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NATIONAL DAM SAFETY PROGRAM. SLIME POND DAM (MO 30611), MISSISS--ETC(U)
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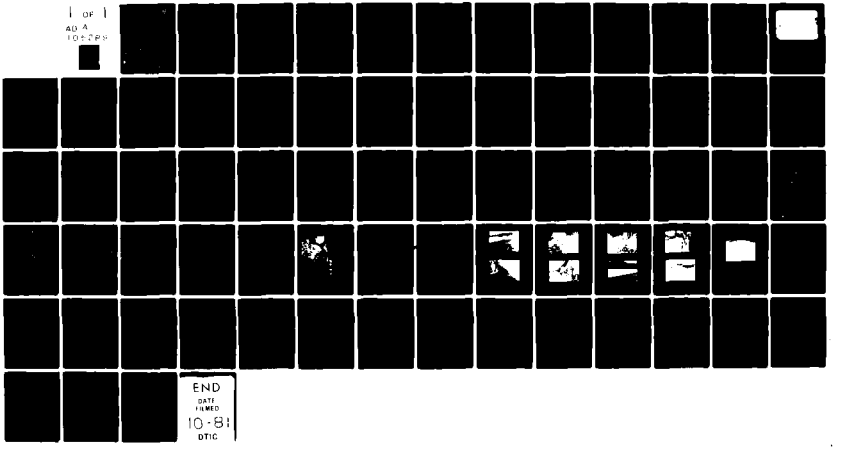

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SLIME POND DAM

MADISON COUNTY, MISSOURI

MO 30611

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY INSPECTION

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1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A105 289
	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* Phase I Dam Inspection Report National Dam Safety Program Slime Pond Dam (MO 30611) Madison County, Missouri	5. TYPE OF REPORT & PERIOD COVERED Final Report 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Woodward-Clyde Consultants	8. CONTRACT OR GRANT NUMBER(s) DACW43-80-C-0066
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Engineer District, St. Louis Dam Inventory and Inspection Section, LMSED-PD 210 Tucker Blvd., North, St. Louis, Mo. 63101	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
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National Dam Safety ~~Inspection~~. Slime Pond Dam (MO 30611) Mississippi - St. Francis Basin, Madison County, Missouri. Phase I Inspection Report.

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Dam Safety, Lake, Dam Inspection, Private Dams

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report was prepared under the National Program of Inspection of Non-Federal Dams. This report assesses the general condition of the dam with respect to safety, based on available data and on visual inspection, to determine if the dam poses hazards to human life or property.

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DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 TUCKER BOULEVARD, NORTH
ST. LOUIS, MISSOURI 63101

REPLY TO ATTENTION OF

SUBJECT: Slime Pond Dam Phase I Inspection Report

This report presents the results of field inspection and evaluation of the Slime Pond Dam (MO 30611).

It was prepared under the National Program of Inspection of Non-Federal Dams.

This dam has been classified as unsafe, non-emergency by the St. Louis District as a result of the application of the following criteria:

a. Spillway will not pass 50 percent of the Probable Maximum Flood without overtopping the dam.

b. Overtopping of the dam could result in failure of the dam.

c. Dam failure significantly increases the hazard to loss of life downstream.

A major concern of this dam is the steep downstream embankment slope. Immediate remedial action by the owner is recommended to ensure the safety of this dam.

SUBMITTED BY: SIGNED 9 JUL 1981
Chief, Engineering Division — Date

APPROVED BY: SIGNED 10 JUL 1981
Colonel, CE, Commanding — Date

SLIME POND DAM

Madison County, Missouri

Missouri Inventory Number 30611

Phase I Inspection Report

National Dam Safety Program

Prepared by

Woodward-Clyde Consultants

Chicago, Illinois

Under Direction of

St Louis District, Corps of Engineers

for

Governor of Missouri

April 1981

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 not to provide a complete evaluation of the safety of the structure nor to provide a guarantee on its future integrity. Rather the purpose of the program is to identify potentially hazardous conditions to the extent they can be identified by a visual examination. The assessment of the general condition of the dam is based upon available data (if any) and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify the need for more detailed studies. In view of the limited nature of the Phase I studies no assurance can be given that all deficiencies have been identified.

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 any data which may be available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action removes the normal load on the structure, as well as the reservoir head along with seepage pressures, 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, so that corrective action can be taken. Likewise continued care and maintenance are necessary to minimize the possibility of development of unsafe conditions.

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam	Slime Pond Dam
State Located	Missouri
County Located	Madison
Stream	Unnamed Tributary of Shays Creek
Date of Inspection	25 February 1981

Slime Pond Dam, Missouri Inventory Number 30611, was inspected by Richard Berggreen (engineering geologist), Pierre Mallard (geotechnical engineer), Jean-Yves Perez (geotechnical engineer), and Sean Tseng (hydrologist). Slime pond dam is an earth dam impounding tailings and a lake used for recreational purposes.

The dam inspection was made following the guidelines presented in the "Recommended Guidelines for Safety Inspections of Dams." These guidelines were developed by the Chief of Engineers, US Army, Washington, DC, with the help of federal and state agencies, professional engineering organizations, and private engineers. The resulting guidelines represent a consensus of the engineering profession. They are intended to provide for an expeditious identification, based on available data and a visual inspection, of those dams which may pose hazards to human life or property. In view of the limited nature of the study, no assurance can be given that all deficiencies have been identified.

Slime Pond Dam is classified as an intermediate size dam based on its height of 33 ft and its storage capacity of approximately 1940 ac-ft of which approximately 500 ac-ft is tailings. The intermediate dam classification applies to dams between 40 and 100 ft high, or with storage capacity between 1000 and 50,000 ac-ft, whichever gives the larger classification.

The St Louis District (SLD), Corps of Engineers, has classified this dam as having a high hazard potential; we concur with this classification. The SLD estimated damage zone length extends approximately 7 mi downstream of the dam. Numerous permanent dwellings, an electrical substation, highways, a railroad line and several bridges are located within this 7-mile zone. Contents of the damage zone were verified by aerial reconnaissance. The loss of life and property could be high in the event of dam failure.

Our visual inspection and evaluation of available information indicate the dam is in generally poor condition. No evidence was noted of cracking, slumping, sinkhole development, animal burrows, or disruption of the vertical or horizontal alignment of the dam crest. However, the downstream slope of the embankment is steep, on the order of 1.4(H) to 1(V) and may be subject to slumping. Large trees, to 12-in. in diameter are growing on the downstream slope and could provide piping paths or voids in the embankment if they are cut, die or are blown down.

No spillway was constructed for this dam. The only outlet facility is the decant tower in the reservoir. Reservoir level is controlled by flow over a stop-log sill in this tower. Discharge flows through a 5 ft wide, 4 ft tall pipe beneath the dam, and exits near the toe of the maximum section. Inlet dimensions are not known, and the 5 ft by 4 ft pipe was assumed to be the controlling dimension for discharge from the reservoir. Discharge through this outlet just prior to overtopping of the dam was calculated to be 320 ft^3/sec.

Hydraulic/hydrologic analyses indicate the dam will be overtopped by a flood which produces greater than 40 percent of the Probable Maximum Flood (PMF). The "Recommended Guidelines for Safety Inspection of Dams" require intermediate size, high hazard dams to pass a spillway design flood of 100 percent of the PMF without overtopping the dam. The PMF is defined as the flood event that may be expected to occur from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. These analyses also indicate the dam will not be overtopped by the 1 percent probability-of-occurrence flood (100 year flood). The material used in the embankment construction and the steep downstream slopes indicate overtopping would likely produce sufficient erosion to result in a breach of this dam.

Seepage and stability analyses comparable to the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency that should be rectified.

Based on our evaluation of the information obtained from the visual inspection, the following specific recommendations should be acted on immediately.

1. Prepare a more detailed hydraulic/hydrologic analysis and design a spillway and discharge channel system capable of passing 100 percent of the PMF without overtopping the embankment. An accurate assessment of the inlet and outlet dimensions of the decant system should be included in this analysis. The spillway and discharge channel should be protected from erosion. The discharge channel alignment and capacity should be such as to prevent erosion at the toe of the slope.

The following topics should be addressed without undue delay.

2. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" should be performed. These analyses should be performed for appropriate loading conditions, including earthquake loads, and made a matter of record.

3. Evaluate the impact on slope stability of the large trees growing on the steep downstream slope of the dam. This evaluation should include an assessment of potential piping along root systems of these trees. Removal of large trees should be done under the supervision of an engineer experienced in the design, construction, and maintenance of dams. Indiscriminate removal of large trees could jeopardize the stability of the embankment.

4. Evaluate the feasibility of a practical and effective warning system to alert downstream residents and traffic in the event hazardous conditions develop at this dam.

5. Install a trash rack in the decant tower to prevent obstruction of flood flows.

All remedial measures should be performed by or under the guidance of an engineer experienced in the design and construction of earth dams.

As there are no operating facilities per se, it is recommended that a program of periodic inspections and maintenance be developed and implemented without undue delay. This program should include, as a minimum the following items.

1. Inspect the crest and slopes of the dam for evidence of slope instability such as cracking, slumping, or excessive settlement of the dam crest.

2. Inspect the areas of seepage along the toe of the dam to identify changes in conditions such as increased seepage flow or turbidity (soil or tailings) in the seepage water. It is recommended this inspection be done when the reservoir level is higher, preferably at the normal operating elevation of the reservoir.

Maintenance procedures and inspection should be under the supervision of an engineer experienced in the design, construction, and maintenance of earth dams. Records should be kept of all inspections and recommended maintenance.

WOODWARD-CLYDE CONSULTANTS

Richard G. Berggreen
Registered Geologist, No 3572, CA

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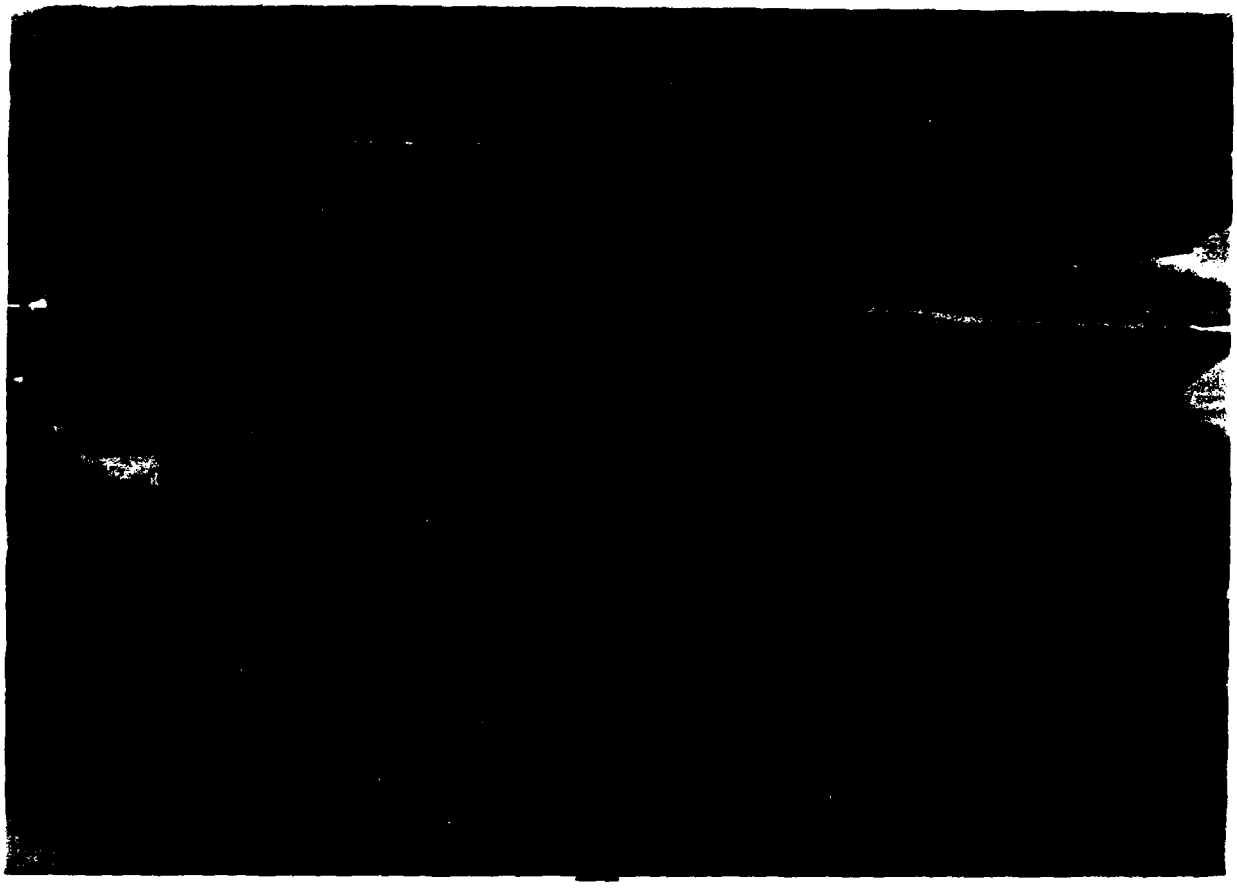
Vice President



OVERVIEW

SLIME POND DAM

MISSOURI INVENTORY NUMBER 30611

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
SLIME POND DAM - MISSOURI INVENTORY NO. 30611
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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
SLIME POND DAM, MISSOURI INVENTORY No. 30611

SECTION 1
PROJECT INFORMATION

1.1 General

a. **Authority.** The National Dam Inspection Act, Public Law 92-367, provides for a national inventory and inspection of dams through the United States. Pursuant to the above, an inspection was conducted of Slime Pond Dam Missouri Inventory Number 30611, (formerly referred to as Mine LaMotte Lake).

b. **Purpose of inspection.** "The primary purpose of the Phase I investigation program is to identify expeditiously those dams which may pose hazards to human life or property... The Phase I investigation will develop an assessment of the general condition with respect to safety of the project based upon available data and a visual inspection, determine any need for emergency measures, and conclude if additional studies, investigations, and analyses are necessary and warranted" (Chapter 3, "Recommended Guideline for Safety Inspection of Dams").

c. **Evaluation criteria.** The criteria used to evaluate the dam were established in the "Recommended Guidelines for Safety Inspection of Dams," and Engineering Regulation No. 1110-2-106 and Engineering Circular No. 1110-2-188, "Engineering and Design National Program for Inspection of Non-Federal Dams" prepared by the Office of the Chief of Engineers, Department of the Army; and "Hydrologic/Hydraulic Standards, Phase I Safety Inspecton of Non-Federal Dams," prepared by the St Louis District (SLD), Corps of Engineers. These guidelines were developed with the help of several federal and state agencies, professional engineering organizations, and private engineers.

1.2 Description of Project

a. **Description of dam and appurtenances.** Slime Pond Dam is an earth dam constructed in the 1950's to impound tailings and water from a lead ore processing mill. The mill and associated underground mine were operated by St Joe Lead Co and are currently abandoned. The lake is now used for recreation, primarily fishing and swimming, by the present owner, Mine LaMotte Lake Recreation Association.

The dam consists of a long, curved earth embankment, convex downstream, spanning a wide, relatively flat drainage basin (see Overview Photograph). The crest of the dam is approximately 2430 ft long (Fig. 3A). The downstream face is steep (1.4(H) to 1(V)) and is approximately 33 ft high. It is densely vegetated with grass, brush and trees up to 12 in. in diameter. The upstream slope is very flat (10(H) to 1(V)). It has been graded and covered with lead tailing sand to create a beach. At several locations, the sand has been pushed over the downstream slope. There is no spillway. The lake level is controlled by a concrete intake tower which was part of the decant system. The overflow from the intake tower flows through a conduit installed through the embankment, exiting at the downstream toe of the dam through a concrete pump house. The conduit is 4 ft wide and 5 ft high at the pump house. The conduit discharges into a small stream flowing into Shays Creek. The drainage way for Shays Creek is broad and without any major obstruction to flow. At the time of the inspection, no water was flowing through the intake structure, and only a small amount of water was flowing out of the discharge pipe.

A portion of the reservoir volume is filled with tailings. No survey was made of the lake bottom, but at the time of the inspection, it was estimated that the storage included approximately 500 ac-ft of tailings.

b. **Location.** The dam is located on a unnamed tributary of Shays Creek, about 3 mi northeast of downtown Fredericktown, in Madison County, Missouri. It is located in Section 33, T34N, R7E, on the USGS Fredericktown 7.5-minute quadrangle map (1980).

c. **Size classification.** Slime Pond Dam is classified as an intermediate size dam based on its storage volume of 1940 ac-ft (including an estimated 500 ac-ft of tailings) and its height of 33 ft. Under the definition in the "Recommended Guidelines for Safety Inspection of Dams," an intermediate size dam is one between 40 ft and 100 ft in height, or having a storage capacity between 1000 and 50,000 ac-ft, whichever gives the larger classification.

d. **Hazard classification.** The St Louis District (SLD), Corps of Engineers, has classified this dam as having a high hazard potential; we concur with this classification. The SLD estimated damage zone length extends approximately seven miles downstream. Within this estimated damage zone are more than four occupied dwellings, an electrical substation, Missouri State Highway 67 and several paved roads (Photo 9). The contents of the downstream damage zone were verified by aerial reconnaissance. The potential for loss of life and property could be high in the event of sudden dam failure.

e. **Ownership.** We understand that the dam is presently owned by Mine LaMotte Lake Recreation Association. Correspondence should be sent to Mr Duwane Williams, President of the Association, 208 Smith Street, Farmington, Missouri 63640 (Tel (314) 756-5573).

f. **Purpose of dam.** The dam was initially constructed by St Joe Lead Co for impoundment of lead tailings and water for their Lindsey Mine lead ore processing mill. The lead mine and mill are currently abandoned and the lake is used for recreation by the present owners.

g. **Design and construction history.** St Joe Lead Co was contacted but could not provide any record of the construction of the dam. According to Mr Williams, the dam was constructed in the 1950's by St Joe Lead Co. No records were found for termination of the mining and mill operations at this dam.

No other information could be obtained regarding the design and construction of this dam.

h. **Normal operational procedures.** There are no facilities requiring operations at this dam. The outlet elevation for the decant structure is controlled by stop-logs. The elevation of the stop-log sill has remained unchanged since the time St Joe Lead Co discontinued tailings disposal operations in this impoundment.

1.3 Pertinent Data

a. **Drainage area.** 0.95 mi^2

b. **Discharge at dam site.**

Maximum known flood at damsite	Unknown
Warm water outlet at pool elevation	N/A (not applicable)
Diversion tunnel low pool outlet at pool elevation	N/A
Diversion tunnel outlet at pool elevation	N/A
Gated spillway capacity at pool elevation	N/A
Gated spillway capacity at maximum pool elevation	N/A
Ungated spillway capacity at maximum pool elevation	320 ft^3/sec
Total spillway capacity at maximum pool elevation	320 ft^3/sec

c. **Elevations (ft above MSL).**

Top of dam	830.8 to 834.4
Maximum pool-design surcharge	N/A
Full flood control pool	N/A
Recreation pool	824.7 (on date of survey 6 March 81)
Spillway crest (gated)	N/A
Upstream portal invert diversion tunnel	N/A
Downstream portal invert diversion tunnel	N/A
Streambed at centerline of dam	Unknown
Maximum tailwater	Unknown
Toe of dam at maximum section	800.6

d. **Reservoir.**

Length of maximum pool	2200 ft
Length of recreation pool	1900 ft
Length of flood control pool	N/A

e. **Storage (acre-feet).**

Recreation pool	1080 (includes approximately 500 ac-ft tailings, remainder water storage)
Flood control pool	N/A
Design surcharge	N/A
Top of dam	1940 (500 ac-ft tailings, remainder water storage)

f. ***Reservoir surface (acres).***

Top of dam	138
Maximum pool	138
Flood control pool	N/A
Recreation pool	103
Spillway crest	N/A

g. **Dam.**

Type	Earth dam with upstream slope covered by mantle of tailings.
Length	2430 ft
Height	33 ft
Top width	10(H) to 1(V) upstream slope averages 75 ft wide from crest to waterline at reservoir elevation 824.7 ft.
Side slopes	Upstream, 10(H) to 1(V) Downstream 1.4(H) to 1(V)
Zoning	Unknown, probably none

Impervious core	Unknown, probably none
Cutoff	Unknown, probably shallow trench
Grout curtain	Unknown, probably none

h. **Diversion and regulating tunnel.**

Type	None
Length	N/A
Closure	N/A
Access	N/A
Regulating facilities	N/A

i. **Spillway.**

Type	None
Length of weir	N/A
Crest elevation	N/A
Gates	N/A
Downstream channel	N/A

j. **Regulating outlets.** Decant structure. Consists of concrete inlet tower on reservoir, conduit beneath dam, and outlet at the toe of maximum section. Inlet elevation controlled by stop-logs, present sill at elevation approx. 826.4 ft. Outlet invert elevation 801.2 ft.

SECTION 2
ENGINEERING DATA

2.1 Design

No design drawings were found for this dam. The dam was designed by St Joe Lead Company. Design documents and records were reported to have been given to the present owners of the property (Mine LaMotte Lake Recreation Association) but could not be found at the time of the visual inspection.

2.2 Construction

There were no construction records located for this dam. The dam was reported by the present owners to have been constructed by St Joe Lead Co in the mid-1950's for water and tailings impoundment as a part of the St Joe Lead Co Lindsey Mine operations.

The embankment was apparently constructed of locally obtained gravelly clay residual soil. Tailings were deposited on the upstream slope and in the reservoir by discharge through a perforated 12-in. diameter pipe along the dam crest. Remnants of the pipe are still visible on the downstream slope of the dam, where they were pushed after operations were terminated. No records could be located for the termination of mining activities at the Lindsey Mine.

2.3 Operation

No facilities requiring operation were identified at this facility. The reservoir elevation is controlled by the stop-log sill elevation of the decant tower inlet. These stop-logs have not been adjusted since the present owners took control of the facility. No records are available of operating procedures by the former owners, St Joe Lead Co.

2.4 Evaluation

a. **Availability.** No engineering data was obtained for this dam, either from the current owners, Mine LaMotte Lake Recreation Association, or from the former owners, St Joe Lead Co.

b. **Adequacy.** The lack of engineering data precludes an evaluation of the adequacy of design of this dam. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available; this is considered a deficiency, which should be rectified. These seepage and stability analyses should be performed for appropriate loading conditions, including earthquake loads, and made a matter of record. These analyses should be performed by an engineer experienced in the design and construction of earth dams.

c. **Validity.** Not applicable.

2.5 Project Geology

The dam is located near the center of the Ozark structural dome. Bedrock in the vicinity of the dam is mapped on the Geologic Map of Missouri (1979) as Precambrian volcanic and granitic units and Cambrian sedimentary formations (Fig. 4). The dam site is mapped as underlain by the Cambrian age LaMotte Sandstone formation. The LaMotte Sandstone is predominantly a quartzose sandstone, ranging from light gray or white to yellow, brown, or red. The LaMotte Sandstone directly overlies the Precambrian basement rock and locally contains conglomerate consisting of felsite pebbles and boulders eroded from the Precambrian units.

The soils developed in the vicinity of the dam is a brown sandy to silty clay (CL) and clayey silt (ML), apparently developed as a weathering product on the sandstone bedrock. The sandy nature suggests the soils are slightly to moderately permeable. The soil is mapped on the General Soils Map of Missouri (1979) as Jonca-LaMotte-Lily-Ramsey Soil Association.

The dam site lies within and along the southwestern edge of the Simms Mountain Fault System. The fault system is approximately 10 mi wide in the vicinity of the

dam, and extends about 42 mi in a northwest-southeast direction. The Mine LaMotte Faults comprise a portion of the Simms Mountain Fault system, and branch faults are mapped less than 1 mi from the dam, although the specific locations of the faults are difficult to plot due to the small scale of the available geologic map, 1 in. equals 8 mi. These faults are within Precambrian and Paleozoic formations and are likely Paleozoic in age. The area is not seismically active and these faults are not considered to pose an unusual hazard to the dam.

The dam is located approximately 80 mi north of the line of epicenters for the very large New Madrid earthquakes of 1811 and 1812. This location places the dam in Seismic Zone 2, to which the guidelines assign a moderate damage potential. Recurrence of an earthquake of the magnitude of the New Madrid earthquakes could cause damage at the dam, but an assessment of this risk is beyond the scope of this Phase I investigation.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. A field inspection was made of Slime Pond Dam on 25 February 1981. The inspection team met with Mr Duwane Williams, president of the Mine LaMotte Lake Recreation Association, owners of the dam. Mr Williams did not accompany the inspection team on the visual inspection.

The inspection indicated the dam is in generally poor condition.

b. Dam. Slime Pond Dam is an earth embankment with a mantle of sand-size lead tailings deposited on the upstream face of the dam. The dam consists of a curved embankment, convex downstream, crossing a valley of relatively low relief (Overview Photo).

The upstream slope of the dam, from the crest to the lake level, has a very gentle slope (Photo 1), on the order of 10(H) to 1(V). Some grading has been done to this slope to prepare a recreational park around the lake.

The downstream slope of the dam is quite steep, on the order of 1.4(H) to 1(V) and locally steeper (Photo 2). The slope has a moderately dense cover of brush and trees up to 12 in. in diameter. Grading on the dam crest and flat upstream slope has pushed some soil and tailings over the crest onto the downstream slope (Photo 3).

No evidence was noted of detrimental settlement or disruption of the dam crest alignment. No significant erosion, animal burrows, cracking or slumping was noted. However, the recent grading and material pushed over the downstream slope of the dam could have obscured some features.

Seepage was observed along most of the toe of the downstream slope (Photo 4). Individual seepage rates ranged from less than 1 gal/min to perhaps

10 gal/min. Total seepage along the toe of the dam may exceed 200 gal/min although a cumulative seepage rate is difficult to estimate. No turbidity, such as soil or tailings, was noted in the seepage observed, but vegetation and swampy conditions at the toe prevented an inspection of the entire toe (Photo 5). The lake level was relatively low at the time of the visual inspection, approximately 2 ft below normal according to the owner's representative. The gradual slope of the upstream face of the dam indicates that as the lake level rises, water will be much nearer the downstream slope, i.e., a 2-ft rise in lake level will bring the water line 20 ft closer to the crest of the dam. Seepage will likely increase as a result of the shorter seepage path and the greater head.

No records or evidence of past overtopping of the embankment were found. The materials in the embankment are considered moderately erodible. The vegetation on the downstream slope provides some erosion protection. Wave erosion will likely occur on the sandy upstream slope of the dam at the water line, but continued maintenance of the beach suggests this will not significantly impact the safety of the dam.

c. **Appurtenant structures.** No spillway has been constructed for this dam. The outlet facilities consist of the decant tower discharge conduit through the dam and outlet structure downstream constructed during the period the lake was used for lead tailings disposal and water supply for the milling operations.

The inlet for the decant system consists of a vertical concrete tower in the reservoir (Photo 6). Flow out of the reservoir is controlled by a number of stop-logs in the tower. At the time of the visual inspection, approximately 3 boards, totaling 20 in. in height, were exposed above the water line.

Discharge for the decant outlet is through a 4 ft by 5 ft concrete conduit located in a concrete pump house at the toe of the dam (Photo 7). A small amount of water was flowing out of the concrete conduit at the time of the visual inspection, probably the result of infiltration through the conduit. A concrete wall at the end of the conduit was showing signs of failure, and could partially obstruct the outlet if it were to fail.

d. **Reservoir area.** The reservoir has been significantly silted in as a result of the deposition of lead tailings in the past. The deepest part of the lake was reported to be approximately 18 ft, and the average depth on the order of 8 to 10 ft.

The drainage area upstream from the reservoir consists of several large sand tailings piles (Photo 8). The sandy, unsaturated nature of this material will limit runoff to some degree, but the easily erodible nature of this material will likely result in continued sedimentation in the reservoir.

The slopes surrounding the reservoir are generally quite flat and no evidence of unstable slopes was noted.

e. **Downstream channel.** As there is no spillway for this dam there is no downstream channel, per se. The channel downstream of the decant outlet crosses a relatively flat area at the toe of the dam and enters the drainage channel for the natural stream (Shays Creek) in this area.

3.2 Evaluation

The visual inspection identified several deficiencies at this dam that could impact the safety of the facility. The evidence of seepage along most of the toe of the dam with the lake surface nearly 2 ft below the normal operating elevation suggests seepage pressures and erosion could affect the stability of the dam. An evaluation of the volume of seepage and possible erosion should be performed when the lake has risen to its normal operating level.

No spillway exists at this facility. No plans were available on the configuration of the decant outlet, but it did not appear a trash rack was present at the decant inlet. The embankment materials are moderately resistant to erosion, and some erosion protection is offered by the vegetation. However, overtopping for a significant depth and duration could cause failure of the dam.

No evidence was noted of cracking, slumping, animal burrows, settlement, sinkhole developements, or disruption of the vertical or horizontal alignment of the dam crest. Grading on the upstream slope could have obscured some evidence. The downstream slope is considered quite steep, 1.4(H) to 1(V) or steeper, and material pushed over the dam crest and vegetation could have obscured evidence of slope instability.

Trees as large as 12-in. in diameter growing on the downstream slope are likely to have roots extending into the dam, providing potential piping paths if the trees die or are cut down. The presence of trees of this size on an earth dam is considered a deficiency.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures

No facilities requiring operation were identified at this dam site. Water level in the reservoir is controlled by flow through the decant tower. Elevation of the stop-log sill at the inlet overflow has not been changed since tailings disposal operations were terminated by St Joe Lead Co.

4.2 Maintenance of Dam

No records of maintenance were identified for this dam. The only identifiable maintenance performed on the dam consisted of grading the upstream slope to form a beach used for recreation. It was reported that the lake bottom was dredged recently using a dragline to deepen an area around a diving platform.

Mr Williams stated that he has been considering cutting down some of the large trees growing on the dam. He was warned by the inspection team that indiscriminate tree removal could jeopardize the safety of the dam and that planning and implementation of tree removal should be made under the guidance of an engineer experienced in the design, construction and maintenance of earth dams.

4.3 Maintenance of Operating Facilities

No records of maintenance were reported for the decant inlet. It was reported that a leaking outlet pipe was grouted shut several years ago. No records were available of that work.

4.4 Description of Any Warning System in Effect

No warning system was identified in the inspection of this dam.

4.5 Evaluation

There is no formal inspection or maintenance program in effect for this dam. The development of a periodic inspection and maintenance program and an evaluation of a practical and effective warning system are recommended for this facility. All inspections and maintenance should be performed by or under the guidance of an engineer experienced in the design and construction of earth dams.

SECTION 5
HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. **Design data.** No hydraulic or hydrologic design information was available for evaluation of the dam and reservoir. Dimensions of the dam were surveyed, measured during the visual inspection, or estimated from topographic mapping. The survey data were furnished by James F. McCaul III and Associates of Potosi, Missouri. The topographic map used in the analysis was the advance print of the USGS Fredericktown, Missouri 7.5-minute quadrangle map (1980).

b. **Experience data.** No recorded rainfall, runoff, discharge or pool stage historical data were found for this reservoir. The current owners report maximum flow through the decant tower is approximately 2 to 4 in. over the stop-log sill. They also stated that the reservoir level at the time of the inspection was approximately 2 ft lower than maximum level observed by them.

c. **Visual inspection.**

1. Watershed. The watershed consists of forest, pastures, and a large area of sand tailings piles. These tailings piles comprise approximately 25 percent of the watershed. This area has been assigned a hydrologic soil classification A, to reflect the high permeability of this unsaturated material in the flood routing analyses. The area of the reservoir, considered impermeable in the flood routing analyses, was 16 percent of the total watershed area of 0.95 mi^2.

2. Reservoir. The reservoir and dam are described in Section 3 of this report, and by the maps and photographs enclosed herewith. The reservoir was partially silted in with tailings during the lead mining operations, the deepest point was reported to be approximately 18 ft. The primary use of the reservoir at present is for recreation.

3. Outlet works. There was no spillway constructed for this dam. Discharge from the reservoir is through the concrete decant tower, a conduit beneath the dam, and the outlet at the downstream toe of the maximum section. The outflow elevation is controlled by a stop-log sill at the inlet. The elevation of this inlet has not been adjusted by the present owners. The lake begins spilling through the tower at an elevation approximately 2 ft above the lake level observed at the time of the visual inspection. Dimensions of the inlet and pipe beneath the dam could not be found nor measured. The outlet dimensions were measured to be 5 ft wide and 4 ft high. This was assumed to be the controlling dimension for discharge. It did not appear that the inlet is protected with a trash rack.

4. Seepage. Seepage was noted along most of the toe of the dam. However, the total seepage could not be measured. The volume of seepage was not included in the overtopping analysis; this is a conservative assumption.

d. Overtopping potential. One of the primary considerations in the evaluation of Slime Pond Dam is the assessment of the potential for overtopping and consequent failure by erosion of the embankment. There is no spillway constructed for this dam, and the downstream slope is quite steep and considered moderately erodible. Overtopping of the embankment would likely lead to a breach of the dam.

Hydraulic/hydrologic analyses of this dam for the 1 and 10 percent probability-of-occurrence floods (100 year and 10 year recurrence interval floods) were based on a starting reservoir surface elevation equal to the stop-log sill of the decant tower outlet. For the various Probable Maximum Flood (PMF) events, antecedent storms equal to half of the subject storms were routed through the reservoir. The decant outlet was found capable of discharging these antecedent storms within 4 days. As a result the PMF storms also had a starting water surface equal to the stop-log sill elevation. The PMF is defined as the flood event that may be expected to occur from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

The analyses indicate that the 1 percent probability-of-occurrence flood (100 year flood) will not overtop the dam. These analyses also indicate that the dam will be overtopped by a flood greater than 40 percent of the PMF. The guidelines require that intermediate size, high hazard dams pass a spillway design flood of 100 percent of the PMF without overtopping the dam.

The following table presents results of the overtopping analysis for various flood events, assuming no erosion of the embankment, and assuming the decant outlet is open and functioning.

Precipitation Event	Maximum Reservoir Elevation, ft (MSL)	Maximum Depth of Overtopping, ft	Maximum Outflow, ft^3/sec	Duration of Overtopping, hrs
1% Prob	828.3	0.0	170	0.0
40% PMF	830.8	0.0	319	0.0
50% PMF	831.7	0.9	488	6.5
100% PMF	833.5	2.7	3204	8.5

Input data and output summaries for the hydraulic and hydrologic analyses are presented in the attached Appendix B.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. **Visual observations.** The visual inspection of Slime Pond Dam identified several features which could affect the structural stability of the embankment. No evidence was noted of slumping or cracking of the embankment; however, the downstream slope was noted to be quite steep, on the order of 1.4(H) to 1(V), and could be subject to slumping and slope failure. No slope stability analysis was available for this dam, but the visual inspection suggests this steep downstream face is only marginally stable in its present condition.

Seepage was noted along most of the toe of the downstream slope. Rates of flow varied from less than 1 gal/min to perhaps 10 gal/min depending on the location. Much of the ground beyond the toe of the dam was swampy as a result of the seepage. No seepage analysis was available for review to evaluate the potential impact of this seepage on the stability of the dam. It should be noted, however, that the owners reported that the normal operating level is approximately 2 ft higher than the lake level at the time of the visual inspection. This higher lake level will shorten the distance between the shoreline and downstream face of the dam substantially, and also raise the head, both of which will tend to increase the seepage. The toe of the dam should be inspected again when the lake has reached its normal operating level.

No spillway was constructed at this dam. The only outlet structure is the decant tower in the reservoir. The materials comprising the embankment are considered moderately erodible in the event of overtopping. As a result, overtopping is judged likely to produce an effective breach of the dam.

b. **Design and construction data.** No design or construction records were available for this dam. The dam was reported to have been built in the mid 1950's by St Joe Lead Co for water and tailings impoundment as a part of St Joe Lead Co Lindsey Mine operations. No records could be found of termination of the Lindsey Mine operations.

c. **Operating records.** There are no records of operation for this dam. It was reported that the decant tower overflows every year, but maximum flow is only a few inches over the stop-log controlled outlet.

d. **Post construction changes.** The present owners reported to the inspection team that a low level steel drain pipe, with a valve at the downstream end developed a leak several years ago. This pipe runs parallel to the decant conduit and ends in the concrete pump house at the toe of the dam. The leak could not be repaired and the line was grouted shut.

Grading of the beach area to develop recreational vehicle parking sites, trees planted near the high water level on the upstream slope and the growth of trees on the downstream slope were other post construction changes identified at this facility.

e. **Seismic stability.** The dam is located in Seismic Zone 2 to which the guidelines assign a moderate damage potential. During a seismic event, liquefaction of the gravelly silt and clay embankment material is unlikely. However, without knowledge of the soil properties of the embankment materials, the seismic stability of the dam cannot be evaluated.

SECTION 7
ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment

a. **Safety.** Based on the visual inspection, the dam appears to be in generally poor condition. The deficiencies identified include the steep downstream slope, the seepage noted along most of the toe of the dam, and the lack of a spillway. The lack of seepage and stability analyses comparable to the "Recommended Guidelines for Safety Inspection of Dams" is also considered a deficiency which should be rectified.

Hydraulic/hydrologic analyses indicate with the present configuration of the dam and outlet works the embankment will be overtopped by a flood greater than 40 percent of the Probable Maximum Flood (PMF). The PMF is defined as the flood event that may be expected to occur from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. The discharge capacity of the decant system with the reservoir level at the minimum top of dam elevation is 320 ft^3/sec.

b. **Adequacy of information.** The visual inspection provided sufficient information to support the conclusions and recommendations presented in this Phase I report.

Seepage and stability analyses for this dam comparable to the "Recommended Guidelines for Safety Inspection of Dams" were not available. This is considered a deficiency that should be rectified.

c. **Urgency.** The deficiencies described in this report could affect the safety of the dam. The recommendations in Section 7.2b concerning the spillway and discharge channel should be acted on immediately. All other recommendations in Sections 7.2b and 7.2c should be acted on without undue delay.

d. **Necessity for Phase II.** In accordance with the "Recommended Guidelines for Safety Inspection of Dams," the subject investigation was a minimum study. This study revealed that additional in-depth investigations are needed to complete the assessment of the safety of the dam. Those investigations which should be performed immediately are described in Section 7.2b. It is our understanding from discussions with the SLD that any additional investigations are the responsibility of the owner.

7.2 Remedial Measures

a. **Alternatives.** There are several general options which may be considered to reduce the possibility of dam failure or to diminish the harmful consequences of such a failue. Some of these options are listed below.

1. Remove the dam, or breach it to prevent storage of water.

2. Increase the height of dam and/or spillway size to pass 100 percent of the PMF without overtopping the dam.

3. Purchase downstream land that would be adversely impacted by dam failure, and restrict human occupancy.

4. Provide a highly reliable flood warning system (generally does not prevent damage but diminished chances for loss of life).

b. **Recommendations.** Based on our inspection of Slime Pond Dam, it is recommended that the following topic be addressed immediately.

1. Prepare a more detailed hydraulic/hydrologic analysis and design a spillway and discharge channel system capable of passing 100 percent of the PMF without overtopping the embankment. An accurate assessment of the inlet and outlet dimensions of the decant system should be included in this analysis. The spillway and discharge channel should be protected from erosion. The discharge channel alignment and capacity should be such as to prevent erosion at the toe of the slope.

The following topics should be addressed without undue delay.

2. Seepage and staiblity analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" should be performed. These analyses should be performed for appropriate loading conditions, including earthquake loads, and made a matter of record.

3. Evaluate the impact on the slope stability of the large trees growing on the steep downstream slope of the dam. This evaluation should include assessment of potential piping along root systems of the trees. Removal of large trees should be done under the guidance of an engineer experienced in design construction, and maintenance of dams. Indiscriminate removal of large trees could jeopardize the stability of the embankment.

4. Evaluate the feasibility of a practical and effective warning system to alert downstream residents and traffic in the event hazardous conditions develop at this dam.

5. Install a trash rack in the decant tower to prevent obstruction of flood flows.

All remedial measures should be performed by or under the guidance of an engineer experienced in the design and construction of earth dams.

c. **O & M procedures.** As there are no operating facilities per se, it is recommended that a program of periodic inspections and maintenance be developed and implemented without undue delay. This program should include, as a minimum, the following items.

1. Inspect the crest and slopes of the dam for evidence of slope instability such as cracking, slumping, or excessive settlement of the dam crest.

2. Inspect the areas of seepage along the toe of the dam to identify changes in conditions such as increased seepage flow or turbidity (soil or tailings) in the seepage water. It is recommended this inspection be done when the reservoir level is higher, preferably at the normal operating elevation of the reservoir.

Maintenance procedures and inspections should be under the supervision of an engineer experienced in the design, construction, and maintenance of earth dams. Records should be kept of all inspections and recommended maintenance.

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Department of the Army, Office of the Chief of Engineers, 1977, EC 1110-2-188, Engineering and Design National Program of Inspection of Non-Federal Dams.

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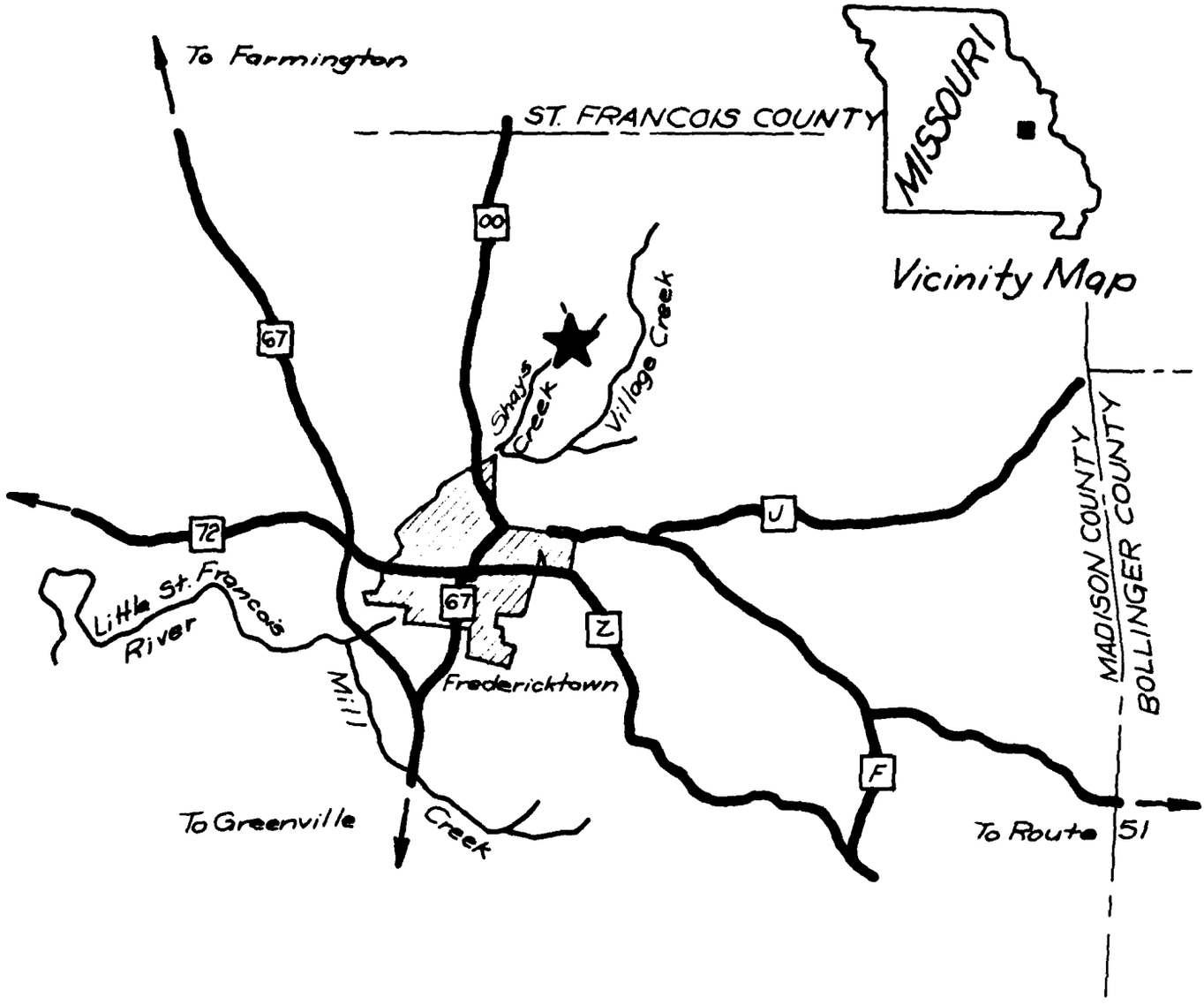
McCracken, M. H., 1971, Structural Features Map of Missouri: Missouri Geological Survey, scale 1:500,000.

Missouri Geological Survey, 1979, Geologic Map of Missouri: Missouri Geological Survey, scale 1:500,000.

St Louis District, US Army Corps of Engineers, 1979, Hydrologic/Hydraulic Standards, Phase I Safety Inspection of Non-Federal Dams.

US Department of Agriculture, Soil Conservation Service, 1971, Hydrology: National Engineering Handbook, Section 4.

US Department of Commerce, US Weather Bureau, 1956, Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24 and 48 Hours, Hydrometeorological Report No. 33.



0 2 4

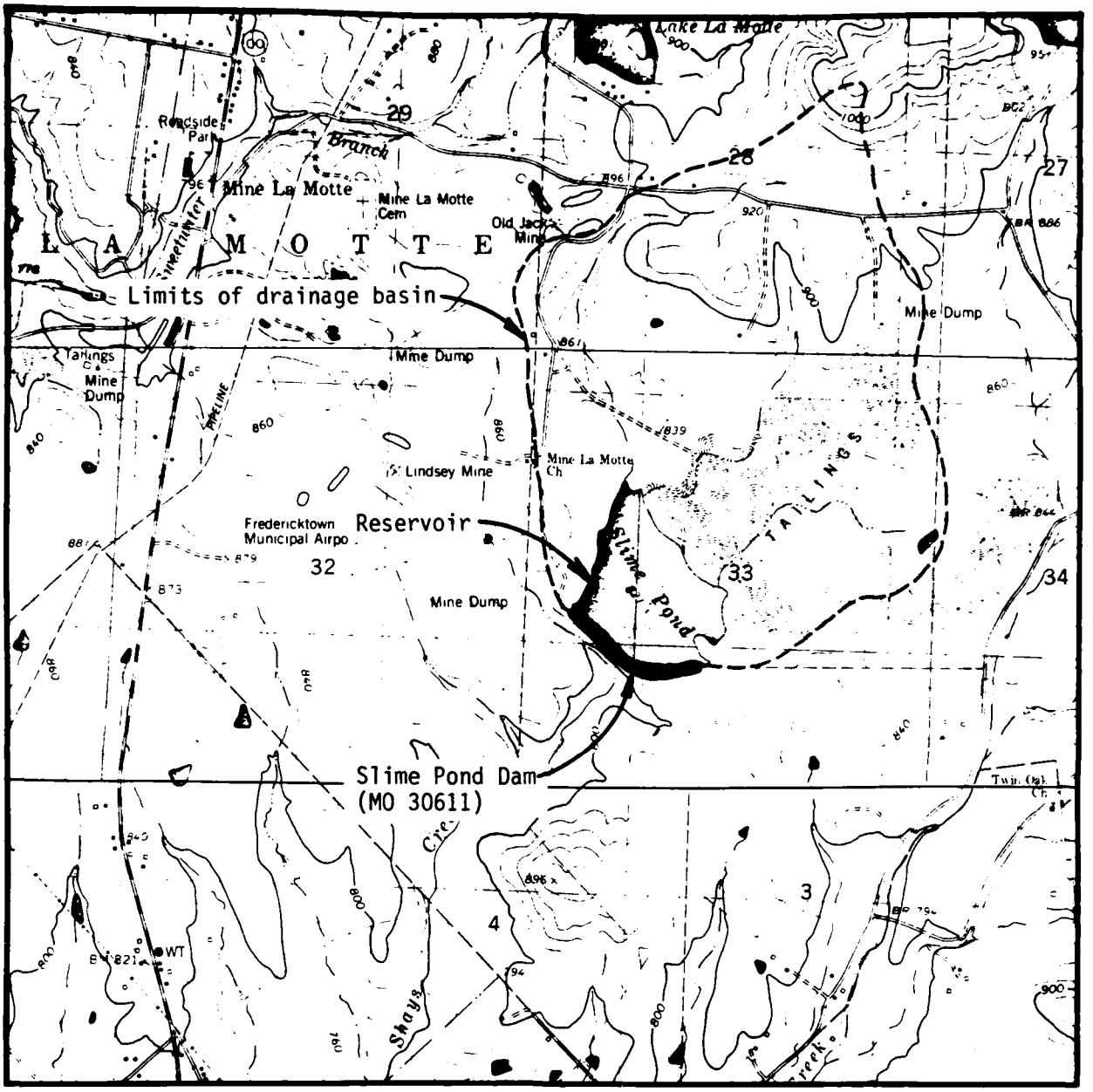
Scale, miles

N

Legend

- County Line
- State highway and Route No.
- River or Creek
- City or Town
- Project location

SITE LOCATION MAP	
SLIME POND DAM	
MO 30611	Fig. 1

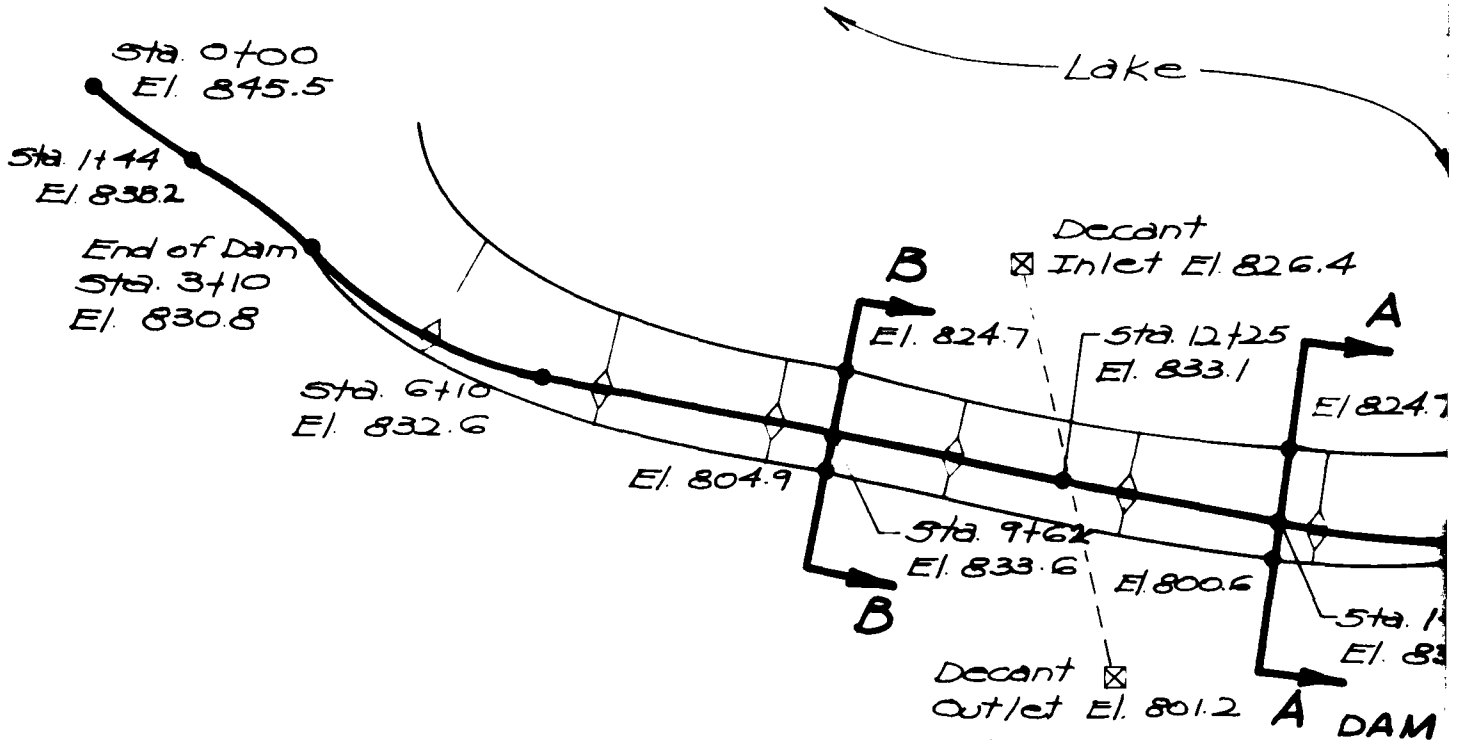


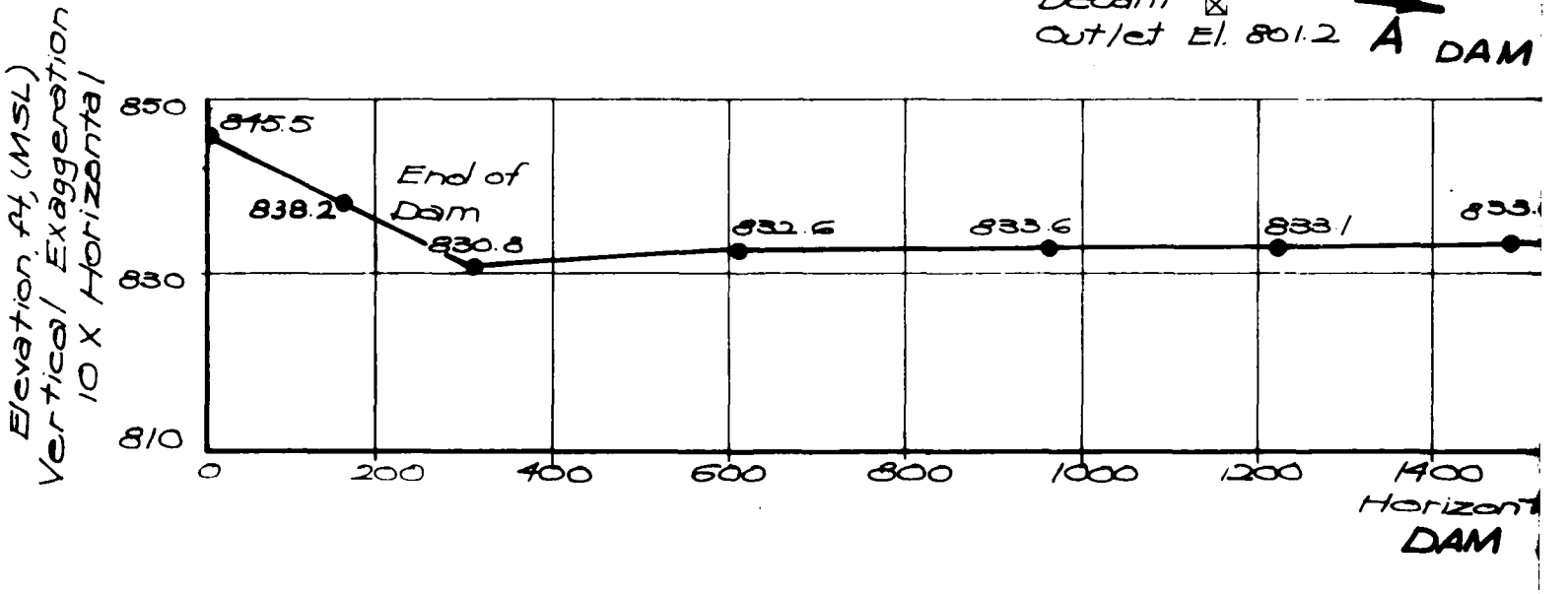
Note: Topography from USGS Fredericktown 7.5-minute quadrangle map (1980).

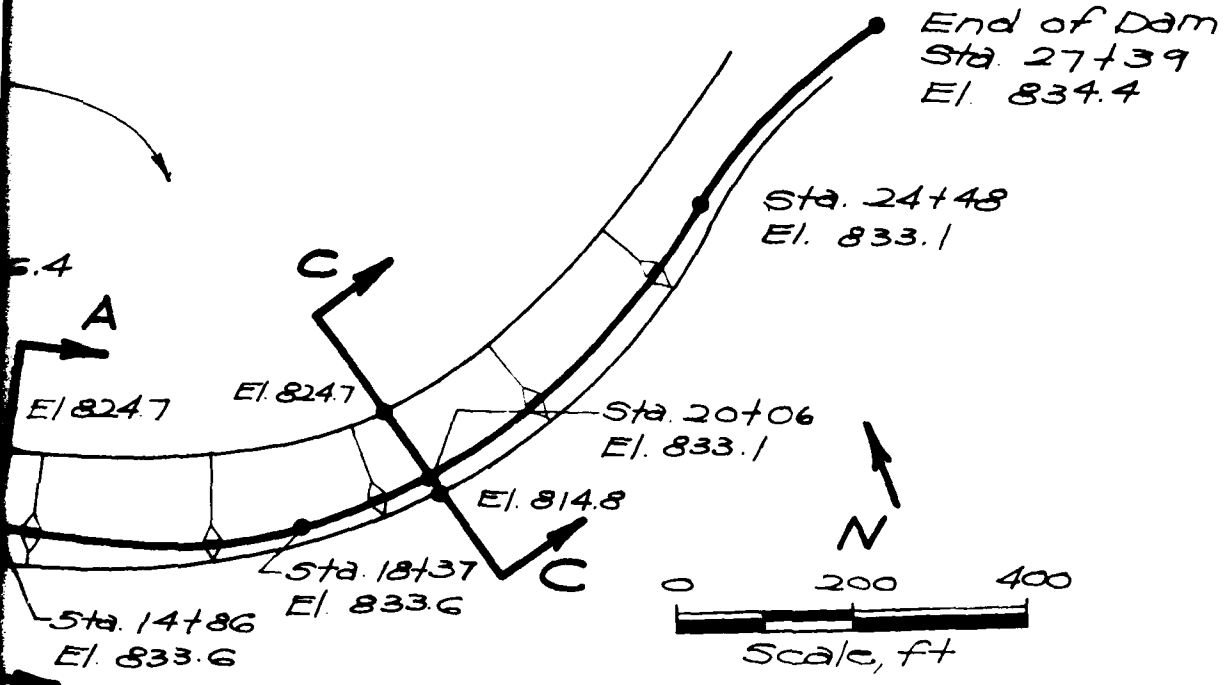
DRAINAGE BASIN AND SITE TOPOGRAPHY

SLIME POND DAM

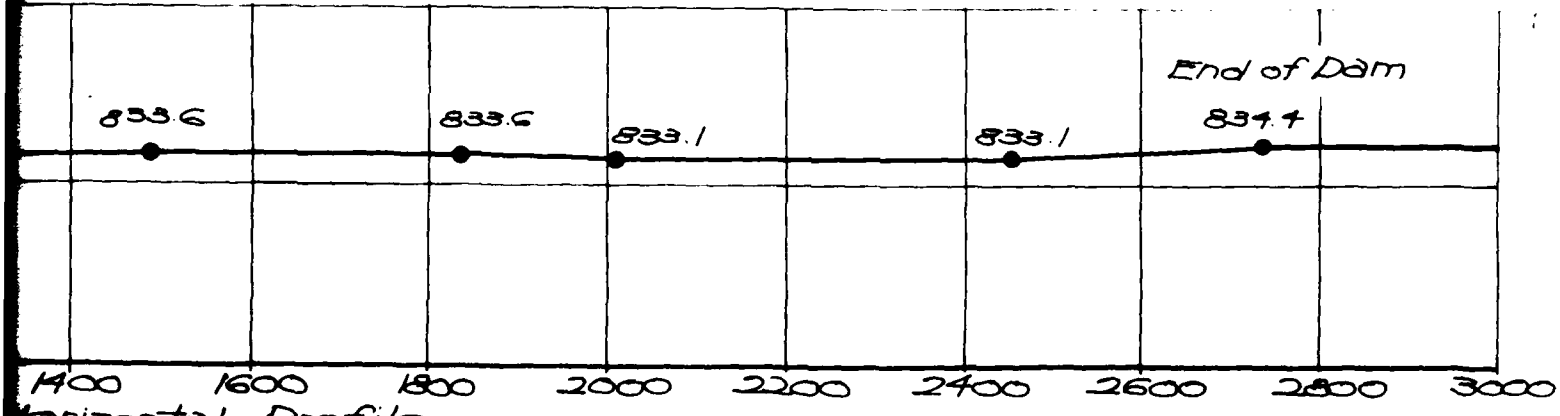
MO 30611 | Fig. 2


Sta. 0+00
El. 845.5
Sta. 1+44
El. 838.2
End of Dam
Sta. 3+10
El. 830.8
Sta. 6+10
El. 832.6
El. 804.9
Lake
Decant
Inlet El. 826.4
B
El. 824.7
Sta. 12+25
El. 833.1
A
El. 824.7
Sta. 9+62
El. 833.6
El. 800.6
B
Decant
Outlet El. 801.2
A
DAM


Elevation, ft. (MSL)
Vertical Exaggeration
10 X Horizontal
850
830
810
845.5
838.2
End of
Dam
830.8
832.6
833.6
833.1
0
200
400
600
800
1000
1200
1400
DAM



DAM PLAN

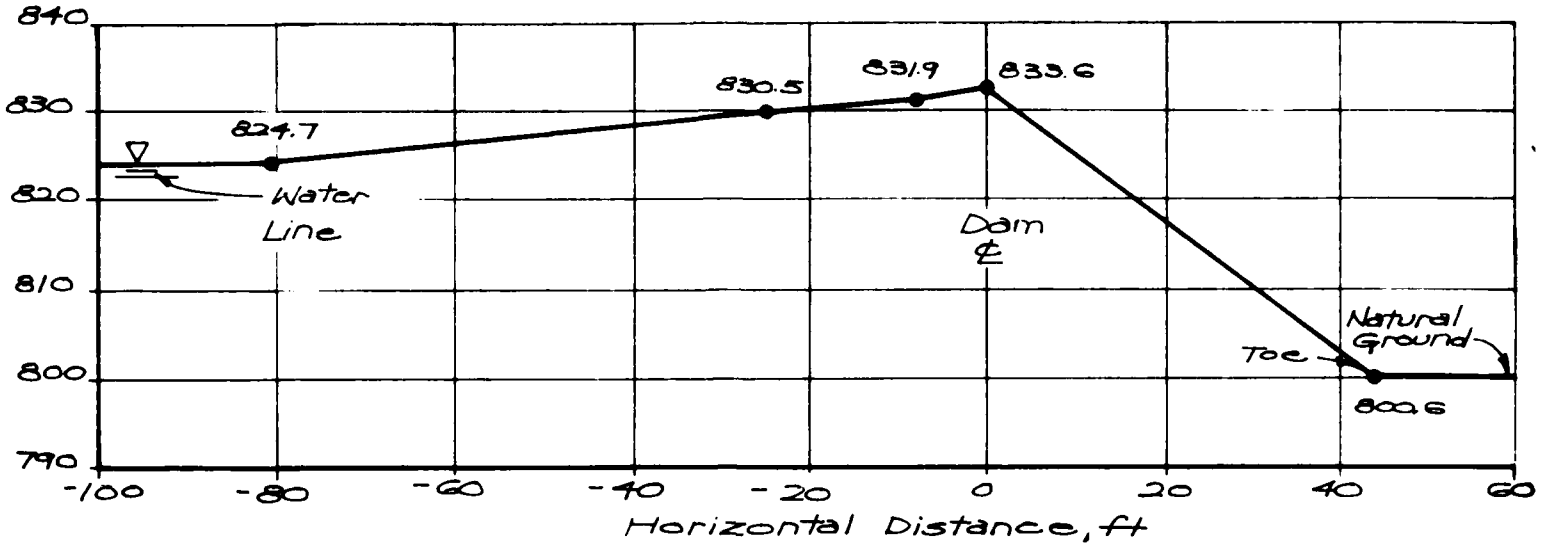


Horizontal Profile

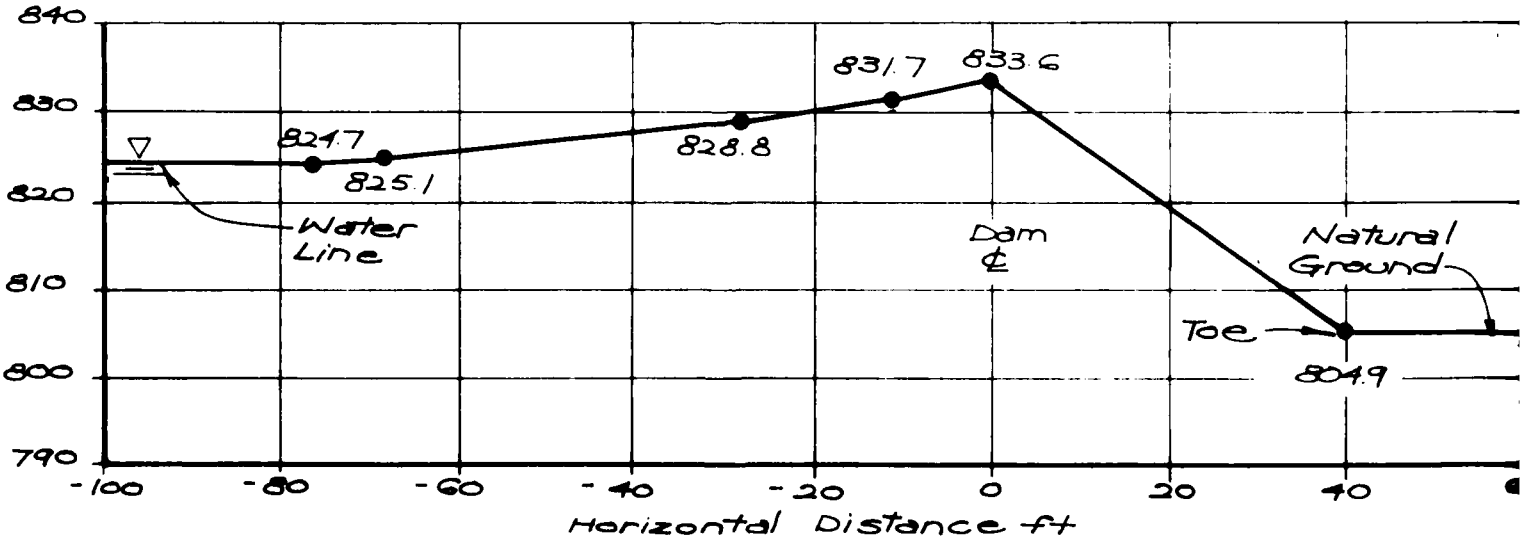
DAM PROFILE

Note:
Surveyed by James F McCaul, III and Associates Consulting Engineers/Land Surveyors
Potosi, Mo. 63664

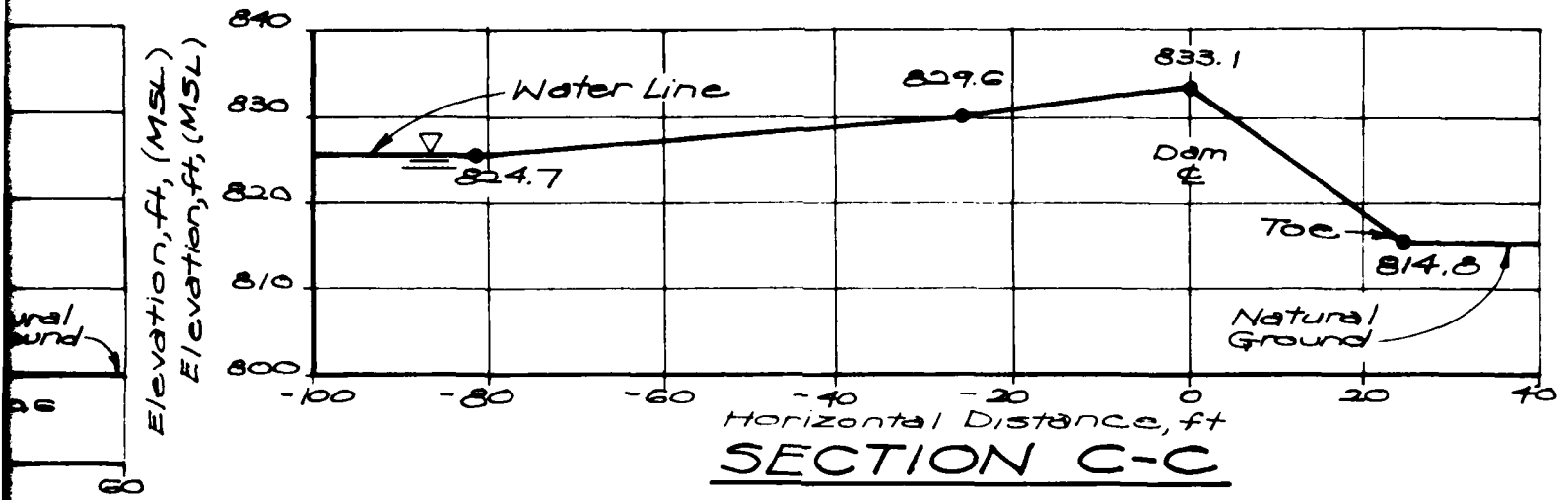
PLAN AND PROFILE OF DAM	
SLIME POND DAM	
NO 88011	Fig. 8-A



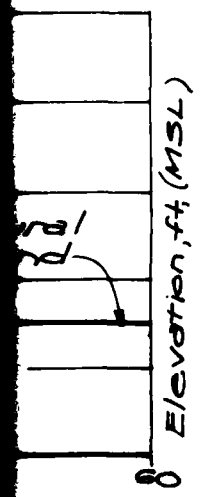
SECTION A-A



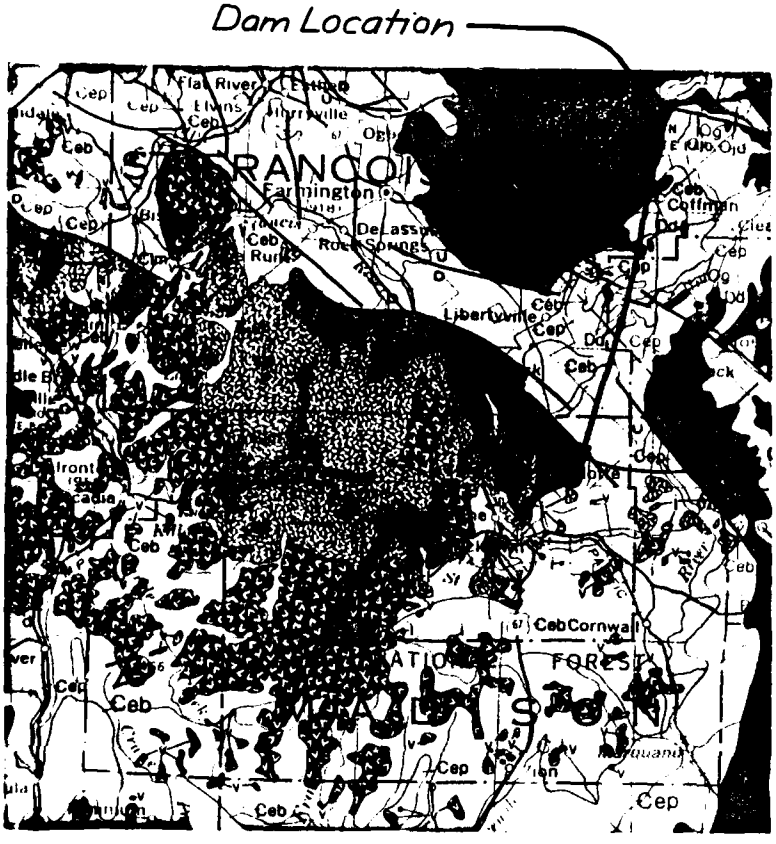
SECTION B-B



SECTION C-C



CROSS SECTIONS OF DAM	
SLIME POND DAM	
MO 30611	Fig. 3-B



Legend

- Or — Roubidoux Formation
- Gasconade Dolomite
  - Gunter Sandstone Member
- Cep — Eminence Dolomite
- Potosi Dolomite
- Ceb — Derby-Doerun Dolomite
- Davis Formation
- Bonneterre Formation
  - Whetstone Creek Member
  - Sullivan Siltstone Member
- Reagan Sandstone (subsurface, western Missouri)
- Lamotte Sandstone
- Diabase (dikes and sills)
- St. Francois Mountains Intrusive Suite
- St. Francois Mountains Volcanic Supergroup

REGIONAL GEOLOGIC MAP

SLIME POND DAM

MO 30611 | **Fig. 4**

APPENDIX A

Photographs

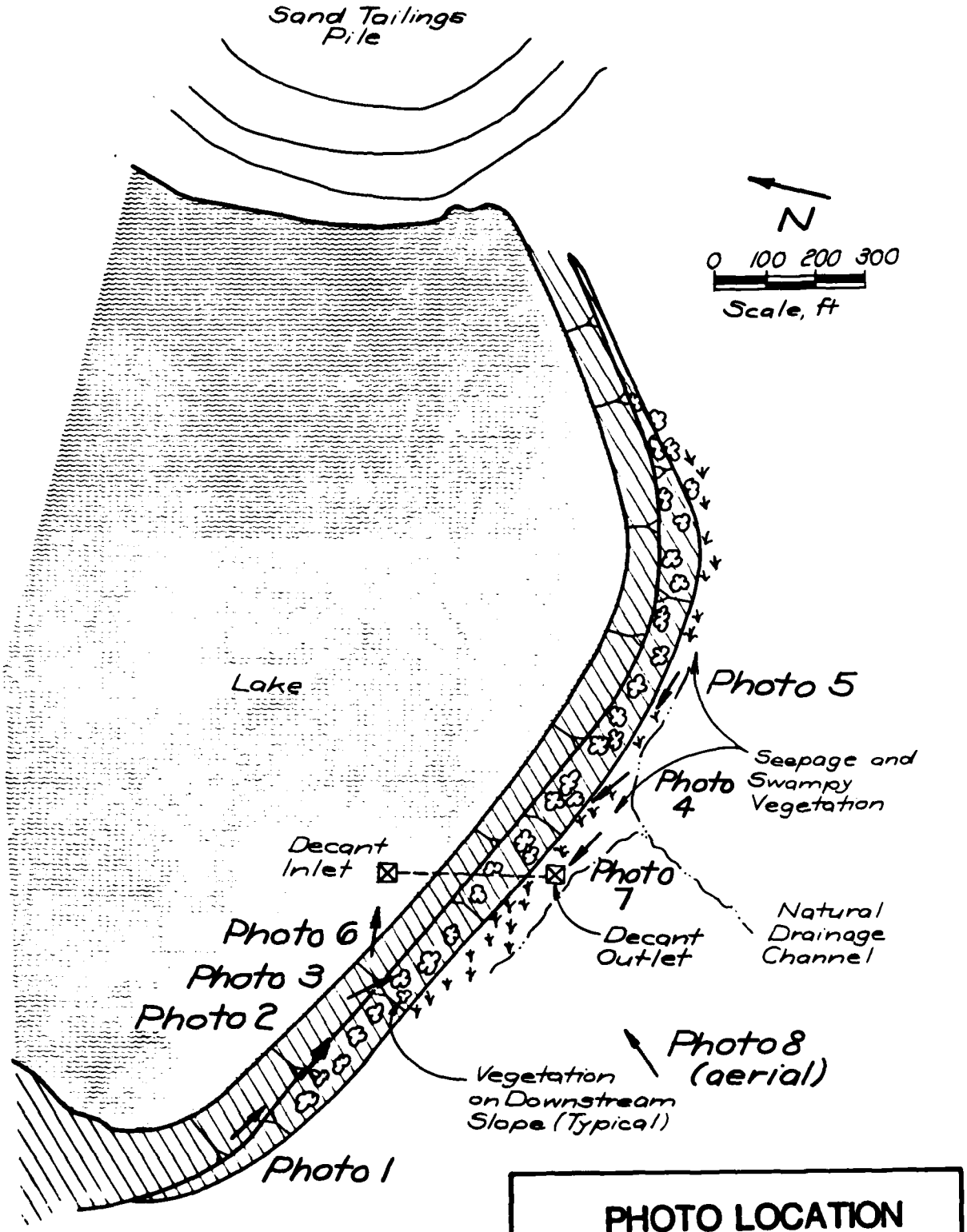
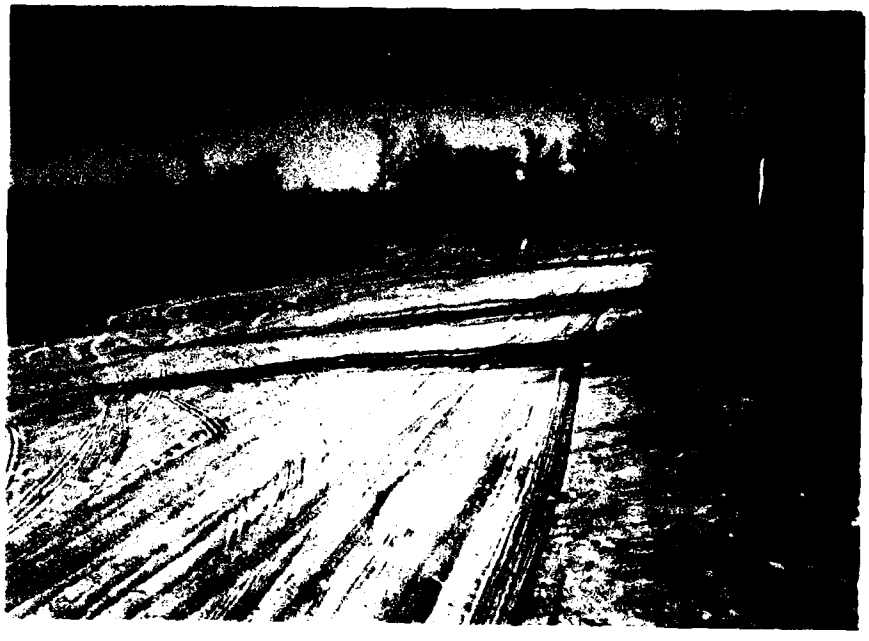


PHOTO LOCATION SKETCH

SLIME POND DAM

MO 30611 | Fig. A-1



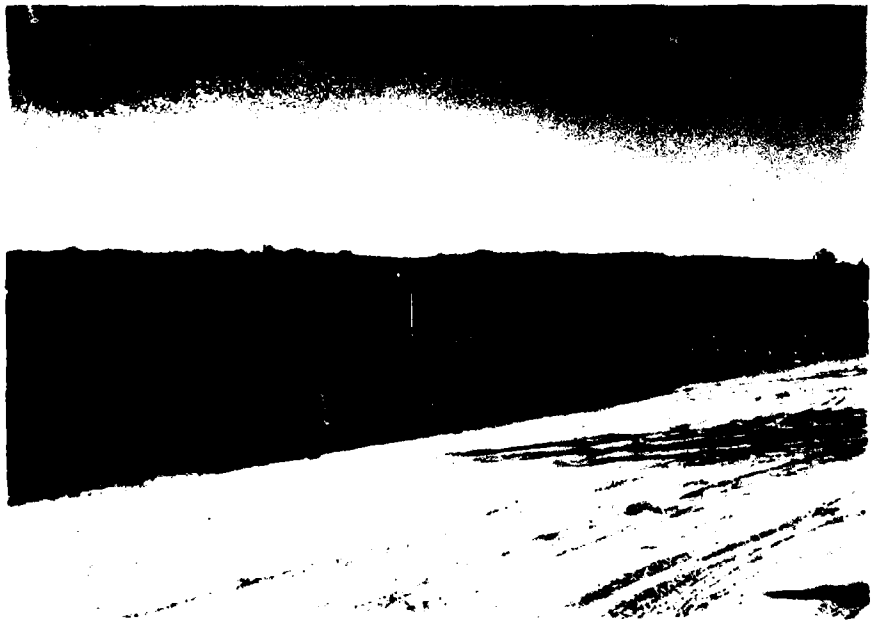
1. Upstream slope of the Slime Pond Dam. Looking southeast from near the right end of the dam.

2. Crest and downstream slope of dam. Note steep slope and tree and brush vegetation. Looking southeast along face of dam.

3. Crest and downstream slope showing material pushed over crest onto downstream slope of dam. Looking southeast along face of dam.

4. Seepage at downstream toe of dam near maximum section. Seepage rates at various points range from less than 1 gal/min to perhaps 10 gal/min.

5. Swampy vegetation along the toe of dam, near the maximum section. Looking northwest.



6. Decant tower inlet structure. Looking east from lake shore.

7. Discharge end of decant line at concrete pump house near maximum section of dam. Note concrete wing wall is inclined toward end of pipe, and could obstruct flow if wall fails.

8. Aerial view of sand tailings pile upstream of reservoir. Looking northeast.

9. Typical contents of downstream hazard zone below Slime Pond Dam. Dam is about 0.5 miles out of picture to the right. Looking north from vicinity of Stringtown.

APPENDIX B

Hydraulic/Hydrologic Data and Analyses

APPENDIX B
Hydraulic/Hydrologic Data and Analyses

B.1 Procedures

a. General. The hydraulic/hydrologic analyses were performed using the "HEC-1, Dam Safety Version (1 Apr 80)" computer program. The inflow hydrographs were developed for various precipitation events by applying them to a synthetic unit hydrograph. The inflow hydrographs were subsequently routed through the reservoir and appurtenant structures by the modified Puls reservoir routing option.

b. Precipitation events. The Probable Maximum Precipitation (PMP) and the 1 and 10 percent probability-of-occurrence events were used in the analyses. The total rainfall and corresponding distributions for the 1 and 10 percent probability events were provided by the St. Louis District, Corps of Engineers. The Probable Maximum Precipitation was determined from regional curves prepared by the US Weather Bureau (Hydrometeorological Report Number 33, 1956). The PMP distribution was computed by the HEC-1 program using the standard EM-1110-1411 method.

c. Unit hydrograph. The Soil Conservation Services (SCS) Dimensionless Unit Hydrograph method (SCS, 1971, Hydrology: National Engineering Handbook, Section 4) was used in the analysis. This method was selected because of its simplicity, applicability to drainage areas less than 10 mi^2, and its easy availability within the HEC-1 computer program.

The watershed lag time was computed using the SCS "curve number method" by an empirical relationship as follows:

$$L = \frac{\ell^{0.8}\,(s+1)^{0.7}}{1900\,Y^{0.5}} \qquad \text{(Equation 15-4)}$$

where: L = lag in hours
ℓ = hydraulic length of the watershed in feet = 7600
$s = \frac{1000}{CN} - 10 = 4.3$
CN = AMC II hydrologic soil curve number as indicated in Section B.2e.
Y = average watershed land slope in percent = 3.0.

This empirical relationship accounts for the soil cover, average watershed slope and hydraulic length.

With the lag time thus computed, another empirical relationship is used to compute the time of concentration as follows:

$$T_c = \frac{L}{0.6} \qquad \text{(Equation 15-3)}$$

where: T_c = time of concentration in hours

L = lag in hours.

Subsequent to the computation of the time of concentration, the unit hydrograph duration was approximated utilizing the following relationship:

$$\Delta D = 0.133 T_c \qquad \text{(Equation 16-12)}$$

where: ΔD = duration of unit excess rainfall
T_c = time of concentration in hours.

The final duration was selected to provide at least three discharge ordinates prior to the peak discharge ordinate of the unit hydrograph. For this dam, a unit hydrograph duration of 15 minutes was used.

d. Infiltration losses. The infiltration losses were computed by the HEC-1 computer program internally using the SCS loss function curve number method. The curve number of SCS loss rate procedure was established taking into consideration the variables of: (a) antecedent moisture condition, (b) hydrologic soil group classification, (c) vegetative cover and (d) present land usage in the watershed. In addition, the computed basin loss was reduced proportional to the impervious area in the drainage basin.

Antecedent moisture condition III (AMC III) was used for the PMF events and AMC II was used for the 1 and 10 percent probability events, in accordance with the guidelines. The remaining variables are defined in the SCS procedure and judgements in their selection were made on the basis of visual field inspection.

e. Starting elevations. Reservoir starting water surface elevations for this dam were set as follows:

(1) 1 and 10 percent probability events - decant stop-log sill elevation of 826.4 ft.

(2) Probable Maximum Storm - decant stop-log sill elevation of 826.4 ft.

Antecedent storms equal to half of the subject storms were entered for the PMF analyses. It was calculated that the decant system could discharge these storm floods within four days. As a result, the starting water surface was set at the decant tower sill elevation.

f. Spillway rating curve. The flow through the 5 ft wide, 4 ft tall rectangular decant outlet was calculated. Weir flow was assumed below elevation 829.0 ft; orifice flow assumed above this elevation. However, analysis shows the dam will be overtopped before the capacity of this outlet is exceeded.

B.2 Pertinent Data

a. Drainage area. 0.95 mi^2.

b. Storm duration. A unit hydrograph was developed by the SCS method option of HEC-1 program. The design storm of 48 hours duration was divided into 15 minute intervals in order to develop the inflow hydrograph.

c. Lag time. 1.24 hrs.

d. Hydrologic soil group. Approximately 75 percent of the basin was assigned hydrologic soil group C. Approximately 25 percent of the drainage basin was assigned a hydrologic soil group A classification to reflect the sand tailings piles in the area upstream of the reservoir.

e. SCS curve numbers.

1. For PMF- AMC III - Curve Number 85
2. For 1 and 10 percent probability-of-occurrence events - AMC II - Curve Number 70

f. Storage. Elevation-area data were developed by planimetering areas at various elevation contours on the USGS Fredericktown, Missouri 7.5-minute quadrangle map (1980). The data were entered on the $A and $E cards so that the HEC-1 program could compute storage volumes.

g. Outflow over dam crest. As the profile of the dam crest is irregular, flow over the crest was computed according to the "Flow Over Non-Level Dam Crest" supplement to the HEC-1 User's Manual. The crest length-elevation data and hydraulic constants were entered on the $D, $L, and $V cards.

h. Outflow capacity. The spillway rating curve was calculated for the rectangular decant conduit. The results of the above were entered on the Y4 and Y5 cards of the HEC-1 program.

i. Reservoir elevations. For the 50 and 100 percent of the PMF events, the starting reservoir elevation was 826.4 ft, the decant stop-log sill elevation. This elevation was selected having considered antecedent storms equal to half of the subject storms. For the 1 and 10 percent probability-of-occurrence events, the starting reservoir elevation was also 826.4 ft.

B.3 Results

The results of the analyses as well as the input values to the HEC-1 program follow in this Appendix. Only the results summaries are included, not the intermediate output. Complete copies of the HEC-1 output are available in the project files.

PMF

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION       JULY 1978
  LAST MODIFICATION  01 APR 80
**********************************
          A1        SLIME POND(MINE LAMOTTE), MO. 30611, MADISON COUNTY, MISSOURI.
          A2        WOODWARD-CLYDE CONSULTANTS, HOUSTON JOB 80C224-T100.
          A3        PROBABLE MAXIMUM FLOODS.
          B    192       0      15       0       0       0       0       0       0       0
          B1     5
          J      1       2       1
          J1   .90     1.0
          K      0  INFLOW                                1
          K1        SLIME POND (MINE LAMOTTE) INFLOW COMPUTATIONS, PMF.
          M      1       2    0.97                     1.0
          P      0      26     102     120     130     140
          T                                                   -1     -85            0.16
          W2           1.24
          X     -1    -.05       5
          K      1     DAM                                1
          K1        FLOOD ROUTING AND OVERTOPPING ANALYSES
          V                                  1       1
          Y1     1                                        -826.4      -1
          Y4 826.4   827.0   828.0   829.0   830.0   831.0   832.0   833.0   834.0   835.0
          Y5    0.    29.0   128.0   246.0   289.0   327.0   360.0   391.0   420.0   446.0
          SA   0.0     8.1     24.    61.0    64.0   100.0   130.0   135.0   220.0
          SE 799.0   800.0   810.0   820.0   821.0   826.4   830.0   830.8   840.0
          SS 826.4
          SD 830.8     2.8     1.5
          SL    0.   300.0   430.0  1310.0  2300.0  2430.0
          SV 830.8   832.6   833.1   833.5   833.8   834.4
          K     99
```

Input Data
Various PMF Events
Slime Pond Dam
MO 30611
B4

Output Summary
Various PMF Events
Slime Pond Dam
MO 30611
B5

```
***********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION        JULY 1978
  LAST MODIFICATION  01 APR 80
***********************************

RUN  DATE? 01/06/29.
     TIME? 14.15.00.

                    SLIME POND(MINE LAMOTTE), MO. 30611, MADISON COUNTY, MISSOURI.
                    WOODWARD-CLYDE CONSULTANTS, HOUSTON JOB 80C224-T100.
                    PROBABLE MAXIMUM FLOODS.

                                      JOB SPECIFICATION
              NQ      NHR     NMIN    IDAY     IHR     IMIN   METRC    IPLT    IPRT   NSTAN
             192        0       15       0       0        0       0       0       0       0
                                     JOPER     NWT    LROPT   TRACE
                                         5       0        0       0

                               MULTI-PLAN ANALYSES TO BE PERFORMED
                                  NPLAN= 1 NRTIO= 2 LRTIO= 1
               RTIOS=     .50   1.00

          *********           *********           *********           *********           *********

                                   SUB-AREA RUNOFF COMPUTATION

                  SLIME POND (MINE LAMOTTE) INFLOW COMPUTATIONS, PMF.

                       ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      INFLOW       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
              IHYDG   IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1      2     .97    0.00     .97    1.00   0.000       0       0       0

                                          PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   26.00  102.00  120.00  130.00  140.00    0.00    0.00

                                           LOSS DATA
        LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
            0    0.00    0.00    1.00    0.00    0.00    1.00   -1.00  -85.00    0.00     .16

              CURVE NO =  -85.00  WETNESS =   -1.00  EFFECT CN =    85.00

                                    UNIT HYDROGRAPH DATA
                                   TC=  0.00     LAG=  1.24

                                        RECESSION DATA
                         STRTQ=   -1.00    QRCSN=    -.05    RTIOR= 5.00
```

UNIT HYDROGRAPH 27 END OF PERIOD ORDINATES, TC= 0.00 HOURS, LAG= 1.24 VOL= 1.00

30.	92.	193.	293.	340.	339.	299.	245.	175.	127.
94.	71.	52.	39.	29.	21.	16.	12.	9.	7.
5.	4.	3.	2.	1.	1.	0.			

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.15	1	.00	.00	.00	1.	1.02	0.15	97	.04	.04	.01	11.
1.01	0.30	2	.00	.00	.00	1.	1.02	0.30	98	.04	.04	.01	14.
1.01	0.45	3	.00	.00	.00	1.	1.02	0.45	99	.04	.04	.01	21.
1.01	1.00	4	.00	.00	.00	1.	1.02	1.00	100	.04	.04	.01	30.
1.01	1.15	5	.00	.00	.00	1.	1.02	1.15	101	.04	.04	.01	41.
1.01	1.30	6	.00	.00	.00	1.	1.02	1.30	102	.04	.04	.01	52.
1.01	1.45	7	.00	.00	.00	1.	1.02	1.45	103	.04	.04	.01	62.
1.01	2.00	8	.00	.00	.00	1.	1.02	2.00	104	.04	.04	.01	70.
1.01	2.15	9	.00	.00	.00	1.	1.02	2.15	105	.04	.04	.01	76.
1.01	2.30	10	.00	.00	.00	1.	1.02	2.30	106	.04	.04	.01	80.
1.01	2.45	11	.00	.00	.00	1.	1.02	2.45	107	.04	.04	.01	84.
1.01	3.00	12	.00	.00	.00	1.	1.02	3.00	108	.04	.04	.01	86.
1.01	3.15	13	.00	.00	.00	1.	1.02	3.15	109	.04	.04	.01	88.
1.01	3.30	14	.00	.00	.00	1.	1.02	3.30	110	.04	.04	.01	90.
1.01	3.45	15	.00	.00	.00	1.	1.02	3.45	111	.04	.04	.01	91.
1.01	4.00	16	.00	.00	.00	1.	1.02	4.00	112	.04	.04	.01	92.
1.01	4.15	17	.00	.00	.00	1.	1.02	4.15	113	.04	.04	.01	93.
1.01	4.30	18	.00	.00	.00	1.	1.02	4.30	114	.04	.04	.00	93.
1.01	4.45	19	.00	.00	.00	1.	1.02	4.45	115	.04	.04	.00	94.
1.01	5.00	20	.00	.00	.00	1.	1.02	5.00	116	.04	.04	.00	94.
1.01	5.15	21	.00	.00	.00	1.	1.02	5.15	117	.04	.04	.00	95.
1.01	5.30	22	.00	.00	.00	1.	1.02	5.30	118	.04	.04	.00	95.
1.01	5.45	23	.00	.00	.00	1.	1.02	5.45	119	.04	.04	.00	96.
1.01	6.00	24	.00	.00	.00	1.	1.02	6.00	120	.04	.04	.00	96.
1.01	6.15	25	.02	.00	.01	1.	1.02	6.15	121	.20	.19	.02	111.
1.01	6.30	26	.02	.00	.01	2.	1.02	6.30	122	.20	.18	.02	132.
1.01	6.45	27	.02	.00	.01	2.	1.02	6.45	123	.20	.18	.02	146.
1.01	7.00	28	.02	.00	.01	2.	1.02	7.00	124	.20	.18	.02	161.
1.01	7.15	29	.02	.00	.01	3.	1.02	7.15	125	.20	.18	.01	220.
1.01	7.30	30	.02	.00	.01	4.	1.02	7.30	126	.20	.19	.01	270.
1.01	7.45	31	.02	.00	.01	4.	1.02	7.45	127	.20	.18	.01	319.
1.01	8.00	32	.02	.00	.01	5.	1.02	8.00	128	.20	.18	.01	354.
1.01	8.15	33	.02	.00	.01	5.	1.02	8.15	129	.20	.18	.01	388.
1.01	8.30	34	.02	.00	.01	5.	1.02	8.30	130	.20	.18	.01	399.
1.01	8.45	35	.02	.00	.01	6.	1.02	8.45	131	.20	.19	.01	419.
1.01	9.00	36	.02	.00	.01	6.	1.02	9.00	132	.20	.19	.01	426.
1.01	9.15	37	.02	.00	.01	6.	1.02	9.15	133	.20	.19	.01	433.
1.01	9.30	38	.02	.00	.01	6.	1.02	9.30	134	.20	.19	.01	442.
1.01	9.45	39	.02	.00	.01	6.	1.02	9.45	135	.20	.19	.01	449.
1.01	10.00	40	.02	.00	.01	6.	1.02	10.00	136	.20	.19	.01	455.
1.01	10.15	41	.02	.00	.01	6.	1.02	10.15	137	.20	.19	.01	458.
1.01	10.30	42	.02	.00	.01	6.	1.02	10.30	138	.20	.19	.01	459.
1.01	10.45	43	.02	.00	.01	6.	1.02	10.45	139	.20	.19	.01	461.
1.01	11.00	44	.02	.00	.01	6.	1.02	11.00	140	.20	.19	.01	464.
1.01	11.15	45	.02	.00	.01	6.	1.02	11.15	141	.20	.19	.01	468.
1.01	11.30	46	.02	.00	.01	6.	1.02	11.30	142	.20	.19	.01	472.
1.01	11.45	47	.02	.00	.01	6.	1.02	11.45	143	.20	.19	.01	476.
1.01	12.00	48	.02	.00	.01	7.	1.02	12.00	144	.20	.19	.01	485.
1.01	12.15	49	.05	.01	.04	7.	1.02	12.15	145	.66	.65	.02	499.
1.01	12.30	50	.05	.02	.04	8.	1.02	12.30	146	.66	.65	.02	527.
1.01	12.45	51	.05	.02	.03	11.	1.02	12.45	147	.66	.65	.01	618.
1.01	13.00	52	.05	.02	.03	14.	1.02	13.00	148	.66	.65	.01	742.
1.01	13.15	53	.06	.02	.04	19.	1.02	13.15	149	.80	.78	.01	912.
1.01	13.30	54	.06	.03	.03	25.	1.02	13.30	150	.80	.78	.01	1081.
1.01	13.45	55	.06	.03	.03	31.	1.02	13.45	151	.80	.79	.01	1244.

Output Summary
Various PMP Events
Slime Pond Dam
MO 30611
B6

1.01	11.30	46	.02	.00	.01	6.	1.02	11.30	142	.20	.19	.01	4[illegible].
	11.45	47	.02	.00	.01	6.	1.02	11.45	143	.20	.19	.01	4[illegible].
1.01	12.00	48	.02	.00	.01	7.	1.02	12.00	144	.20	.19	.01	4[illegible].
1.01	12.15	49	.05	.01	.04	7.	1.02	12.15	145	.66	.65	.02	4[illegible].
1.01	12.30	50	.05	.02	.04	8.	1.02	12.30	146	.66	.65	.02	927.
1.01	12.45	51	.05	.02	.03	11.	1.02	12.45	147	.66	.65	.01	618.
1.01	13.00	52	.05	.02	.03	14.	1.02	13.00	148	.66	.65	.01	5[illegible].
1.01	13.15	53	.06	.02	.04	19.	1.02	13.15	149	.80	.78	.01	512.
1.01	13.30	54	.06	.03	.03	25.	1.02	13.30	150	.80	.78	.01	1[illegible].
1.01	13.45	55	.06	.03	.03	31.	1.02	13.45	151	.80	.79	.01	1[illegible].
1.01	14.00	56	.06	.03	.03	38.	1.02	14.00	152	.80	.79	.01	1368.
1.01	14.15	57	.08	.04	.04	44.	1.02	14.15	153	.99	.98	.01	1531.
1.01	14.30	58	.08	.04	.03	52.	1.02	14.30	154	.99	.99	.01	1[illegible].
1.01	14.45	59	.08	.04	.03	59.	1.02	14.45	155	.99	.99	.01	1778.
1.01	15.00	60	.08	.05	.03	68.	1.02	15.00	156	.99	.99	.01	1903.
1.01	15.15	61	.08	.05	.03	76.	1.02	15.15	157	1.01	1.00	.01	2020.
1.01	15.30	62	.16	.10	.05	86.	1.02	15.30	158	2.02	2.00	.01	2199.
1.01	15.45	63	.43	.31	.12	105.	1.02	15.45	159	5.64	5.62	.02	2447.
1.01	16.00	64	.11	.08	.03	134.	1.02	16.00	160	1.41	1.41	.00	2521.
1.01	16.15	65	.07	.06	.02	174.	1.02	16.15	161	.93	.93	.00	3[illegible].
1.01	16.30	66	.07	.06	.02	211.	1.02	16.30	162	.93	.93	.00	4[illegible].
1.01	16.45	67	.07	.06	.01	232.	1.02	16.45	163	.93	.93	.00	4[illegible].
1.01	17.00	68	.07	.06	.01	236.	1.02	17.00	164	.93	.93	.00	4[illegible].
1.01	17.15	69	.06	.05	.01	226.	1.02	17.15	165	.73	.73	.00	4[illegible].
1.01	17.30	70	.06	.05	.01	210.	1.02	17.30	166	.73	.73	.00	3[illegible].
1.01	17.45	71	.06	.05	.01	189.	1.02	17.45	167	.73	.73	.00	3339.
1.01	18.00	72	.06	.05	.01	172.	1.02	18.00	168	.73	.73	.00	2982.
1.01	18.15	73	.00	.00	.00	157.	1.02	18.15	169	.07	.06	.00	2[illegible].
1.01	18.30	74	.00	.00	.00	143.	1.02	18.30	170	.07	.06	.00	2419.
1.01	18.45	75	.00	.00	.00	127.	1.02	18.45	171	.07	.06	.00	2117.
1.01	19.00	76	.00	.00	.00	108.	1.02	19.00	172	.07	.06	.00	1[illegible].
1.01	19.15	77	.00	.00	.00	89.	1.02	19.15	173	.07	.06	.00	1470.
1.01	19.30	78	.00	.00	.00	71.	1.02	19.30	174	.07	.06	.00	1[illegible].
1.01	19.45	79	.00	.00	.00	56.	1.02	19.45	175	.07	.06	.00	922.
1.01	20.00	80	.00	.00	.00	44.	1.02	20.00	176	.07	.06	.00	720.
1.01	20.15	81	.00	.00	.00	35.	1.02	20.15	177	.07	.06	.00	574.
1.01	20.30	82	.00	.00	.00	29.	1.02	20.30	178	.07	.06	.00	4[illegible].
1.01	20.45	83	.00	.00	.00	24.	1.02	20.45	179	.07	.06	.00	3[illegible].
1.01	21.00	84	.00	.00	.00	21.	1.02	21.00	180	.07	.06	.00	330.
1.01	21.15	85	.00	.00	.00	18.	1.02	21.15	181	.07	.06	.00	2[illegible].
1.01	21.30	86	.00	.00	.00	16.	1.02	21.30	182	.07	.06	.00	2[illegible].
1.01	21.45	87	.00	.00	.00	14.	1.02	21.45	183	.07	.06	.00	229.
1.01	22.00	88	.00	.00	.00	13.	1.02	22.00	184	.07	.06	.00	2[illegible].
1.01	22.15	89	.00	.00	.00	12.	1.02	22.15	185	.07	.06	.00	1[illegible].
1.01	22.30	90	.00	.00	.00	12.	1.02	22.30	186	.07	.06	.00	189.
1.01	22.45	91	.00	.00	.00	11.	1.02	22.45	187	.07	.06	.00	1[illegible].
1.01	23.00	92	.00	.00	.00	11.	1.02	23.00	188	.07	.06	.00	173.
1.01	23.15	93	.00	.00	.00	11.	1.02	23.15	189	.07	.06	.00	176.
1.01	23.30	94	.00	.00	.00	11.	1.02	23.30	190	.07	.06	.00	1[illegible].
1.01	23.45	95	.00	.00	.00	11.	1.02	23.45	191	.07	.06	.00	1[illegible].
1.02	0.00	96	.00	.00	.00	11.	1.03	0.00	192	.07	.06	.00	1[illegible].
									SUM	36.40	34.69	1.71	85[illegible].
										(925.1[illegible]	881.1[illegible]	43.1[illegible]	2430.38)

Output Summary
Various PMF Events
Slime Pond Dam
MO 30611
B7

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .50	RATIO 2 1.00
HYDROGRAPH AT	INFLOW	.97 (2.511)	1	2211. (62.611)	4422. (125.221)
ROUTED TO	DAM	.97 (2.511)	1	488. (13.821)	3204. (90.731)

Output Summary
Various PMF Events
Slime Pond Dam
MO 30611
B8

Output Summary
Various PMF Events
Slime Pond Dam
MO 30611
B9

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
		826.40	826.40	830.80
	STORAGE	1000.	1000.	1590.
	OUTFLOW	0.	0.	319.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	831.68	.88	1720.	488.	6.50	43.75	0.00
1.00	833.92	2.12	1947.	320.	0.00	41.75	0.00

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .30	RATIO 2 .35	RATIO 3 .40	RATIO 4 .45
HYDROGRAPH AT	INFLOW	.97 (2.511)	1	1327. (37.581)	1548. (43.821)	1769. (50.081)	1990. (56.341)
ROUTED TO	DAM	.97 (2.511)	1	278. (7.881)	299. (8.471)	319. (9.021)	364. (10.311)

Output Summary
Various PMF Events
Slime Pond Dam
MD 30611
B10

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	826.40	826.40	830.80
STORAGE	1000.	1000.	1598.
OUTFLOW	0.	0.	319.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.30	829.75	0.00	1460.	278.	0.00	43.75	0.00
.35	830.27	0.00	1527.	299.	0.00	43.75	0.00
.40	830.78	0.00	1595.	319.	0.00	44.00	0.00
.45	831.26	.46	1662.	364.	5.50	44.00	0.00

Output Summary
Various PMF Events
Slime Pond Dam
MO 30611
B11

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********************************
    1         A1      SLIME POND(MINE LAMOTTE), NO. 30611, MADISON COUNTY, MISSOURI.
    2         A2      WOODWARD-CLYDE CONSULTANTS, HOUSTON 40B 80C224-T100.
    3         A3      PROBABILISTIC FLOOD - 100 YEAR.
    4         B    192       0      15       0       0       0       0       0       0       0
    5         B1     3
    6         K      0   INFLOW                                  1
    7         K1      RAIN STA IS LESTERVILLE, FREQ = 1.0, INTERVAL=15.0 MIN., DURATION= 48 HRS.
    8         M      0       2    0.97                     1.0
    9         O    192   0.038                  DA =    5.00
   10         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   11         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   12         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   13         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   14         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   15         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   16         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   17         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   18         O1  .016    .016    .016    .016    .016    .016    .016    .016    .016    .016
   19         O1  .016    .016    .016    .016    .016    .016    .021    .021    .021    .021
   20         O1  .021    .021    .021    .021    .021    .021    .021    .021    .021    .021
   21         O1  .021    .021    .021    .021    .021    .021    .021    .021    .021    .021
   22         O1  .041    .041    .041    .041    .042    .042    .042    .042    .042    .042
   23         O1  .042    .042    .042    .042    .042    .042    .042    .042    .042    .042
   24         O1  .042    .041    .041    .041    .075    .076    .076    .076    .076    .076
   25         O1  .102    .102    .178    .180    .424    .769   1.689    .431    .181    .179
   26         O1  .102    .102    .076    .076    .076    .076    .076    .076    .021    .021
   27         O1  .021    .021    .021    .021    .021    .021    .021    .021    .021    .021
   28         O1  .021    .021    .021    .021    .021    .021    .021    .021    .021    .021
   29         O1  .021    .021
   30         T                                               -1     -70            0.16
   31         W2 [illegible]   1324.
   32         X     -1    -.05       5
   33         K      1     DAM                                   1
   34         K1      FLOOD ROUTING AND OVERTOPPING ANALYSES
   35         Y                              1
   36         Y1     1                                        -826.4      -1
   37         Y4 826.4   827.0   828.0   829.0   830.0   831.0   832.0   833.0   834.0   835.0
   38         Y5    0.    29.0   129.0   246.0   289.0   327.0   360.0   391.0   420.0   446.0
   39         $A   0.0     8.1     24.    61.0    64.0   100.0   130.0   135.0   220.0
   40         $E 795.0   800.0   810.0   820.0   821.0   826.4   830.0   830.8   840.0
   41         $S 826.4
   42         $D 830.8     2.8     1.5
   43         $L    0.   300.0   430.0  1310.0  2300.0  2430.0
   44         $V 830.8   832.6   833.1   833.5   833.8   834.4
   45         K     99
```

Input Data
1% Probability Event
Slime Pond Dam
MO 30611
B12

Output Summary
1% Probability Event
Slime Pond Dam
MO 30611
B13

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********************************

RUN  DATE? 81/06/29.
     TIME? 13.32.57.

            SLIME POND(MINE LAMOTTE), MO. 30611, MADISON COUNTY, MISSOURI.
            WOODWARD-CLYDE CONSULTANTS, HOUSTON JOB 80C224-T100.
            PROBABILISTIC FLOOD - 100 YEAR.

                                 JOB SPECIFICATION
      NQ      NHR     NMIN    IDAY     IHR    IMIN   METRC    IPLT    IPRT   NSTAN
     192        0       15       0       0       0       0       0       0       0
                             JOPER     NWT   LROPT   TRACE
                                 3       0       0       0

      **********       **********       **********       **********       **********

                             SUB-AREA RUNOFF COMPUTATION

      RAIN STA. 18=LESTERVILLE, FREQ=  1.0, INTERVAL=15.0 MIN., DURATION= 48 HRS.

                 ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                 INFLOW      0       0       0       0       0       1       0       0

                                 HYDROGRAPH DATA
      IHYDG   IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO  ISNOW   ISAME   LOCAL
          0      2     .97    0.00     .97    1.00   0.000      0       0       0

                                   PRECIP DATA
                            NP   STORM     DAJ     DAK
                           192    8.84    0.00    0.00
                                  PRECIP PATTERN
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .02     .02     .02     .02     .02     .02     .02     .02     .02     .02
   .04     .04     .04     .04     .04     .04     .04     .04     .04     .04
   .04     .04     .04     .04     .04     .04     .04     .04     .04     .04
   .04     .04     .04     .04     .08     .08     .08     .08     .08     .08
   .10     .10     .18     .18     .42     .77    1.69     .43     .18     .18
   .10     .10     .08     .08     .08     .08     .05     .04     .07     .07
   .02     .02     .02  [illegible]
```

.10	.10	.08	.08	.08	.08	.05	.05	.02	.02
.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
.02	.02								

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	-1.00	-70.00	0.00	.16

CURVE NO = 70.00 WETNESS = -1.00 EFFECT CN = 70.00

UNIT HYDROGRAPH DATA

TC= 0.00 LAG= 1.24

RECESSION DATA

STRTQ= -1.00 QRCSN= -.05 RTIOR= 5.00

UNIT HYDROGRAPH 27 END OF PERIOD ORDINATES, TC= 0.00 HOURS, LAG= 1.24 VOL= 1.00

92.	193.	293.	340.	339.	299.	249.	195.	137.		
94.	71.	52.	39.	29.	21.	16.	12.	9.	7.	
5.	4.	3.	2.	1.	1.	0.				

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.15	1	.02	.00	.01	1.	1.02	.15	97	.02	.01	.01	14.
1.01	.30	2	.02	.00	.01	1.	1.02	.30	98	.02	.01	.01	14.
1.01	.45	3	.02	.00	.01	1.	1.02	.45	99	.02	.01	.01	14.
1.01	1.00	4	.02	.00	.01	2.	1.02	1.00	100	.02	.01	.01	14.
1.01	1.15	5	.02	.00	.01	3.	1.02	1.15	101	.02	.01	.01	14.
1.01	1.30	6	.02	.00	.01	4.	1.02	1.30	102	.02	.01	.01	17.
1.01	1.45	7	.02	.00	.01	4.	1.02	1.45	103	.02	.01	.01	17.
1.01	2.00	8	.02	.00	.01	5.	1.02	2.00	104	.02	.01	.01	17.
1.01	2.15	9	.02	.00	.01	5.	1.02	2.15	105	.02	.01	.01	17.
1.01	2.30	10	.02	.00	.01	6.	1.02	2.30	106	.02	.01	.01	20.
1.01	2.45	11	.02	.00	.01	6.	1.02	2.45	107	.02	.01	.01	20.
1.01	3.00	12	.02	.00	.01	6.	1.02	3.00	108	.02	.01	.01	21.
1.01	3.15	13	.02	.00	.01	6.	1.02	3.15	109	.02	.01	.01	21.
1.01	3.30	14	.02	.00	.01	6.	1.02	3.30	110	.02	.01	.01	21.
1.01	3.45	15	.02	.00	.01	6.	1.02	3.45	111	.02	.01	.01	21.
1.01	4.00	16	.02	.00	.01	6.	1.02	4.00	112	.02	.01	.01	22.
1.01	4.15	17	.02	.00	.01	6.	1.02	4.15	113	.02	.01	.01	22.
1.01	4.30	18	.02	.00	.01	6.	1.02	4.30	114	.02	.01	.01	22.
1.01	4.45	19	.02	.00	.01	6.	1.02	4.45	115	.02	.01	.01	23.
1.01	5.00	20	.02	.00	.01	6.	1.02	5.00	116	.02	.01	.01	23.
1.01	5.15	21	.02	.00	.01	6.	1.02	5.15	117	.02	.01	.01	23.
1.01	5.30	22	.02	.00	.01	6.	1.02	5.30	118	.02	.01	.01	23.
1.01	5.45	23	.02	.00	.01	6.	1.02	5.45	119	.02	.01	.01	24.
1.01	6.00	24	.02	.00	.01	6.	1.02	6.00	120	.02	.01	.01	24.
1.01	6.15	25	.02	.00	.01	6.	1.02	6.15	121	.04	.02	.02	24.
1.01	6.30	26	.02	.00	.01	6.	1.02	6.30	122	.04	.02	.02	24.
1.01	6.45	27	.02	.00	.01	6.	1.02	6.45	123	.04	.02	.02	27.
1.01	7.00	28	.02	.00	.01	6.	1.02	7.00	124	.04	.02	.02	31.
1.01	7.15	29	.02	.00	.01	6.	1.02	7.15	125	.04	.02	.02	34.
1.01	7.30	30	.02	.00	.01	6.	1.02	7.30	126	.04	.02	.02	37.
1.01	7.45	31	.02	.00	.01	6.	1.02	7.45	127	.04	.02	.02	42.
1.01	8.00	32	.02	.00	.01	6.	1.02	8.00	128	.04	.02	.02	48.
1.01	8.15	33	.02	.00	.01	6.	1.02	8.15	129	.04	.02	.02	51.
1.01	8.30	34	.02	.00	.01	6.	1.02	8.30	130	.04	.02	.02	46.
1.01	8.45	35	.02	.00	.01	6.	1.02	8.45	131	.04	.02	.02	41.
1.01	9.00	36	.02	.00	.01	6.	1.02	9.00	132	.04	.02	.02	37.
1.01	9.15	37	.02	.00	.01	6.	1.02	9.15	133	.04	.02	.02	34.
1.01	9.30	38	.02	.00	.01	6.	1.02	9.30	134	.04	.02	.02	31.

Output Summary
1% Probability Event
Slime Pond Dam
MO 30611
B14

1.01	10.00	40	.02	.00	.01	6.	1.02	10.00	136	.04	.02	.02	97.
1.01	10.15	41	.02	.00	.01	6.	1.02	10.15	137	.04	.02	.02	98.
1.01	10.30	42	.02	.00	.01	6.	1.02	10.30	138	.04	.02	.02	98.
1.01	10.45	43	.02	.00	.01	6.	1.02	10.45	139	.04	.03	.02	99.
1.01	11.00	44	.02	.00	.01	6.	1.02	11.00	140	.04	.03	.02	100.
1.01	11.15	45	.02	.00	.01	6.	1.02	11.15	141	.04	.03	.02	100.
1.01	11.30	46	.02	.00	.01	6.	1.02	11.30	142	.04	.03	.02	101.
1.01	11.45	47	.02	.00	.01	6.	1.02	11.45	143	.04	.03	.02	101.
1.01	12.00	48	.02	.00	.01	6.	1.02	12.00	144	.04	.03	.02	102.
1.01	12.15	49	.02	.00	.01	6.	1.02	12.15	145	.07	.05	.03	103.
1.01	12.30	50	.02	.00	.01	6.	1.02	12.30	146	.08	.05	.03	104.
1.01	12.45	51	.02	.00	.01	6.	1.02	12.45	147	.08	.05	.03	105.
1.01	13.00	52	.02	.00	.01	6.	1.02	13.00	148	.08	.05	.03	106.
1.01	13.15	53	.02	.00	.01	6.	1.02	13.15	149	.08	.05	.03	107.
1.01	13.30	54	.02	.00	.01	6.	1.02	13.30	150	.08	.05	.03	108.
1.01	13.45	55	.02	.00	.01	6.	1.02	13.45	151	.10	.07	.03	109.
1.01	14.00	56	.02	.00	.01	6.	1.02	14.00	152	.10	.07	.03	110.
1.01	14.15	57	.02	.00	.01	6.	1.02	14.15	153	.18	.12	.05	120.
1.01	14.30	58	.02	.00	.01	6.	1.02	14.30	154	.18	.13	.05	124.
1.01	14.45	59	.02	.00	.01	7.	1.02	14.45	155	.42	.31	.11	140.
1.01	15.00	60	.02	.00	.01	7.	1.02	15.00	156	.76	.54	.17	211.
1.01	15.15	61	.02	.00	.01	7.	1.02	15.15	157	1.67	1.39	.29	323.
1.01	15.30	62	.02	.00	.01	7.	1.02	15.30	158	.43	.37	.06	449.
1.01	15.45	63	.02	.00	.01	7.	1.02	15.45	159	.18	.16	.02	514.
1.01	16.00	64	.02	.00	.01	7.	1.02	16.00	160	.18	.16	.02	516.
1.01	16.15	65	.02	.00	.01	8.	1.02	16.15	161	.10	.09	.01	1001.
1.01	16.30	66	.02	.00	.01	8.	1.02	16.30	162	.10	.09	.01	999.
1.01	16.45	67	.02	.00	.01	8.	1.02	16.45	163	.08	.07	.01	909.
1.01	17.00	68	.02	.00	.01	8.	1.02	17.00	164	.08	.07	.01	783.
1.01	17.15	69	.02	.00	.01	8.	1.02	17.15	165	.08	.07	.01	694.
1.01	17.30	70	.02	.00	.01	9.	1.02	17.30	166	.08	.07	.01	623.
1.01	17.45	71	.02	.00	.01	9.	1.02	17.45	167	.08	.07	.01	439.
1.01	18.00	72	.02	.00	.01	9.	1.02	18.00	168	.08	.07	.01	369.
1.01	18.15	73	.02	.00	.01	9.	1.02	18.15	169	.02	.02	.00	318.
1.01	18.30	74	.02	.00	.01	9.	1.02	18.30	170	.02	.02	.00	272.
1.01	18.45	75	.02	.00	.01	10.	1.02	18.45	171	.02	.02	.00	234.
1.01	19.00	76	.02	.00	.01	10.	1.02	19.00	172	.02	.02	.00	199.
1.01	19.15	77	.02	.00	.01	10.	1.02	19.15	173	.02	.02	.00	167.
1.01	19.30	78	.02	.00	.01	10.	1.02	19.30	174	.02	.02	.00	139.
1.01	19.45	79	.02	.00	.01	11.	1.02	19.45	175	.02	.02	.00	114.
1.01	20.00	80	.02	.00	.01	11.	1.02	20.00	176	.02	.02	.00	93.
1.01	20.15	81	.02	.00	.01	11.	1.02	20.15	177	.02	.02	.00	76.
1.01	20.30	82	.02	.00	.01	11.	1.02	20.30	178	.02	.02	.00	63.
1.01	20.45	83	.02	.00	.01	11.	1.02	20.45	179	.02	.02	.00	52.
1.01	21.00	84	.02	.01	.01	12.	1.02	21.00	180	.02	.02	.00	42.
1.01	21.15	85	.02	.01	.01	12.	1.02	21.15	181	.02	.02	.00	35.
1.01	21.30	86	.02	.01	.01	12.	1.02	21.30	182	.02	.02	.00	29.
1.01	21.45	87	.02	.01	.01	12.	1.02	21.45	183	.02	.02	.00	24.
1.01	22.00	88	.02	.01	.01	12.	1.02	22.00	184	.02	.02	.00	20.
1.01	22.15	89	.02	.01	.01	12.	1.02	22.15	185	.02	.02	.00	16.
1.01	22.30	90	.02	.01	.01	13.	1.02	22.30	186	.02	.02	.00	13.
1.01	22.45	91	.02	.01	.01	13.	1.02	22.45	187	.02	.02	.00	11.
1.01	23.00	92	.02	.01	.01	13.	1.02	23.00	188	.02	.02	.00	9.
1.01	23.15	93	.02	.01	.01	13.	1.02	23.15	189	.02	.02	.00	7.
1.01	23.30	94	.02	.01	.01	13.	1.02	23.30	190	.02	.02	.00	6.
1.01	23.45	95	.02	.01	.01	14.	1.02	23.45	191	.02	.02	.00	5.
1.02	0.00	96	.02	.01	.01	14.	1.03	0.00	192	.02	.02	.00	4.
									SUM	8.84	5.78	3.06	14164.
										224.11	147.11	78.11	401.281

Output Summary
12 Probability Event
Slime Pond Dam
MO 30611
B15

RUNOFF SUMMARY. AVERAGE FLOW IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES(SQUARE KILOMETERS)

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	INFLOW	1001.	428.	140.	74.	.97
		(28.36)((	(12.12)((	(3.96)((	(2.09)((	(2.51)(
ROUTED TO	DAM	167.	155.	57.	30.	.97
		(4.72)((	(4.40)((	(1.61)((	(.84)((	(2.51)(

Output Summary
1% Probability Event
Slime Pond Dam
MO 30611
B16

Output Summary
1% Probability Event
Slime Pond Dam
MO 30611
B17

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
		826.40	826.40	830.90
	STORAGE	1060.	1060.	1598.
	OUTFLOW	0.	0.	319.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.00	828.33	0.00	1287.	167.	0.00	43.25	0.00


DATE
TIME