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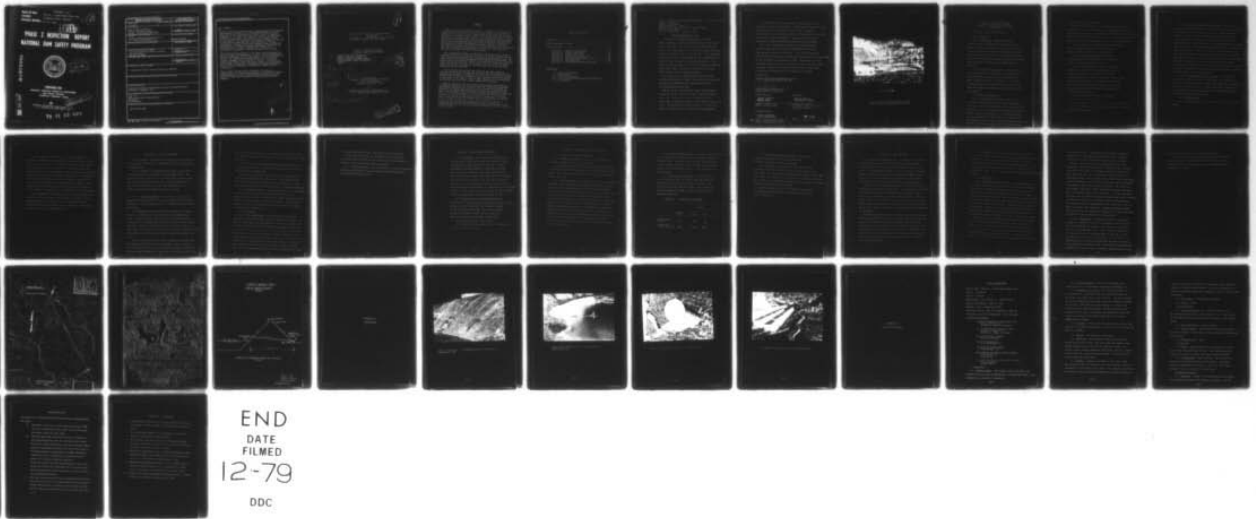
SCHNABEL ENGINEERING ASSOCIATES RICHMOND VA
NATIONAL DAM SAFETY PROGRAM. MOSS NUMBER 1 FRESH WATER SUPPLY D--ETC(U)
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Name Of Dam:

SEPTEMBER, 1979

Location:

MOSS NO. 1 FRESH WATER SUPPLY DAM

DICKENSON COUNTY, VIRGINIA

Inventory Number:

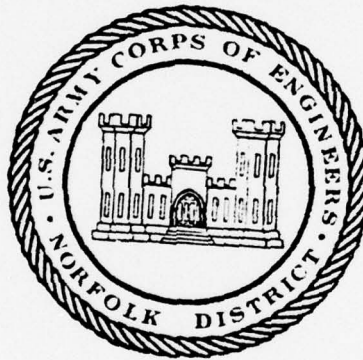
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LEVEL II

PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM

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PREPARED FOR

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

BY

SCHNABEL ENGINEERING ASSOCIATES, P.C./
J. K. TIMMONS AND ASSOCIATES, INC.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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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 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.

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NAME OF DAM: MOSS NO. 1 FRESH WATER
SUPPLY DAM
LOCATION: DICKENSON COUNTY, VIRGINIA
INVENTORY NUMBER: VA. NO. 05103

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

6 National Dam Safety Program. Moss
Number 1 Fresh Water Supply Dam
(Inventory Number VA 05103), Dickenson
County, Virginia. Phase I Inspection
Report.

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10 James A. Walsh

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PREFACE

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

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

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

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

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Name: Moss No. 1 Freshwater Supply Dam Va. No. 05103
State: Virginia
County: Dickenson
USGS Quad Sheet: Pound
Coordinates: Lat 37° 06.9' Long 82° 31.9'
Stream: Lick Fork
Date of Inspection: June 12, 1979

BRIEF ASSESSMENT OF DAM

Moss No. 1 Freshwater Supply Dam is a mine waste structure, constructed with coarse to fine coal refuse materials. It is about 300 ft long and 65 ft high. This impoundment is a side valley type structure which is located at the toe of Moss No. 1 Dam. Although no longer in use, this impoundment once supplied fresh water for use in the coal preparation process. The spillway pipe consists of a 36 inch diameter corrugated metal pipe (CMP). The dam is located on Lick Fork about 4 miles east of Pound, Virginia.

This dam has been scheduled for abandonment by filling with refuse in 1980. Plans have been prepared showing the abandonment procedure and these are currently being implemented.

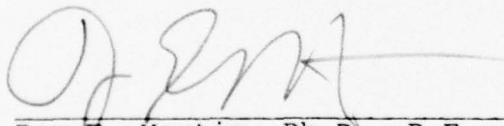
The dam is an "intermediate" size, "significant" hazard structure. The appropriate spillway design is the $\frac{1}{2}$ PMF. Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the spillway is rated adequate. The dam will contain 100 percent of the PMF without overtopping.

The embankment structure appears to be similar to the drawings recently developed by L. Robert Kimball and Associates for future use and abandonment of the dam. Original design data is not available, and it is impossible to evaluate the stability of the structure. Since the dam is to be abandoned in 1980, additional studies are not necessary.

The visual inspection revealed no apparent problems with the embankment; however, the downstream end of the spillway pipe should be uncovered. The severe embankment erosion present on the left downstream slope need not be corrected if the reservoir is abandoned in 1980. Otherwise, it is recommended that these areas be backfilled and compacted, since continued erosion over a long period of years could create a condition detrimental to the integrity of the dam.

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District Engineer

Recommended By:

Original signed by:
Carl S. Anderson, Jr.

for Jack G. Starr, R.A., P.E.
Chief, Engineering Division

Date: SEP 27 1979



OVERVIEW PHOTO

(View looking at upstream face of berm
and arrow denoting principal spillway.)

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
MOSS NO. 1 FRESHWATER SUPPLY DAM
Va. No. 05103

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 (See Reference 1, Appendix V). The main responsibility is to expeditiously identify those dams which may be a potential threat to human life or property.

1.2 Project Description:

1.2.1 Dam and Appurtenances: Moss No. 1 Freshwater Supply Dam is a side valley mine waste structure constructed with coarse to fine coal refuse materials. It is approximately 300 ft long and 65 ft high.* The top of the dam is 22 ft wide and is at elevation 1945[±] msl. Side slopes are 1 horizontal to 1 vertical (1:1) on the downstream and upstream side

*Height is based on natural ground at outlet pipe.

(See Plate No. 3, Appendix I).

The spillway consists of a 36" CMP approximately 200 ft long (upstream Invert El 1897[±] msl) located at the center of the dam (See Photo No. 3). The downstream channel follows the toe of the embankment and passes through a 36" corrugated metal pipe under the access road below the dam into a broad floodplain.

1.2.2 Location: Moss No. 1 Freshwater Supply Dam is located on Lick Fork 4.0 miles east of Pound, Virginia (See Plate 1, Appendix I).

1.2.3 Size Classification: The dam is classified as an "intermediate" size structure because of the dam height of 65 ft.

1.2.4 Hazard Classification: The dam is located in a rural area; however, based upon the downstream proximity of the Moss No. 1 Coal Processing Plant, the dam is assigned a "significant" hazard classification. The hazard classification used to categorize a dam is a function of location only and has nothing to do with its stability or probability of failure.

1.2.5 Ownership: The dam is owned by the Clinchfield Coal Company.

1.2.6 Purpose: The impoundment once supplied fresh water for the Moss No. 1 coal preparation plant; however, the reservoir is no longer in use.

1.2.7 Design and Construction History: There was no original design data available; however, the dam was reportedly constructed under the supervision of the Clinchfield Coal Company. Future use and abandonment plans are currently being prepared by the Owner's engineering consultant. An abandonment plan is the filling of the impoundment with refuse and diversion of runoff away from the impoundment. Preliminary engineering studies were performed by L. Robert Kimball and Associates, Ebensburg, Pennsylvania in 1978; however, Orbital Engineering has since been retained by the Owner for completing the plan. Reports and plans are submitted on an interim basis and the study was not complete at the time of the investigation. Appendix IV presents recommendations made by Kimball for abandonment of this impoundment.

1.2.8 Normal Operational Procedures: The spillway is ungated; therefore, water rising above the invert of the outlet pipe automatically is discharged downstream in quantities based on the pipe capacity. Normal pool (Elev. 1881 msl) is maintained by the normal groundwater elevation and drawdown created by pumping from the pool.

1.3 Pertinent Data:

1.3.1 Drainage Areas: The drainage area is 0.07 square miles.

1.3.2 Discharge at Dam Site: Maximum known flood at the dam site occurred in April 1977; however, the pool elevation was not observed. Water has never been observed in the spillway.

Spillway Discharge:

Pool Elevation at Crest of Dam 190 CFS
(El 1945 msl)

1.3.3 Dam and Reservoir Data: See Table 1.1, below

TABLE 1.1 DAM AND RESERVOIR DATA

Item	Elevation Feet MSL	Reservoir			
		Ares Acres	Acre Feet	Watershed Inches	Length Miles
Crest of Dam	1945	11.2	525	143	.2
Spillway Invert	1897	5.8	100	27.3	.1
Downstream Toe of Dam*	1880 [±]	-	-	-	-

* Mine waste dam for fresh water collection.

SECTION 2 - ENGINEERING DATA

2.1 Design: There is no design data for the original construction. All phases of mining operations are controlled and regulated by the U. S. Department of Labor, Mine Safety and Health Administration (MSHA); the Virginia Division of Mines and Quarries (VDMQ); and the Virginia Division of Mined Land Reclamation (DMLR). We understand that the fresh water impoundment has been used and maintained in compliance with standards required by the above governmental agencies. Although design and "As Built" data were not available, the Owner is presently completing an engineering study for future use and eventual abandonment (for explanation of abandonment, see Section 1) of the entire Moss No. 1 refuse area, which includes the Moss No. 1 fresh water supply dam. A preliminary abandonment report was completed in 1978 by L. Robert Kimball and Assoc., which included a hydrologic and stability study. The Owner has since retained Orbital Engineering for completion of the future use and abandonment plan. This dam is scheduled for abandonment as an impoundment in 1980, and all impoundment capabilities will be eliminated by filling the reservoir with refuse.

2.2 Construction: Construction records were not available. The dam was reportedly constructed with equipment owned by Clinchfield Coal Company.

2.3 Operation: Abandonment of the impoundment is planned in 1980 and this area will then be used for disposal of coarse coal refuse. Five water observation wells have been installed for this structure in order to measure the phreatic level in the embankment. Their locations and measured water level readings are included in Section 6.2 of Appendix III. (Ground elevations were not available). Water levels are monitored weekly by the Clinchfield Coal Company. Test borings were being made at the time of the inspection for use in further evaluation of the stability of the impoundment.

2.4 Evaluation: Original engineering calculations and drawings are not available, but drawings available for the abandonment plan are representative of the dam, and the hydraulic/hydrologic calculations are adequate. There are no records available for dam performance.

SECTION 3 - VISUAL INSPECTION

3.1 Findings: The dam was generally in good condition at the time of inspection. Field observations are outlined in Appendix III.

3.1.1 General: An inspection was made 12 June 1979 and the weather was fair with the temperature 65^oF. The pool elevation at the time of inspection was elevation 1881 msl and no tailwater was observed. The pool level was 16 feet below the invert of the 36" CMP spillway at the time of inspection and round conditions were dry.

3.1.2 Dam and Spillway: The spillway consists of an ungated 36" CMP located 16 feet above normal pool elevation. The pipe is in good condition but is blocked by mine waste at the outlet.

The embankment was constructed with coarse coal refuse and was essentially free of vegetation. The downstream slope is very steep (1:1 and greater) and includes numerous erosion gullies located near the center and left sides of the dam face. Talus has accumulated along the downstream toe as the result of surface runoff across spoil piles. Erosion gullies 6 ft[±] wide and 10 ft[±] deep were noted on the left downstream slope.

Seepage estimated as less than 5 gpm[±] was observed along the downstream toe near the left abutment. This seepage is believed to be either spring related or possibly the result of surface runoff following an impermeable zone (former haul road)

or covered stream channel. It is not believed to be related to seepage through the embankment, since it occurs above normal pool level.

Five water observation wells was located along the crest and downstream slope. Measured water levels are present in Section 6.2 of Appendix III.

3.1.3 Reservoir Area: The reservoir is constructed from mining waste with side slopes 1:1. Sedimentation was observed at several spots within the reservoir area. There was no vegetation on the slopes and severe erosion has occurred.

3.1.4 Downstream Area: The downstream area is a railroad yard to storage of coal cars along with the Moss No. 1 coal preparation plant. No debris was noted, although the area had mining waste dumped in several locations. The railroad yard is a flat area approximately 250 feet wide with slopes rising on approximately 1.5:1.

3.2 Evaluation:

3.2.1 Dam and Spillway: The spillway was blocked on the outlet side by mine waste and this should be removed. The pipe is reportedly in good condition. The severe embankment erosion encountered on the left downstream slope was not considered hazardous at the time of inspection and it need not be corrected if the pond is abandoned in 1980. Otherwise, it is recommended that areas be backfilled and compacted since continued erosion over a long period of years could create a condition detrimental to the integrity of the dam. Seepage observed near the left downstream abutment is not believed to be related

to seepage through the dam. Monitoring is not necessary.

Ground elevations were not available for the water observation wells; therefore, the elevation of the piezometric surface could not be determined accurately.

3.2.2 Downstream Area: The location of the coal preparation facility downstream of the dam (2500'±) provides potential for damage and loss of life.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures: The fresh water pond sustains a normal pool elevation through a groundwater supply provided by seepage through the Moss No. 1 refuse impoundment located adjacent to and above the pond. The fresh water pond has a raw water pump with an 8" discharge line, which draws down the water level in the pond during operation. The raw water was once pumped to the mining operation where it was used in a coal washing process. However, the impoundment is no longer in use. If the water level reaches the 36" CMP spillway, it will automatically discharge through the dam.

4.2 Maintenance of Dam and Appurtenances: Maintenance of the dam and appurtenances is the responsibility of the Clinchfield Coal Company, a member of the Pittston Coal Group. The raw water pump appears to be kept in good working condition. There are no other maintenance requirements.

4.3 Warning System: None exists.

4.4 Evaluation: The maintenance of the dam and appurtenances is adequate.

SECTION 5 - HYDRAULICS/HYDROLOGIC DATA

5.1 Design: No data is available.

5.2 Hydrologic Records: There are no hydrologic records available for this drainage area.

5.3 Flood Experience: The maximum pool elevation observed was in April 1977; however, the pool elevation is not known. The pool elevation has never been above the invert of the spillway.

5.4 Flood Potential: 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 reasonable possible), or fractions thereof. Precipitation amounts for the PMF and $\frac{1}{2}$ PMF are taken from U. S. Weather Bureau Information (Reference 5, Appendix V). Appropriate adjustments for basin size and shape were accounted for and inflow volumes were determined by procedures as outlined in Reference 4, Appendix V. The maximum pool elevation was determined by the reservoir storage curve at the volume of inflow predicted.

5.5 Reservoir Regulation: The pool at the beginning of the inflow was assumed to be at elevation 1881 msl (normal Pool). Reservoir stage-storage data was determined from the available plans, reports, field measurements, and USGS quadrangle sheets. The spillway was not utilized.

5.6 Overtopping Potential: The predicted rise of the reservoir pool and other pertinent data were determined by storing the volume of inflow in the reservoir as previously described. The results for the flood conditions (PMF, $\frac{1}{2}$ PMF) are shown in the following Table 5.1.

TABLE 5.1 RESERVOIR PERFORMANCE

	Normal Flow	Volume	
		$\frac{1}{2}$ PMF	PMF
Total Inflow, Ac-Ft	0.5	45	90
Maximum Pool Elev.,ft., MSL	1881	1890	1898

5.7 Reservoir Emptying Potential: There is no method of lowering the reservoir below the spillway except by seepage and pumping.

5.8 Evaluation: Calculations indicate that the reservoir will rise to within 55 ft of the dam crest for the $\frac{1}{2}$ PMF. The appropriate spillway design flood is the $\frac{1}{2}$ PMF due to the "significant" hazard conditions existing downstream. The reservoir is considered adequate as the reservoir will store 100% of the PMF without overtopping.

Hydrologic data used in the evaluation pertains to present day conditions with no consideration given to future development.

SECTION 6 - DAM STABILITY

6.1 Foundation and Abutments: The dam site is located within the southeast portion of the Appalachian Plateau (locally Cumberland Plateau) Physiographic Province of Virginia. The Cumberland Plateau is a stream dissected plateau which is underlain by sedimentary rocks up to Upper Pennsylvanian in age (see Reference 3, Appendix V). Throughout Dickenson County the ground surface is extremely rugged.

The dam site is underlain by rocks of the Wise Formation of Middle to Upper Pennsylvanian Age. This formation consists of alternating beds of sandstone, shale and coal; however, many beds of clay also occur within the formation. Only the lower 750 ft of the formation is exposed in northwest Dickenson County, and economic coal beds are generally restricted to the lower 200 ft. Bedrock is generally flat-lying throughout the area.

Bedrock was exposed in the abutments, particularly along the left abutment. The bedrock is essentially flat-lying and consists of alternating beds of sandstone and shale with occasional thin interbeds of coal. Test boring data were not available at the time of this investigation. No faults were observed in the field during this investigation and geologic maps of the area do not show the presence of any faults in the immediate vicinity.

6.2 Embankment: The upstream and downstream slopes are 1 horizontal to 1 vertical (1:1) with crest at elevation 1945± msl. The crest of the dam is roughly 22 ft wide. The embankment appears to be constructed with coarse to fine coal refuse, which generally consists of rock debris and nonplastic fines. It is a waste product of the coal preparation process.

6.3 Evaluation:

6.3.1 Foundation and Abutments: Dam foundations must be evaluated on the basis of potential settlement, sliding and seepage. Excessive settlement of the dam is not believed to be a problem assuming the structure rests upon fairly competent bedrock and firm to compact overburden soils. Without any subsurface data, the compressibility of the overburden soils cannot be assessed. Underlying soils; however, are probably similar to the sandy silty clays with cobbles and boulders overlying bedrock, which were encountered in test borings made at the Moss No. 1 Dam immediately upstream.

Sliding within the foundation bedrock would not normally appear to be a problem based upon the nature of the Wise Formation. A review of the geologic data indicates that there are probably no adversely oriented weak planes within the foundation rock that would act as a potential sliding plane. However, thin layers of clay reportedly occur through-

out this formation. Based upon the reported satisfactory performance of the dam for more than 20 years, sliding within the foundation would not appear to be a problem.

Ground elevations were not available for the water observation wells (See Section 6.2, Appendix III); however, the water levels measured probably represent seepage from both the above Moss No. 1 impoundment and the Moss No. 1 Fresh Water Pond. This seepage is apparently moving downslope in the subsurface, probably passing through fractured bedrock or permeable zones in the refuse materials. The origin of the seepage (less than 5 gpm[±]) observed along the left abutment of the downstream toe is not known. It could represent a spring, surface runoff following an impermeable zone (probably a former haul road), or flow from a covered stream channel. The seepage occurs at approximately elev. 1925 msl, which is above the normal pool elevation. Seepage apparently occurs within and above the foundation; however, it is not considered detrimental to the stability of the structure.

6.3.2 Embankment: No undue settlement, cracking or seepage was noted at the time of inspection; thus it appears that the embankment is adequate for normal pool level with water at elevation 1881 [±] msl. Since complete abandonment by refuse disposal in the impoundment is planned in 1980, no additional studies are recommended. At the time of the inspection test borings were being made in order to develop a more detailed abandonment plan. Preliminary recommendations (Appendix IV) indicate that a stability analysis will be made

once the fresh water pond is filled with refuse.

The severe embankment erosion present along the left downstream slope is the result of runoff. The erosion, although severe in appearance, does not presently create a stability problem.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment: Moss No. 1 Dam at the time of inspection was in good condition. The dam is an "intermediate" size, "significant" hazard structure. The appropriate design flood is the $\frac{1}{2}$ PMF. The impoundment will contain the PMF without overtopping the dam and is considered adequate.

The actual embankment structure appears to be similar to the abandonment drawings. No stability analysis has been performed for the steady seepage or rapid drawdown cases for the embankment. However, since the dam will be abandoned in 1980, no further studies are recommended. The severe embankment erosion present on the left downstream slope need not be corrected if the reservoir is abandoned in 1980. Otherwise, it is recommended that these areas be backfilled and compacted since continued erosion over a long period of years could create a condition detrimental to the integrity of the dam.

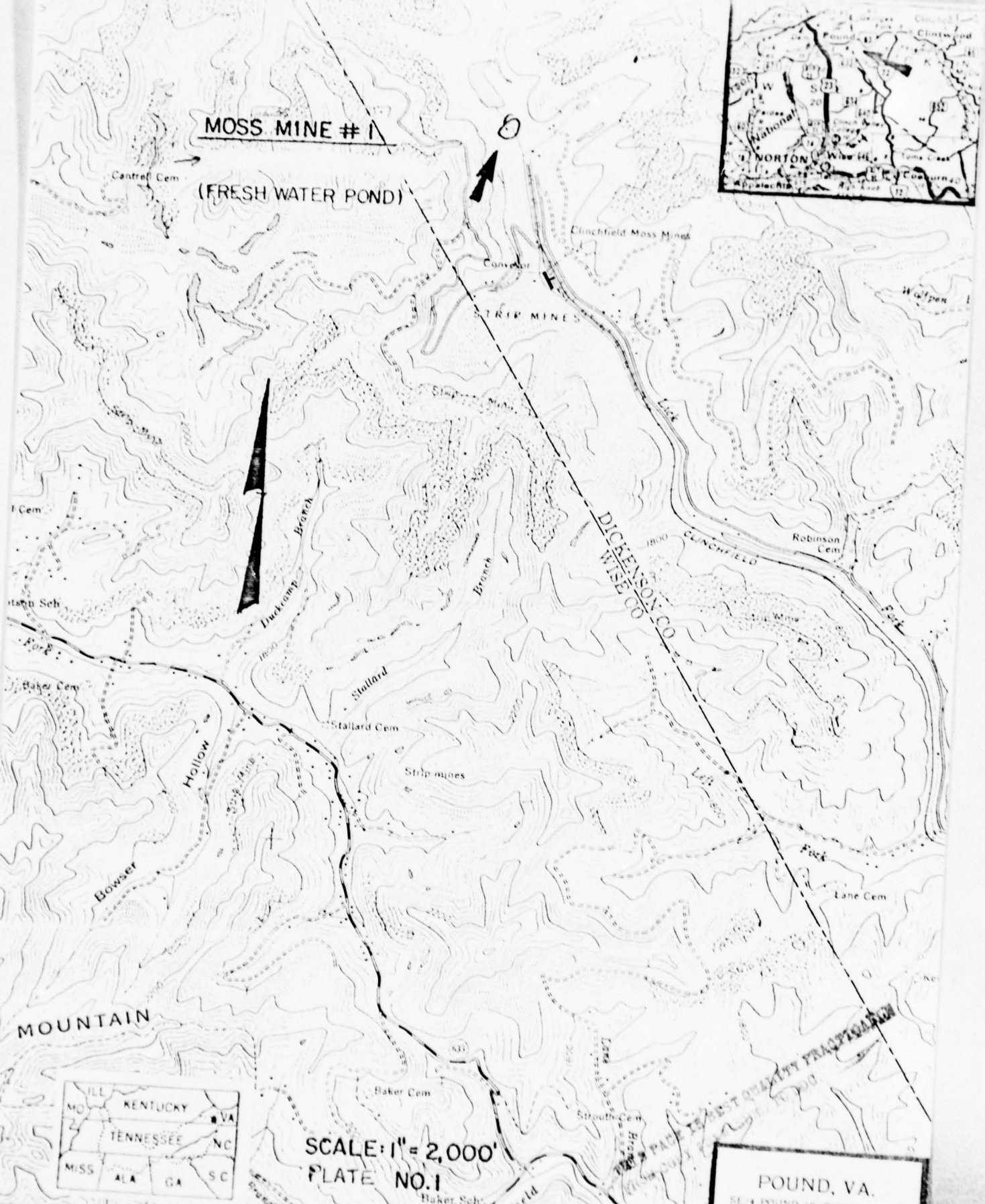
7.2 Remedial Measures: Based on the visual inspection and review of existing records, there is no serious problem that would require immediate action for the normal pool conditions.

7.3 Maintenance Measures: The downstream end of the spillway pipe should be uncovered.

APPENDIX I
MAPS AND DRAWINGS

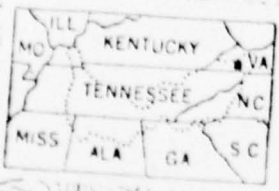


MOSS MINE # 1
(FRESH WATER POND)



DICKENSON CO
WISE CO

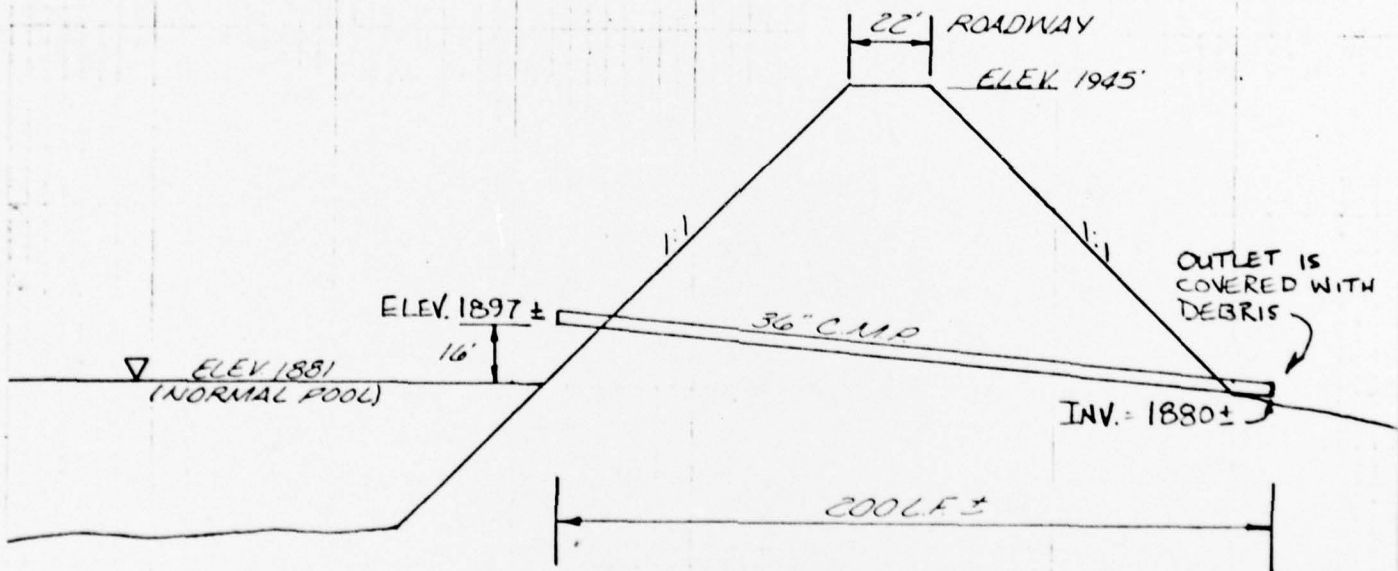
MOUNTAIN



SCALE: 1" = 2,000'
PLATE NO. 1

PAPEL & PAPER QUALITY PRACTICAL
POUND, VA.
SE 1/4 POUND IS QUADRANGLE
N 3700 - W 8230 / 75

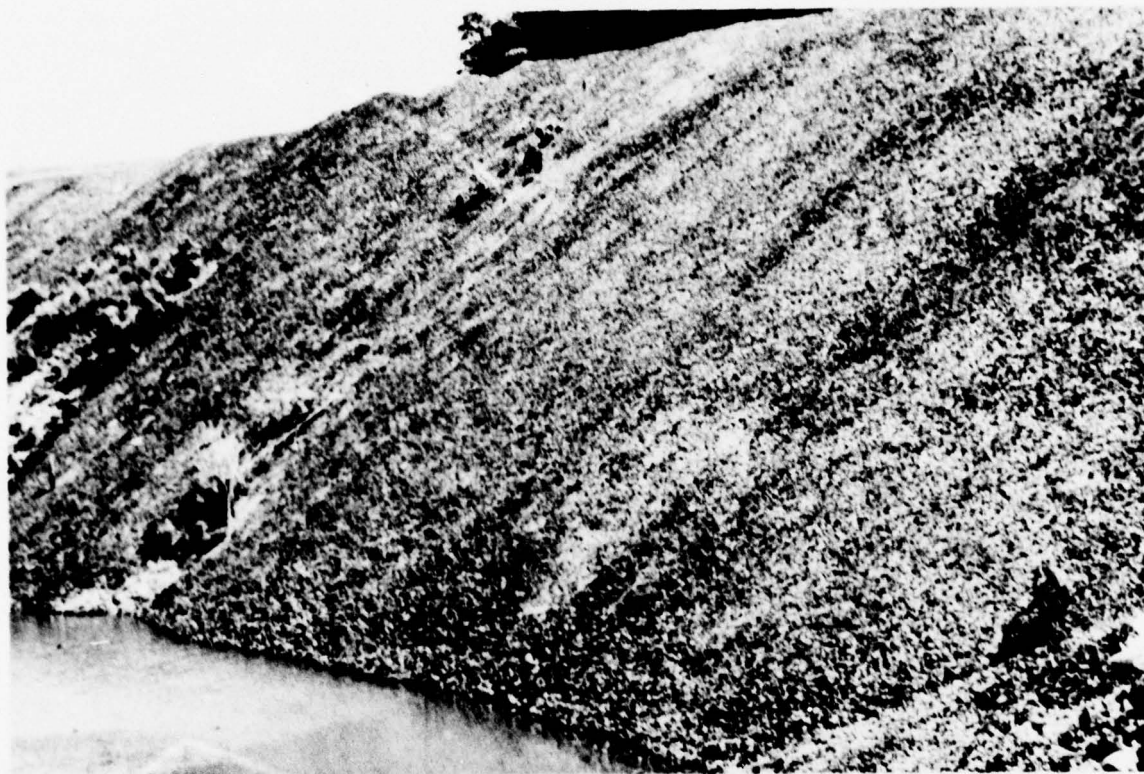
MOSS MINE NO. 1
FRESH WATER SUPPLY
POND



SECTION THROUGH DAM AT OUTLET
PIPE

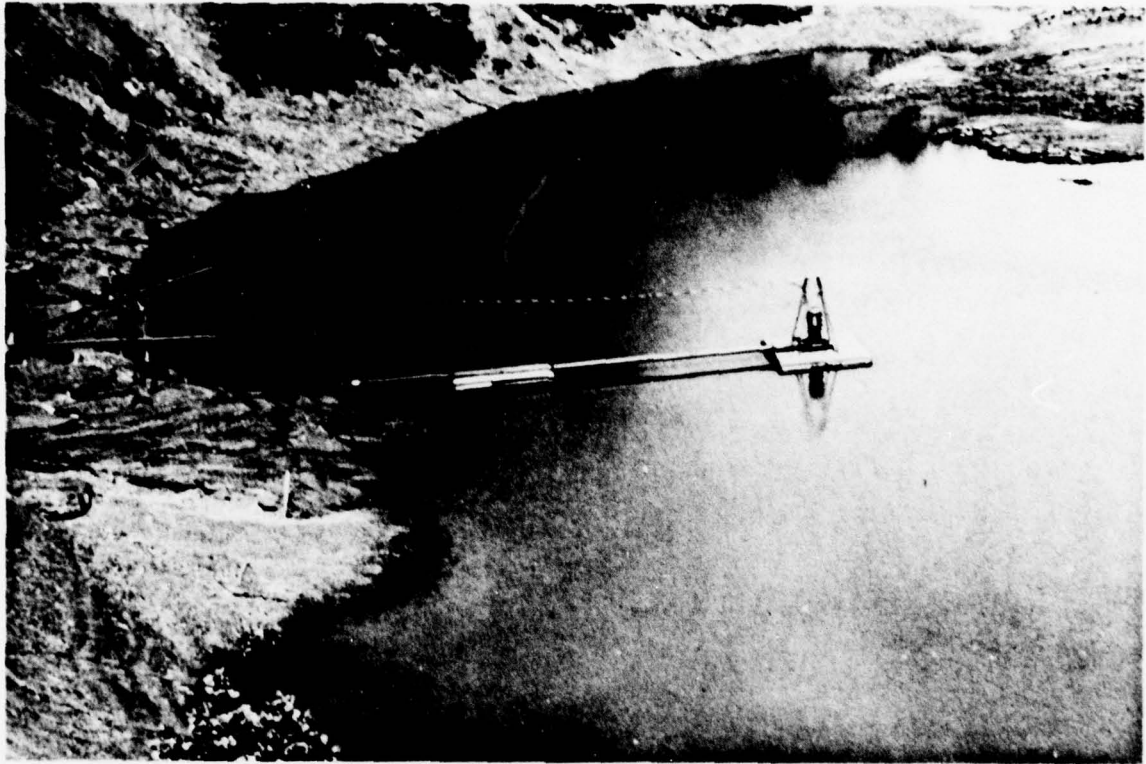
SCALE: 1" = 50'
DRAWN: FESSLER
CHECKED: ROOP
PLATE NO. 3

APPENDIX II
PHOTOGRAPHS



VIEW OF DAM SLOPE
FRESH WATER POND

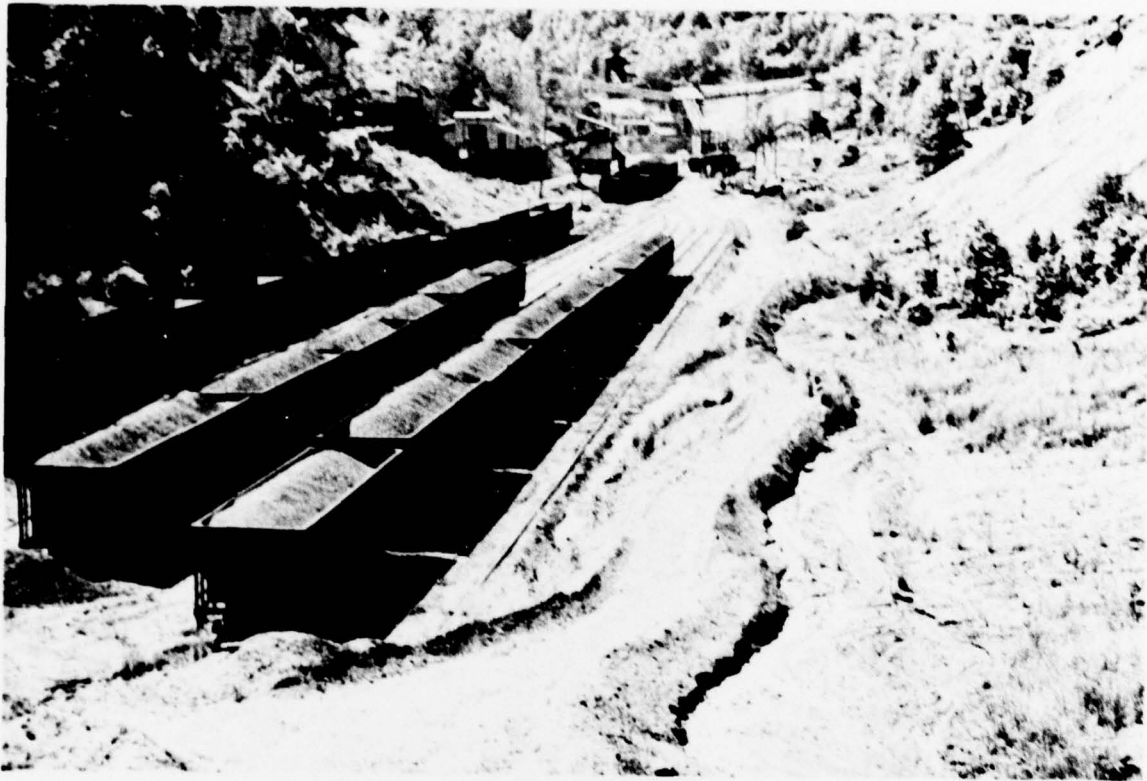
AT UPSTREAM FACE OF MOSS MINE #1



VIEW OF PUMP FROM TOP OF DAM AT MOSS MINE #1
FRESH WATER POND



PRINCIPAL SPILLWAY MOSES MINE #1 FRESH WATER POND



DOWNSTREAM VIEW MOSS MINE #1 FRESH WATER POND

APPENDIX III
FIELD OBSERVATIONS

FIELD OBSERVATIONS

Name of Dam: Moss No. 1 Fresh Water Supply Dam

County: Dickenson

State: Virginia

Coordinates: Lat 37°-06.9' Long 82°-31.9'

Date of Inspection: June 12, 1979

Weather: Fair, temperature 65°F

Pool Elevation at Time of Inspection: 1881 msl

Tailwater at Time of Inspection: None Observed

Inspection Personnel:

Schnabel Engineering Associates, P.C.
Ray E. Martin, P.E.
Stephen G. Werner (recorder)

J. K. Timmons and Associates, Inc.
Robert G. Roop, P.E.
William A. Johns (recorder)

Clinchfield Coal Company
Michael Holbrook

Orbital Engineering
J. E. Barrick, P.E.

State Water Control Board
Hugh Gildea, P.E.

Mine Safety and Health Administration
Phil Muron, Jr.
Doug Carico

Virginia Division of Mines and Quarries
Lewis Wheatley
Arthur Reed

1 Embankment:

1.1 Surface Cracks: The slopes, crest, spillway, and abutment contacts were inspected and no cracks were noted. The embankment was devoid of vegetation.

1.2 Unusual Movement: No unusual movements were noted on the dam or downstream beyond the embankment toe.

1.3 Sloughing or Erosion: The downstream slope is at the angle of repose with numerous erosion furrows near the center and left sides of the dam face. The left abutment had rock sloughing off the shale slope with sandstone exposed at the base. The downstream toe appears as a talus area formed by runoff down the slopes. Erosion furrows 6 ft[±] wide and 10 ft[±] deep occur across the downstream slope. Material at the top of the slopes looks like fill material dumped but not graded.

1.4 Alignment: There does not appear to be any specific vertical or horizontal alignment. The crest is 22 ft[±] wide and used as a roadway.

1.5 Riprap: No riprap was encountered.

1.6 Junctions: The abutments consist of spoil with coarse coal refuse on top. The fill materials appear to be graded against but not cut into the abutment slopes. A general shale, massive sandstone with joints and coal sequence exists along the toe of the left abutment. A haul road extends across the right side.

1.7 Seepage: Seepage estimated as less than 5 gpm[±] was observed along the downstream toe near the left abutment and above the nonflowing outlet pipe. This seepage is believed to be either spring related or possibly the result of surface

runoff following an impermeable zone (former haul road possibly) or covered stream channel. It is not believed to be related to seepage through the embankment, since it occurs above pool level.

1.8 Staff Gage: A staff gage is present

1.9 Drains: None.

2 Outlet Works:

2.1 Intake Structure: The spillway consists of a 36" corrugated metal pipe with a slope, $S = 5\%$. The pipe is 16 ft[±] above the pool and water has never been to the invert level.

2.2 Outlet Structure: Same as intake.

2.3 Outlet Channel: Rock and mine waste is scattered along the channel. Access road crosses the channel immediately below the dam.

2.4 Emergency Gate: None.

3 Reservoir:

3.1 Slopes: Steep slopes (1:1) consisting of coarse coal refuse surround the reservoir. The slopes appear to stand at the angle of repose and some erosion was noted.

3.2 Sedimentation: Some observed. The reservoir is used as a fresh water pond for process water. The pond level is pumped down continuously. Water has never been through or to the level of the outlet pipe.

4 Downstream Channel:

4.1 Condition: Channel is essentially free of vegetation; however, scattered rock debris is present. A 4 ft[±]

CMP extends beneath the haul road directly below the embankment. Water appears to run beneath the pipe in the underlying rock debris rather than through the pipe.

5 Reservoir:

5.1 Slopes: Steep natural slopes occur in the left side with scattered vegetation up the slope, then dense woods. A fill slope and road exist on the right side. Downstream, the haul road crosses another berm and fill slope.

5.2 Population and Facilities: A coal loading facility is located approximately 2500 ft downstream.

6 Instrumentation:

6.1 Monumentation:

6.2 Observation Wells and Piezometers: Five observation wells or piezometers were noted in the field. The following water level data was measured:

<u>Location</u>	<u>Water Level (ft±) Below Ground Surface *</u>
Back right corner, just below haul road	80.5
B-6 Top of Embankment Slope	77
B-6A	80
B-7 Toe of Embankment Slope	26.5
B-7A	70.5

*Ground elevations were not available.

APPENDIX IV
PRELIMINARY RECOMMENDATIONS FOR
ABANDONMENT OF MOSS NO. 1 FRESH WATER POND

By

L. Robert Kimball
& Associates

RECOMMENDATIONS

To facilitate refuse placement the following recommendations are made:

1. Eliminate the water in the fresh water pond, MSHA I.D. No. 1211VA5-0021-01D, prior to the placement of coarse refuse in this area.
2. Continue placement of coarse refuse to eliminate the impounding potential of the fresh water pond. After the coarse refuse has reached elevation 1960 \pm and the impounding potential has been eliminated, a drilling program is proposed to verify subsurface conditions and to substantiate parameters to be employed in future stability analyses.
Using the results of this investigation, the structural portion of the embankment will be delineated with detailed operational procedures to be outlined for continued placement.
3. Continue refuse placement in accordance with the five (5) year plan and as outlined under the General Operational Requirements included in this report and the Specific Operational Requirements as determined under item 2.

APPENDIX V - REFERENCES

1. Recommended Guidelines for Safety Inspection of Dams, Department of Army, Office of the Chief of Engineers, 46 pp.
2. Design of Small Dams, U. S. Department of Interior Bureau of Reclamation, 1974, 816 pp.
3. The Geology and Coal Resources of Dickenson County, Virginia, Albert W. Giles, Virginia Division of Mineral Resources Bulletin 21, 1921, 224 pp.
4. Section 4, Hydrology, Part 1, Watershed Planning, SCS National Engineering Handbook, Soil Conservation Service, U. S. Department of Agriculture, 1964.
5. Hydrometeorological Report No. 33, U. S. Department of Commerce, Weather Bureau, U. S. Department of Army, Corps of Engineers, Washington, D. C., April 1956
6. Future Coal Refuse Disposal Area for Moss #1, L. Robert Kimbal & Associates, Ebensburg, Pa. 1978