at top of dam: 31 c.f.s.

**Emergency Spillway:**
- Pool level at top of dam: 2998 c.f.s.

**NAME OF DAM:** GREENE ACRES
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**

<table>
<thead>
<tr>
<th>Item</th>
<th>Elevation feet</th>
<th>Area acres</th>
<th>Watershed acres</th>
<th>Length feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top of dam</td>
<td>100.0</td>
<td>29.2</td>
<td>341</td>
<td>10.0</td>
</tr>
<tr>
<td>Emergency spillway crest</td>
<td>97.0</td>
<td>25.4</td>
<td>271</td>
<td>8.0</td>
</tr>
<tr>
<td>Principal spillway crest</td>
<td>95.0</td>
<td>23.0</td>
<td>230</td>
<td>6.7</td>
</tr>
<tr>
<td>Streambed at centerline of dam</td>
<td>63+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

(a) All elevations are based on plan datum which is about 630+ feet above U.S.G.S. datum.

**NAME OF DAM:** GREENE ACRES
SECTION 2 - ENGINEERING DATA

2.1 Design: The design data reviewed included the following information obtained from the design file:

1) Design drawings indicating typical section of dam, plan of dam, toe drains, overflow pipe, and emergency spillway profile. Plan and typical sections of the dam are included as Plates 1, 2, and 3 (Appendix I).

2) Preliminary hydrologic and hydraulic design data including surface areas, storage capacity, drainage area, and time of concentration estimates.

3) Miscellaneous correspondence including construction reports and memorandums (Appendix V).

4) Soil tests data (Appendix VI) including liquid limits, plasticity index, and moisture content in the borrow areas and spillway.

All design data was borrowed from Mr. Richard Vogel of V. H. & D., Warrenton, Virginia, who was formerly employed with the designer of the dam.

2.2 Construction: The dam, constructed by Kibler Construction Company, was completed in 1970. Complete construction records were not available; however, miscellaneous construction reports and memorandums were in the design file.

2.3 Operation: No operational records are kept for Greene Acres Dam. No written record on the frequency of use of the reservoir drain was available. A local resident indicated that the drain is not periodically checked.

2.4 Evaluation:

2.4.1 Design: The hydrologic and hydraulic design data was used along with calculations made as part of this report to assess the adequacy of design. No as-built drawings or boring records were available for review to aid in assessing the stability of the dam. However, some data on soil tests was available (Appendix VI).
2.4.2 Construction: Complete construction records were unavailable for review. Miscellaneous reports and memorandums were useful to indicate modifications and changes made during construction (Appendix V).

2.4.3 Operation: The dam requires no formal operation and therefore has no operational records. The only operational feature of the dam is the 10 inch gate valve used as a reservoir drain.

NAME OF DAM: GREENE ACRES
SECTION 3 - VISUAL INSPECTION

3.1 Findings

3.1.1 General: The field investigation was made on 27 November 1978. The weather was rainy with a 33°F. temperature and a light cover of snow on the ground. The embankment and the appurtenant structures were found to be in satisfactory condition and do not require immediate remedial action.

3.1.2 Dam: The dam was in an adequate condition except for an apparent slough in the downstream slope on the right side near the crest. Evidence of a 300 foot long, steep scarp with a 2 to 4 foot height exists. There did not appear to be any easily observable bulge or cracks to signify distress in the embankment. This scarp did not appear to be the result of a recent sliding or erosion of the embankment. Reddish-brown, clayey silt with sand and traces of rock fragments was observed on most of the surfaces of the embankment. Snow and vegetation cover, including small trees on the slope, obscured detailed observations. The upstream slope (see Photo 1) has been severely eroded by wave action, which has cut a steep slope 2 feet high above the present shoreline.

Clear seepage was observed for a 50 foot width at the toe of the embankment 50 feet right of the reservoir drain. The clear seep has no defined flow and flow was too minimal to estimate (less than 1 g.p.m.). A small stream originates in the ditch just downstream from the end of the paved overflow ditch in the vicinity of the clear seepage (see Photo 3).

3.1.3 Appurtenant Structures: The inlet and outlet of the 24 inch C.M.P. overflow pipe appear to be in good physical condition and are able to function properly (see Photos 1 and 2). Water was about 0.5 foot below the crest of the overflow pipe. The 10 inch submerged blow-off pipe with a closed gate valve appears to be functional (see Photo 4). Water is ponded at the outlet of the pipe toe drain.

NAME OF DAM: GREENE ACRES
There is minor surface erosion, which has removed portions of the grass cover, in the emergency spillway (see Photo 5). Some clear seepage was observed from the end of the sod in the discharge channel of the emergency spillway (see Photo 6). There are several bare areas on the left cut slope.

3.1.4 Reservoir Area: The slopes in the reservoir area are satisfactorily vegetated with little or no erosion and sloughing.

3.1.5 Downstream Channel: The downstream channel of the paved overflow ditch has well-defined slopes of adequate depth in soil, and its banks are covered with bushes and trees. The outlet area for the pipe toe drains (not observed in the field) is swampy and the channel is poorly defined.

3.2 Evaluation: The most significant deficiency is the apparent slough along the upper portion of the embankment on the right side. However, there may have been additional grading on top of the dam which produced a slope steeper (1:1) than the overall downstream slope of 2:1, because there did not appear to be an obvious bulge or cracks in the embankment. Additional inspection is recommended in the area before corrective measures are taken. Trees and brush should be removed from the embankment. The amount of clear seepage at the toe of the dam to the right of the reservoir drain is small and could be flow from the toe drain which was not observed in the field. The overflow ditch is large enough to convey the spring which forms a stream past the end of the paved portion. The outlets for the toe drains near the 10 inch gate valve should be located, and adequate drainage from the toe of dam by a well-defined downstream channel should be provided. Riprap should be placed on the shoreline where wave action has undercut the upstream slope to prevent further erosion. The gullies in the emergency spillway should be filled, covered with topsoil, and seeded. A staff gage should be installed to monitor reservoir levels above normal pool. The cited deficiencies do not appear to seriously affect the immediate stability of the dam.
SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures: Greene Acres Dam has no formal operating procedures since the dam is used solely for recreational purposes. The dam remains at normal pool level (95.0 feet P.D.) with excess flows passing through the emergency spillway at an elevation of 97.0 feet P.D. The reservoir drain is not operated periodically to check for proper functioning.

4.2 Maintenance of Dam: Maintenance of the dam is the responsibility of the First American Group of Companies. No regular maintenance inspections are routinely conducted.

4.3 Maintenance of Operating Facilities: Periodic inspection and opening of the 10 inch gate valve on the reservoir drain is not conducted. It is not known what type of maintenance is provided for the reservoir drain.

4.4 Warning System: At the present time, there is no warning system or evacuation plan in operation. It is recommended that a formal emergency procedure be prepared and 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.

3) Procedures for evaluating inflow during periods of emergency operation.

4.5 Evaluation: Regular (at least annual) maintenance inspections should be conducted by qualified personnel, and recommendations for maintenance items should be reported to the owner.
SECTION 5 - HYDRAULIC/HYDROLOGIC DATA

5.1 **Design:** Partial hydrology and hydraulic design data was reviewed and used, where possible, in the computation of spillway adequacy for this report.

5.2 **Hydrologic Records:** No rainfall or stream flow records were available at the dam site.

5.3 **Flood Experience:** No exact high water marks were available; however, local residents indicated that the emergency spillway was activated during the June 1972 flood.

5.4 **Flood Potential:** Performance of the dam and reservoir by routing the Probable Maximum Flood (PMF), the 1/2 PMF, and the 100-year flood is shown in Table 5.1.

Surface area and storage capacity data were obtained from the design file and checked for accuracy. Outlet discharge capacity, hydrograph, and routing determinations were computed as part of this report. Flood routings were started assuming the reservoir level was at normal pool (elevation 95.0 feet P.D.).

5.5 **Reservoir Regulation:** Pertinent dam and reservoir data are shown in Table 1.1, paragraph 1.3.3.

Regulation of flow from Greene Acres Dam is automatic. Normal pool (elevation 95.0 feet P.D.) is maintained by the 24 inch C.M.P. overflow located approximately 200 feet from the right abutment. Water entering the overflow pipe flows through the embankment and exits into a concrete-lined, "V" shaped channel on the abutment just beyond its junction with the downstream embankment. Excess flows are diverted around the embankment through the ungated, earth, side-channel, emergency spillway in the event the reservoir level rises above the crest elevation of 97.0 feet P.D.

NAME OF DAM: GREENE ACRES

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5.6 Overtopping Potential: The probable rise in the reservoir and other pertinent information on the reservoir performance in various hydrographs are shown in the following table:

<table>
<thead>
<tr>
<th>Item</th>
<th>Hydrographs</th>
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<td>Normal</td>
<td>100 Year</td>
<td>1/2 PMF</td>
<td>PMF</td>
</tr>
<tr>
<td>Peak flow, c.f.s.</td>
<td>-</td>
<td>1617</td>
<td>3240</td>
<td>6481</td>
</tr>
<tr>
<td>Inflow</td>
<td>-</td>
<td>318</td>
<td>2674</td>
<td>5844</td>
</tr>
<tr>
<td>Outflow</td>
<td>-</td>
<td>95.0</td>
<td>97.6</td>
<td>99.8</td>
</tr>
<tr>
<td>Peak elev., ft. P.D. (a)</td>
<td>95.0</td>
<td>97.6</td>
<td>99.8</td>
<td>100.8</td>
</tr>
<tr>
<td>Emergency spillway</td>
<td>-</td>
<td>0.4</td>
<td>1.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Depth of flow, ft. (b)</td>
<td>-</td>
<td>3.7</td>
<td>7.7</td>
<td>9.0</td>
</tr>
<tr>
<td>Avg. velocity, f.p.s.</td>
<td>-</td>
<td>2.0</td>
<td>6.1</td>
<td>6.6</td>
</tr>
<tr>
<td>Duration of flow, hrs.</td>
<td>-</td>
<td>0.4</td>
<td>1.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Non-overflow section</td>
<td>-</td>
<td>3.7</td>
<td>7.7</td>
<td>9.0</td>
</tr>
<tr>
<td>Depth of flow, ft.</td>
<td>-</td>
<td>2.0</td>
<td>6.1</td>
<td>6.6</td>
</tr>
<tr>
<td>Average velocity, f.p.s.</td>
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<td>0.8</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Duration of overtopping, hrs.</td>
<td>-</td>
<td>0.8</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Tailwater elev., ft. P.D.</td>
<td>62.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

(a) Plan datum is approximately 630+ feet above U.S.G.S. datum.
(b) Depth at control section, not including velocity head.

5.7 Reservoir Emptying Potential: Neglecting inflow, the time required to drawdown the reservoir from the crest of the overflow pipe (normal pool) is approximately 20 days.

5.8 Evaluation: Greene Acres Dam is classified according to COE criteria as a "small" size-"high" hazard structure requiring passage of a spillway design flood equal to 1/2 PMF. Greene Acres Dam will pass approximately 56 percent of the PMF without overtopping.

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

NAME OF DAM: GREENE ACRES
SECTION 6 - DAM STABILITY

6.1 Foundation and Abutments: Boring records were not available. Based on visual observations and soils information from the investigation for the design (Appendix VI), however, it was determined that less than 6 feet of sand and gravel were present in the bottom of the gully near the original stream. There is clayey and sandy silt on the slopes above. Bedrock is apparently quartz monzonite and granite with two outcrops shown on the site plan and others observed on the right side near the downstream toe of embankment. The bedrock is in the Lovingston Formation of the Virginia Blue Ridge complex. The cutoff trench had been designed to be 2 feet deep by 2 feet wide in soil on the slopes and approximately 6 feet deep by 30 feet wide to the bottom of the granular soils near the old stream channel. The cutoff trench was back filled with clay and silt.

6.2 Stability Analysis

6.2.1 Visual Observations: During the inspection, no unusual movement or cracking was noted beyond the toe. A 300 foot long section on the downstream side on the right abutment near the crest exhibited a steeper slope which was 2 to 4 feet high. The "scarp" appeared to be caused by localized slumping. The upstream slope above the present shore-line has been eroded by wave action which cut a steep slope 2 feet high and formed a small bench. Clear seepage was observed at the toe of the embankment in a 50 foot wide section to the right of the reservoir drain. Flow from the clear seep is non-measurable and could originate from the toe drain.

6.2.2 Design Data: No stability analyses were available.

According to design plans and field measurements, the side slopes are 3:1 on the upstream embankment and 2:1 on the downstream embankment with a crest width of 17 feet. Seepage control according to design plans is provided by a cutoff trench 20 feet wide and 2 feet deep, and toe drains consisting of 6 inch perforated B.C.C.M.F. extending along the toe of the dam and exiting on both sides of the reservoir drainpipe (seepage drain outlets were not observed during the field inspection).

NAME OF DAM: GREENE ACRES
According to the construction reports and memorandums in Appendix V, coarse soils from the borrow areas such as decomposed rock and clayey or silty sands were to be placed in the downstream section of the embankment. Excavated material from the spillway area was to be used in the flat portion of the embankment along the upstream toe because these soils were highly impervious and least stable. Materials excavated from the borrow area on the left abutment along the reservoir side of the spillway saddle were to be mixed by cutting through the surface plastic clays and obtaining the silty, sandy clays and clayey sands below. It was also noted that moisture content should be kept under control as some of the soils indicated moderate swell possibilities.

6.2.3 Operating Records: The structure has no instrumentation which would provide stability information. There were no inspection, maintenance, or operating records available.

6.2.4 Post-Construction Changes: No apparent post-construction changes have been made to the dam.

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

6.3 Evaluation: Although no stability analyses were available for this review, it appears that the dam has been adequately constructed. The localized sloughing at the crest on the right side does not appear to have adversely affected the rest of the embankment in that area. The source of the clear seepage at the downstream toe is not known. The design plans indicate the outlet of the toe drain should be in the general area of the clear seepage and may be the source of the clear seep. The toe drains should be located, cleaned, and their flow directed away from the toe of the dam. If it is determined that the drains were not constructed, then an adequate means of draining the toe of the dam should be investigated. A thorough field inspection including surveyed cross-sections should be performed, especially on the right abutment, to assess the extent of the sloughing, and a stability analysis should be performed before a final evaluation can be made.

The owner should provide wave erosion protection on the upstream slope, and repair and protect eroded sections of the downstream toe near the overflow pipe.

NAME OF DAM: GREENE ACRES
7.1 Dam Assessment: The dam will pass 56 percent of the PMF without overtopping which is considered adequate according to the Recommended Guidelines for Safety Inspection of Dams for a "small" size="high" hazard category. No boring logs or stability calculations were available for review; however, miscellaneous correspondence did indicate partial foundation investigations and soil tests. A section of the downstream embankment near the crest revealed possible sloughing. The area extends from near the right abutment 300 feet along the crest. Small trees and brush hindered observations, but no cracks or bulging indicating extreme embankment distress were evident.

Erosion was evident where the open concrete channel from the overflow pipe ends and the natural channel begins. Although the natural channel appears to have eroded to rock, any erosion at or near the toe of an earth dam is not desirable and should be remedied. Severe erosion from wave action was also evident on the upstream slope of the embankment along its entire length and has created a steep condition above normal pool. There was some erosion observed in the emergency spillway due primarily to the lack of adequate grass cover. However, the spillway size and discharge slope is sufficient to divert high discharges away from the embankment.

The area immediately downstream of the reservoir drain is rather swampy with flat slopes. The stream channel is not well-defined and, with the flat slopes, cannot remove all drainage from near the toe of the dam. Outlets to the toe drain, if they exist, were not found during the field inspection and could possibly be covered with soil or submerged by the water at the toe.

7.2 Recommended Remedial Measures: It is recommended that the owner have a visual inspection and stability analysis conducted due to the apparent sloughing on the downstream embankment at the crest. Also, a channel capable of providing adequate drainage away from the toe of the dam should be excavated. Outlets from the toe drains (shown on the plans but not observed during the field inspection) should be opened, and their flow should be directed to this channel. If the outlets and drain are not located or do not exist, a means of providing drainage through the dam should be investigated.
Protection against wave action on the upstream embankment near the waterline and against additional erosion in the earth section of the drainage channel from the overflow pipe should be provided by placement of riprap.

The inspection revealed certain preventative maintenance items which should be scheduled as part of an annual maintenance program. These are:

1) Remove all trees and brush growing on the embankments and obstructing flow in the downstream channel.

2) Fill and seed any erosion gullies and bare areas on the embankment and in the emergency spillway.

3) Maintain an adequate downstream channel to provide proper drainage from the toe of the dam.

4) Install a staff gage to monitor reservoir levels above normal pool.
APPENDIX I

PLATES
CONTENTS

Location Plan

Plate 1: Plan and Profile of Dam
Plate 2: Typical Section and Details of Dam

NAME OF DAM: GREENE ACRES
LOCATION PLAN
GREENE ACRES DAM
* AS-BUILT CONDITIONS FOUND DURING MICHAEL BAK
APPENDIX II

PHOTOGRAPHS
CONTENTS

Photo 1: Corrugated Outlet Pipe Near Right Abutment
Photo 2: Concrete-Lined Drainage Channel From Outlet Pipe and Eroded Area
Photo 3: Clear Seepage at End of Concrete Drainage Channel
Photo 4: Gate Valve on Outlet of Reservoir Drainpipe
Photo 5: Left Abutment of Dam and Emergency Spillway
Photo 6: Exit Slope From Emergency Spillway

Note: Photographs were taken on 27 November 1978.

NAME OF DAM: GREENE ACRES
GREENE ACRES DAM

PHOTO 1. Corrugated Outlet Pipe Near Right Abutment

PHOTO 2. Concrete Lined Drainage Channel From Outlet Pipe and Eroded Area
PHOTO 3. Clear Seepage at End of Concrete Drainage Channel

PHOTO 4. Gate Valve on Outlet of Reservoir Drainpipe
GREENE ACRES DAM

PHOTO 5. Left Abutment of Dam and Emergency Spillway

PHOTO 6. Exit Slope From Emergency Spillway
APPENDIX III

CHECK LIST - VISUAL INSPECTION
Check List
Visual Inspection
Phase 1

Name of Dam  Greene Acres  County  Greene  State  Virginia  Coordinates  Lat.  3819.3
                           Long.  7827.1

Date Inspection  27 November 1978  Weather  Rainy, Cold  Temperature  33°F.

I-III  Pool Elevation at Time of Inspection  94.4 ft. P.D.* M.S.L.
      Tailwater at Time of Inspection  62.7 ft. P.D.* M.S.L.

*Plan Datum (P.D.) is approximately 630 feet above U.S.G.S. datum.

Inspection Personnel:
                         Michael Baker, Jr., Inc.:
               T. W. Smith  W. L. Sheafer  T. J. Dougan

Greene Acres Property Owners Association:
                                Mr. Mullens  Mr. Smith

T. W. Smith  Recorder
<table>
<thead>
<tr>
<th>Name of Dam:</th>
<th>GREENE ACRES</th>
<th>EMBANKMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VISUAL EXAMINATION OF</strong></td>
<td><strong>OBSERVATIONS</strong></td>
<td><strong>REMARKS OR RECOMMENDATIONS</strong></td>
</tr>
<tr>
<td><strong>SURFACE CRACKS</strong></td>
<td>None were visible.</td>
<td></td>
</tr>
</tbody>
</table>

| **UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE** | None was visible. |

| **SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES** | There appears to be some sloughing and erosion near the crest on the upper portion of the downstream slope where a 2 to 4 ft. scarp at a ratio steeper than 1:1 has developed for a 300 ft. section of the dam on the right side. The slope on the left side is uniform. The upstream slope is steeply eroded above the shoreline. | Placement of additional fill, grading, compaction, and seeding are recommended on the right side of the downstream slope. Riprap should be placed on the shoreline to prevent erosion. |

| **VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST** | Good at centerline of dam. |

| **RIPRAP FAILURES** | Stone riprap with topsoil and grass cover is shown in the plans on the right side of the spillway at the dam abutment. However, the riprap was not observed during the inspection. |

| **SLOPES** | The slopes are well-covered with vegetation except adjacent to the upstream shoreline. Small trees are scattered on the downstream slope. The downstream slope was constructed at a 2:1 ratio with grass and topsoil cover. The upstream slope was constructed at 3:1 with topsoil and grass near the crest. | The trees should be removed. |
**EMBANKMENT**

Name of Dam: **GREENE ACRES**

<table>
<thead>
<tr>
<th>VISUAL EXAMINATION OF</th>
<th>OBSERVATIONS</th>
<th>REMARKS OR RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTRUCTION MATERIALS</td>
<td>Reddish-brown, clayey silt with a little sand and traces of rock fragments were observed on most of the surface. The consulting geologist, according to reports in Appendix V, had recommended to place most of the least permeable soils on the upstream side and the granular soils downstream.</td>
<td>The abutment on the right side is in reddish-brown, clayey and sandy silt with a small outcrop of decomposed granite exposed. The left abutment consists of red, clayey silt with sandy lenses and traces of rock fragments. The embankment has been constructed on top of a hill on the left near the open spillway.</td>
</tr>
<tr>
<td>JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM</td>
<td>Clear seepage (non-measurable) occurs at the downstream toe for a length of 50 ft. on the right side of the blow-off pipe where the clayey silt is soft and wet at the surface. There was no apparent flow or piping effect. The toe drain which was not visible may be the source of water. A small stream originates 50 ft. downstream from the toe in the overflow ditch in the vicinity of the seepage.</td>
<td>Any noticeable seepage should be considered dangerous. Periodic observations of the wet areas are advised. Uncover and open the buried toe drain.</td>
</tr>
<tr>
<td>ANY NOTICEABLE SEEPAGE</td>
<td>None</td>
<td>A staff gage should be installed to monitor reservoir levels above normal pool.</td>
</tr>
<tr>
<td>STAFF GAGE AND RECORDER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRAINS</td>
<td>A pipe toe drain with granular backfill is shown on the plans at the downstream toe of slope.</td>
<td></td>
</tr>
</tbody>
</table>
# EMBANKMENT

**Name of Dam:** GREENE ACRES

<table>
<thead>
<tr>
<th>VISUAL EXAMINATION OF</th>
<th>OBSERVATIONS</th>
<th>REMARKS OR RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABUTMENT SLOPE GUTTERS</td>
<td>An erosion gully (1 x 1 ft. maximum) occurs on the left of the lower slope where surface drainage flows into a wet area near the blow-off pipe outlet. A paved overflow ditch for the 24 in. C.M.P. on the right collects the drainage. There is an unpaved ditch extension to the dam crest.</td>
<td>Stone should be placed in the gully on the left to prevent further erosion.</td>
</tr>
<tr>
<td>FOUNDATION</td>
<td>Less than 6 ft. of sand and gravel was reported in the bottom of the gully near the original stream. There is clayey and sandy silt on the slopes above. Bedrock is apparently quartz monzonite and granite of the Lovington Formation in the Virginia Blue Ridge complex. It had been recommended to excavate the cutoff trench 2 ft. deep x 20 ft. wide in soil on the slopes and approximately 6 ft. deep x 30 ft. wide to the bottom of the granular soils near the old stream channel. The cutoff trench was back filled with clay and silt. Boring records were not available. The foundation appears to be stable.</td>
<td></td>
</tr>
</tbody>
</table>
OUTLET WORKS

Name of Dam: **GREENE ACRES**

<table>
<thead>
<tr>
<th>VISUAL EXAMINATION OF</th>
<th>OBSERVATIONS</th>
<th>REMARKS OR RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRACKING AND SPALLING</td>
<td>Normal outlet conduit is a 24 in. C.M.P. through the embankment which discharges into a &quot;V&quot; shaped concrete channel which runs along the downstream right abutment of the dam. Concrete in this channel shows no unusual cracking or spalling.</td>
<td></td>
</tr>
<tr>
<td>OF CONCRETE SURFACES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN OUTLET CONDUIT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTAKE STRUCTURE</td>
<td>The intake structure consists of a vertical section of 24 in. diameter C.M.P. (invert elevation of 95.0 ft. P.D.) turning 90°, running 73 ft. through the embankment near the right abutment, and exiting at an elevation of 88.0 ft. P.D. The 24 in. inlet has a 2 ft. section of 36 in. diameter C.M.P. around it which serves as a trash shield.</td>
<td></td>
</tr>
<tr>
<td>OUTLET STRUCTURE</td>
<td>The 24 in. C.M.P. exits into the &quot;V&quot; shaped channel which runs toward the toe of the dam along the right abutment near the junction with the dam embankment (see Photo 1).</td>
<td></td>
</tr>
<tr>
<td>OUTLET CHANNEL</td>
<td>The paved overflow ditch outlets into loose rocks and weathered quartz monzonite bedrock near the downstream toe of the dam where a stream is formed from clear seepage and/or a small spring in the area (see Photo 3). No water was flowing in the paved ditch which has some cracks (see Photo 2).</td>
<td></td>
</tr>
<tr>
<td>RESERVOIR DRAIN AND CHANNEL</td>
<td>The 10 in. blow-off drainpipe (invert elevation 72.7 ft. P.D.) outlets in a low wet area with some brush. Some of the water flows into the stream channel downstream from the overflow ditch. The outlet valve is closed. Apparently, the water comes from the outlet of the toe drain (see Photo 4).</td>
<td>The channel for the outlets of the blow-off pipe and toe drain should be well-formed to conduct the water into the adjacent stream channel. A stone riprap basin would prevent erosion near the outlets. The consulting geologist Adolf Honkala expressed &quot;apprehensions&quot; about the contractor's use of gasoline pipe for the blow-off drain in the fill.</td>
</tr>
</tbody>
</table>
**UNGATED SPILLWAY**

**Name of Dam:**  
GREENE ACRES

<table>
<thead>
<tr>
<th>VISUAL EXAMINATION OF CONCRETE WEIR</th>
<th>OBSERVATIONS</th>
<th>REMARKS OR RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

**APPROACH CHANNEL**  
The approach channel for the emergency spillway has been eroded. There is a sparse grass cover overlying a red, clayey silt with sand and clay lenses, and traces of rock fragments (see Photo 5).  
Topsoil should be placed in the bare areas and seeded with grass. Erosion gullies should be filled.

**DISCHARGE CHANNEL**  
The upper part of the channel has areas of erosion created, apparently, by the overflow during Hurricane Agnes. Clear seepage was observed from beneath the end of the soil cover. Surface drainage flows down the ditches in red, clayey silt adjacent to the access road on the right side (see Photo 6).  
It is recommended that topsoil be placed and seeded in the bare areas to prevent erosion.

**BRIDGE AND PIERS**  
None

**SLOPES**  
Reddish-brown, clayey silt with traces of rock fragments was deposited in the gentle cut slope on the left abutment which is mostly covered with low vegetation. The slope (2:1) on the right side is embankment fill above a cut, both of which are in clayey silt with traces of rock fragments.  
The bare areas on the left cut slope should be seeded with grass to prevent more erosion.
<table>
<thead>
<tr>
<th>Instrumentation</th>
<th>Observation</th>
<th>Monumentation/Survey</th>
<th>Weirs</th>
<th>Piezometers</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Dam: Greene Acres</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

None were observed.
**Name of Dam:** GREENE ACRES

<table>
<thead>
<tr>
<th>VISUAL EXAMINATION OF</th>
<th>OBSERVATIONS</th>
<th>REMARKS OR RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SLOPES</strong></td>
<td>The slopes are gentle near the dam where there is grass. The other slopes are moderate in the areas near the cottages and steeper in the wooded portions. There are few exposures of weathered bedrock on the slopes of clayey and sandy silt with little rock fragments.</td>
<td></td>
</tr>
</tbody>
</table>

| **SEDIMENTATION**     | No unusual sedimentation was noted. However, there is minor sedimentation around the 24 in. C.M.P. inlet pipe. |

---
<table>
<thead>
<tr>
<th>Name of Dam:</th>
<th>GREENE ACRES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOWNSTREAM CHANNEL</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>VISUAL EXAMINATION OF</strong></th>
<th><strong>OBSERVATIONS</strong></th>
<th><strong>REMARKS OR RECOMMENDATIONS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDITION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(OBSTRUCTIONS, DEBRIS, ETC.)</td>
<td>There is a considerable amount of small trees and brush in the downstream area. The area is flat and rather swampy.</td>
<td>The brush and obstructing trees should be removed to allow an open channel for discharges.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SLOPES</th>
<th>The slopes are well-defined in sandy and clayey silt with some rock fragments.</th>
</tr>
</thead>
</table>

| APPROXIMATE NO. OF HOMES AND POPULATION | There are a few homes located immediately downstream of the dam. |
APPENDIX IV

CHECK LIST - ENGINEERING DATA
CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Name of Dam: **GREENE ACRES**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLAN OF DAM</td>
<td>is included in this report as Plate 1 and was obtained from design file.</td>
</tr>
<tr>
<td>REGIONAL VICINITY MAP</td>
<td>is included in this report as Location Plan.</td>
</tr>
<tr>
<td>CONSTRUCTION HISTORY</td>
<td>The dam was constructed in 1970 by Kibler Construction Company of Luray, Virginia.</td>
</tr>
</tbody>
</table>

**TYPICAL SECTION OF DAM** is shown on Plate 2.

**HYDROLOGIC/HYDRAULIC DATA** Partial hydrologic and hydraulic data was contained in the design file.

**OUTLETS - PLAN,**

- **DETAILS,**
  - and **CONSTRAINTS** are shown on Plates 1 and 2.
  - **DISCHARGE RATINGS** were obtained from design data.

**RAINFALL/RESERVOIR RECORDS** None were available.
**Name of Dam:**  **GREENE ACRES**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN REPORTS</td>
<td>The design file was obtained from Mr. Richard Vogel of V.H.&amp;D., Warrenton, Virginia, formerly associated with Bartenstein and Associates, the designer.</td>
</tr>
<tr>
<td>GEOLOGY REPORTS</td>
<td>There is a brief note in the available soils reports by the consulting geologist which cites the presence of bedrock. The available geologic data is minimal.</td>
</tr>
<tr>
<td>DESIGN COMPUTATIONS HYDROLOGY &amp; HYDRAULICS DAM STABILITY SEEPA GE STUDIES</td>
<td>Some hydrologic and hydraulic data were contained in the design file. There were no dam stability analyses or seepage studies available for this report.</td>
</tr>
<tr>
<td>MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD</td>
<td>Some laboratory test results of soil samples from two borrow areas and the emergency spillway were available for this report. Boring and test pit records were not available.</td>
</tr>
<tr>
<td>POST-CONSTRUCTION SURVEYS OF DAM</td>
<td>No post-construction surveys of the dam were available.</td>
</tr>
<tr>
<td>BORROW SOURCES</td>
<td>The soil from the excavation for the emergency spillway was suitable for placement in the embankment. The consulting geologist indicated that an approved borrow area was located in the ridge near the left abutment in the vicinity of the approach for the spillway in the reservoir.</td>
</tr>
</tbody>
</table>
Name of Dam:          GREENE ACRES  

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MONITORING SYSTEMS</td>
<td>There are none.</td>
</tr>
<tr>
<td>MODIFICATIONS</td>
<td>Modifications that were discovered by the Michael Baker, Jr., Inc. field inspection were different than those shown on the design drawings (Plates 1 and 2) and are noted.</td>
</tr>
<tr>
<td>HIGH POOL RECORDS</td>
<td>None available</td>
</tr>
<tr>
<td>POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS</td>
<td>None available</td>
</tr>
<tr>
<td>PRIOR ACCIDENTS OR FAILURE OF DAM</td>
<td>There are no known prior failures or accident reports on the dam.</td>
</tr>
<tr>
<td>MAINTENANCE OPERATION RECORDS</td>
<td>There are no maintenance or operating records available.</td>
</tr>
</tbody>
</table>
Name of Dam:  **GREENE ACRES**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPILLWAY PLAN,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SECTIONS. and DETAILS are shown on Plates 1 and 2.</td>
</tr>
</tbody>
</table>

OPERATING EQUIPMENT are shown on Plates 1 and 2.
PLANS & DETAILS
CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 0.64 sq.mi.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 95.0 ft. P.D. (230 ac.-ft.)
ELEVATION EMERGENCY SPILLWAY CREST (STORAGE CAPACITY): 97.0 ft. P.D.
ELEVATION MAXIMUM DESIGN POOL: 100.0 ft. P.D. (341 ac.-ft.)
ELEVATION TOP DAM: 100.0 ft. P.D.

CREST: Emergency Spillway
   a. Elevation 97.0 ft. P.D.
   b. Type Earth, side-channel
   c. Width 170 ft. (bottom width)
   d. Length Level section, approximately 50 ft.
   e. Location Spillway outside left abutment
   f. Number and Type of Gates Not Applicable

OUTLET WORKS:
   a. Type 24 in. C.M.P. used as a drop-inlet
   b. Location In reservoir near right abutment
   c. Entrance Inverts 95.0 ft. P.D. (controls normal pool)
   d. Exit Inverts 88.0 ft. P.D. at 24 in. C.M.P.
   e. Emergency draindown facilities 10 in. diameter cast-iron pipe
      (invert 72.7 ft. P.D.)

HYDROMETEOROLOGICAL GAGES: None at dam site
   a. Type
   b. Location
   c. Records

MAXIMUM NON-DAMAGING DISCHARGE Unknown

Name of Dam: GREENE ACRES
APPENDIX V

CONSTRUCTION REPORTS AND MEMORANDUMS
Mr. Robert Bartenstein  
Bartenstein & Associates  
P. O. Box 298  
Warrenton, Virginia 22186

Subject: Price Job, Standardsville, Va.

Dear Bob:

The borrow samples from two areas were tested for Atterburg limits and found to offer good possibilities. One borrow material shows liquid limits below 40 and P.I.'s of around 10 which is a relatively stable material. This material came from Borrow Holes 1, 2 and 3 and is a brown sandy clay.

From the spillway area a red silty clay shows an average liquid limit of 45 and a P.I. of 15 which makes it less stable but still a good borrow source.

To further test these materials the laboratory is now completing compaction tests and will utilize type samples to complete two remolded triaxial shear tests, one for the brown sandy clay and one for the red silty clay. These tests will tell us what slopes may be used.

The borings placed at the centerline show stable soil to exist along the proposed axis. The only treatment excepting a cutoff trench would be the removal of a shallow lense of gravelly sand along the creekbed itself to a depth of 6-7'. At the present moment it would not appear necessary to excavate to rock, only remove this sandy zone.

If test results are as anticipated, a stable random zone w/cutoff, would be constructed out of the most stable material using the more plastic red silty clay as an upstream blanket. A toe trench is proposed for the downstream toe.

These are preliminary ideas and figures and final conclusions will be supported by test data. It appears that laboratory data should be complete by the end of next week.

I will keep you informed. Can you have a crew at Leigh's Mountain - say on the 28th of November, or the 1st of December?

Very truly yours,

Adolf U. Honkala, CPG
R. M. BARTENSTEIN & ASSOCIATES
P. O. BOX 298 • WARRENTON, VIRGINIA 23186 • PHONE 347-2200

MESSAGE

TO
Mr. Adolph U. Harkala
3819 Arklow Road
Richmond, Virginia

DATE
November 26, 1969

Re: Green Acres Lake

Dear Mr. Harkala:

After talking to you this AM, the contractor called to tell us that in excavating the cutoff trench at the creek they encountered solid bedrock at less than 6 feet depth. They found the sand and gravel you mentioned. I told him to clean off down to the rock being careful to remove all sand and gravel and not to disturb the rock in any way, as you instructed, and gave him permission to begin backfill with imperious material after pumping out the water. He is preparing to do this and to begin laying 20", welded steel pipe with 3" poured concrete antisep rings, 50' apart, the modified one at the CL.

SIGNED

DETACH AND FILE FOR FOLLOW-UP
Mr. R. M. Bartenstein  
R. M. Bartenstein & Associates.  
Consulting Engineers and Surveyors  
P. O. Box 298  
Warrenton, Virginia  

Dear Bob:  

I want to comment in general about the inspection made  
on December 4, 1969, at subject project.  

Overall capabilities of the contractor appear to be good  
and his attitude toward cooperation seems to be satisfactory. I  
explained to Mr. Kibler the purpose of compaction control and the  
basics of material distribution within the dam as I feel it  
should be. These items were pointed out:  

(1) Any waste should be stored upstream in the first  
small draw, i.e. on right abutment, and not be  
used to fill in below dam except where used as  
topsoil in a thin surface dressing.  

(2) The borrow area on the left abutment along the  
reservoir side of the spillway saddle should be  
developed as a half moon shaped cut and not  
vertically into the spillway ridge. Soils should  
be mixed by cutting through the surface plastic  
clayey clays and picking up the silty sandy clays and  
clayey sands below.  

(3) If there are coarse soils encountered in the borrow  
areas, as decomposed rock soil and clayey or silty  
sands, such soils should be placed in the downstream  
section.  

(4) Moisture content should be kept under control as  
some of these soils indicate moderate swell possi- 
bilities.  

(5) The spillway excavation should be used in the upstream  
portion of the dam, as a sloped blanket along the up-
stream toe. This is a highly impervious soil and is  
the least stable hence should occupy the flattest  
slope area.  

5 December 1969
Mr. R. N. Bartenstein

5 December 1969

The contractor still has more cleaning to do prior to fill preparation around the inlet area of the drainpipe and he so agreed.

I still have apprehensions about the use of the gas line pipe in the fill. Perhaps it is all right, but I believe it should be 100% the responsibility of the contractor.

Regarding use of material from the spillway channel, I suggest that some be used to fill in the old road along the base of the spillway saddle where erosion has deepened its position.

The contractor's suggestion about the muskrat wire is concurred to, and I feel that a galvanized wire should be used.

I spoke at some length with Dick Dress, the Price & Radin representative. He appeared very interested in proper controls and asked me about the influence of frozen soil lumps in the fill—which is negative, naturally. Also, we discussed the value received by the owner when too much preparation is required to get ready and close down on cold days. There is soon a point of diminishing values.

Mr. Kibler and I discussed briefly the condition in which the dam should be left over the winter, if not complete. He suggests compacting and rounding off the fill. This is all right to minimize damage from overflow but perhaps even better is to crowd the water to one abutment and cut a flat trench with the pan in order to distribute the water evenly over a flat surface.

These comments are submitted for your information.

Very truly yours,

Adolf U. Honkala, CGP

P.S. I have not designated to anyone, but compactation of the fill should be 95% of STANDARD PROCTOR T-99 with optimum moisture deviation allowable 2-3%. For the blanket material from the spillway 90% of STANDARD PROCTOR T-99 with optimum moisture deviation of 2-3%. The laboratory will have the unit weights and optimum moistures. You will receive laboratory copies as soon as I receive them. I am now working on lab notes.

Enclosures 4
APPENDIX VI

SOIL TESTS DATA
GREEN ACRES LAKE
STANDARDSVILLE, VIRGINIA

SOIL TEST DATA FOR DAM AND FOUNDATION DESIGN

DECEMBER 1969
Record No.: T-1056-12
Report Of: Soil Tests
Made For: Adolf U. Honkaia
3819 Arcklow Road
Richmond, Va.
Project: Standardsville Dam

FROEHLING & ROBERTSON, INC.
SINCE 1881
INPECTION ENGINEERS • CHEMISTS • BACTERIOLOGISTS
CABLE ADDRESS—"FROEHLING"

Richmond, Va.
December 5, 1969

Respectfully,

V. FROEHLING & ROBERTSON, INC.

Note: T-94 fir Standard Proctor
Bar. No. 1 = 11.2, Opt. moisture = 2.8% 
Bar. No. 2 = 16.5, Opt. moisture = 15%

cc: Adolf Honkaia

VI-1
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*Note: The table and diagram are not clearly visible in the image.*
APPENDIX VII

REFERENCES
REFERENCES


NAME OF DAM: GREENE ACRES

VII-1


NAME OF DAM: GREENE ACRES

VII-2