REPORT OF THE
DEPARTMENT OF CONSERVATION
AND RECREATION

STUDY OF DAMS OWNED BY SOIL AND WATER CONSERVATION DISTRICTS

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 49

COMMONWEALTH OF VIRGINIA
RICHMOND
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December 30, 1997

The Honorable George Allen, Governor
Commonwealth of Virginia
Capital Square
Richmond, VA 23219

Members of the 1998 General Assembly
Commonwealth of Virginia
General Assembly Bldg., Capital Square
Richmond, VA 23219

Dear Governor Allen and Members of the General Assembly,

Enclosed for your review is the report of the 1997 House Joint Resolution 446; Study of Dams Owned by Soil and Water Conservation Districts prepared by the Department of Conservation and Recreation. We appreciate the assistance of the legislative oversight committee chaired by Senator Emmett W. Hanger.

Sincerely,

Kathleen W. Lawrence

Kathleen W. Lawrence
Director

STUDY OF DAMS OWNED BY SOIL AND WATER CONSERVATION DISTRICTS

Prepared by:

Virginia Department of Conservation and Recreation
12/4/97

STUDY OF DAMS OWNED BY SOIL AND WATER CONSERVATION DISTRICTS

EXECUTIVE SUMMARY

Dams owned by soil and water conservations districts are a form of infrastructure in the Commonwealth that were built for the purpose of flood control as long as 60 years ago. These dams were built using sound engineering procedures but, to serve their intended function in a safe manner well into the future requires proper care and maintenance by the owners of the dams.

This report details the overall status of these structures and outlines some of their needs. It responds to a request made by Virginia General Assembly to provide an overall assessment of dams owned by soil and water conservation districts which are political subdivisions of the Commonwealth. See Appendix 4.

The Department of Conservation and Recreation contracted with Gannett Fleming, Inc. to perform detailed engineering studies and analyses of selected dams during the summer and fall of 1997 as outlined in the legislative language. This study was done in three phases consisting of a preliminary reconnaissance phase of the 22 dams which meet the criteria specified by the General Assembly stipulations of Class 1 or Class 2 and built prior to 1969. After the preliminary reconnaissance of all 22 dams, detailed inspections were made of major structural features of 16 dams. The study was concluded with a report prepared by the consultant that provided analyses of findings, detailed recommendations, alternative approaches, and cost estimates. See Appendices 5, 8, and 10 for additional details. The detailed study results provided by the consultant were supplemented by other data available to the Division of Dam Safety to prepare this overall assessment of district owned dams.

Detailed review of the 22 dams in this study did not reveal any conditions that warrant immediate emergency action. Some needs identified, however, do warrant priority attention to assure continued safe beneficial usage. Corrective actions can be phased in over a period of years. The Department of Conservation and Recreation recommends the following to address the identified needs of the district dams:

1- Establish a maintenance and repair program with set objectives within a specified time frame. The initial efforts should be directed on a priority basis to sites with immediate needs.

2- Continue systematic study to look at remaining dams on a priority basis.

3- Continue operation and maintenance funding to the Soil and Water Conservation Districts. (NOTE: The total need has been identified as over $100,000 per year, it is recommended that there be a 50%-50% cost share

between the state and the locality. $50,000 was provided to the soil and water districts during FY98 by the Acts of the 1997 General Assembly.)

4- Identify beneficiaries of dams to determine more appropriate allocation of cost for periodic rehabilitation needs (deteriorating concrete, metal features, etc.) including a contingency fund in case damage occurs during operation of water control gates. The needs for concrete rehabilitation, particularly at dams with open, leaking joints, should not be deferred.

5- Develop legislative initiative to investigate funding sources for dams identified as needing major upgrades on a priority basis.

STUDY OF DAMS OWNED BY SOIL AND WATER CONSERVATION DISTRICTS

STUDY OF DAMS OWNED BY SOIL AND WATER CONSERVATION DISTRICTS

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STUDY OF DAMS OWNED BY SOIL AND WATER CONSERVATION DISTRICTS

AUTHORITY

This study was initiated in response to HJR No. 446 language which reads as follows:

". . . That the Department of Conservation and Recreation be requested to study the structural condition and the costs of maintaining dams owned by soil and water conservation districts. In conducting its study, the Department shall evaluate (i) the integrity of these structures and the risk to health, safety, and welfare of the public; (ii) the infrastructure needs and maintenance and repair costs of the dams; (iii) the need for integrated flow and observation warning systems (IFLOWS); and (iv) the design of each of these dams to determine whether they are adequate to meet the changing land use patterns of the watershed. . .

"The Department of Conservation and Recreation shall complete its work in time to submit its findings and recommendations to the Governor and the 1998 Session of the General Assembly as provided in the Division of Legislative Automated Systems for the processing of legislative documents."

Funding to perform detailed analyses of selected dams was provided in the FY1998 appropriations.

INTRODUCTION

This study is being made to address the status and needs of the 104 dams owned by Soil and Water Conservation Districts in Virginia. This study and analysis of the designated dams responds to the following:

the current status and integrity of the dams;
the maintenance and repair needs and costs;
the necessity and use of IFLOWS; and
the adequacy of the dams in meeting changes in land use.

Although designs and construction methods may have been similar for many of the district-owned dams, there are also many dissimilarities among them due to varying site conditions, geologic conditions, different contractors, different materials sources, different construction seasons, etc. In other words, each dam has its own unique character. Dams are not manufactured in a factory under controlled conditions and care must be exercised in making extrapolations from one dam to another.

CURRENT STATUS OF DISTRICT-OWNED DAMS

Summary information on each of the 104 district dams is contained in Appendix 1. The following provides a brief overview.

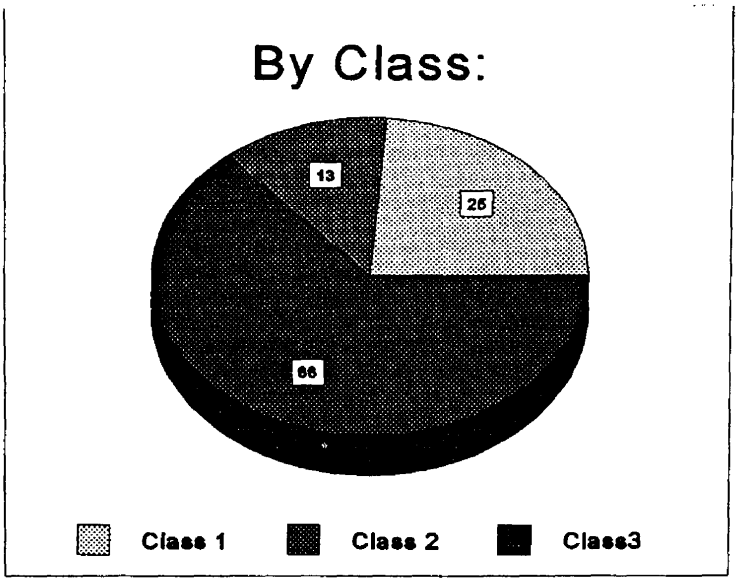
One of the first considerations given to the safety evaluation of any district dam or any other dam under the Virginia Dam Safety Act, is its classification, sometimes referred to as "hazard classification." The Virginia Dam Safety Regulations specify that each dam be classified based on potential loss of human life or property damage if it were to fail. The classes range in the order of decreasing hazard potential from Class 1 to Class 4 with Class 1 having the greatest potential for adverse downstream impacts in event of failure. **This classification is not related to the physical condition of the dam nor the probability of its failure.** The classification of any dam depends upon the downstream consequences if it were to fail and has nothing to do with the physical condition of the dam. See Appendix 3 which shows the classification criteria as contained in the Dam Safety Regulations.

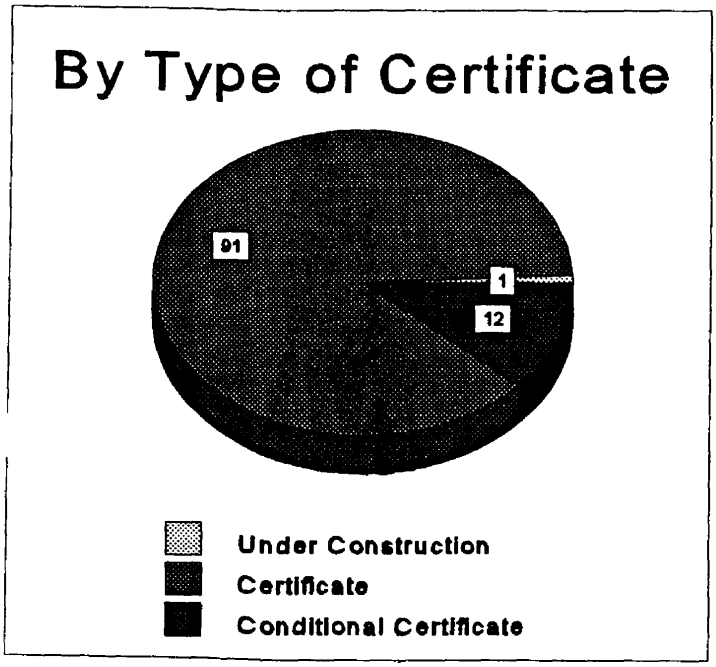
Standards are established for each dam and are related to the dam's classification. Virginia's standards are not unlike those of our neighboring states and are in line with similar standards throughout the country. Safety standards become increasingly more stringent as the potential for adverse impact increases. For example, a Class 1 dam -- that is, one whose failure would result in probable loss of human life -- is required to meet higher standards than a dam whose failure would not be as likely to result in such severe adverse consequences.

Under the Virginia Dam Safety Act, the owners of all dams, including soil and water conservation districts, are issued certificates and permits based upon regulations promulgated by the Virginia Soil and Water Conservation Board. If a dam meets all requirements of the regulations, a certificate is issued by the Board for a period of six years. If deficiencies of a nonimminent danger category exist, a Conditional Certificate can be issued for a period not to exceed two years.

The following charts provide an overview of the number of Soil and Water Conservation District dams by classification, by certificate type, and by age.

	# Dam
Class 1	25
Class 2	13
Class 3	66
Total	104

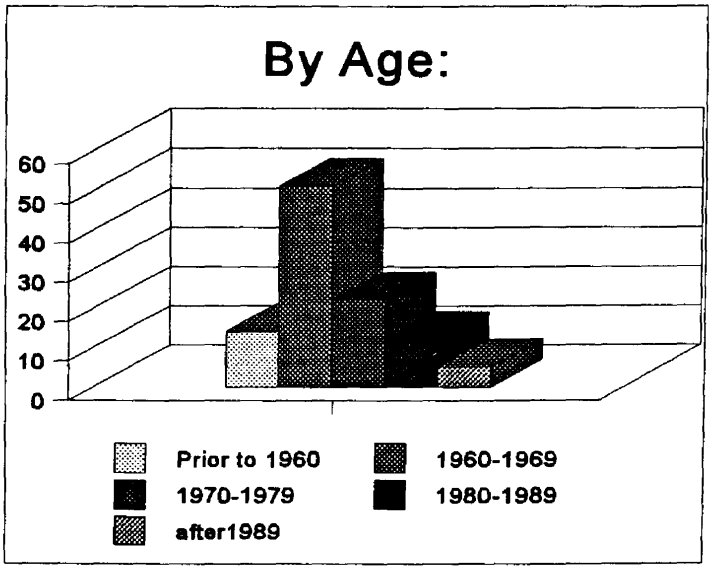




	# Dams
Under Construction	1
Certificate	91
*Conditional Certificate	12
Total	104

**Of the 12 Conditional Certificates, 2 are Class 1 dams that have significant emergency spillway erosion but both are under an Alteration Permit for repair. 7 are Class 1 dams with insufficient emergency spillway capacity. 3 are Class 2 dams with insufficient emergency spillway capacity.*

Year Built:	No. Of Dams
prior to 1960	14
1960-1969	51
1970-1979	22
1980-1989	12
after 1989	5
Total	104



BACKGROUND

With the exception of the Woodstock Dam, all district-owned dams have been built through assistance of the US Department of Agriculture under the small watershed program, PL 83-566 and PL 78-534. The dams have been built throughout the Commonwealth starting in 1954. Of the 146 dams that have been built in Virginia under the watershed program, 43 are the responsibility of cities, towns, local special purpose districts, or counties. The remaining 103 are the responsibility of soil and water conservation districts. The Woodstock Dam, brings the number of dams owned by soil and water conservation districts to a total 104 dams including one that is currently under a construction permit.

For each dam, agreements have been executed between the US Department of Agriculture and the city, town, county, or district. These agreements, in general, specify that the USDA will provide the engineering and financial services for building the dam and that operation of the dam is the responsibility of the local governmental entity (county, district, etc.) throughout the life of the dam. USDA refers to these local entities as "sponsors." See Appendix 7 for a copy of a sample agreement.

The Virginia Dam Safety Act defines the owner of a dam as follows:

> *"Owner" means the owner of the land on which a dam is situated, the holder of an easement permitting the construction of a dam and any person or entity agreeing to maintain a dam.*

From this perspective, a District, in addition to being a "sponsor" of a federal project, is a dam owner.

To provide access and authority for operation and maintenance of the dams, each district has executed an easement with the landowner in lieu of fee simple title. See Appendix 6 for a copy of a sample easement. Since the landowner maintains title to the land upon which the dam is located, he/she is also considered the "owner," of the dam as defined in the Act. In reality, it is the district that is usually called upon to provide the maintenance and operation of the dam although many landowners -- but unfortunately, not all -- take great pride in "their" dam and do an outstanding job of mowing, trash removal and general care of the dam. However, responsibility for major maintenance features such as gate operation, replacements to structural features, and major repairs falls upon the districts as noted in the previously mentioned agreements.

METHODOLOGY

The Department of Conservation and Recreation contracted with Gannett-Fleming, Inc. to perform detailed engineering studies and analyses of selected dams during the summer and fall of 1997 as outlined in the legislative language. The study was done in three phases consisting of a preliminary reconnaissance phase of the 22 dams which meet the criteria specified by the General Assembly stipulations of Class 1 or Class 2 and built prior to 1969. For details, refer to Appendix 10.

After the preliminary reconnaissance of all 22 dams, detailed inspections were made of major structural features of 16 dams. These 16 dams were selected on a priority basis taking into account the location of the dams, their accessibility, size, and age. Two dams were not considered for the detailed study because one (Hone Quarry, L N River #83, #16503) is being planned for major repair due to damage suffered during recent floods and the other (Marrowbone #1, #08908) is being redesigned for a major upgrade to bring it into compliance with the Dam Safety Act. The respective districts and local land owners were extremely helpful in gaining access to each dam. The study was concluded with a report prepared by the consultant which provided analyses of findings, detailed recommendations, alternative approaches, and cost estimates. See Appendix 5 and refer to the Final Study Report (Appendix 10) for additional details.

Meetings were held with interested parties during the course of the study as follows:

May 5, 1997 in Charlottesville with the Virginia Association of Soil and Water Conservation Districts and the 12 districts which own dams

July 15, 1997 with the Joint Select Committee in Richmond

July 30, 1997 in Verona with the 4 districts which owned dams targeted for special detailed study

September 23, 1997 with the Joint Select Committee in Verona and included a field trip to two district dams

This report also provides details regarding all dams owned by soil and water conservation districts and draws heavily upon a 1991 task force report on Dam Maintenance and Safety Study on district dams prepared by the Virginia Association of Soil and Water Conservation Districts in cooperation with the Virginia Department of Conservation and Recreation, the US Department of Agriculture, the Virginia Association of Counties, the Virginia Municipal League, and the Virginia Soil and Water Conservation Board. This "task force report" contained a detailed analysis of district-owned dam needs and has provided a framework for addressing the needs of the district dams. It has been used as a basis for setting priorities on modification needs and is still today a valuable tool for an overall analysis of these dams.

Limitations

During the course of the study, a question arose pertaining to the districts' authority to enforce easements and their liability. A request was made to the Attorney General's office for assistance in clarifying the districts' authority. See Appendix 4. Because of the liability question, the districts were reluctant to lower the reservoirs. The inspection was therefore limited to what was observable from inside the risers and no attempt was made to inspect the exterior of the concrete by underwater means.

In response to DCR's request, the Office of the Attorney General indicated that the Commonwealth would be liable for claims resulting from a "negligent or wrongful act or omission of a state employee acting within the scope of his employment."

The landowner would not be liable unless he caused the damage.

When the Federal Energy Regulatory Commission inspects dams, they often require the owner to operate the gates to avoid Federal liability. The consultant, Gannett Fleming, Inc., indicated to DCR that if they were to accept the contingent liability of operating the gates, they would have to add that factor into the cost of the study.

Use was made of "As-Built" plans where available to help in analyses of the dams. In the case of Tom's Branch dam, however, the plans did not agree with observed conditions. The cause of this discrepancy could not be determined.

DISCUSSION

Spillway design flood requirements

As part of this overall assessment, ten district dams have been identified as needing major modification or upgrade because they do not meet the criteria for spillway design flood requirements. Nine of these dams were also included in the 1991 task force report. Marrowbone Dam #1 was not included in the 1991 task force report because at that time consideration was being given to transfer of the dam to the City of Martinsville and adding significant storage for water supply. The modifications, however, were never implemented and thus it is still a district-owned dam. The ten dams are discussed under the section Major Modification or Upgrade later in this report.

The 1991 task force report devoted a major emphasis on the need to meet the spillway capacity requirements. At that time, 19 dams had conditional Operation and Maintenance Certificates. Of these, it was estimated that eight would need major upgrades to meet the spillway requirements. The remaining eleven were expected to be brought into compliance with the regulations through further engineering studies. The following is the status of the 19 district dams listed in the 1991 task force report as having conditional certificates and as summarized in Table A.

2 dams have been modified to bring them into compliance with the Act:

South River #4 Leatherwood #2A

8 have been brought into compliance with additional engineering studies

Leatherwood #4	Johns Crk # 2	Johns Crk # 3
Johns Crk # 4	Willis River # 6	South River # 7
Upper Blackwater # 6	Horse Pasture # 2	

9 dams remain from the 1991 list that still have Conditional Certificates:

Leatherwood # 3	Leatherwood # 5	Leatherwood # 6
Johns Creek # 1	South River # 6	South River # 23
South River # 25	South River # 26	Upper Blackwater # 4

TABLE A. DAMS NEEDING UPGRADE OR STUDY PER 1991 TASK FORCE REPORT.

Inv. #	Name	Remarks 1991	Est. Cost 1991	Est. Const Cost 1994	Current Needs Est Cost	Spw. Cap.	Class	Current Cert	Comments
08095	Leatherwood 2A	Mod. Require	39,900	119,317		50%PMF	II	MR	Dam modified
08904	Leatherwood 3	Mod. Require	227,000	170,000	340,000	30%PMF	II	MC	Req. Mod.
08906	Leatherwood 4	Try Reclass.				100 YR	III	MR	Cert w/ detailed study
08902	Leatherwood 5	Mod. Require	128,000	120,000	240,000	30%PMF	II	MC	Req. Mod.
08907	Leatherwood 6	Mod. Require	33,000	130,000	260,000	30%PMF	II	MC	Req. Mod.
04502	John's Creek 1	Try Sec. 3.4		1,000,000	1,800,000	32%PMF	I	MC	Sec. 3.4.tried, not successful
04501	John's Creek 2	Try Sec. 3.4				45%PMF	I	MR	Cert. Sec 3.4
04503	John's Creek 3	Try Sec. 3.4				30%PMF	I	MR	Cert. Sec 3.4
04504	John's Creek 4	Try Sec. 3.4				45%PMF	I	MR	Cert. Sec 3.4
02907	Willis River 6	Try Reclass.				50%PMF	II	MR	Cert. w/ detailed study
01511	South River 4	Mod. Require	120,000	301,858		PMF	I	MR	Dam modified
01509	South River 6	Mod. Require	187,000	210,000	420,000	80%PMF	I	MC	Req. Mod.
01522	South River 7	Mod. Require	82,000			90%PMF	I	MR	Cert w/ detailed study
01508	South River 23	Try Reclass.		150,000	300,000	55%PMF	I	MC	Reduce class tried, unsuccessful
01502	South River 25	Mod. Require	162,000	330,000	660,000	60%PMF	I	MC	Sect.3.4 tried, not successful
01501	South River 26	Try Sec. 3.4		130,000	260,000	50%PMF	I	MC	Sect.3.4 tried, not successful
06702	Upper Blackwater 4	Try Sec. 3.4		270,000	540,000	20%PMF	I	MC	Needs detailed study for 3.4
06701	Upper Blackwater 6	Try Reclass.				50%PMF	II	MR	Cert. w/ detailed study
08909	Horse Pasture 2	Try Sec. 3.4				50%PMF	II	MR	Cert. w/ detailed study
08908	Marrowbone 1			610,000	610,000	32%PMF	I	MC	Des. Mod. Underway
	TOTAL EST COST				5,430,000				

1. The total cost includes funding of $430,000 which has already been spent to bring Leatherwood 2A and So. River #4 up to standards.
2. Marrowbone #1 was not included in 1991 study. It is included here as an impending District need.
3. MR means O&M Certificate
   MC means Conditional O&M Certificate

Water Control Gates and Valves

A particular problem which has been noted for many years, but which has come to light especially during this detailed study, has been the operation of gates on the dams. Typically, the dams had "drawdown" or "low level water release" gates installed when they were built. The purpose of these gates is to enable the owner to readily lower the reservoir to be able to make needed repairs to the inlet structure and to provide a ready means for inspection of features that may otherwise normally be covered with water. These gates, which are made of metal, usually have a life expectancy of 25 or so years -- much less than the expected life of the dam. Therefore gate replacement should be expected as a periodic maintenance need every few decades.

In order to make detailed engineering inspections it is desirable to have the reservoirs drawn down as far as possible. This makes the intake tower (riser) -- both inside and outside -- readily available for inspection. Drawdown also minimizes the flow going through the principal spillway and thus enables better visibility and access for inspection.

The first preference is to open the gate and provide drawdown through the principal spillway. For gates that have historically been periodically operated, this should not be a problem. Of course, there is always a chance that the gate, once opened, would not close completely. This is a risk that, as usual, must be borne by the owner. If the gate cannot be closed, it could result in a loss of the reservoir or permanent pool. Loss of the reservoir, from the dam safety standpoint, is not a problem; however in many or most cases it would be the loss of a valuable local resource.

A possibility would be that the gate, once opened, could get blocked with sediment or debris or otherwise not seal properly upon closing and therefore leak continually even to the point that the desired reservoir level cannot be maintained. Sediment build up near the riser should generally be fined grained and tend to flush itself out. The biggest hazard would probably be old sunken tree limbs or other debris. Each case would need to be handled individually. Alternatives for unblocking gates could include: 1) allowing a complete drawdown and remove the obstruction after the reservoir is down to gate level; or 2) sending down a diver to remove the obstruction (NOTE: THIS CAN BE AN EXTREMELY RISKY OPERATION AND SHOULD ONLY BE ATTEMPTED UNDER SPECIAL, CONTROLLED CONDITIONS. MANY OF THESE GATES OPERATE UNDER A LARGE HYDRAULIC HEAD AND WHEN AN OBSTRUCTION IS SUDDENLY REMOVED, EXTREMELY DANGEROUS FLOW CURRENTS AND PRESSURES CAN OCCUR.)

It is normally recommended that mechanical equipment such as a water control gate be operated regularly (every few months). Otherwise, the mechanism has a chance of getting corroded and "frozen" in place which would render the gate inoperable when needed. Troublesome gates should not be unanticipated and measures, including a

contingency fund, should be included in the maintenance program to address gate problems as they develop. Repair or even a complete replacement is certainly within the realm of funding normally expected in operation of the dam.

Districts should operate these water control gates on a regular basis. It would have been desirable to operate the gates for the detailed inspections conducted as part of this study. However, due to the risk of possible damage, neither the districts nor the local land owners wanted to open or attempt to move the gates without a determination of liability or the financial resources to make any necessary repairs replacements. See discussion below on the detailed inspections. See Appendix 4 for question of liability.

Detailed Inspections

The initial thrust of the detailed inspections was to have provided a reservoir drawdown so that underwater surfaces and the interior of the principal spillways could be readily inspected. Because of the reluctance of the districts to operate the gates as discussed above, it is obvious that the first deficiency is that the water level control gates need to be operated and, if they cannot be operated, they should be made operable. Judging from the appearance of the gates from inside the risers (non-water side) they appeared to be in fairly good condition and it is possible that they could be operated with a minimum of problems. However, there is no way to determine this until they are actually operated.

The detailed inspections made by Gannett-Fleming as part of this study revealed several other deficiencies that cannot otherwise be discovered during regular visual inspections. The major deficiencies involved deteriorating concrete beyond what was normally observable. This was discovered by cutting off the flow of water through the dam's principal spillway and having a person enter the riser for further examination. The conduits and outlet pipe of the drains were inspected by means of a remote video camera.

Due to the inconclusiveness of the status of the drainage systems of several of the dams, consideration needs to be given to the installation of monitoring wells or piezometers at the dams with priority given to those dams with a possible problem. Such monitoring would provide a means to determine the location of the phreatic line in the embankment and thus enable an assessment of the operation of the drainage system. This problem was most apparent at Tom's Branch #01502 which is listed as a Priority 2 Periodic Rehabilitation need. Further investigation and installation of piezometers for Tom's Branch is expected to be in the range of $30,000 to $40,000.

Integrated Flood Observing and Warning System -- IFLOWS

Detailed information of the IFLOWS system is contained in Appendix 2. IFLOWS gages have been installed on 5 district owned dams. These gages are valuable for determining critical situations during flood events. They can, when properly calibrated,

provide information on rainfall quantities at the site and reservoir stage data. This data is especially important for sites which cannot be readily accessible for on-site monitoring during floods.

IFLOWS installations can be a very important asset to monitoring capabilities. It would be helpful to have an operational IFLOWS system on every Class 1 and 2 dam in the state. However, an IFLOWS installation is NOT a substitute for having adequate spillway capacity. Several reasons can be cited for this. For one, an IFLOWS installation does nothing to prevent a dam failure and the dam is still as susceptible to failure as before. Any kind of remote monitoring depends on several specific actions to be effective. The systems are not fool-proof. Although the technology can be made very reliable, the effectiveness still will also depend upon human response-- that is, it depends mainly upon people to make the proper notification to other people who must then be depended upon to take the correct action during an emergency. Perhaps though the most important fact is that most of the dams are on very small drainage areas, steep and mountainous terrain, very remote areas, and subject to very fast, flash flooding. There often is simply insufficient time to react. Most engineers who deal with dams on a regular basis support the conclusions of the fallacy of substituting warning for upgrading the spillway.

NEEDS AND FUNDING TO BE CONSIDERED

When given proper care, earth fill embankment dams have proven to be very effective almost indefinitely. A good operation and maintenance program will help protect the dam against deterioration and prolong its life, resulting in protection not only to the owner but to the general public as well.

Although a dam itself may be designed for a one hundred year life span, it is normally expected that operating gates and other metal features have an expected life span of 25 years and would therefore need replacement several times during the life of the dam. Occasionally, some dams may need major rehabilitation due to some unusual circumstance such as a major flood event. For discussion purposes, the total funding needs for the dams are grouped into three general categories. The three groups are discussed below:

1) regular annual maintenance;
2) periodic rehabilitation; and
3) major modification or upgrade.

Regular Annual Maintenance

These measures are needed on a regular basis, normally on a frequency of at least once each year. Typical activities which should be included in a good maintenance program include:

- mow dam semi-annually
- grazing, if allowed on an embankment, needs to be controlled
- operate drawdown gate twice annually and lubricate annually or as recommended by the manufacturer.
- monitor dam during and immediately following significant rainfall events
- repair fences as needed
- eliminate woody growth and other undesirable vegetation on embankment, along wave berm, stilling basin, outlet channel, AND within 25 feet of all contacts of embankment with natural ground
- clean up debris on embankment and appurtenances as needed
- inspect at least annually

One item that is common to many dams is a perceived inability to mow embankments. It must be emphasized that regular mowing accomplishes two very important items. For one, it reduces the likelihood of unwanted woody vegetation and helps to maintain a desirable cover of close-growing grasses. For another, it keeps the vegetation low enough to enable an inspector to traverse the embankment to detect potential problem areas that may not otherwise be seen. The steepness of the embankments is usually cited as the reason because normal mowing equipment is difficult to use. It should be noted that several manufacturers now have available equipment that is designed especially for mowing steep embankments. While the equipment may be expensive for any one district to purchase for their own use, consideration could be given to a "joint venture" whereby several districts could pool their funding to enable them to do the necessary mowing. Consideration could also be given to the districts contracting with private contractors who also do mowing on steep slopes for VDOT.

The General Assembly appropriated $50,000 for maintenance work for district-owned dams for FY1998. The funding was allocated through the Department of Conservation and Recreation to each of the 12 districts that own dams based on the number of dams owned by each district. Table B indicates the allocation made to the districts and the proposed use of the funds. The activities are still ongoing and Table B is intended to indicate the typical use being made of the funding based on the highest priorities. DCR is tracking progress. The districts appear to be making good use of this funding and are targeting it to provide some of the much needed maintenance on a priority basis. Maintenance with a lower priority still needs attention and it is recommended that, because these dams are a local asset, that local funding options be investigated to provide the balance of the needs.

The 1991 task force report estimated a normal annual maintenance need to be from $1,000 to $2,000 per dam which represents an estimated need of $104,000 to $208,000 for all 104 dams. Based upon the experience of districts which have provided good maintenance and with the limited experience to date with the use made of the maintenance fund for dams, this still appears to be a valid estimate of the needs. Some districts have funding available to supplement the amount appropriated through DCR but other districts have very limited funds and are unable to meet their maintenance needs. Of the estimated maintenance needs of about $100,000 per year, it is expected that approximately $50,000 would be provided through funding by the General Assembly and the balanced financed locally through the districts.

TABLE B. DISTRICT MAINTENANCE ACTIVITIES USING MAINTENANCE FUND

DISTRICT/ NO. OF DAMS	AMOUNT RECEIVED	ACTIVITY**
BLUE RIDGE -----10	$ 4,854	Highest priority is tree removal from 2 dams at an estimated cost of about $1,000. The remaining funding will be used for other maintenance on a priority basis.
CULPEPER --------11	5,340	Bush hog, remove trees and fill ground hog holes on dams.
HANOVER-CAROLINE--1	485	Mowing and liming.
HEADWATERS ------11	5,340	Liming and fertilizing of additional dams.
LORD FAIRFAX -----3	1,456	Mowing of the two earth dams.
MOUNTAIN CASTLE---4	1,942	Spraying to kill unwanted vegetation
PETER FRANCISCO--17	8,252	Bush hogging completed or underway on 11 of the 17 structures based on the highest priorities.
PIEDMONT --------13*	6,311	Mowing completed for 9 dams.
ROBERT E. LEE-----6	2,913	Mowed 4 of the 6 dams and had alders removed from one.
SHENANDOAH VALLEY-7	3,398	Bids to be advertised in December for the hand removal of woody growth.
SOUTHSIDE -------12	5,825	Repairing damage caused by traffic across the crest of four to five dams.
THOMAS JEFFERSON--8	3,884	Bids out for the mowing of six dams with greatest need.
TOTAL ---------- 103*	$ 50,000	

NOTES: * Dam #14741 was not included because it is under a Construction Permit.
**The activities are still ongoing and this list is intended to indicate the typical use being made of the funding based on the highest priorities. DCR is tracking progress.

Periodic Rehabilitation

Periodic rehabilitation is expected to be needed on a more or less irregular and infrequent basis and is required to repair, restore or improve the dams to conditions appropriate for their intended use and ensure long term safety. Some of these types of periodic needs were the subject of the detail inspection provided by the consultant during this study. For a summary and conclusions refer to Appendix 5. Typically, activities which need to be addressed in a good maintenance program include:

- ♦ periodic detailed inspection using remote video or other means to inspect areas not normally accessible
- ♦ repair deteriorating concrete
- ♦ repair or replace deteriorating trash racks, ladders, and railings
- ♦ replace corrugated metal pipes before they completely deteriorate
- ♦ periodically flush and monitor performance of embankment drains
- ♦ repair or install needed structural monitoring devices such as staff gages, monuments, or observation wells
- ♦ major revegetation restoration*
- ♦ removal of unwanted woody vegetation*
- ♦ repair or replace drawdown gates
- ♦ replacement or installation of riprap

* NOTE: These items should not be needed IF proper regular annual maintenance has been performed.

Based upon the detailed inspection of the 22 dams selected for study, recommendations for repairs are grouped in priority order are as follows:

Priority 1 -- repair leaks in concrete

#01507 Upper North River #77 (Hearthstone)
#16502 Lower North River #78 (Briery Branch)
#04502 John's Creek 1

Priority 2 -- deteriorating concrete in riser or monitor embankment

#01501 South River #26(Inch Branch)
#01502 South River #25 Toms Branch
#01508 South River #23 (Robinson Hollow)
#01511 South River #4 Lofton)
#01509 South River #6 (Senger Mountain)

Priority 3 -- minor repairs

#08902 Leatherwood Cr #5
#01514 South River #19 Waynesboro Nursery
#04501 Johns Creek #2

It is expected that the rehabilitation needed to address the concrete deficiencies noted would consist primarily of epoxy or cementitious grouts to fill voids or reduce seepage or leakage and the application of coatings/sealers to restore surfaces. Some of this work will probably require partial or complete drawdown of the reservoirs. Naturally, if this cannot be accomplished by opening of the reservoir drainage gate, the first action would be to make the necessary repairs or replacement of these gates. Based upon experience with work normally needed for the concrete repairs expected to be needed, an estimated cost is expected to be in the $20,000 to $30,000 price range. Gate replacement, if needed, could add another $10,000 to $20,000 per site. Assuming an effort to renovate about five dams per year on a priority basis, the periodic need for these infrequent rehabilitations is thus estimated at about $150,000 per year.

A recommended maintenance program for all 104 district dams would be based upon a rehabilitation need on an average frequency of about 20 to 30 years. This would translate to about 4 or 5 dams per year which could be accomplished for about $150,000 per year with preference given to the highest priorities listed above. In order to establish priorities for these needed rehabilitations, extension of the detailed study is recommended at an estimated cost of about $125,000 per year. The additional detailed inspections may reveal some needs more critical than those identified as priority 3 above.

Major Modification or Upgrade

This category of need refers to dams that need major upgrades because they do not meet current recognized dam safety criteria or standards. It is a type of upgrade that is normally not anticipated but occurs because the dam has had a change in hazard class.

The classification of a dam is not static. Downstream conditions, including land use, can and often do change. Although a dam itself may remain relatively stable, it is subject to reclassification if a change occurs in the downstream inundation zone. For example, if new homes are built in the downstream potential inundation zone of a Class 2, 3 or 4 dam, the dam could be reclassified to Class 1.

Most of the district-owned dams met the federal engineering standards at the time they were built. However, subsequent downstream development has necessitated a change in classification. A change in classification can create a dilemma because when a dam is reclassified, it usually does not meet the higher standards of the new classification. To meet the required higher standards, the owner of the dam is often required to make expensive modifications. Several district-owned dams were built as Class 2 or 3 and are currently designated as a higher potential hazard. Because of the spillway capacity requirements for the higher classification, most of these dams do not now meet the Dam Safety Act and Regulations and are therefore deficient. Currently, 12 District-owned dams have conditional certificates. See following list.

Inventory No	Name of Dam	Class
01501	South River #26	1
01502	South River #25	1
01508	South River #23	1
01509	South River #6	1
04502	Johns Creek #1	1
06702	Upper Blackwater River #4	1
08908	Marrowbone Creek #1	1
16503	Lower North R. #83	1
16507	Lower North R. #82	1
08902	Leatherwood Creek #5	2
08904	Leatherwood Cr. #3	2
08907	Leatherwood Creek #6	2

Of the twelve district dams having Conditional Certificates, two dams #16503 and #16507 carry conditional certificates because they have had significant flood damage. Both are in the process of being repaired through assistance of the USDA Natural Resources Conservation Service at a total cost of about $500,000. As soon as the repair work is completed, it is expected that both of these dams can receive regular certificates.

The remaining ten dams have Conditional Certificates because they do not meet the required spillway design flood requirements. These ten dams will require major modification or upgrade and are listed in Table C in the order of their proposed priority. It is estimated that the funding required to upgrade these ten dams is about 5.4 million dollars. This estimated total cost is based upon updated construction cost estimates made in 1994 and updated to current total cost as part of this study. As long as no other changes occur in the classification of district dams, this should be considered as a one time need to bring these dams into conformance with the dam safety act and regulations.

It should be noted that 79 district dams are Class 2 or Class 3. If downstream areas develop, some of these dams could be subject to reclassification. To avoid the need for expensive modifications of these dams in the future, all affected parties should recognize the impact that downstream development can have on the required standards for a dam. Before downstream development occurs, its potential impact on the owner of a dam should be recognized as a part of local land use planning. Educating land use planners of this relationship is the most efficient way to prevent the problem rather than to ignore the issue and attempt to meet the increased safety requirements later.

TABLE C. ESTIMATED COST and PRIORITIES FOR MAJOR MODIFICATION OR UPGRADE

Inv. No.	Name	Current Needs Est.	Spw. Cap.	Class	Priority
#08908	Marrowbone 1	610,000	32% PMF	1	1
#06702	Upr Blackwater 4	540,000	20% PMF	1	2
#04502 *	John's Creek 1	1,800,000	32% PMF	1	3
#01501 **	South River 26	260,000	50% PMF	1	4
#01508 **	South River 23	300,000	55% PMF	1	5
#08902 ***	Leatherwood 5	240,000	30% PMF	2	6
#08907	Leatherwood 6	260,000	30% PMF	2	7
#08904	Leatherwood 3	340,000	30% PMF	2	8
#01502 **	South River 25	660,000	60% PMF	1	9
#01509 **	South River 6	420,000	80% PMF	1	10
TOTAL		5,430,000			

Note: These dams are also identified as needing periodic rehabilitation based on the detailed inspections conducted as part of this study:

* Priority 1

** Priority 2

*** Priority 3

CONCLUSIONS

Dams owned by soil and water conservations districts have served the citizens of the Commonwealth well for many years but can continue to do so only if they are properly maintained. Although these dams were built using sound engineering procedures they cannot continue to serve their intended function in a safe manner without proper care and maintenance.

In general their needs are broken down into three main categories:

1) Regular annual operation and maintenance. The districts and local land owners can usually handle this by themselves but some districts need to be more diligent about controlling vegetation on and adjacent to the embankments. Districts also need to operate water level control gates on a regular and systematic basis and anticipate periodic problems that will need to be addressed.

2) Periodic rehabilitation. This needs to be anticipated every few decades as some of the structural features begin to deteriorate. Periodic repair and/or replacement of water level control gates needs to be anticipated.

3) Major upgrades. Since 1991, the number of district dams that do not meet the requirements of the Virginia Dam Safety Act and regulations has been reduced from 19 to 10. Major upgrades are still needed at those 10 dams and it is recommended that effort be devoted to removing these deficiencies on the basis of their listed priority. A reasonable approach would be an effort to upgrade one dam every year or so based on their priority. An effort is currently underway to upgrade the Marrowbone Creek dam. The Natural Resources Conservation Service is providing the design services and some funding for the upgrade has been appropriated through the General Assembly.

Continuing funding needs for the district owned dams can be summarized as follows:

Annual needs for regular operation and maintenance	$ 100,000 per year
Periodic needs for infrequent rehabilitation	$ 150,000 per year
Major modification or upgrade for 10 dams	$5,430,000 one time effort for the ten dams spread over ten years
Continue study of all SWCD dams	$ 125,000 per year for 2 yrs.

APPENDICES

APPENDIX 1

SUMMARY OF DISTRICT DAMS

APPEND[illegible] SUMMARY OF DISTRICT DAMS

I_NO	NAME_DAM	OWNER_NAME	CLASS	CERT_TYPE	CERT_DATE	PMT_TYPE	PMT_DATE	TOT_HT	TOT_CAP	YR_COMP	COUNTY
06701	Upper Blackwater River Dam #6	Blue Ridge SWCD	2	MR	05/18/95			50	672	1972	FRANKLIN
06702	Upper Blackwater River Dam #4	Blue Ridge SWCD	1	MC	03/20/97			59	338	1974	FRANKLIN
08902	Leatherwood Creek Dam #5	Blue Ridge SWCD	2	MC	07/18/96			57	2997	1963	HENRY
08904	Leatherwood Cr. Dam #3	Blue Ridge SWCD	2	MC	07/18/96			41	2400	1964	HENRY
08905	Leatherwood Creek Dam #2A	Blue Ridge SWCD	2	MR	09/19/96			52	1750	1964	HENRY
08906	Leatherwood Creek Dam #4	Blue Ridge SWCD	3	MR	05/19/93			42	432	1964	HENRY
08907	Leatherwood Creek Dam #6	Blue Ridge SWCD	2	MC	07/18/96			32	500	1964	HENRY
08908	Marrowbone Creek Dam #1	Blue Ridge SWCD	1	MC	07/18/96			46	2343	1960	HENRY
08909	Horse Pasture Creek Dam #2	Blue Ridge SWCD	2	MR	07/15/93			38	459	1972	HENRY
08912	Horse Pasture Creek Dam #1C	Blue Ridge SWCD	3	MR	09/18/97			53	985	1973	HENRY
04701	Mountain Run Dam #8A	Culpeper SWCD	3	MR	05/15/97			34	1870	1959	CULPEPER
04705	Mountain Run Dam #13	Culpeper SWCD	3	MR	05/15/97			30	1140	1960	CULPEPER
04706	Mountain Run Dam #18	Culpeper SWCD	1	MR	07/18/96			43	2290	1973	CULPEPER
11302	Beautiful Run Dam #2A	Culpeper SWCD	3	MR	09/21/95			39	688	1965	MADISON
11303	Beautiful Run Dam #4	Culpeper SWCD	3	MR	09/21/95			29	86	1967	MADISON
11304	Beautiful Run Dam #5	Culpeper SWCD	3	MR	09/18/97			27	77	1967	MADISON
11305	Beautiful Run Dam #6	Culpeper SWCD	3	MR	09/21/95			29	195	1968	MADISON
11306	Beautiful Run Dam #7	Culpeper SWCD	3	MR	09/21/95			26	133	1969	MADISON
11307	Beautiful Run Dam #10	Culpeper SWCD	3	MR	09/21/95			28	89	1969	MADISON
11308	Beautiful Run Dam #11	Culpeper SWCD	3	MR	09/18/97			30	309	1968	MADISON
11309	Beautiful Run Dam #1B	Culpeper SWCD	3	MR	12/05/95			35	452	1977	MADISON
08502	South Anna #52 B	Hanover-Caroline SWC	3	MR	01/16/92			33	2019	1973	HANOVER
01522	South River Dam #7	Headwater SWCD	1	MR	03/18/93			46	690	1957	AUGUSTA
01501	South River Dam #26	Headwaters SWCD	1	MC	07/10/97			57	868	1956	AUGUSTA
01502	South River Dam #25	Headwaters SWCD	1	MC	07/10/97			62	1281	1957	AUGUSTA
01505	Upper North River Dam #10	Headwaters SWCD	3	MR	09/17/92			68	865	1963	AUGUSTA
01507	Upper North R. #77	Headwaters SWCD	1	MR	07/20/95			110	3680	1966	AUGUSTA
01508	South River Dam #23	Headwaters SWCD	1	MC	07/10/97			49	919	1956	AUGUSTA
01509	South River Dam #6	Headwaters SWCD	1	MC	07/10/97			56	1283	1959	AUGUSTA
01511	South River Dam #4	Headwaters SWCD	1	MR	11/10/94			56	890	1959	AUGUSTA
01512	South River Dam #11	Headwaters SWCD	1	MR	07/20/95			27	292	1957	AUGUSTA
01513	South River Dam #24	Headwaters SWCD	2	MR	09/17/92			35	330	1954	AUGUSTA
01514	South River Dam #19	Headwaters SWCD	2	MR	09/17/92			35	1034	1957	AUGUSTA
17101	Stony Creek Dam #9	Lord Fairfax SWCD	1	MR	01/18/96			73	3260	1971	SHENANDOAH
17102	Stony Creek Dam #10	Lord Fairfax SWCD	1	MR	01/16/97			71	1910	1971	SHENANDOAH
17104	Woodstock Dam	Lord Fairfax SWCD	1	MR	05/18/95			44	102	1957	SHENANDOAH
04501	Johns Creek Dam #2	Mountain Castles SWC	1	MR	03/17/94			51	1334	1967	CRAIG
04502	Johns Creek Dam #1	Mountain Castles SWC	1	MC	03/21/96			62	3759	1967	CRAIG
04503	Johns Creek Dam #3	Mountain Castles SWC	1	MR	03/19/92			50	292	1968	CRAIG
04504	Johns Creek Dam #4	Mountain Castles SWC	1	MR	03/17/94			95	1022	1966	CRAIG

APPENDIX 1. SUMMARY OF DISTRICT DAMS

02901	Willis River Dam #1A	Peter Francisco SWCD	3	MR	09/19/96			42	3183	1975	BUCKINGHAM
02902	Willis River Dam #1B	Peter Francisco SWCD	3	MR	09/19/96			44	1204	1975	BUCKINGHAM
02903	Willis River Dam #3	Peter Francisco SWCD	3	MR	05/16/96			44	871	1974	BUCKINGHAM
02904	Willis River Dam #4	Peter Francisco SWCD	3	MR	05/16/96			44	1102	1974	BUCKINGHAM
02905	Willis River Dam #5E	Peter Francisco SWCD	3	MR	05/16/96			42	1448	1972	BUCKINGHAM
02906	Willis River Dam #5F	Peter Francisco SWCD	3	MR	05/16/96			43	1178	1972	BUCKINGHAM
02907	Willis River Dam #6	Peter Francisco SWCD	2	MR	05/16/96			47	4922	1972	BUCKINGHAM
02908	Willis River Dam #6A	Peter Francisco SWCD	3	MR	05/16/96			33	1036	1973	BUCKINGHAM
02909	Willis River Dam #7	Peter Francisco SWCD	3	MR	09/19/96			38	3251	1969	BUCKINGHAM
02910	Willis River Dam #9	Peter Francisco SWCD	3	MR	05/16/96			36	590	1969	BUCKINGHAM
02911	Muddy Creek Dam #1	Peter Francisco SWCD	3	MR	09/18/97			39	997	1962	BUCKINGHAM
02912	Muddy Creek Dam #2	Peter Francisco SWCD	3	MR	09/18/97			33	495	1962	BUCKINGHAM
02919	Willis River Dam #2	Peter Francisco SWCD	3	MR	09/19/96			46	2730	1975	BUCKINGHAM
02933	Slate River Dam #14	Peter Francisco SWCD	3	MR	09/18/97			40	1814	1982	BUCKINGHAM
02934	Slate River Dam #13	Peter Francisco SWCD	3	MR	09/18/97			35	1318	1983	BUCKINGHAM
02935	Slate River Dam #8	Peter Francisco SWCD	3	MR	09/18/97			50	2919	1984	BUCKINGHAM
02936	Slate River Dam #7	Peter Francisco SWCD	2	MR	06/18/92			50	2670	1991	BUCKINGHAM
14701	Buffalo Creek Dam #1	Piedmont SWCD	3	MR	09/19/96			35	2537	1966	PRINCE EDWAR
14702	Buffalo Creek Dam #3	Piedmont SWCD	3	MR	09/19/96			51	2018	1966	PRINCE EDWAR
14703	Buffalo Creek Dam #4	Piedmont SWCD	3	MR	09/19/96			46	5064	1967	PRINCE EDWAR
14706	Buffalo Creek Dam #2	Piedmont SWCD	3	MR	09/19/96			35	1537	1963	PRINCE EDWAR
14707	Buffalo Creek Dam #5	Piedmont SWCD	3	MR	09/19/96			37	1350	1965	PRINCE EDWAR
14708	Buffalo Creek Dam #6	Piedmont SWCD	3	MR	09/19/96			38	1373	1965	PRINCE EDWAR
14709	Buffalo Creek Dam #7	Piedmont SWCD	3	MR	09/19/96			36	623	1965	PRINCE EDWAR
14710	Buffalo Creek Dam #8	Piedmont SWCD	3	MR	09/19/96			38	619	1965	PRINCE EDWAR
14711	Buffalo Creek Dam #9	Piedmont SWCD	3	MR	09/19/96			41	608	1968	PRINCE EDWAR
14734	Bush River Dam #2	Piedmont SWCD	2	MR	09/19/96			49	2245	1985	PRINCE EDWAR
14736	Bush River Dam #7	Piedmont SWCD	3	MR	09/19/96			44	3570	1990	PRINCE EDWAR
14739	Bush River Dam #5	Piedmont SWCD	3	MR	03/16/95			39	1010	1994	PRINCE EDWAR
14740	Bush River #6	Piedmont SWCD	3	MR	05/16/96			37	1810	1995	PRINCE EDWAR
14741	Bush River Dam #4B	Piedmont SWCD	3			CO	07/10/97	48	7277		PRINCE EDWAR
01102	East Fork Falling River #7	Robert E. Lee SWCD	3	MR	07/18/96			47	1442	1958	APPOMATTOX
01103	East Fork Falling River #15	Robert E. Lee SWCD	3	MR	07/18/96			38	907	1956	APPOMATTOX
01104	East Fork Falling River #21	Robert E. Lee SWCD	3	MR	07/18/96			36	414	1956	APPOMATTOX
03101	Little Falling River Dam #1	Robert E. Lee SWCD	3	MR	07/18/96			44	3132	1967	CAMPBELL
03103	Little Falling River Dam #2	Robert E. Lee SWCD	3	MR	07/18/96			42	584	1968	CAMPBELL
03104	Little Falling River Dam #3	Robert E. Lee SWCD	3	MR	07/18/96			34	578	1966	CAMPBELL
16501	Lower North R. #80	Shenandoah Valley SW	1	MR	05/15/97			87	1345	1967	ROCKINGHAM
16502	Lower North R. #78	Shenandoah Valley SW	1	MR	05/15/97			89	2550	1968	ROCKINGHAM
16503	Lowe R. #83	Shenandoah Valley SW	1	MC	[illegible]	AL	09/18/97	93	2167	1968	ROCKINGHAM
16507	Lowe R. #82	Shenandoah Valley SW	1	MC	[illegible]	AL	09/18/97	120	5780	1980	ROCKINGHA

APPENDIX 1 'MARY OF DISTRICT DAMS

16509	Shoemaker River Dam #1A	Shenandoah Valley SW	1	MR	05/15/97			52	545	1980	ROCKINGHAM
16510	Shoemaker River Dam #4C	Shenandoah Valley SW	1	MR	05/15/97			86	2159	1984	ROCKINGHAM
16511	Shoemaker River Dam #3B	Shenandoah Valley SW	1	MR	05/15/97			74	792	1986	ROCKINGHAM
03703	Roanoke Creek Dam # 35A	Southside SWCD	3	MR	09/18/97			45	900	1960	CHARLOTTE
03704	Roanoke Creek Dam # 68	Southside SWCD	3	MR	09/18/97			32	1575	1961	CHARLOTTE
03705	Roanoke Creek Dam #5B	Southside SWCD	3	MR	09/18/97			34	1379	1962	CHARLOTTE
03706	Roanoke Creek Dam #6A	Southside SWCD	3	MR	09/18/97			36	1819	1962	CHARLOTTE
03707	Roanoke Creek Dam # 49A	Southside SWCD	3	MR	09/18/97			34	2130	1963	CHARLOTTE
03708	Roanoke Creek Dam # 62	Southside SWCD	3	MR	09/18/97			44	3373	1964	CHARLOTTE
03709	Roanoke Creek Dam # 67	Southside SWCD	3	MR	09/18/97			32	1470	1960	CHARLOTTE
03710	Roanoke Creek Dam # 4A	Southside SWCD	3	MR	09/18/97			36	473	1962	CHARLOTTE
03711	Roanoke Creek Dam # 61A	Southside SWCD	3	MR	09/18/97			36	794	1963	CHARLOTTE
03712	Roanoke Creek Dam # 31B	Southside SWCD	3	MR	09/18/97			30	1718	1967	CHARLOTTE
03713	Roanoke Creek Dam #54	Southside SWCD	3	MR	09/18/97			37	2798	1968	CHARLOTTE
03715	Roanoke Creek Dam # 43A	Southside SWCD	3	MR	09/18/97			31	2219	1975	CHARLOTTE
10902	Little River Dam #4	Thomas Jefferson SWC	3	MR	03/21/94			32	1699	1966	LOUISA
10904	South Anna Dam #5	Thomas Jefferson SWC	2	MR	05/18/95			31	1405	1973	LOUISA
10905	South Anna Dam #7	Thomas Jefferson SWC	3	MR	03/17/94			34	715	1970	LOUISA
10924	Little River Dam #1	Thomas Jefferson SWC	3	MR	03/17/94			37	1534	1976	LOUISA
10931	South Anna Dam #3	Thomas Jefferson SWC	2	MR	05/18/95			33	990	1980	LOUISA
10932	South Anna Dam #4	Thomas Jefferson SWC	3	MR	05/18/95			32	2100	1981	LOUISA
10933	South Anna Dam #6B	Thomas Jefferson SWC	3	MR	03/17/94			36	1380	1980	LOUISA
10935	South Ann Dam #23	Thomas Jefferson SWC	3	MR	03/17/94			32	417	1983	LOUISA
	NOTES:										
	MR=Certificate										
	MC=Conditional Certificate										
	CO=Construction Permit										
	AL=Alteration Permit										

APPENDIX 2

INTEGRATED FLOOD OBSERVING AND WARNING SYSTEM

IFLOWS

APPENDIX 2

INTEGRATED FLOOD OBSERVING AND WARNING SYSTEM -- IFLOWS

IFLOWS became operational for the first time in 1981, in a pilot program involving twelve counties in Kentucky, Virginia, and West Virginia. Over the past ten years, IFLOWS has grown considerably, both in size and in capability. It is now operational at approximately 200 locations in twelve eastern states, including Pennsylvania, Connecticut, New York, New Jersey, North Carolina, Tennessee, Maryland, and Ohio. Its complement of 1,600 plus automated rainfall and stream stage sensors makes it one of the largest surface weather observing networks in the world.

The Virginia network includes 38 participating local jurisdictions, the state Emergency Operations Center, and four National Weather Service (NWS) offices. The network is currently monitoring 243 rain gages and 46 stream gages. Virginia is also interfaced with the Kentucky, West Virginia, and Tennessee networks. The data from more than 600 sensors is available from a single site.

IFLOWS was conceived by the NWS in 1979. Its primary objective is to collect, disseminate, and analyze real-time rainfall and stream stage information to help local and state emergency management personnel predict and react to the threat of flooding. Unlike locality-based systems, IFLOWS operates over large geographic areas, and supports information sharing among localities as a keystone of its design. Moreover, all information gathered by IFLOWS is supplied to the National Weather Service for incorporation into its forecast procedures.

IFLOWS is unique in another way. It is a cooperative venture involving the NWS as well as state and local governments. The NWS provides overall program management and most capital equipment. State and local governments provide day-to-day operational support and maintenance. Horizon Data Systems of Richmond, Virginia, provides design, development, and system support services under contract funding provided by the NWS.

Each participating IFLOWS locality has a small computer system located in a central dispatch area, and several automated rainfall and/or stream stage gages, usually in headwater areas, that report observations to the computer by radio. The data is analyzed comparing reported values against pre-determined thresholds, and the system can sound alarms when these threshold levels are exceeded. IFLOWS can provide real-time data in a variety of formats, and allows users to modify alarm thresholds. In addition, users can exchange messages with all other IFLOWS network locations, including NWS offices. In some cases, voice communication among IFLOWS sites is provided as well.

At the same time, each computer exchanges its information with nearby systems using combinations of radio, microwave, telephone lines, and, in Pennsylvania, satellite. In

this way, each locality (and state personnel) can observe and respond to events with as much warning as possible. IFLOWS even exchanges real-time information among independent state systems, providing the maximum possible geographic coverage.

An important IFLOWS feature recently added to the system is its ability to create and maintain, in real-time, an external file of current observations and the relative threat posed by each, determined by user-defined thresholds. Programs outside IFLOWS can access this file, analyze its contents, and respond accordingly. It is precisely this mechanism that EIS uses to obtain the current rainfall data that drives the Proactive Flood Monitoring.

APPENDIX 3

TABLE 1
from
VIRGINIA DAM SAFETY REGULATIONS

TABLE I

Class of Dam	Hazard Potential If Impounding Structure Fails	SIZE CLASSIFICATION Maximum Capacity(Ac-Ft)[a]	Height (Ft)[a]	Spillway Design Flood(SDF)[b]
I	Probable Loss of Life;Excessive Economic Loss	Large > 50,000 Medium > 1,000 & < 50,000 Small > 50 & < 1,000	> 100 > 40 & < 100 > 25 & < 40	PMF[c] PMF 1/2 PMF to PMF
II	Possible Loss of Life; Appreciable Economic Loss	Large > 50,000 Medium > 1,000 & < 50,000 Small > 50 & < 1,000	> 100 > 40 & < 100 > 25 & < 40	PMF 1/2 PMF to PMF 100-YR to 1/2 PMF
III	No Loss of Life Expected; Minimal Economic Loss	Large > 50,000 Medium > 1,000 & < 50,000 Small > 50 & < 1,000	> 100 > 40 & < 100 > 25 & < 40	1/2 PMF to PMF 100-YR to 1/2 PMF 50-YR[d] to 100-YR[e]
IV	No Loss of Life Expected; No Economic Loss to Others	> 50 (non-agricultural) > 100 (agricultural)	> 25 (both)	50-YR to 100-YR

a. The factor determining the largest size classification shall govern.

b. The spillway design flood (SDF) represents the largest flood that need be considered in the evaluation of the performance for a given project. The impounding structure shall perform so as to safely pass the appropriate SDF. Where a range of SDF is indicated, the magnitude that most closely relates to the involved risk should be selected. The establishment in this regulation of rigid design flood criteria or standards is not intended. Safety must be evaluated in the light of peculiarities and local conditions for each impounding structure and in recognition of the many factors involved, some of which may not be precisely known. Such can only be done by competent, experienced engineering judgement, which the values in Table 1 are intended to supplement, not supplant.

c. PMF: Probable Maximum Flood. This means the flood that might be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. The PMF is derived from the current probable maximum precipitation (PMP) available from the National Weather Service, NOAA. In some cases local topography or meteorological conditions will cause changes from the generalized PMP values; therefore, it is advisable to contact local, state or federal agencies to obtain the prevailing practice in specific cases.

d. 50-Yr: 50-Year Flood. This means the flood magnitude expected to be equaled or exceeded on the average of once in 50 years. It may also be expressed as an exceedence probability with a 2 percent chance of being equaled or exceeded in any given year.

e. 100-Yr: 100-Year Flood. This means the flood magnitude expected to be equaled or exceeded on the average of once in 100 years. It may also be expressed as an exceedence probability with a 1 percent chance of being equaled or exceeded in any given year.

APPENDIX 4

LETTERS TO ATTORNEY GENERAL
dated
May 12, 1997
and
July 29, 1997

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural Resources

Kathleen W. Lawrence
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 302

TDD (804) 786-2121 Richmond, Virginia 23219-2010 (804) 786-6124 FAX (804) 7866141

MEMORANDUM

To: Fred Fisher
From: Sandy Liddy Bourne
Subject: SWCD Watershed Dam Easements
Date: May 12, 1997

Enclosed is a request from Headwaters Soil and Water Conservation District that relates to the legal authority soil and water conservation districts have in enforcing easements to the watershed dams owned by the districts as they attempt to maintain and repair the dams. There is some potential concern that a few landowners may not provide access to the dams. We are preparing to study the structural integrity of the dams under HJR 446 and answers to the questions posed in the letter will provide us with useful information in this regard.

Thank you for your timely assistance in this matter.

cc Kathleen W. Lawrence
Charles Horn
Joe Haugh
Jack Frye

Headwaters
Soil & Water Conservation District
P.O. Box 70
Verona, Virginia 24482-0070
(540) 248-4328 or 248-4518

VIRGINIA SOIL & WATER CONSERVATION

May 9, 1997

Alexandra Liddy Bourne
Department of Conservation and Recreation
203 Governor Street, Suite 302
Richmond, VA 23219

Dear Ms. Bourne:

I want to thank you for your willingness to have DCR help us obtain a decision from the Attorney General's office on the easement questions I raised at the meeting on May 5th. I feel it would be better to know for sure the extent of our authority to study and make repairs in case a gate valve does not close and a lake is drained. This is of special concern at South River #6 where the original landowner developed a campground that has been sold and developed into timeshare camp sites.

Enclosed are examples from South River Dam #25 (Toms Branch) of easements, deeds, and Operation and Maintenance Agreement between the Soil Conservation Service and the District. Also I included two easements from South River #6 (Stoney Creek). The easements are virtually the same. Because of this I did not include easements for all the dams. If this is necessary contact me and I will make copies and forward to you.

I need to note that the easements are granted to the Shenandoah Valley Soil Conservation District. The Headwaters Soil and Water Conservation District was formed from the Shenandoah Valley District in 1975 and takes in the 13 South River and 3 North River watershed structures.

The questions that I need answered are:

1. Does the fact that the Headwaters District is not the original easement holder create any problems.

2. If the landowners around a lake formed by the flood control dam are uncooperative, can we still proceed with lowering water levels to investigate and make repairs to the risers.

3. If the gate valve does not close and the lake is drained dry, is the District obligated to make immediate repairs (since you know money is seldom available) or is a lake even obligated under the easement.

You have already warned me that an answer from the Attorney General's office is usually slow in coming. Yet I am sure you realize how important this investigative study is and how excited our District is to finally have some appropriated money to do so. I hope you can relay this to the Attorney General's office to speed the process.

Sincerely,

John Kaylor

John Kaylor, Conservation Technician

Enc.

cc: Charles E. Horn, Chairman, HSWCD
Richard P. Coon, Chairman Dam Safety and Main. HSWCD
Ralph Denney, Associate Director, HSWCD
Joseph S. Haugh, Director, Division of Dam Safety, DCR
Gerald L. Jones, District Dam Safety Consultant, DCR
Charles W. Wade, Field Operations Manager, DCR
A. Lee Ervin, Augusta Co. Commonwealth Attorney
Plunkett & Woodworth, PC, Attorneys, Co. of Augusta

George Allen
Governor

Becky Dunlop
Secretary of Natural Resources

Kathleen W. Lawrence
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 302
TDD (804) 786-2121 Richmond, Virginia 23219-2010 (804) 786-6124 FAX (804) 7866141

MEMORANDUM

To: Frederick S. Fisher, Assistant Attorney General
From: Alexandra Liddy Bourne, Chief Deputy Director
Subject: HJR 446 Study of SWCD Owned Dams
Date: July 29, 1997

The 1997 General Assembly passed HJR 446 requiring the study of Soil and Water Conservation District Dams; Chapter 356 establishing a Soil and Water Conservation District Dam Maintenance and Repair Fund; and appropriated $125,000 to the Department of Conservation and Recreation for the study of the repair and maintenance costs of Soil and Water Conservation District Dams. Twelve Districts own 103 dams. DCR has completed the initial reconnaissance phase of the study and is preparing to go forward with the field review of the structural integrity of thirteen dams selected as top priority flood control structures .

There is a concern about liability for the next phase of the study. It is necessary to draw down the water level for all the dams to gather further data. Several of the dams have not had their gates open for years. There is a possibility that opening the gates or attempting to open the gates for the study could damage the structures including the possibility that they will not be able to close the gates, thus risking total drainage of the body of water. None of the 13 dams have significant downstream development. The flood control structures are for a single purpose, ie., they are not used for recreational purposes or for water supply to a locality.

The Districts hold conservation easements for access to the structures and were appropriated $50,000 for small repair and maintenance. Private landowners own the property around the flood control structures. Should damage occur, who is liable; DCR, the Districts, the General Assembly, all of the above, or the landowner? The Districts basically want to know who will bear the brunt of the cost if damage occurs beyond what exists during the time of the study?

I have brought this matter to the attention of Legislative Services, specifically Marty Farber, who suggested that I confer with you.

cc Kathleen W. Lawrence
Sen. Emmett W. Hanger, Jr
Joseph S. Haugh
Martin G. Farber

APPENDIX 5

DAMS STUDIED IN DETAIL

APPENDIX 5

Dams studied in detail

The following 22 dams were the subject of the detailed study by Gannett Fleming, Inc. during the Summer and Fall of 1997. All 22 dams were given a preliminary reconnaissance during the week of June 23-27, 1997 and 16 of the 22 were selected for detailed study. Two sites, #08908 and #16503, were deleted from further investigation because plans are being made to make rather major modifications to both in the near future.

I_NO	NAME_DAM	TV Insp	Comments
08902	Leatherwood Cr#5	Yes	Roots noted in drain. Some concrete deterioration. Repair needed. *
08904	Leatherwood Cr#3	No	Gap between pipe and headwall needs repair *
08905	Leatherwood Cr#2A	No	n/a
08907	Leatherwood Cr#6	Yes	Crack in riser slab *
08908	Marrowbone Cr #1	No	Major rehab planned - inadequate spwy.*
01522	South River #7	Yes	n/a
01501	South River #26	Yes	Concrete pitted and in poor condition. Needs major repair. Gate stem needs replacement. *
01502	South River #25	Yes	Exp. aggregate. Minor repair needed. Riser was replaced about 1987. Embankment drain absent. Stability evaluation recommended. *
01507	Upper North R #77	Yes	Conc. deficiencies in riser need repair.
01508	South River #23	Yes	Concrete is poor and pitting. Repair needed. *
01509	South River #6	Yes	Poor concrete condition. Needs repair. *
01511	South River #4	Yes	Riser is pitting. Some exposed steel. Needs minor repair.
01512	South River #11	Yes	n/a

I_NO	NAME_DAM	TV Insp	Comments
01513	South River #24	Yes	Riser was replaced in 1984.
01514	South River #19	Yes	Aggregate exposed. Minor repair needed.
04501	Johns Creek #2	Yes	Minor deterioration of concrete. Minor repair needed. Drain filled with sand.
04502	Johns Creek #1	No	Concrete deficiencies in riser need repair. *
04503	Johns Creek #3	No	n/a
04504	Johns Creek #4	Yes	Exp. aggregate. Minor repair needed.
16501	Lower North R. #80	Yes	n/a
16502	Lower North R. #78	Yes	Conc. deficiencies in riser need repair.
16503	Lower North R. #83	No	Major spillway repair underway.

*** NOTE:These dams are also noted as having deficient emergency spillway capacity and are listed as needing major modification or upgrade. See Table C in main body of the report.**

General conclusions of the detailed inspections were as follows: More detail is included in the final report prepared by the consultant.

1. Severe concrete deficiencies have been discovered at three dams listed below as Priority 1 (Hearthstone, John's Creek 1 and Briery Branch). Although not considered an emergency situation at present, the condition is sufficiently severe to warrant repair as soon as practicable. The dams listed as Priority 2 should be repaired as funds are available.

2. Conduits appear to be in good condition with no evidence of joint separation resulting from settlement of the embankments. Some minor stress cracks were observed but are not considered significant. Of the dams which were not inspected during this study, there are several (about six) that were built with corrugated pipe. Such pipe is normally expected to have a life span of 30 to 50 years and these pipes should be given a detailed inspection prior to reaching that age.

3. The embankment drains appear to be in good condition. Although corrosion has been noted at the exit end, there is no evidence of deterioration internal to the embankment. Most of the pipe coating appears to be in good condition. Some deposits were evident in some of the drains. The source/cause of deposits and

their overall effect of potential drain failures on slope stability need to be further investigated.

4. The limited sampling of structures did not reveal trends which would correlate structural deficiencies to geographic location. In general, the most serious deficiencies in the riser seem related to construction procedures on the more massive structures constructed after 1960. Various degrees of concrete pitting were observed, most notably on structures constructed prior to 1960. The major deficiencies discovered could not have been detected without internal inspection methods. The detailed inspections should be continued with top priority given to the 65 dams built prior to 1969.

5. The entire detailed inspection process could be enhanced by a lowering of the reservoir level using the water level control gates. Due to the reluctance of the districts to take on the responsibility and liability associated with gate operation, the gates were not operated. It is recommended that the districts be required to regularly operate these gates to provide access for inspection and repair and that they have some funding mechanism to be able to provide any needed gate repairs or replacements should they develop.

Rehabilitation needed to address the concrete deficiencies noted during this study is expected to consist of epoxy or cementitious grouts to fill voids or reduce seepage or leakage and application of coatings/sealers to restore surfaces. Some of this work will probably require partial or complete drawdown of the reservoirs. Naturally, if this cannot be accomplished by opening of the reservoir drain, the first action would be to make the necessary repairs or replacement of these drainage gates. Based upon experience with work normally needed for the concrete repairs expected to be needed, an estimated cost is expected to be in the $20,000 to $30,000 price range. Gate replacement, if needed, could add another $10,000 to $20,000 per site. Assuming an effort to renovate about five dams per year on a priority basis, the periodic need for these infrequent rehabilitations is thus estimated at about $150,000 per year.

Recommendations for repairs grouped in priority order are as follows:

Priority 1 -- repair leaks in concrete
- #01507 Upper North River #77 (Hearthstone)
- #16502 Lower North River #78 (Briery Branch)
- #04502 John's Creek 1

Priority 2 --repair or replace deteriorating concrete in risers
- #01501 South River #26(Inch Branch)
- #01508 South River #23 (Robinson Hollow)
- #01511 South River #4 Lofton)
- #01509 South River #6 (Senger Mountain)

Priority 3 -- more minor repairs

#08902 Leatherwood Cr #5
#01502 South River #25 Toms Branch
#01514 South River #19 Waynesboro Nursery
#04501 Johns Creek #2

The dams listed as priority 1 and priority 2, while not in a state of imminent failure, should be repaired as soon as practicable. If left unrepaired, they will continue to deteriorate and at some time could lead to failure of the principal spillway to operate and lead to other serious problems at the dam. Dams listed as priority 3 as well as the other dams studied should be continued to be monitored for signs of further deterioration and repaired as funds are available.

APPENDIX 6

SAMPLE EASEMENT
between
District and Landowner

South River #6

41762

WATERSHED PROTECTION EASEMENT

THIS INDENTURE, made this 1st day of May, 1958 by Lena W. Vines, single - Lillian V. Davis, widow - Flora V. Wiseman, widow and Carrie E. Vines, single, hereinafter referred to as the Landowners, and the Shenandoah Valley Soil Conservation District, hereinafter referred to as the Local Organization,

WITNESSETH THAT:

WHEREAS, The Secretary of Agriculture, United States Department of Agriculture, is authorized by the Watershed Protection and Flood Prevention Act to carry out a program of assistance to Local Organizations in planning and installing works of improvement for flood prevention or agricultural phases of the conservation, development, utilization and disposal of water, and

WHEREAS, the Local Organization is cooperating in said program for the purpose of installing a project in the South River watershed a subwatershed of the Potomac River watershed, State of Virginia, in connection with which it desires to secure certain rights in, over and upon the hereinafter described land of the Landowner,

THEREFORE, for and in consideration of One Dollar ($1.00) and the benefits accruing to the Landowner from the installation of said project, and other good and valuable considerations, the receipt whereof is hereby acknowledged, the Landowners do hereby grant, bargain, sell, convey and release unto the Local Organization an easement in, over and upon the following described land situated in the County of Augusta, State of Virginia, to-wit:

A portion of a tract of land located in Rivershead District adjoining the National Forest Land and the Palmer Estate, now owned by H. A. and Mary C. Senger. The location of the tract is as shown on the attached plat. The easement boundary will be the maximum flood pool line as drawn on the plat not to exceed one acre in area.

1. The Local Organization shall have the right, privilege and authority to use said land for the temporary storage of flood waters that may be impounded by any dam or other reservoir structure described below:

An earth fill flood water retarding structure located on the H. A. Senger, land approximately 400 feet downstream.

2. The Local Organization shall be responsible for operating, maintaining, and keeping in good repair the works of improvement herein described.

3. The Landowners reserve the right to use said land or any part thereof at any time and for any purpose, provided such use does not interfere with the full enjoyment by the Local Organization of the easement herein conveyed.

4. The easement herein conveyed shall be subject to any easements, rights-of-way, or mineral reservations or rights now outstanding in third persons.

5. In the event (a) the works of improvement herein described are not installed on said land within sixty (60) months from the date hereof, or (b) the easement described herein is abandoned, the rights, privileges, and authority granted hereunder to the Local Organization shall be terminated.

IN WITNESS WHEREOF, the Landowners have executed this instrument on the day and year first above written.

Lena W. Vines
Lena W. Vines - single

Carrie E. Vines
Carrie E. Vines - single

Lillian V. Davis
Lillian V. Davis - widow

Flora V. Wiseman
Flora V. Wiseman, - widow

41762

Recorded in the Clerk's Office of the Circuit Court for the County of Augusta

Mar 2

19 58, at 1:50 A.M. P.M.

Deed Book No. 439 Page 452

Tax	
Transfer	
Recording Plat	4.00
Total	4.00

Teste: Rudolph K. Shaver Clerk

County of Augusta
State of Virginia

I Bowman Jr., a notary public in and for the State and County aforesaid whose commission expires on the 15 day of January 1961, do hereby certify that Lena W. Vines, whose name is signed to the foregoing writing bearing date on the 1 day of May, 1958 personally appeared before me in my County aforesaid and acknowledged the same this 1 day of May, 1958.

Bowman Jr.
Notary Public

County of Augusta
State of Virginia

I Bowman Jr, a notary public in and for the State and County aforesaid whose commission expires on the 15 day of January 1961, do hereby certify that Carrie E. Vines, whose name is signed to the foregoing writing bearing date on the 1st day of May, 1958 personally appeared before me in my County aforesaid and acknowledged the same this 1st day of May, 1958.

Bowman Jr.
Notary Public

County of Augusta
State of Virginia

I Bowman Jr, a notary public in and for the State and County aforesaid whose commission expires on the 15th day of January 1961, do hereby certify that Lillian V. Davis, whose name is signed to the foregoing writing bearing date on the 1st day of May, 1958 personally appeared before me in my County aforesaid and acknowledged the same this 1st day of May, 1958.

Bowman Jr.
Notary Public

County of Augusta
State of Virginia

I Bowman Jr, a notary public in and for the State and County aforesaid whose commission expires on the 15 day of January 1961, do hereby certify that Flora V. Wiseman, whose name is signed to the foregoing writing bearing date on the 1 day of May, 1958 personally appeared before me in my County aforesaid and acknowledged the same this 1 day of May, 1958.

Bowman Jr.
Notary Public

VIRGINIA: In the Clerk's Office of the Circuit Court of Augusta County. This instrument, with the certificate of acknowledgment thereto annexed, is admitted to record at 1:50 o'clock P.M. May 2 19 58. The State Tax of ..... paid.

TESTE: Rudolph P. Shaver CLERK

APPENDIX 7

SAMPLE AGREEMENT
between
District and USDA

Potomac River FP Project
South River Sub-Watershed
Augusta County, Virginia

OPERATION AND MAINTENANCE AGREEMENT

THIS AGREEMENT, made and entered into the 6 day of October, 1958, by and between the Soil Conservation Service, United States Department of Agriculture, hereinafter referred to as the "Service," and the Shenandoah Valley Soil Conservation District, hereinafter referred to as the "District" relates to the operation and maintenance of the following described Works of Improvement:

01510 Flood Retarding Structure No. 3, located on Poor Creek near Greenville, Va..

01509 Flood Retarding Structure No. 6, located on Cold Springs Creek near Greenville, Virginia.

01512 Flood Retarding Structure No. 11, located on Canada Run, near Sherando, Va..

01514 Flood Retarding Structure No. 19, located near Lyndhurst, Virginia.

01508 Flood Retarding Structure No. 23, located in Robinsons Hollow near Lyndhurst, Virginia.

01513 Flood Retarding Structure No. 24, located near Lyndhurst, Virginia.

01502 Flood Retarding Structure No. 25, Located on Toms Branch near Sherando, Va..

01501 Flood Retarding Structure No. 26, located on Inch Branch near Lyndhurst, Va..

All Structures are in Augusta County, Virginia and are a part of the South River Flood Control Project, Potomac River Watershed.

The estimated annual cost for operating and maintaining the works of improvement herein described is $50.00/ per structure based on present construction costs.

I. OPERATION

The parties hereto agree as follows to the operation of the works of improvement:

A. The Service will provide such technical services as are available for assistance in the proper operation of the works of improvement.

B. The District will:

1. Be responsible for operation of the works of improvement simultaneously with the receipt of a written notice from the Service that the works of improvement have been accepted from the contractor.

2. Prohibit the installation of gates or other obstructions of any kind being placed in any portion of the principal or emergency spillway(s).

3. Prohibit any works to raise any portion of the spillways above the planned elevation or to deflect or decrease the planned flow through the spillways in any manner.

4. Prohibit the installation of Mikes or other structures which may decrease the capacity of the flood channel or deflect the flow from the constructed channel bottom.

5. Take all other necessary steps to insure that the works of improvement are permitted to function in the manner for which they were designed, and are operated in accordance with any applicable state law.

II. MAINTENANCE

The parties hereto agree as follows to the maintenance of the works of improvement:

A. The Service Will:

1. Inspect the works of improvement at least annually.

2. Prepare and furnish to the District a report of inspection findings including recommendations for maintenance work needed and when such work should be completed.

3. Provide such technical services as are needed and available for preparing plans, designs and specifications for needed maintenance of the works of improvement.

B. The District will:

1. Be responsible for maintenance of the works of improvement simultaneously with the receipt of a written notice from the Service that the works of improvement have been accepted from the contractor.

2. Inspect the works of improvement at least annually and after every major storm or the occurrence of any other unusual condition that might adversely affect the works of improvement to insure proper functioning and to check for possible damage or deterioration. Items to be checked at time of inspection may include, but not be limited to, the following:

a. Principal spillways.
   (1) Damage or obstructions.
   (2) Condition of outlet and riser.
      (a) Signs of seepage.
      (b) Separation of joints.
      (c) Cracks or breaks.
      (d) Differential settlement.
   (3) Sediment level in relation to top of riser.

b. Emergency spillways - drainage ways.
   (1) Erosion
   (2) Sedimentation
   (3) Weeds, logs and other obstructions or accumulations reducing channel capacity.
   (4) Conformity with original design (deposition or sloughing).

c. Reservoir area.
   (1) Undesirable vegetative growth.
   (2) Cut or fallen trees.
   (3) Slash and other debris.

d. Embankments.
   (1) Settlement or cracking.
   (2) Erosion
   (3) Leakage
   (4) Rodent, wildlife or livestock damage.
   (5) Condition of vegetative cover.

e. Fences and Gates.
   (1) General Condition - Repairs needed.
      (a) Loose or damaged posts.
      (b) Loose or broken wires.
      (c) Accumulated debris.
      (d) Open gates.

3. Perform all maintenance needs indicated by inspections and reports thereof within the time limits specified, if any, in such manner as not to damage the works of improvement in any way and in accordance with any applicable state laws. Maintenance may include, but not be limited to, the following:

a. Remove and burn debris.
b. Refill, smooth and vegetate rilling on embankments, spillways, and drainage ways.
c. Realign disposal channel where needed.
d. Repair damaged riprap or other works.
e. Repair fences and gates where needed.
f. Other maintenance work as indicated in Service inspection reports.

4. Prepare a report for each inspection performed and furnish one copy to the Service. Maintain a record of all maintenance work performed and make such records available for review by the Service.

5. Perform operation and maintenance by Local Contract

6. Obtain operation and maintenance funds by Operation and Maintenance Agreement entered into between the District and the Commonwealth of Virginia, Department of Welfare and Institutions for Flood Retarding Site No. 3.

   An agreement between the District and the City of Waynesboro, whereby the city of Waynesboro will provide funds for maintenance of the balance of the structures.

III. IT IS MUTUALLY AGREED THAT:

A. Government representatives shall have the right of free access to inspect the works of improvement at any time.

B. Whenever possible the parties to this agreement will make their annual inspections jointly. It is desirable that the annual inspections be made during the months of February, March, or April. Any supplemental inspections then determined necessary will be scheduled and agreed to at that time.

C. The District will secure prior Service approval of any agreement(s) to be entered into with other parties for any operation or maintenance of these works of improvement and furnish the Service with 2 copies of such agreements. The District also will notify in writing the party assuming operation or maintenance responsibilities under the agreement and provide the Service with 2 copies of such notification.

No Member of or Delegate to Congress, or Resident Commissioner shall be admitted to any share or part of this agreement or to any benefit to arise therefrom. This provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

The signing of this agreement was authorized by a resolution of the governing body of the Shenandoah Valley Soil Conservation District, Harrisonburg, Virginia adopted at a meeting held on July 24, 1958.

SHENANDOAH VALLEY SOIL CONSERVATION DISTRI

By: [signature]
Chairman of Board

Date: July 24, 1958

Soil Conservation Service
United States Dept. of Agriculture

By: [signature]
Acting State Conservationist

Date: Oct 6, 1958

COOPERATIVE AGREEMENT

01510

FOR

MAINTENANCE OF FLOODWATER RETARDING STRUCTURES

South River Sub-Watershed

This agreement for the maintenance of a floodwater retarding structure, designated as Dam No. 3, South River Watershed, is entered into by the Shenandoah Valley Soil Conservation District, referred to hereafter as the District, and the Commonwealth of Virginia, Department of Welfare and Institutions, Richmond, Virginia, hereinafter referred to as the Farmer, and is in addition to the provisions agreed to in the Farmer-District Cooperative Agreement No. A-862-B-GC-49 and the terms of the Watershed Protection Easement for Dam No. 3, South River Watershed.

The District agrees to:

1. Provide regular inspection of the structure and technical advice on proper maintenance.

The Farmer Agrees to:

1. To protect the structure and adjoining improvements from harmful grazing.

2. To furnish and apply fertilizer and seed as needed to maintain an adequate sod on structure, spillway and adjoining improvements.

3. To mow or otherwise control weeds and other objectionable growth as may be necessary to maintain adequate sod on said structure, spillway and improvements.

4. To generally use and protect said structure and improvements in such manner that the continuing function thereof will in no wise be impaired.

5. To remove all debris that may lodge in and impair function of mechanical spillway.

6. To repair damage to structure or spillway caused by rilling, washing and etc.

(Signed) E. W. Armstrong
E. W. Armstrong, Chairman
Board of Supervisors
Shenandoah Valley SCD

(Signed) Richard W. Copeland
Commonwealth of Virginia
Dept. of Welfare & Institutions

APPENDIX 8

Interim Memorandum

Gannett Fleming
ENGINEERS AND PLANNERS

GANNETT FLEMING, INC.
P.O. Box 67100
Harrisburg, PA 17106-7100
Location:
207 Senate Avenue
Camp Hill, PA 17011
Fax: (717) 763-1808
Office: (717) 763-7211

September 22, 1997

Joseph S. Haugh, P.E.
Chief of Dam Safety
203 Governor Street, Suite 206
Richmond, VA 23219

RE: SWCD Dam Inspection
Interim Memorandum

Dear Mr. Haugh:

At this time, we are at about the mid-point of the inspection program for damsites you have identified in the Blue Ridge, Headwaters, Mountain Castle and Shenandoah Districts. The purpose of this study is to inspect specified structural features -- namely, the risers, conduits and embankment drains -- which are not accessible for viewing without employing confined space entry procedures and/or video equipment mounted on a remote operating vehicle.

The following is a preliminary summary of findings based upon our limited visual reconnaissance of all 22 listed sites and a more detailed inspection of risers, conduits and embankment drains at the first six selected sites. We are currently preparing to initiate the final phase of inspections, which will be followed by a more comprehensive report.

The 22 reconnaissance visits were performed during the week of June 23 to June 27, 1997, primarily to assess access and dewatering requirements for inspection of the risers, conduits and embankment drains. The findings of the cursory visual inspections were used to develop a matrix of site conditions for prioritizing the order of detailed inspections. The matrix, along with other supporting documentation from the reconnaissance visits, was compiled in a memorandum, dated July 15, 1997, and our conclusions from the site visits were summarized verbally during a July 16, 1997 meeting with the Division of Dam Safety. At that time, we indicated there was no compelling evidence of structural deficiencies at any of the visited sites which would influence the priorities for detailed inspections. On that basis, 20 of the 22 sites were jointly categorized into three levels of priority, attempting to assure that the more detailed inspections will include a balanced sampling of sites within the available limits of funding. Consideration for establishing priorities included the comparative age of the structures, the comparative height of embankments, the physiographic setting, along with access and dewatering requirements necessary to complete the more detailed inspections. Two of the sites, Marrowbone and Hone Quarry, were deleted from further consideration for inspection at this time, because of pending maintenance/repair contracts for rehabilitating or enlarging the emergency spillways. The prioritized listing is enclosed for reference.

The first phase of the more detailed inspections was performed on six selected sites during the week of August 11 through August 15, 1997. In order to minimize travel and maximize the number of first phase inspections, all of the sites for the first phase of inspection were grouped in the Shenandoah and Headwaters Districts. Three of these sites (Wilda, Waynesboro Nursury and Sengers Mountain Lake) were the only ones among the 22 listed dams which had no discharge through the principal spillway. The remaining three dams (Hearthstone, Union Springs and Briery Branch) have two stage risers, with actively flowing low-level cold water intake pipes. These intakes were temporarily blocked off for inspection using inflatable packers. The camera was advanced through the conduit at each site, using a pan-and-tilt mechanism to provide head-on viewing of each conduit joint, except at Sengers Mountain Lake, where the televising was straight through the conduit. The embankment drain outlets were flushed as necessary to clear siltation prior to televising. All four walls of the riser structure were televised for full depth. Concrete deficiencies are referenced with respect to the top of structure. For reference, all four sides of the riser exterior were also video taped above the water line for record. Four of the six sites had embankment drains with outlets consisting of 6- to 10-inch-diameter corrugated-metal pipe.

Video tapes and field logs of the first six inspected sites were provided to the Division of Dam Safety during a meeting on August 21, 1997. General conclusions of the first inspections were as follows:

1. Conduits, all of which are concrete, appear to be in good condition with no evidence of joint separation resulting from settlement of the embankment. Some minor stress cracks were observed in the pipe crown which are not considered significant.

2. Concrete deficiencies (primarily leaks and spalls at the apparent location of cold joints) were revealed in two of the six riser structures (Hearthstone and Briery Branch). Neither of these conditions are considered to constitute an emergency at present, however, the leakage is severe at Briery Branch, which may inhibit maintenance of normal pool level. The risers at both sites warrant repair to prevent further deterioration of the concrete and reinforcing steel.

3. The embankment drains appear to be in good condition. Although corrosion has been observed at the exit end, there is generally no evidence of deterioration internal to the embankment. Most of the pipe coating appears to be in good condition. However, friable black fragments of what appears to be bituminous coating were flushed out of the drains at Union Springs when water was jetted into the drains with a power washer to remove silt. Deposits were evident in the drain outlets at one site. The source/cause of deposits and the overall effect of potential drain failures on slope stability need to be further investigated.

4. The limited sampling of structures did not reveal trends which would correlate structural concrete deficiencies to the age of the structure or the site location. In general, the most serious deficiencies in the riser seem to be related to construction procedures. Various degrees of concrete pitting were also observed, but the major deficiencies were not readily detectable without inspection from the interior.

5. The limited sampling of structures did not reveal trends which would correlate embankment drain clogging to the age of the structure or the site location. Conclusive evidence of silt migration (piping) through the filter or drain pipe joints has not been revealed by the inspection to date. The next phase of inspection will be composed entirely of dams with embankment drains to further investigate drain condition and occurrence of deposits.

The proposed final phase of inspection was devised to complete inspections on all the priority 1 and 2 dams. The dams with embankment drains (but without impact basins) were given preference for inspection among the priority 3 sites which were selected to complete the inspection schedule. The proposed dam sites, and proposed optional sites which will be inspected if time allows, are shown by the attached table. The final phase of inspections will broaden the sampling base by covering a wider geographic area. As a result of this wider geographic sampling, the findings may be affected by the different material sources available for construction and/or potentially more compressible foundation conditions beneath the embankments.

During the final phase of this study, we will also evaluate options for repair of concrete structures. These options are expected to include injection of epoxy or cementitious grouts to fill voids and eliminate or reduce seepage/leakage, and application of coatings/sealers to restore surfaces. Some of this work may require partial or complete impoundment drawdown which may provide the opportunity to assess reservoir drain operability. Based on our experience with work of this nature, costs for concrete repair, exclusive of drawdown, staging and mobilization, can be expected to range form $20,000 to $30,000 per site.

Other recommendations for repairs which may result from further inspection are related to the source of deposits located in the drain outlets, and to potential failure of embankment drains and procedures for rehabilitation. Piezometers to evaluate phreatic levels within the embankment may be warranted to compete stability analyses to assess dependence on drain performance. Costs for design and repair work to rehabilitate drain systems, if necessary, are site specific and have not been developed for this interim report.

We trust sufficient general information is provided with this interim report and the video documentation that has been previously made available, and we appreciate the opportunity to continue to assist the Division of Dam Safety with this study.

Very truly yours,

GANNETT FLEMING, INC.
Water Resources and Geotechnical Division

WILLIAM B. BINGHAM, P.E.
Vice President
Manager, Dam and Flood Control Section

WBB/cb

Dam No.	Name	Year Const.	Height (Feet)	Embankment Drains	Priorities of 7/16/97	Televised Inspections
08908	Marrowbone Creek No. 1	1960	46	1	Deleted	
08902	Leatherwood Creek No. 5	1963	57	2 - Silted ?	1	Proposed
08904	Leatherwood Creek No. 3	1964	41	2 - In impact Basin	3	
08905	Leatherwood Creek No. 2	1964	32	2 - In impact Basin	3	Proposed
08907	Leatherwood Creek No. 6	1964	32	2 - Clogged	2	Proposed
04504	Johns Creek No. 4	1966	95	2 - In impact Basin	1	Proposed
04501	Johns Creek No. 2	1967	51	2 - Clean	2	Proposed
04502	Johns Creek No. 1	1967	62	2 - Rt. Clogged	3	Proposed Optional
04503	Johns Creek No. 3	1968	50	N/A	3	
16501	Union Springs - Lower North River No. 80	1967	87	2 - Silted ?	1	8/11/97
16502	Briery Branch - Lower North River No. 78	1968	89	N/A	1	8/12/97
16503	Hone Quarry - Lower North River No. 83	1968	93	N/A	Deleted	
01513	Happy Hollow - South River No. 24	1954	35	1 - Clean	2	Proposed
01501	Inch Branch - South River No. 26	1956	57	1 - Silted ?	3	Proposed
01508	Robinson Hollow - South River No. 23	1956	49	1	3	Proposed Optional
01502	Toms Branch - South River No. 25	1957	62	1 - Damaged End	2	Proposed
01522	Wilda - South River No. 7	1957	46	1	1	8/14/97
01512	Canada Run - South River No. 11	1957	27	1 - Silted ?	3	Proposed
01514	Waynesboro Nurs. - South River No. 19	1957	35	1 - Clean	1	8/14/97
01509	Sengers Mnt. Lake - South River No. 8	1959	56	1	3	8/15/97
01511	Lofton - South River No. 4	1959	56	N/A	3	
01507	Hearthstone - Upper North River No. 77	1966	66	N/A	1	8/13/97

APPENDIX 9

Virginia's Program for Safe Dams

testimony presented at meeting of
Joint Select Committee
on
July 15, 1997
by
Joseph S. Haugh, Director, Division of Dam Safety

VIRGINIA'S PROGRAM FOR SAFE DAMS

by Joseph S. Haugh, P.E[1]

INTRODUCTION

I appreciate the opportunity to appear before you today to discuss the Virginia Dam Safety program and especially on the relationship with dams owned by the several Soil and Water Conservation Districts.

I would like to begin by providing just a brief background and where dam safety has gone over the past couple of decades. Some of you may recall that back in the 1970s' that there was a considerable amount of interest, effort, debate, and activity about responsibility for dams. To no one's surprise, the responsibility issue came around to the point that it was the owner who is responsible for the safety of his or her dam. There was also pretty much unanimous agreement that no one wanted the federal government to come in and apply federal standards to privately owned dams. This is where the states come in. The Association of State Dam Safety Officials has done a super job at coordinating these efforts throughout the country.

VIRGINIA AND DAM SAFETY

Virginia is no different from many other states in that we have many dams out there that no one is paying much attention to. Most people are not surprised to learn that Virginia has more than 1,500 lakes. People are generally aware of the lakes and drive by them or otherwise notice them on a daily basis. However people do not generally realize that only two of these lakes occur naturally. The remainder are created by dams. Of these 1,500 or so dams, 477 are under jurisdiction of the state dam safety program.

Since 1986, the number of dams in full compliance with the Virginia dam safety program has gone from about 28 dams to 425 dams. However, it takes continual vigilance to make sure that owners know how to take care of their dams.

Owners do not want their dams to fail. While that may sound like a very trite statement and although it should be obvious, the truth is that many owners do not have any earthly idea about how to take care of a dam. Maybe they've never been told, perhaps they forgot, or it may be a new owner. When I see a dam with its upstream slope neatly

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[1]Director, Division of Dam Safety, Virginia Department of Conservation and Recreation. Remarks prepared for discussion at meeting of the Joint Select Committee Studying Dams, Richmond, VA, July 15, 1997.

mowed and in good shape, then turn around and see the downstream slope grown up in a jungle of large trees, it brings me back to the reality that not all owners are aware of the needs to care for their dams. One of the primary roles of our staff is education of the owners who must respond and take care of their dams.

RESPONSIBILITY AND PARTNERSHIP

Virginia's dam safety program is tailored on the fundamental precept that responsibility for the safety of each dam rests with its owner and that the Commonwealth is responsible for the safety of its citizens. Virginia's dam safety program relies on a partnership involving: the owner who is ultimately responsible for the safety of each dam; the private sector which provides the needed engineering assistance; and the Virginia Soil and Water Conservation Board which ensures that the public interest is served and makes the program viable. Virginia's program contrasts sharply with that of many other states in that we rely heavily upon the use of private consultants to provide the engineering inspections of dams.

DIVERSITY OF DAMS

The dams covered under the program are quite diverse. Most are earth embankments but there are also several other types including concrete gravity, arch, and now we are beginning to see a few roller compacted concrete dams. Ownership includes local municipalities, home owner associations, local water authorities, companies, private citizens, and the State. Private owners make up about half of the dams we regulate.

SPILLWAY REQUIREMENTS

Some have questioned the design requirements for high hazard dams. As you may be aware, the design criteria for dams where failure would result in a probable loss of human life, requires that the spillway be capable of passing an extremely large flood – up to the probable maximum flood (PMF). Admittedly, this size flood is very extreme. Some owners of dams contend that the criteria is too extreme because their dam has been in place for many years and has never experienced such a large flood. My answer to them is that have been very lucky. We also have to recognize that we humans often have a very limited perspective and short term time frame. In defense of such extreme criteria, I would cite a couple of recent examples.

Can a PMF happen? Ask the folks in Nelson County who went through Hurricane Camille in 1969. I have heard reports of 31 inches in five hours . . . or ask the folks in

Madison County where, according to at least one report, a rainfall of about 24 inches occurred in June 1995.

On June 22, 1995, the Timber Lake Dam near Lynchburg failed. That was a terrible tragedy but, considering the fact that the rainfall was much more intense than the dam was expected to handle, it was certainly not unexpected. The dam was simply not capable of withstanding a flood of that intensity. Virginia continued to experience major flooding for several more days and several dams in the Commonwealth received significant damage. Floods the following winter and then followed by Hurricane Fran in September 1996 continued to devastate much of the state. Many owners are still trying to catch up with making repairs to some of the dams that were damaged by these floods.

The point is that in any specific area, we can go for several decades without having a very large storm and then get "dumped on" with one of these huge floods.

CHANGING CLASSIFICATION

A problem that we deal with continually relates to classification of dams and how it can change with time. Dams are classified based on their potential to cause damage if they were to fail. This obviously means that a dam's class depends on what happens to be downstream. Usually the owner of the dam has no control over future land use in the downstream area. If land use intensifies, the owner may be left with a dam that does not meet the appropriate standards for the now higher class dam. In other words, a dam's classification can change with time through actions by others and over which the dam's owner has no control. The responsibility for meeting these higher standards is on the owner even though he or she may have done nothing to cause the change. These are not trivial matters. It is very expensive to upgrade a dam to the higher standard. There may be a better way to keep these uncontrolled changes from occurring but obviously we start getting into the very sensitive issue of land owners' rights. It may take a little imaginative thinking to deal with this problem before it occurs when the solution may be much less expensive. We obviously need to do a better job in dealing with this reclassification problem. We cannot hide our head in the sand and pretend that the problem does not exist.

STUDY OF DAMS OWNED BY SOIL AND WATER CONSERVATION DISTRICTS

Over the next several months, DCR will be making a study of dams owned by Soil and Water Conservation Districts. We had a meeting in Charlottesville on June 5 with District leaders to initiate some dialog about the study. I would like to touch on a couple of items that may be of interest to this committee.

One of the items will be to look at is the adequacy of any dam to meet changing land use needs. As noted earlier, a dam's classification and its resulting requirements for spillway capacity depends on the what happens to be downstream. Any dam that does not currently have a spillway capacity meeting the Probable Maximum Flood requirements could be vulnerable if downstream land use changes to require a reclassification of the dam. Only 14 of the 104 District owned dams have a spillway capable of passing a full PMF. Although we do not expect land use below many of the other 90 dams to change, nevertheless, as we all know, any attempt to predict future land use changes is fraught with uncertainty and such changes could happen unless there is some commitment or requirement by local land use planners and decision-makers to bite the bullet and provide some positive assurance to keep the downstream land use in line with the hazard classification of each dam. We do have to recognize that if the land use changes do occur, it could require a reclassification of the dam. The resultant spillway capacity requirements can present a very significant financial burden on the owner.

Part of the study will consist of a detailed assessment of Class 1 and 2 District-owned dams built prior to 1969. Specifically, that comes to 23 dams. We have hired a consultant and are in the initial reconnaissance phase. This phase consists of a field reconnaissance of 22 of these dams to assess their general condition and to provide a basis for setting priorities for further, more detailed studies. We anticipate that these more detailed studies will consist of inspections of the interior of pipes and other structural features which are not normally inspected by more routine inspections. These inspections will utilize modern technology such as remote operated video cameras and/or divers to inspect non-accessible areas. These assessments should provide us with a better idea of the long term outlook for these dams and enable the Districts to plan for their future needs. We do not expect to be able to perform this detailed assessment for all 23 dams. However, we should be able to provide a pretty good indication of their overall integrity and their risk to life, health, safety, and welfare of the public as well as the long-term infrastructure needs and the maintenance and repair costs of the dams. Hopefully, it will also provide us with more insight as to what to anticipate on the overall long-term condition of many other dams which are not owned by Districts.

USE OF IFLOWS

Integrated Flow and Observation Warning Systems (IFLOWS) have been suggested by some as a substitute for providing spillway capacity. First, let me explain briefly what IFLOWS is. I understand that Stan Campbell, from the Department of Emergency Services, is here and will explain how this works in more detail and, I'm sure more succinctly. Basically, an IFLOWS installation on a dam is a device to record, in real time, the level of the reservoir and the rainfall that falls at the dam. The information is

transmitted to another location, usually a county emergency operations center, which can interpret this data using a set of parameters for the particular dam and be able to provide an emergency response in event of an impending emergency situation. Virginia's Dam Safety Act was amended in 1993 to permit the installation of IFLOWS on SWCD dams while awaiting funds to correct emergency spillway deficiencies.

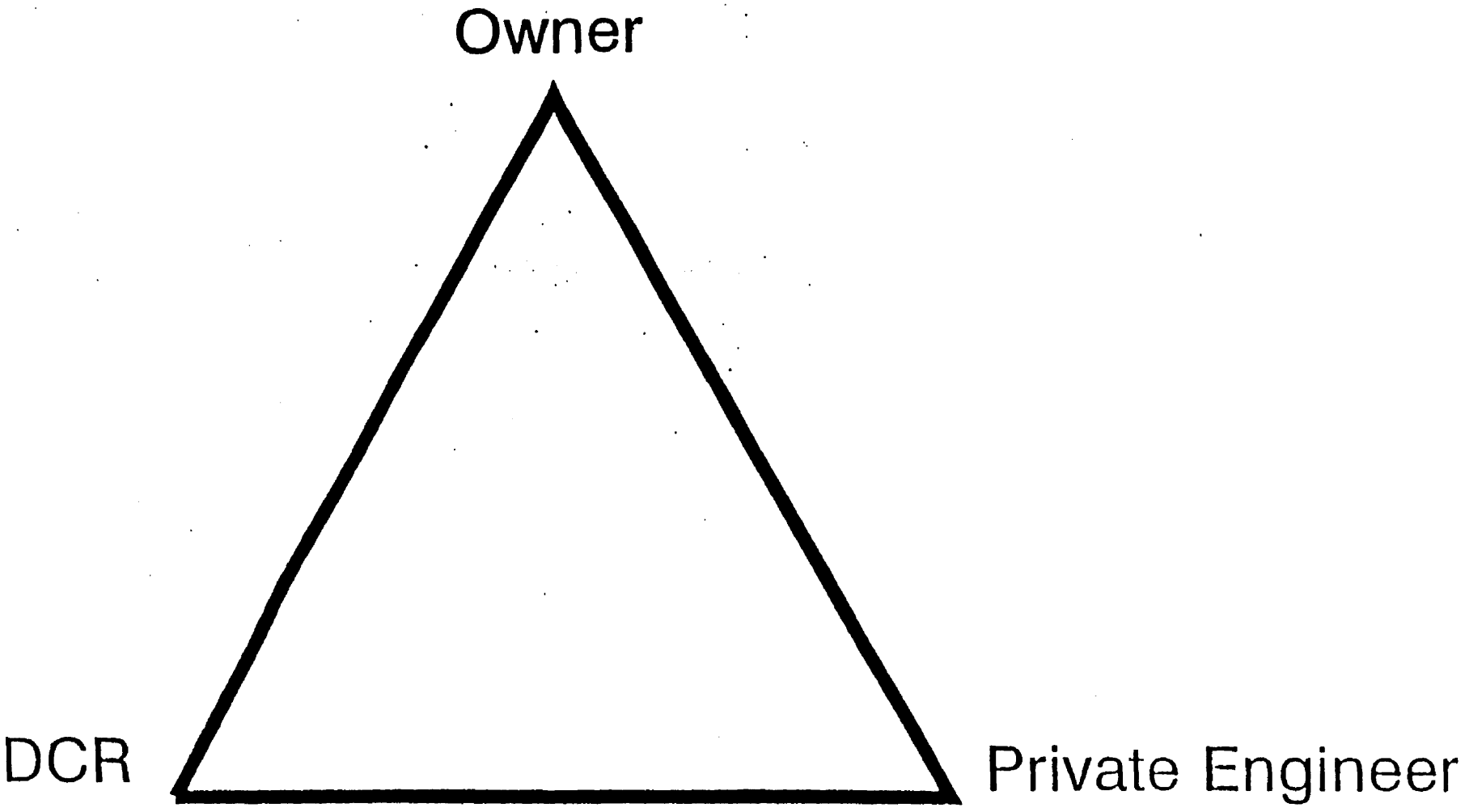
Let me say, very emphatically, that I fully support IFLOWS installations. I wish that we had them on every Class I and 2 dam in the state. They are almost essential at any site that cannot be readily reached overland due to inclement weather. However, and again I will say this very emphatically, an IFLOWS installation is NOT a substitute for having an adequate spillway. I can cite several reasons for this. For one, an IFLOWS installation does nothing to prevent a failure and the dam is still as susceptible to a failure as before. Any kind of remote monitoring depends on several specific actions to be effective. They are not fool-proof. Although the technology can be made very reliable, the effectiveness still will depend upon human response— that is, it depends mainly upon people to make the proper notification to other people who must then be depended upon to take the correct action during an emergency. Perhaps though the most important fact is that most of these sites are on very small drainage areas, very steep, mountainous terrain, very remote areas, and subject to very fast, flash flooding. There often is simply insufficient time to react. I don't think that I'm out there by myself on this subject. I think that almost all engineers who deal with dams on a daily basis will support my conclusions on the fallacy of substituting warning for fixing the spillway. I will readily admit that the IFLOWS installations are cheaper than increasing capacity of a spillway. Somehow or other though, we have to admit that it is expensive to modify any spillway. Just as with many other items in our infrastructure, there are no cheap fixes.

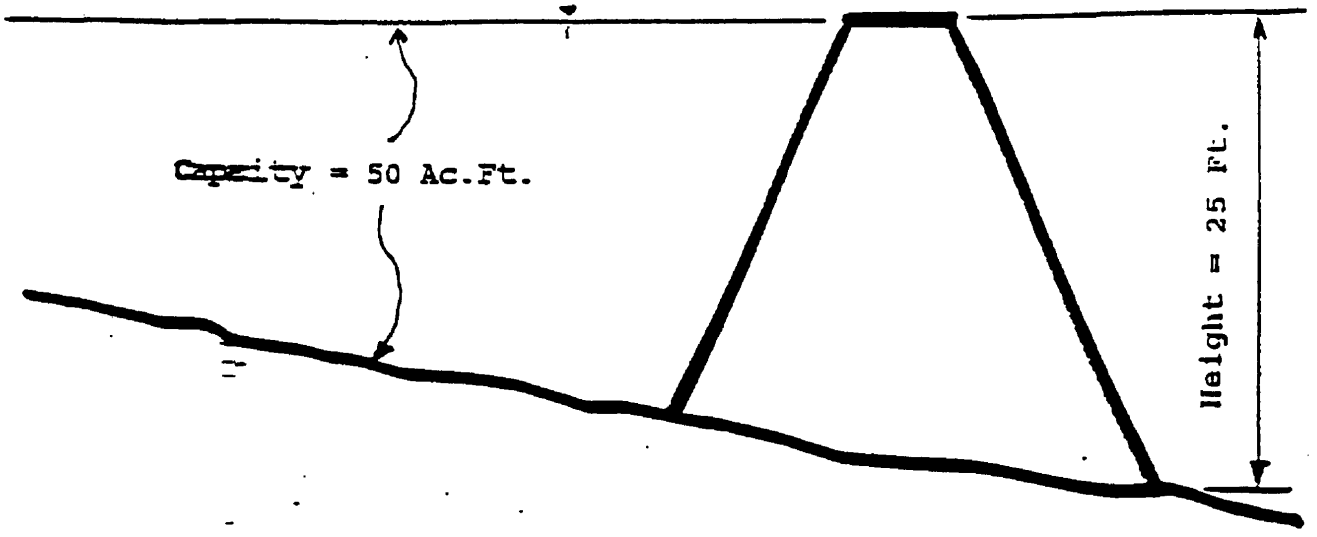
CLOSING

No amount of regulation can replace the need for a sound engineering approach when it comes to evaluating dams. Dams are getting older. They are an integral part of our state's and our Nation's infrastructure every bit as much as roads, highways, water supplies, sewerage systems, buildings, power supplies, etc. With proper care, an earth dam can last a very long time.

I want to do all that I can to encourage the partnership approach involving the dam owner, the owner's engineer, and our staff, as we work toward our common goal of public safety. Thank you for the opportunity to meet with you here today. I appreciate your interest and look forward to our continuing dialog.

DAM SAFETY PARTNERSHIP





VIRGINIA DAM SAFETY ACT

APPLICABILITY

STATUS OF REGULATED DAMS

July 10, 1997

CLASS 1 (High Hazard Potential)

Total 100

Regular O&M Certificates -	72
Conditional O&M Certificates -	25
Construction Permit -	1
No O&M Certificate -	2*

* Blue Ridge Estates Dam, Botetourt County
Big Cherry Dam, Wise County

CLASS 2 (Significant Hazard Potential)

Total 112

Regular O&M Certificates -	97
Conditional O&M Certificates -	10
Construction Permit -	5
No O&M Certificate -	0

CLASS 3 (Low Hazard Potential)

Total 244

Regular O&M Certificates -	220
Conditional O&M Certificates -	12
Construction Permit -	9
No O&M Certificate -	3*

*Stump Dump Landfill Dam, Fairfax County
Darr Pond, King George County
Fye Dam, Halifax County

CLASS 4 (Low Hazard Potential)

Total 21

Regular MF authorization -	20
Construction Permit -	1
No authorization -	0

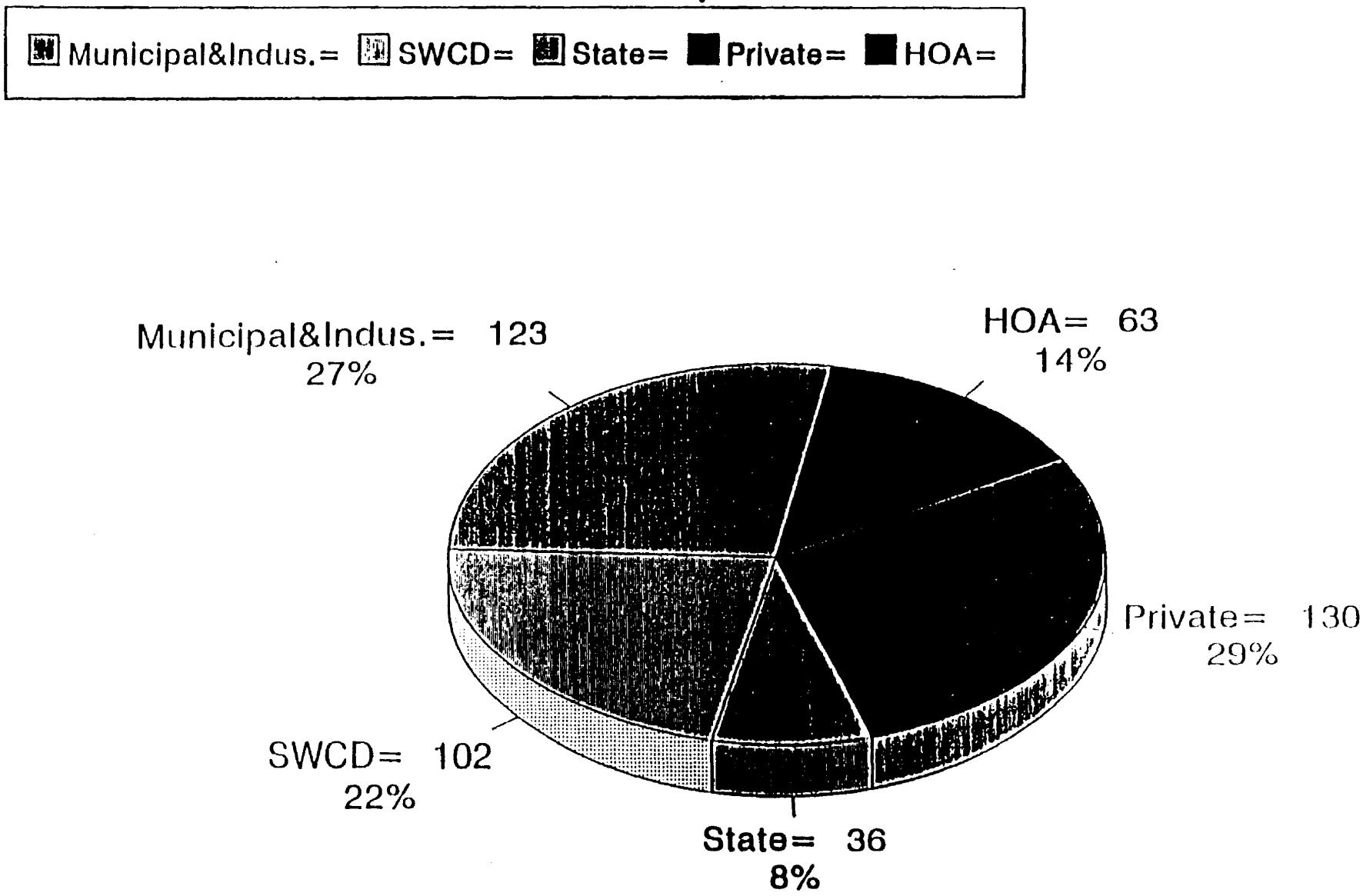
SUMMARY

Construction Permits	16
Regular Certificates or authorized	409
Conditional Certificates	47
Not in Compliance	5

TOTAL REGULATED DAMS 477

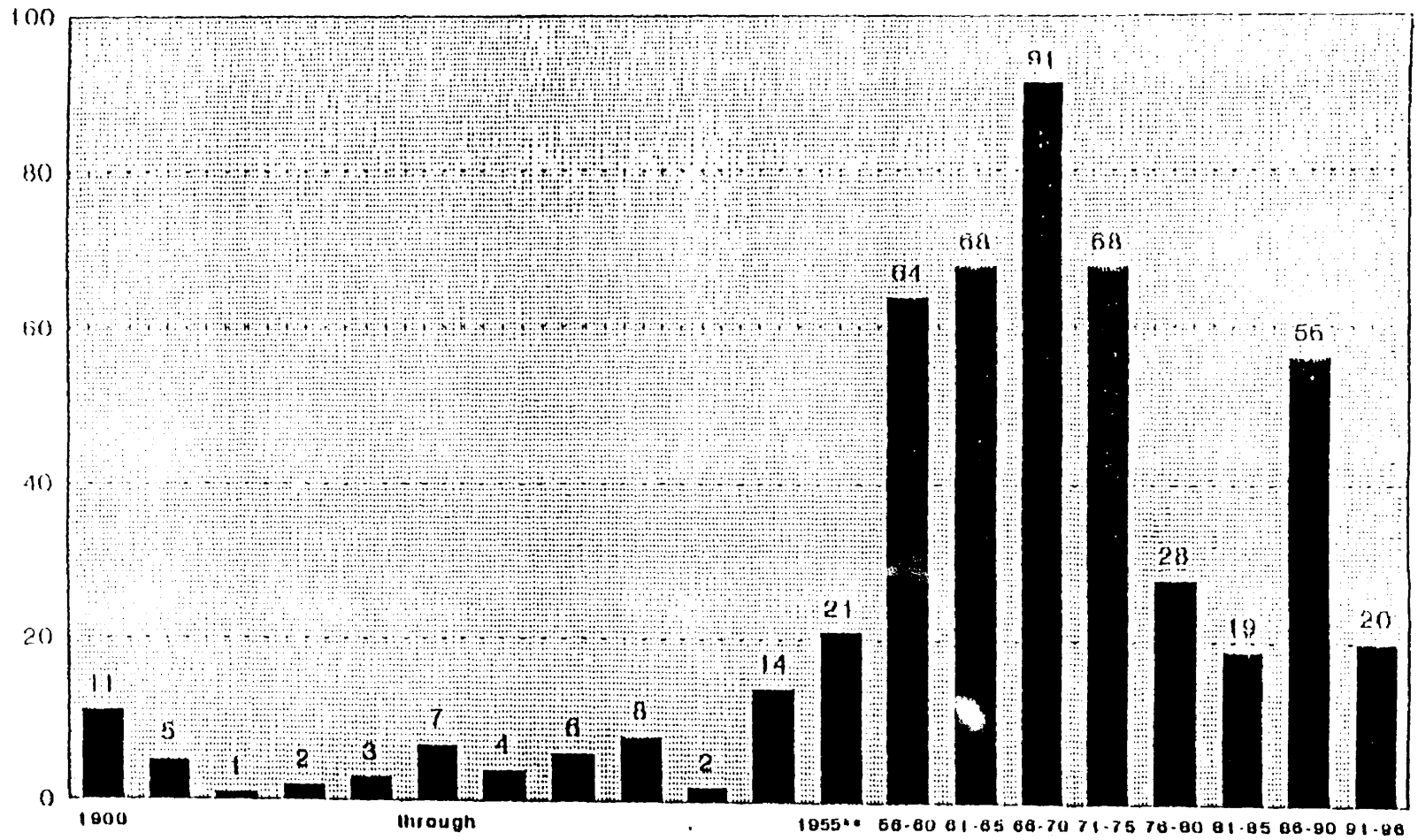
(Non-regulated dams in data base 1,097)

Ownership Classification

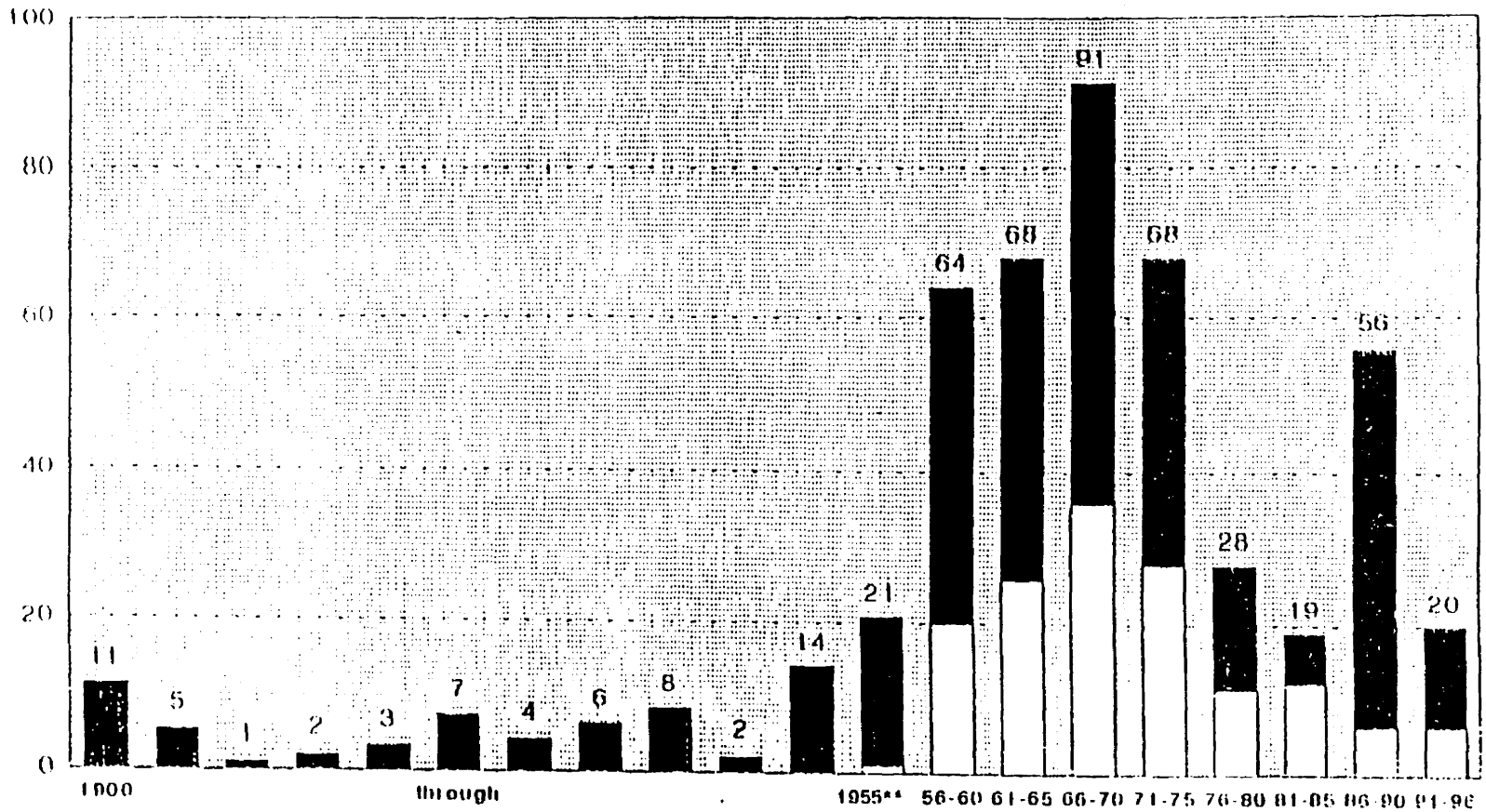


Department of Conservation & Recreation
Dam Safety Program (7/93)

Regulated Dams Constructed in Virginia



Regulated Dams Constructed in Virginia
(Showing NRCS (SCS) Assisted*)



* SCS started assisting in 1955

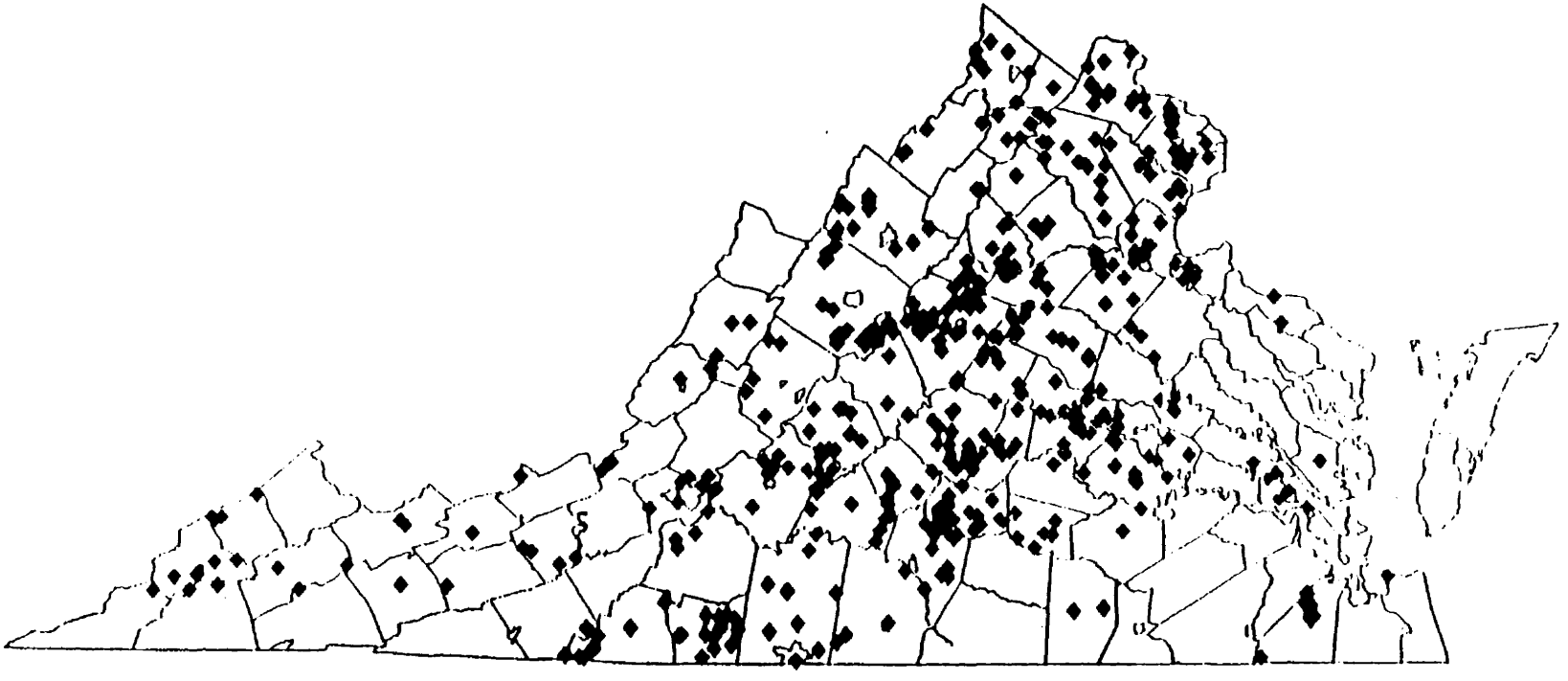
** in 5 year intervals

CLASSIFICATION AND SPILLWAY REQUIREMENTS

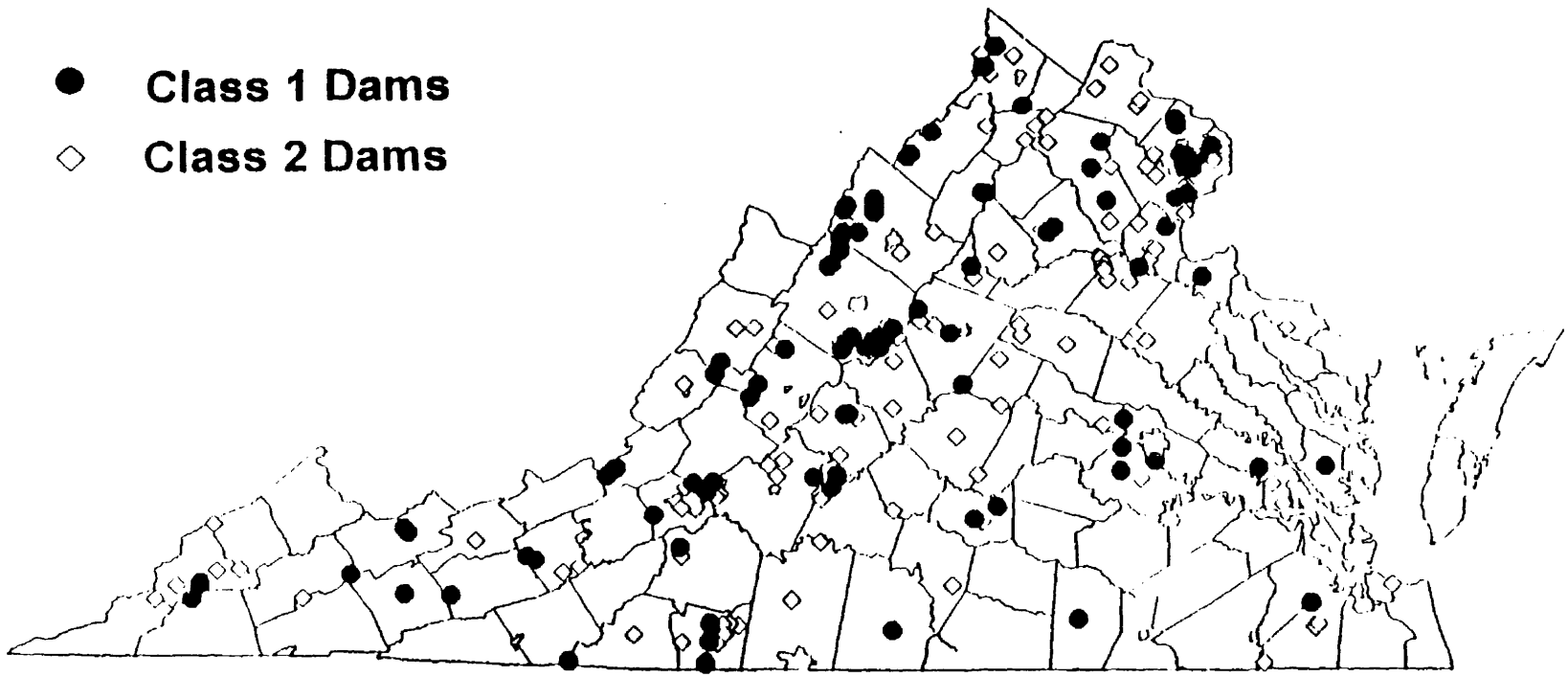
CLASS	POTENTIAL HAZARD	SIZE	SPILLWAY DESIGN FLOOD
1	Probable Loss of life or excessive economic loss	Large	PMF
		Medium	PMF
		Small	½ PMF to PMF
2	Possible Loss of Life or appreciable economic loss	Large	PMF
		Medium	½ PMF to PMF
		Small	100-yr to ½ PMF
3	No Loss of Life expected; minimal economic loss	Large	½ PMF to PMF
		Medium	100-yr to ½ PMF
		Small	50-yr to 100-yr
4	No Loss of Life expected; no economic loss to others	all	50-yr to 100-yr

VIRGINIA DAM SAFETY PROGRAM
jsh 9/96

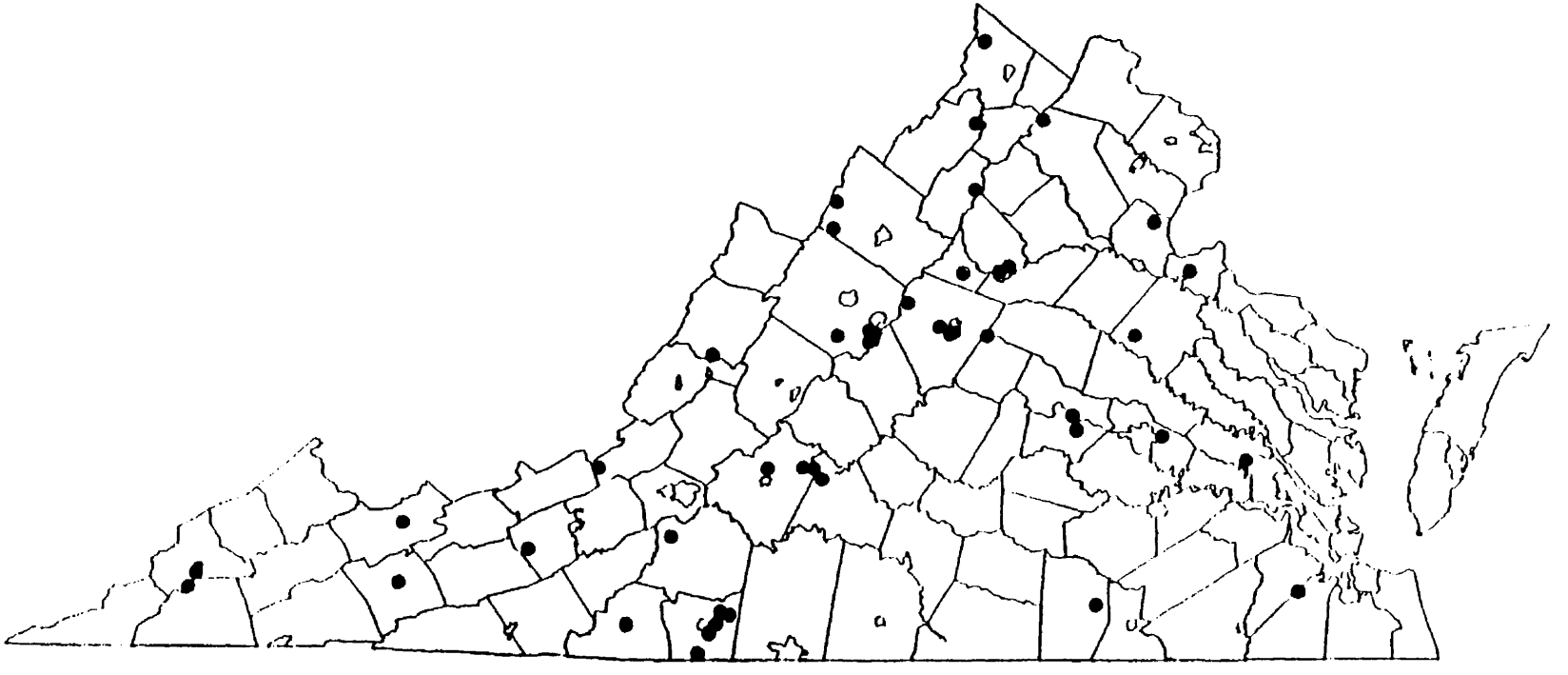
REGULATED DAMS IN VIRGINIA



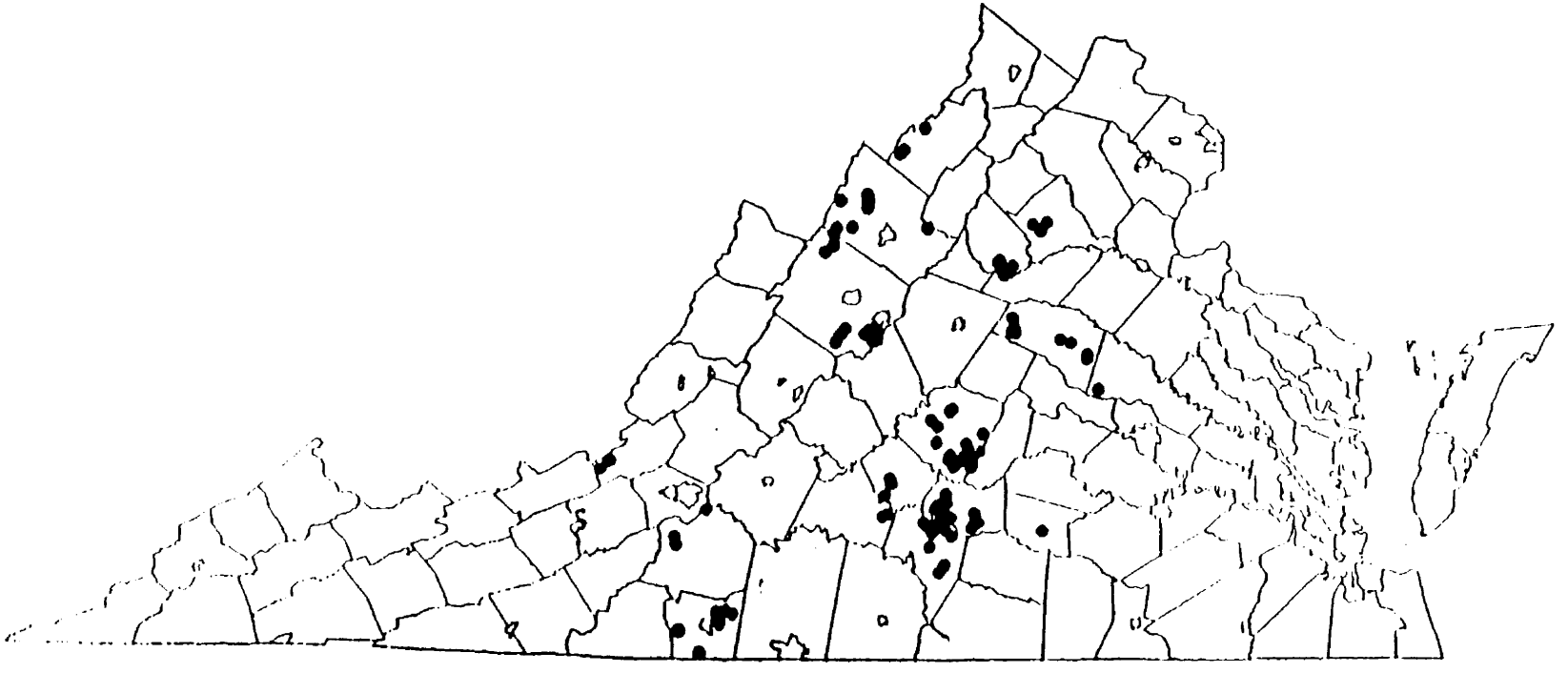
CLASS 1 & 2 DAMS IN VIRGINIA



DAMS IN VIRGINIA
WITH CONDITIONAL CERTIFICATES



DISTRICT DAMS IN VIRGINIA



DISTRICT-OWNED DAMS
Type of Certificate/Permit

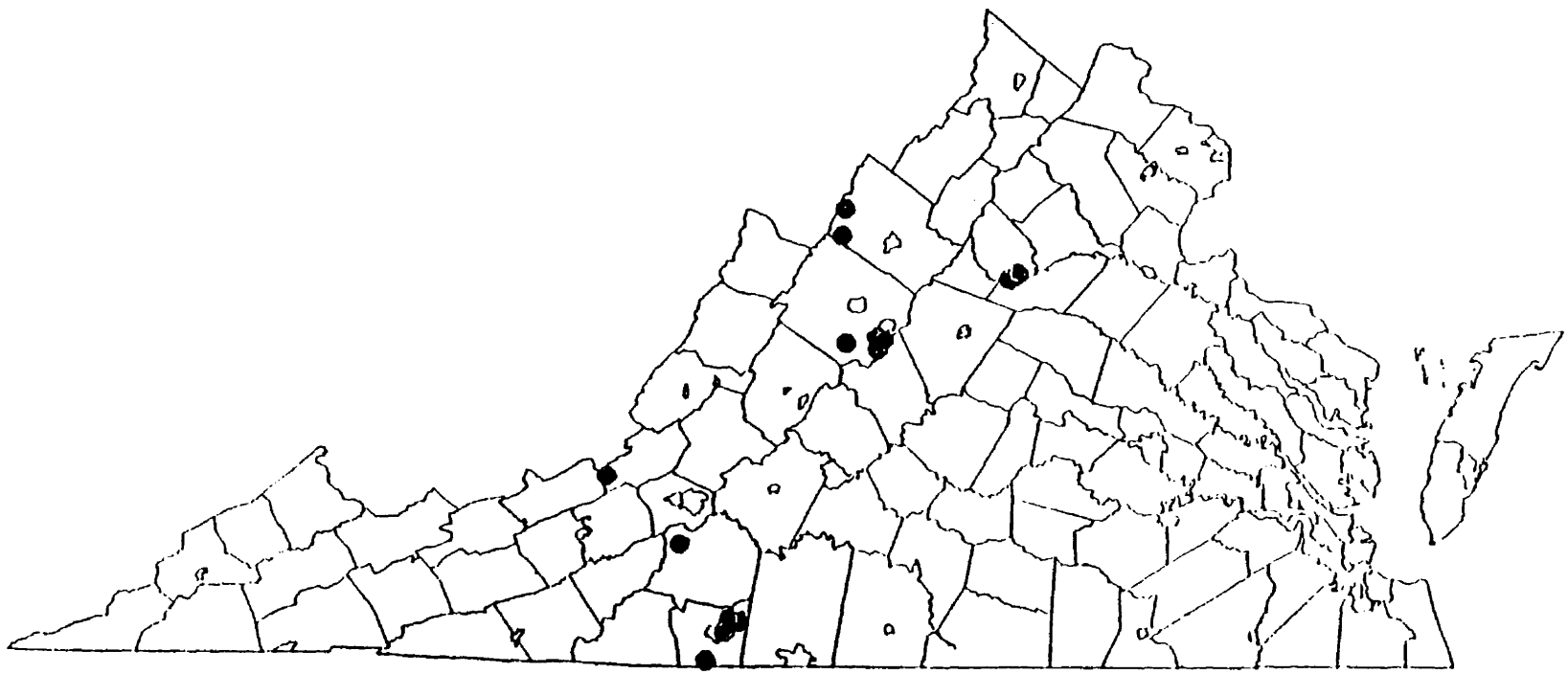
CLASS	REGULAR	CONDITIONAL	CONSTRUCTION	TOTAL
1	16	9	0	25
2	10	3	0	13
3	63	2	1	66
TOTAL	89	14	1	104

DISTRICT OWNED DAMS

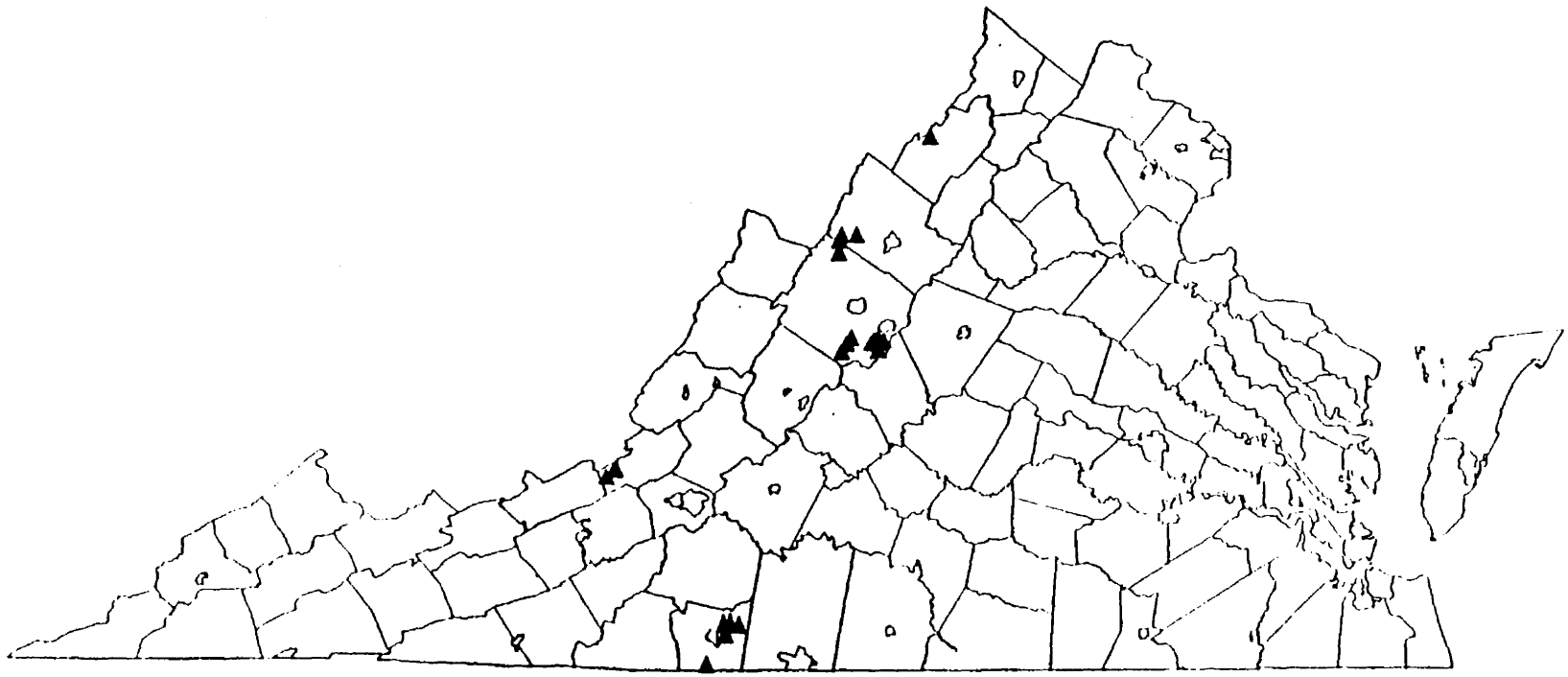
Spillway Capacity (% PMF)

CLASS	20-49	50-74	75-99	100%	Total
1. REGULAR	3	2	1	10	16
CONDITIONAL	3	3	1	2	9
2. REGULAR	1	8	0	1	10
CONDITIONAL	3	0	0	0	3
3. REGULAR	52	10	0	1	63
CONDITIONAL	2	0	0	0	2
CONSTRUCTION	1	0	0	0	1
	65	23	2	14	104

DISTRICT DAMS IN VIRGINIA WITH CONDITIONAL CERTIFICATES



CLASS 1 & 2 DISTRICT DAMS IN VIRGINIA
Built Prior to 1969



APPENDIX 10

FINAL REPORT
on
STUDY OF SELECTED DAMS OWNED BY SOIL AND WATER CONSERVATION DISTRICTS IN VIRGINIA

prepared by
Gannett Fleming, Inc.

November 1997

Study of 22 SWCD Dams

FINAL REPORT

presented to:

Commonwealth of Virginia
Department of Conservation and Recreation
Richmond, Virginia

November 1997

Gannett Fleming
ENGINEERS AND PLANNERS

Gannett Fleming
ENGINEERS AND PLANNERS

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November 20, 1997

Joseph S. Haugh, P.E.
Director, Division of Dam Safety
Commonwealth of Virginia
Department of Conservation & Recreation
203 Governor Street
Richmond, VA 23219

RE: SWCD Dam Inspections
Final Report

Dear Mr. Haugh:

We have completed inspections of dam sites identified in the Blue Ridge, Headwaters, Mountain Castle and Shennadoah Districts and are pleased to submit our SWCD Dam Inspections Final Report. A total of 22 dam sites were visited during this study, 20 of which were placed into a prioritized listing for inspection of the risers, conduits and embankment drains. Based on the available funding, 16 of the 20 prioritized sites were re-visited to perform televised inspections, the results of which are reported herein, along with our comments and recommendations. The 14 video tapes and field logs for each of the 16 dam sites were provided under separate cover.

We have enjoyed the opportunity to provide our services to the Commonwealth of Virginia on this project and remain available to address any questions you may have regarding the findings of our investigation and our recommendations.

Very truly yours,

GANNETT FLEMING, INC.
Water Resources & Geotechnical Division

Robert W. O'Connor
ROR

William B. Bingham, P.E.
Vice President
Manager, Dam and Flood Control Section

[t:\31246.308\M3288]

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SWCD DAM INSPECTIONS
DIVISION OF DAM SAFETY
COMMONWEALTH OF VIRGINIA

1.0 EXECUTIVE SUMMARY

The 22 flood control structures included within the scope of this study were constructed by the former Soil Conservation Service [SCS], now the Natural Resources Conservation Service [NRCS], during the period from 1954 to 1968. The primary purpose of this study was to inspect and assess the internal condition of the risers, outfall conduits, and embankment drains which are not accessible for viewing without employing confined space entry procedures and/or video equipment mounted on a remote operating vehicle. Deficiencies revealed by inspection will be reviewed by the Division of Dam Safety to develop budgetary priorities in conjunction with overall dam safety requirements which have not been addressed by this study.

The findings of the study did not reveal any conditions of obvious imminent danger which would warrant emergency action. However, several maintenance needs were identified which should be prioritized and budgeted for repair. Primary among the maintenance needs, most of the reservoir drain control valves reportedly have not been operated in many years, and we suspect that at least some of the valves are no longer operable. Having the ability to lower the impoundment in a controlled manner is important for emergency response to various situations where embankment performance may be threatened, i.e., excessive seepage, slides, sloughs, etc. Our recommendation for addressing this issue is to develop a short-range plan which would coordinate scheduled impoundment drawdowns for riser repairs with the evaluation and rehabilitation of the operator and drain control valves. Implementation of the short-range plan would provide information to refine a long-range [5 to 10 year] plan to inspect, repair and/or replace operator and drain control valves at sites with less immediate needs for rehabilitation of the riser.

Risers which were constructed in the 1950's, and have not already been replaced, appear to be serviceable, although four of seven of the remaining original risers contain severely deteriorated concrete surfaces below the normal water level. The service life of these structures can be extended by rehabilitation of the concrete surfaces, which can be phased over several years. Among the 1950's era risers, exposures of reinforcing steel were not observed, except at the Lofton site.

A more urgent priority for repair should be established for those risers with leaks or open joints. These features are subject to freeze thaw action, and/or cavitation below the water line. The open joints may also be exposing reinforcing steel to corrosion which cannot be directly observed. The risers at Briery Branch, Hearthstone and Johns Creek No. 1 were all observed to have open joints. All three of these structures are two stage risers constructed in the period from 1966 to 1968

and the deficiencies are believed to be related to construction procedures rather than the age of the structures.

It is our opinion that deferral of riser repairs where leaks and open joints were encountered could diminish the value of the state's investment in flood control facilities, resulting in higher expenditures for repair or replacement at a later date. Also, we estimate that rehabilitation of the oldest risers from the 1950's can be accomplished for about 75 to 80% of the replacement cost, but rehabilitation will only remain an option as long as the basic integrity of the structure is maintained.

Outfall conduits range from 24 to 48 inch diameter concrete pipe. With the exception of some minor cracks, the conduits are typically in good condition, even at sites where the riser concrete is severely pitted and/or otherwise deteriorated. Soil staining presumably from a past pipe joint leak was observed at Johns Creek No. 2, but no active leaks or joint separations provide evidence of embankment settlement damage to conduits within the study group. Regrouting of the interior joints is a means to reduce risks of soil migration into the conduits, but this effort does not appear to be warranted by the overall inspection results.

Embankment drains range from 6 to 10 inch diameter corrugated metal pipe. Some of the bituminous coatings used for corrosion protection have cracked and deteriorated, typically near the outlet end of the drains, but otherwise the pipes appear to be in good condition, with little evidence of corrosion, except at the outlet.

The embankment drains were partially clogged with silt or combinations of silt and sand at over half of the sites where televised internal inspections were conducted . These materials are believed to be migrating into the drains from the filter trench, but may be only doing so during brief periods of high water level in the impoundment. The embankment designs depend upon the drains for slope stability and/or control of seepage pressures and piping. Accordingly, it is essential that the drains be maintained free to flow. We suspect that at least some of the sources of material migration into the drains are related to construction. However, this cannot be verified without excavating into the embankment, which we do not recommend at this time. Even though the drains which are flowing are partially clogged, the water appears to be clear and free of suspended sediment. Constant drain flows may, however, be piping silt at rates which are visually imperceptible. To assess the risks associated with long term migration of material through the drains, we recommend a comparison of turbidity tests on samples obtained from the drain outlets during various different impoundment water level conditions. This would provide data to allow calculation of estimated quantities of materials that may have migrated over the life of the structures.

Maintaining the embankment drains in a free flowing condition is essential to preserving the integrity of the original design, many of the specifics of which are no longer available. At Toms Branch, the original design included embankment drains which apparently were not constructed. Owing to the absence of as-built plans and slope stability analysis for this site, we recommended verification of existing conditions by performing a slope stability analysis.

The scope of this study did not focus on items normally addressed by the routine periodic inspections required by law. Some general observations typical of periodic inspections, such as erosion, vegetation, missing hardware or debris clogging on orifice trashracks, were noted in the Reconnaissance Phase memorandum of July 1997, but are not considered all inclusive. In overview, the absence of railings and ladder cages on risers does not conform with current OSHA standards, which may need to be addressed in consideration of future funding for rehabilitation or replacement of risers. Also, all the sites in this study group revealed a lack of maintenance with respect to embankment cover, except at sites where public use is prevalent. Notable areas that appear inadequately maintained are adjacent to the principal discharge conduit outlet structures which are overgrown to the extent that visual inspection is impaired and discouraged. Included in the vicinity of these structures are the embankment drain outlets which, as indicated above, need to be monitored to provide insight to embankment performance. Fine root mass was removed from the embankment drains during flushing operations at several sites, including Union Springs, Leatherwood No. 5 and Robinson Hollow. This may suggest that the roots from vegetation at the embankment toe are contributing to clogging of the drains.

2.0 PROJECT SCOPE

The subject project was divided into three phases conducted over a period of about 6 months. The work was subdivided into an initial Reconnaissance Phase for prioritizing, a second phase consisting of televised inspections at sites within relatively close proximity of each other, and a third and final phase consisting of televised inspections over a broad geographic area, including interim and final reporting. Work scopes for each phase were conducted as follows:

2.1 Phase I:

Conducted a reconnaissance of all 22 listed sites during the week of June 23 to June 27, 1997, primarily to assess access and dewatering requirements for inspection of the risers, conduits, and embankment drains. Notes were assembled on the principal discharge conduit, embankment drains and the intake structures and appurtenances such as the operators, trashracks and ladders. The findings of the reconnaissance inspection were used to develop a matrix of site conditions for prioritizing the order of detailed inspections. The matrix, along with other supporting documentation from the reconnaissance visits was compiled in a Memorandum dated July 15, 1997, and our conclusions from the site visits were summarized verbally during a July 16, 1997 meeting with the Division of Dam Safety. At that time, we indicated there was no compelling evidence of structural deficiencies at any of the visited sites which would influence the priorities for detailed inspections. On that basis, 20 of the 22 sites were jointly categorized into three levels of priority, attempting to assure that the more detailed inspections would include a balanced sampling of sites within the available limits of funding. Consideration for establishing priorities included the comparative age of the structures, the comparative height of embankments, the physiographic setting, along with access and dewatering requirements necessary to complete the more detailed inspections. Two of the sites, Marrowbone and Hone Quarry, were deleted from further consideration for inspection at this time, because of pending maintenance/repair contracts for rehabilitating or enlarging their emergency spillways.

2.2 Phase II:

More detailed inspections were performed on six selected sites during the week of August 11 through August 15, 1997. In order to minimize travel and maximize the number of first phase detailed inspections, all the sites for the inspections were grouped in the Shennadoah and Headwaters districts. A pan and tilt camera was used for televised inspections of the outfall conduit in order to provide head-on viewing of each conduit joint. The embankment drain outlets were flushed as necessary to clear siltation prior to televising. All four interior walls of the riser structure were televised for full depth. Concrete deficiencies are referenced with respect to depth from the top of the structure. For reference, all four sides of the riser exterior were also video taped above the water line. Exterior concrete surfaces normally under water were not inspected during this program, and the operability of the reservoir drain control valve was not verified. Video tapes and field logs of the first six inspected sites included in Phase II were provided to the Division of Dam Safety during a meeting on August 21, 1997.

2.3 Phase III:

The third phase of study included interim reporting of project status and findings, additional detailed inspections of ten sites and preparation of the final report. The proposed final phase of inspection was devised to complete inspections on all the dams classified in Phase I as Priority I and II dams. The dams with embankment drains [but without impact basins] were given preference for inspection among the Priority III sites which were selected to complete the inspection schedule. The field work for the third phase of inspection was conducted during the period from September 22 through October 2, 1997. Video tapes and field logs of the ten Phase III inspections were forwarded to the Division of Dam Safety by letter of October 9, 1997.

3.0 BACKGROUND

All of the dams included within this study were designed as flood control projects and include the most simple operative mode requiring little or no regulation from human resources for the intended purpose. Because of this, intake structures at a number of the dams are constructed without direct access to discourage trespassing and unauthorized personnel. This arrangement also limits and hinders efficient access to features for inspection and maintenance.

Intake structures at the inspected dams are either single or double stage. Single stage structures are constructed as uncontrolled overflow weirs designed to accommodate pressure flow conditions at advanced impoundment stages. Each of these includes an integral crest slab located over the weir opening to preclude entry of oversize debris or unauthorized personnel. Access to the operating stem for the reservoir drain is also available from the crest slab. Reservoir drain diameter is consistent with conduit diameter and ranges from 24 to 42 inches. Control for reservoir drains appear to be sluice gates designed for seating head operation.

Double stage intake structures are also constructed as uncontrolled overflow weirs with an integral crest slab and include one or more openings typically located a significant distance below the weir crest. These openings are rectangular shaped orifices approximately 24 inches wide by 18 inches high. Openings to pipes, approximately 12 to 14 inches in diameter and located through the intake walls are also included at a number of the sites. The pipes are continued external to the intake structure and extended to the reservoir bottom for the purpose of introducing colder water to normal releases. The positions of the orifices and pipe openings, in close proximity, establish a normal pool stage. Trash rack structures are positioned at the weir and orifice openings.

Reservoir drain operators are located on the crest slab. Reservoir drain diameter for double stage risers is consistent with conduit diameter and range from 24 to 48 inches. Control for reservoir drains also appear to be sluice gates designed for seating head operation.

Conduits for controlled releases through the embankment are reinforced concrete pipe constructed integral with the intake structure. The intake structure is transitioned at the base to provide efficient conveyance of flow from the intake into the conduit.

Two outlet arrangements were common for the 20 dams included with this inspection program. One arrangement is a concrete structure consisting of a head wall, sidewalls and stilling basin with sill. Outlets for embankment drains if included with the design are located in the sidewalls.

The second arrangement consists of a projecting conduit, located through riprap protection. The riprap protection is extended into an excavated stilling basin area. Outlets for embankment drains if included with the design, are also located through the riprap.

4.0 DISCUSSION OF FINDINGS

The following, Sections 4.1 through 4.4, present an overview of the study findings with respect to the condition of the risers, drain control valves, conduits and embankment drains. All supporting information consisting of inspection narratives, overview photographs and video logs are included in the appendices to this report. Narratives for each of the sixteen Phase II and III inspections are included in Appendix A, along with an abbreviated Summary Table of some of the significant findings at each site. Unless otherwise noted, the narratives refer to interior inspected surfaces. General overview photographs of each of the 20 prioritized sites are included in Appendix B, following photographs of specific features from the video inspections as referenced in the narratives. The July 15, 1997 Reconnaissance Phase Memorandum contains additional overview photographs of all 22 original sites. The operator's video logs are included in Appendix C for direct reference to other specific features.

4.1 Risers:

The general condition of the risers is judged to be satisfactory with respect to serviceability, but deficient in some areas of maintenance. Concrete surfaces for the intake structures above the normal water level externally, and internally for the full height of the structure, generally appear to be without significant deterioration. Exposed aggregate faces on exterior surfaces over the normal range of water fluctuation and pitting on interior surfaces are evident at most of the intake structures. Minor spalling is probably caused by freeze-thaw action, and, in some cases, spalls may be associated with methods of concrete placement and form removal. Exposed aggregate and pitting, are probably caused by cavitation. Neither spalling or exposed aggregate are considered to be a serious concern with regard to structural integrity at this time.

Deterioration of concrete surfaces suggests the need for maintenance at several sites which have been divided into categories as follows:

Surface deterioration without exposed reinforcing steel

South River No. 26	-	Inch Branch
South River No. 23	-	Robinson Hollow
South River No. 6	-	Sengers Mountain Lake

Surface deterioration with exposed reinforcing steel

South River No. 4	-	Lofton

Construction Joint Deterioration

Lower North River No. 78	-	Briery Branch
Upper North River No. 77	-	Hearthstone
Johns Creek No. 1	-	McDaniels Lake

4.1.1. Concrete Surface Deterioration:

Nine of the twenty inspected structures were originally constructed during the 1950's. Within that group, we understand that the risers were replaced at the 1957 Toms Branch site and at the 1954 Happy Hollow site. Concrete surface deterioration appears to be more advanced in four of the seven remaining 1950's era risers, as listed above. This deterioration is possibly related to freeze-thaw activity, but could also be a result of cement aggregate reaction. Recovery of concrete cores for testing is a means to check for the presence of alkali-silica compounds prior to final selection of an option to either replace or restore the existing riser and may establish trends relative to deterioration of aging structures. Should testing confirm the presence of alkali-silica compounds, measures to seal the concrete surfaces from water intrusion should, as a minimum, be considered.

All the listed structures with deteriorated concrete surfaces are considered serviceable at this time. With the exception of the Lofton riser, reinforcing steel exposures were not observed and as such, the useful service life may extend several years into the future without taking action. Reinforcing steel exposure will, however, accelerate the corrosion process and eventually eliminate options to cost effectively rehabilitate concrete to extend the service life of the structure. Photographs depicting surface deterioration of concrete are shown by Plates 11 and 12 in Appendix B.

4.1.2 Construction Joint Deterioration:

Eleven of the twenty inspected structures were constructed after 1960. Compared with the 1954 to 1959 risers which are 8 to 18 feet high, the inspected risers constructed between 1963 and 1968 are typically 20 to 53 feet high. Concrete for the walls of these taller and more massive structures would have been placed in stages. In addition, scheduling for continuous placement of concrete for each stage may have been made more difficult by the remote site locations, which may account for the open joint conditions observed at three of the eleven sites constructed in the post 1960 era, as listed above.

The riser interior was not televised at Johns Creek No. 1, nevertheless, the Phase I reconnaissance of all 22 original sites revealed a weathered joint on the exterior face of this riser, about 2 feet above the water line. The open joint appears to be weathering completely around the structure and is probably a planned construction joint location. This feature is shown in the general site overview photograph contained in Appendix B.

Leaking joints below the water line were revealed within the interior of the risers at Briery Branch and Hearthstone. These features are generally irregular with respect to location and deviation from horizontal, which leads to the belief that there may have been time gaps between concrete truck deliveries or segregation of the concrete matrix where the material was not completely vibrated into the forms. Photographs depicting interior joint leaks are shown by Plates 3 and 4 in Appendix B.

It is our opinion that the structures with open joints should be repaired to arrest further deterioration due to freeze thaw action, cavitation and exposure of reinforcing steel to corrosion. Deferral of these repairs could diminish the value of these structures, resulting in higher costs for repair or replacement at a later date.

4.2 Operator and Drain Control Valves:

No attempts were made to operate the drain control valves as a part of this study. Sluice gates generally appear to be seated without evidence of leakage, however, at the Wilda site (South River No. 7), a sock was noted in the sluice gate, which the owner indicated was sealing a leak.

Operation of the reservoir drain control valve can be verified by testing, which is recommended annually and will be discussed further in this report. Proper testing requires that prior arrangements be made with all pertinent agencies and/or parties to accommodate a range of circumstances that might occur as a result of drain operation. Probably the most serious circumstance that could occur would be the inability to completely close the valve. For such a situation, provisions including a source of funding should be made to replace the valve and operator as required.

Typically sluice gates properly installed and maintained have a service life of about 30 to 50 years. With the apparent lack of operator maintenance, it is reasonable to assume that some of the control valves are inoperable and may require major rehabilitation or replacement.

4.3 Conduits and Outlet Structures:

The general condition of the conduits is judged to be good. Outfall conduits range from 24 to 48 inch diameter concrete pipe. Some minor cracks were observed in the pipes, none of which appear to be significant with respect to structural integrity. Pipe joints generally appear to be tight, but not consistently grouted at all sites. Even though some of the cracks appear to be moist, no active leaks or joint separations provide evidence of embankment settlement damage to conduits. At Johns Creek No. 2, staining which is probably the result of past pipe joint leakage was observed at one location, but the joint does not appear to be actively leaking, despite its position which is probably below the phreatic line. Photographs of this joint are shown by Plates 5 and 6 in Appendix B, however, the discoloration is considerably more visible in the video.

Three of the original 22 dam sites -- Leatherwood Dam Nos. 2 and 3, and Johns Creek No. 4 -- were constructed with reinforced concrete impact basins at the outlet. All of these structures appear to be in good condition. At Leatherwood 3, the joint between the conduit and the headwall of the outlet structure needs to be sealed. A photograph of this feature is shown in the Phase I Report.

4.4 Embankment Drains:

Seventeen of the original 22 dams in the study were constructed with embankment drains. One of the 17 dams with embankment drains -- Marrowbone -- was deleted from the prioritized list of dams to be inspected. In addition, three of the dams with drains have outlets extending through the sidewalls of impact basins. Televising of the drains was attempted at one of these sites, however, owing to acute pipe bends beyond the basin walls, televising was not possible with the available equipment. The drains were televised at all but one of the remaining 13 sites with embankment drains. At that location, Johns Creek No. 1, at least one of the two drains is clogged at the outlet end, as shown by the photograph in the Phase I Report.

All of the drains were constructed with corrugated metal pipe (CMP) ranging from 6 to 10 inches in diameter, except at Toms Branch. The 1956 design plans for Toms Branch indicate the dam should have been constructed with a 10 inch diameter CMP drain. There is a 2 inch diameter iron pipe protruding into the riprapped plung pool, left of the outfall conduit. The iron pipe was televised for its full length and was found to be capped at 17 feet from the outlet end with no apparent perforations in the side walls. A photograph of the drain interior at Toms Creek is shown by Plate 8 in Appendix B.

Among the eleven remaining sites where embankment drains were televised, seven of the sites were found to have drains 20 percent or more clogged with silt or combinations of silt and sand. As indicated by the Phase I reconnaissance memorandum, many of the drains are not actively flowing when the impoundment is at normal pool level. Where flows were observed, the water at least visually appears to be clear, even at locations where the outlet is partially clogged. At two of the sites where the embankment drains had the greatest volume of flow, Union Springs and Robinson Hollow, the drains were clogged with silt or silt and sand by as much as 90%.

Some of the bituminous coatings used for corrosion protection have cracked and deteriorated. Cracks in the coating can be observed in the video for Johns Creek No. 2. Fragments of the bituminous coating were recovered from the flush water tailings at Union Springs and Robinson Hollow. Deterioration of the bituminous coating appears to be predominately near the outlet end of the drains. As evidence of this, even at the Union Springs and Robinson Hollow sites where fragments of the coating were recovered in the flush water, the coating appears to be intact further within the drains. The relatively good condition is possibly due to more modest temperature variation and reduced oxygen at locations embedded further within the embankment. Evidence of possible corrosion can be observed at some of the pipe perforations (refer to Plates 1 and 2 in Appendix B), but corrosion does not appear to be effecting drain performance. In no case were the drains found to be seriously corroded beyond the protruding outlet end. By comparison, the ungalvanized animal guards on the drain outlets at some sites have been completely destroyed by corrosion.

Sources of material migration into the drains may vary. Moreover, piping, i.e. seepage transport of embankment soil, may be on-going or periodically occurring, despite the visual

appearance of clear flow under normal pool seepage conditions. Photographs of various conditions of drain clogging are shown by Plates 1, 2, 7, 9 and 10 in Appendix B. Soil deposition within the drains can be broadly categorized as backflow (tailwater) siltation, filter sand migration, or silt migration through the filter or pipe joints. There is evidence of all of these mechanisms, even within drains on the same site. Our opinions regarding suspected sources of drain clogging at each of the seven effected sites are as follows:

Johns Creek No. 2

Suspect that concrete sand was used for filter without an aggregate interface at the drain perforations. Sand migration into drains through the perforations has nearly filled the drain in some locations, as shown by Plate 7 in Appendix B. No deposits of sand were found below the drain outlets, which may suggest that drain flows are insufficient to transport sand out of the drain.

Union Springs

Suspect that silt is migrating into the drain from the filter trench on the left side of the dam (reference Plate 2 in Appendix B), similar to the migration through pipe perforations shown by Plate 1 in Appendix B. Design gradations of the filter material appear to be appropriate, but the 8 inch thickness of coarse and fine filter material surrounding the drain may have been difficult to construct within specified tolerances, possibly resulting in insufficient filtering in some locations. A blind trench which extends up the relatively steep right abutment likely creates relative high hydrostatic head above the right drain, which contains silt as well as sand from the filter. A stick located over 100 feet up within one of the drains may indicate that tail water also occasionally deposits silt and debris into the drains at this site.

Inch Branch

Suspect that silt is migrating into the drain pipe through joints (reference Plate 9 in Appendix B), but could not view full length of drain owing to a joint obstruction.

Robinson Hollow

No apparent source of soil migration into drains and as-built construction drawings are not available for comparison. The soil clogging the drain is predominately silt, containing no filter sand. Fragments of wood within the flush water tailings may suggest deposition by tailwater, which the 1979 Phase I Inspection Report indicates has submerged the drain outlets in the past. Conditions about 100 feet into the drain are shown by Plate 10.

Canada Run

Within the drain, dry silt with surface riffles may be an indication of tailwater deposition. No indication of other potential sources of soil migration was observed throughout the full 62 foot length of non-perforated drain.

Leatherwood 5 and 6

No indications were observed of the source of siltation within the drains. Relatively flat, 0.75%, drain slopes may not positively drain the pipe, particularly if influenced by settlement and/or fine root mass growth within the drain. Deposition may be related to tailwater submergence of the drains.

The design intent accompanying the use of embankment drains can not be fully understood with certainty on the basis of available records. It is evident that slope stability calculations relied upon the use of embankment drains to control the phreatic line during the flood stage. In addition, the drains are also relied upon to prevent piping in deep boulder areas (John's Creek No. 4), to relieve seepage pressures (Leatherwood No. 5) and to reduce the hazard of piping in sandy material in the downstream section around the conduit (Johns Creek No. 1). Accordingly, it is essential that the drains be maintained.

To preserve the original intent of design, the embankment drains must be maintained free to flow. At Toms Branch, embankment drains were shown on the design plans in the 1978 Phase I Inspection Report, but could not be found in the field. The Phase I Report also indicates that no as-built plans or slope stability analysis are available for this dam. As such, the constructed conditions may not meet the intent of design. Slope stability and seepage analysis to verify the adequacy of existing conditions are beyond the scope of this study. While it is important to investigate as-built conditions which appear to deviate from the design, it should be recognized that the analysis of slope stability at many of these sites, with or without drains, could reveal deficiencies which require correction to meet current standards.

5.0 COMMENTS AND RECOMMENDATIONS

Based on a review of the completed inspections and intended long-term serviceability of the subject dams, it is recommended that the owners and operators prepare and complete a systematic maintenance/repair program to insure the reliability of the projects for future flood protection. Identified needs are maintenance related rather than emergencies. Accordingly, the work effort can be phased over a period of years. To protect the Commonwealth's investment in flood control structures, we suggest that long range plans be established to accomplish set objectives within a specified time frame, probably 5 to 10 years. The initial 1 to 2 years of effort may only include 3 to 5 dams per year, concentrating on sites possessing the most immediate needs for riser maintenance, as identified in this report. Impoundment dewatering to rehabilitate risers at these sites will provide information to refine probable long range costs for rehabilitating the operator and drain control valves.

As a minimum, drain operability should be verified at each of the sites. Recommended steps and probable estimated costs are outlined below. We expect that as the needs for structural maintenance/repair are reduced by the initial phases of work, the later phases of a long range plan may include more structures within comparable limits of funding.

The needs for concrete rehabilitation, particularly at sites with open joints, should not be deferred. A program of continuing inspections and identification of needs can be on-going concurrent with contracts for rehabilitation. The work effort should be phased to best accommodate available funding and mesh with the Department's overall requirements for dam safety. Towards that goal, we offer the following itemized listing with estimated associated costs for budgeting and planning purposes. The costs shown are per site.

5.1 Diving Prior to Dewatering Impoundment:

Preliminarily assess condition of drain control valve by diver, with primary objective to remove accumulated debris from drain opening prior to operation. Diver can also check condition of submerged hardware and assess debris surrounding the drain which may be pulled into the drain by high velocity flow when the gate is opened.

Estimated diver cost, assuming 2 days for inspection and debris removal:

$6,000

5.2 Impoundment Dewatering:

Dewater the impoundments in accordance with predetermined dewatering rates and monitor embankment performance throughout the drawdown. Coordinate this activity with appropriate regulatory agencies, e.g., Game and Inland Fisheries, and downstream communities. Allowable drawdown rates typically vary from 6 to 12 inches per day. Based upon the variable, and

in some instances unknown characteristics of embankment soils, we recommend maintaining drawdown rates near the lower end of that range. Beyond the cost of an underwater inspection and debris clearing by a diver, the costs for dewatering ideally could be relatively low, assuming an operable valve and the availability of owner personnel to operate the valve and observe the embankment during drawdown. Assuming that a repair contractor is responsibile for dewatering, labor costs over a drawdown period of 2 to 6 weeks will add to construction costs. Labor costs for dewatering could be a significant percentage of total construction cost if full time personnel are required to monitor pumping. For instance, at Canada Run, the valve stem is damaged to a degree that operation may not be possible. Also, at Inch Branch, the valve stem is missing. A number of other valves may also be inoperable, in which case accomplishing drawdown by pumping through the riser may be required.

Estimated cost to dewater by pumping, including labor and equipment:

$7,000/month

5.3 Riser Rehabilitation/Replacement:

Inspect and repair the concrete intake structure as required. Repairs are expected to include removal of deteriorated concrete, filling/patching of voids, and sealing/coating of concrete surfaces. Briery Branch, Hearthstone and Johns Creek No. 1, all have open joints or voids which should be given priority for repairs.

Estimated costs based upon various conditions of repair that may be required are as follows:

a. Rehabilitation of single stage riser, assuming 200 SF cost basis -- includes sandblasting, gunite resurfacing, new gate and operator, 15% engineering and inspection:

$34,000

b. Replace single stage riser in kind -- assuming size comparable to above includes new control gate and operator, 15% engineering and inspection:

$44,000

c. Concrete joint repairs, assuming repairs are made in the dry -- includes scaffolding, joint preparation and joint filler. Estimate does not include diver and dewatering costs, nor engineering and inspection which should be added to total:

$4,000

5.4 Operator and Drain Control Valve Replacement Contingency:

Inspect and repair/replace the operator and drain control valve as required. Estimated cost to replace the sluice gate and operator, assuming installation in the dry, are as follows:

a. 24" diameter **$10,000**.

b. 36" diameter **$12,000**.

c. 48" diameter **$16,000**.

5.5 Embankment Drain Maintenance and Monitoring:

Periodically clean embankment drains as necessary to maintain flow. To assess performance of the drains, obtain turbidity tests of embankment drain discharge from drain outlets during various different water level conditions within the impoundment. Robinson Hollow and Union Springs are sites with partially clogged drains and a steady discharge under normal pool seepage conditions. If piping of fines from the embankment is a slow, on-going process, these sites should provide a good source of data which can be compared with turbidity test results from sites with periodically flowing drains which were indicated to be relatively clean (refer to table in Appendix A).

Estimated cost of turbidity testing is as follows, assuming 20 to 30 tested specimens per year, with on-site sampling by district personnel. Estimate includes sample vials, shipping and laboratory testing. Cost of drain cleaning should be evaluated on a case by case basis and is not included.

$500/year

5.6 Slope Stability Analysis:

Slope stability analysis of the Toms Branch site should be performed to evaluate the apparent as-built deviation from the design plans which included 10 inch diameter embankment drains. We recommend that the analysis include a geotechnical investigation along with the installation of piezometers to permit periodic monitoring of the phreatic surface.

Estimated cost for field sampling, instrumentation, laboratory testing and related analysis (excluding long term monitoring of piezometers):

$40,000

Dam No.	Name	Year Const.	Height (Feet)	Priorities of 7/16/97	Televised Inspections		Embankment Drains			Conduits			Risers	
					Tape No.	Date	No.	Size	Condition	Size	Len.*	Condition	Hgt.*	Condition
08908	Marrowbone Creek No. 1	1960	46	Deleted			1	6"		42"				
08902	Leatherwood Creek No. 5	1963	57	1	7	9/23/97	2	6"	Pipes sag - poss. settled	36"	332'	Satisfactory	36'	1 minor spall
08904	Leatherwood Creek No. 3	1964	41	3			2	6"	In impact basin	42"		Minor Gap at Pipe/Headwall Joint		
08905	Leatherwood Creek No. 2	1964	32	3			2	6"	In impact basin	36"				
08907	Leatherwood Creek No. 6	1964	32	2	6	9/22/97	2	6"	Pipes sag - silt clogging; poss. settled	24"	210'	Satisfactory	20'	Satisfactory; Crack in Slab
04504	Johns Creek No. 4	1966	95	1	8	9/24/97	2	6"	In impact basin	30"	278'	Cracks & repairs	39'	Exposed aggregate
04501	Johns Creek No. 2	1967	51	2	9	9/25/97	2	6"	Up to 100% clogged - silt & sand	30"	289'	1 cracked segment; 1 dry joint stain	32'	Exposed aggregate mi pitting & spalls
04502	Johns Creek No. 1	1967	62	3			2	8"	Lt. dry; Rt. weeping & clogged	42"				Weathered joint gap exterior
04503	Johns Creek No. 3	1968	50	3			0			24"				
16501	Union Springs - Lower North River No. 80	1967	87	1	1	8/11/97	2	8"	Up to 90% clogged - silt & sand	30"	473'	1 minor crack	53'	Satisfactory
16502	Briery Branch - Lower North River No. 78	1968	89	1	2	8/12/97	0			36"	470'	3 minor cracks	47'	Leaking
16503	Hone Quarry - Lower North River No. 83	1968	93	Deleted			0			36"				
01513	Happy Hollow - South River No. 24	1954	35	2	10	9/29/97	1	6"	Replaced 1984; satisfactory	24"	185'	Replaced 1984; satisfactory	14'	Replaced 1984; satisfactory
01501	Inch Branch - South River No. 26	1956	57	3	11	9/30/97	1	8"	Up to 90% clogged - silt; dry joint stain	24"	309'	Satisfactory	15'	Poor; Pitted
01508	Robinson Hollow - South River No. 23	1956	49	3	12	9/30-10/2/97	2	8"	Over 50% clogged - silt	24"	306'	Satisfactory	16'	Poor; Pitted
01502	Toms Branch - South River No. 25	1957	62	2	10	9/29/97	1	2"	Non-functional; design deviation	24"	371'	Exposed aggregate; 1 crack	17'	Replaced 1985-87; mi pitting; surface sealed
01522	Wilda - South River No. 7	1957	46	1	4	8/14/97	1	6"	Satisfactory	24"	253'	Satisfactory	13'	Satisfactory; surface sealed
01512	Canada Run - South River No. 11	1957	27	3	14	10/2/97	1	8"	Silt in bottom 20%	24"	179'	Satisfactory	9'	Satisfactory
01514	Waynesboro Nurs. - South River No. 19	1957	35	1	4	8/14/97	1	10"	Satisfactory	24"	194'	Satisfactory	8'	Aggregate exposure & minor crack
01509	Sengers Mnt. Lake - South River No. 6	1959	56	3	5	8/15/97	1	6"	Satisfactory	24"	343'	Satisfactory	11'	Poor; Pitted
01511	Lofton - South River No. 4	1959	56	3	13	10/1/97	0			24"	316'	Satisfactory	18'	Poor; Pitted and Exposed Steel
01507	Hearthstone - Upper North River No. 77	1966	66	1	3	8/13/97	0			48"	570'	Minor cracks	49'	Leaking

1246JM-L3320

* *Based on field measurements, which may vary slightly from design dat*

Video Tape No. 1
Dam No. 16501
Lower North River No. 80
Union Springs

Conditions at Time of Inspection

Pool level about 12 inches below upstream orifice at time of inspection. Cold water intake pipe flow was temporarily cut off for the duration of riser and outfall conduit inspections.

Riser - Approximate height 53 feet.

Concrete condition generally appears to be satisfactory, with minor pitting of interior surfaces at depths in excess of 30 feet below the top. The location of pitted concrete corresponds with the normally wetted surfaces below the orifice (normal pool) level. The sluice gate does not appear to be leaking.

Outfall Conduit - 30 inch diameter concrete, 473 feet long.

Concrete surfaces generally appear to be in satisfactory condition. A minor crack was noted in crown of pipe, 173 feet from downstream end. Crack appears to be hairline. Joints of pipe appear to be tight.

Embankment Drains - 8 inch diameter corrugated metal pipe (left and right)

Left - televised from downstream to upstream against flow up to the right angle, pipe bend located 107 feet from downstream end. Pipe clogged with reddish brown silt size material which was flushed out with a power washer prior to televising. Wash water tailings included some fine root mass and fragments of the bituminous coating used for corrosion protection on the corrugated metal pipe. Reddish brown staining on the side walls of the pipe extend the full 107 foot length, providing some evidence of the degree of clogging and potential source of material inflow. Based upon the staining patterns within the drain, estimated depths of blockage appear to have been about 90% at 40 feet from the end, 80% at 50 feet, and 40% at 60 feet. The only observed pipe joint occurs at 67 feet. Beyond the joint, pipe perforations are visible on each side. Staining at the one third full level is slightly below the perforations (see plate 1), providing evidence that embankment material of similar color may be migrating into the pipe from this location. At 88 feet, perforations consist of a double line of holes on the right side of the pipe only (embankment left looking downstream). There is no evidence of staining to indicate the perforations in this vicinity are allowing material to migrate in from the embankment. However, as shown by plate 2, the side wall staining abruptly

Video Tape No. 1
Union Springs - Continued

3 feet of the pipe bend to the right (embankment left). This strongly suggests that material is migrating into the drain from a source located further within the filter trench aligned parallel to the dam crest, where pipe gradients are likely higher.

Right - televised against flow up to the capped off end of pipe located 111 feet from the downstream end. From the outlet end, pipe appeared to be clogged with reddish brown silt size material. Upon flushing and prior to televising, noted that the wash water tailings changed from reddish brown initially to brown with a sandy constituent. Side wall staining revealed by televising indicates most of the pipe was probably about 60% clogged prior to flushing. First evidence of perforations in pipe noted in the 30 to 40 foot range, but perforations may be obscured from view by soil within ranges before and after that area. Beyond 92 feet, the left side of pipe (embankment right) is perforated on double lines extending along the mid line of the drain and slightly below the midline. Perforations, throughout the right side of pipe are a suspected source of soil migration into the drain. The sandier material is probably from the filter and its presence reduces the possibility that deposition within the drain was caused by turbid tailwater submerging the drain outlets, i.e., in the absence of flow velocity, the heavier sand particles would not transport into the outlet end as readily as silt size particles.

Apparent Intent of Design

Review of the 1967 as-built embankment drain details, along with the results of design phase slope stability analysis contained in the 1978 Phase I Inspection Report revealed the following:

1. The right embankment drain was intended to be capped, as revealed by the televised inspection. Eventhough there is no pipe extending through a filter on the right side of the embankment, the 108 foot length of bituminous coated drain pipe is shown to be perforated to within 10 feet of the outlet end. Also, a 3 foot wide trench drain of fine filter material (sand) extends more than 150 feet up the right abutment.

2. Both the right and left embankment drains are shown to be sloped at 2.6% along alignments parallel to the principal spillway. Beyond the televised 90° elbow (termination of TV inspection), the left drain pipe extends 300 feet left on a 4.2% slope.

3. By design, the embankment drains (left and right) are perforated with 3/16 inch diameter holes up to within 10 feet of the outlet end. All of the perforated pipe was to be embedded in a coarse filter material (gravel) with a minimum 8 inch cover on the pipe, followed by a minimum 8 inch cover of fine filter material (sand).

Video Tape No. 1
Union Springs - Continued

4. The slope stability analysis during design was based upon the Swedish Circle Method, assuming saturated (consolidated - undrained) soil parameters. All of the tested soils were classified GM (silty gravels, gravel - sand - silt mixture) as per the Unified Soil Classification System. Based on the original design, the lowest computed factor of safety for the downstream slope is 1.33 with no embankment drains and 1.66 with the drains.

Video Tape No. 2
Dam No. 16502
Lower North River No. 78
Briery Branch

Conditions at the Time of Inspection

Pool level was below orifice. Cold water intake pipe flow was temporarily cut-off for the duration of riser and outfall conduit inspections. Leaks in left wall of riser were also plugged with rags and rubber matting prior to televising interior.

Riser - Approximate height 47 feet.

Two holes in left wall about 34 feet below the top of the riser are connected by a near horizontal crack, which appears to be evidence of an improperly prepared cold joint during construction. Plate 3 provides a view of the cracks after the estimated 25,000 gallons per day (GPD) flow was curtailed by packing the cracks with rags and rubber matting. Concrete surfaces otherwise appear to be generally satisfactory, with aggregate exposure below the normally wetted zone, starting at the orifice level. The sluice gate does not appear to be leaking.

Outfall Conduit - 36 inch diameter concrete, 470 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Possible cracks were noted at distances of 138 feet, 170 feet and 383 feet from the outlet end, with possible seepage (wetness) at the middle (1+70) crack. Joints of pipe appear to be tight.

Embankments Drains

Not applicable

Video Tape No. 3
Dam No. 01507
Upper North River No. 77
Hearthstone

Conditions at Time of Inspection

Pool level about 12 inches below orifice at time of inspection. Cold water intake pipe flow was temporarily cut-off for the duration of riser and outfall conduit inspection.

Riser - Approximate height 49 feet.

The upstream, downstream and right side walls of the riser are cracked, generally in the range from 25 to 45 feet below the top of the riser. Seepage was noted on the joint cracks within the upstream and downstream faces. Probing of the joints was possible to depths of 1 to 4 inches on the downstream face where leakage was estimated to be 10,000 gpd at the worst location. On the upstream wall face, joint probing was possible to a depth of 13 inches at an angle of about 30° off vertical. Leakage at the upstream wall location was estimated at 3000 gpd. Concrete surfaces otherwise appear to be in satisfactory condition. The sluice gate does not appear to be leaking. Leakage along the downstream wall is shown by plate 4.

Outfall Conduit - 48 inch diameter concrete, 570 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Minor cracks were noted in the crown of pipe in the range from 43 to 343 feet from the downstream end. Cracks are hairline with no visible seepage. Joints of pipe appear to be tight.

Embankment Drains

Not Applicable

Video Tape No. 4
Dam No. 01514
South River No. 19
Waynesboro Nursery

Conditions at Time of Inspection

No flow through primary spillway, water bailed into the riser to float a leader line through the conduit prior to televising. Water level within impoundment is low enough to expose top of sluice gate on upstream exterior side of riser.

Riser - Approximate height 8 feet.

Concrete condition is generally satisfactory. Concrete aggregate surfaces are exposed below normal pool level, but the surfaces are not pitted or spalling. Minor hairline cracking noted within upper 3 feet of structure.

Outfall Conduit - 24 inch diameter concrete, 194 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Joints of pipe appear to be tight.

Embankment Drain - 10 inch diameter corrugated metal pipe (right side only).

No flushing required to clear drain prior to televising. Televised against flow up to right angle bend in pipe located 72 feet from downstream end. Corrugated metal pipe appears to be in satisfactory condition.

Video Tape No. 4
Dam No. 01522
South River No. 7
Wilda

Conditions at Time of Inspection

No flow through primary spillway. Water was used to float a leader line through the conduit prior to televising.

Riser - Approximate height 13 feet.

Concrete surfaces on interior of riser appear to be coated with a sealer. Concrete condition appears to be satisfactory. Noted a sock in sluice gate which the owner indicates is sealing a leak.

Outfall Conduit - 24 inch diameter concrete, 253 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Joints of pipe appear to be tight.

Embankment Drain - 6 inch diameter (left only).

No flushing required to clear drain prior to televising. Televised against flow up to right angle bend in pipe located 98 feet from downstream end. Helical corrugated metal pipe appears to be in satisfactory condition.

Video Tape No. 5
Dam No. 01509
South River No. 6
Sengers Mountain Lake

Conditions at Time of Inspection

No flow through primary spillway. Water used to float a leader line through the conduit prior to televising.

Riser - Approximate height 11 feet.

Concrete surfaces appear to be severely pitted. The sluice gate does not appear to be leaking.

Outfall Conduit - 24 inch diameter concrete, 343 feet long.

Concrete surfaces appear to be in satisfactory condition. Joints of pipe appear to be tight.

Embankment Drain - 6 inch diameter corrugated metal pipe (left only).

No flushing required to clear drain prior to televising. Televised against flow up to right angle bend in pipe located 123 feet from downstream end. Corrugated metal pipe appears to be in satisfactory condition.

Video Tape No. 6
Dam No. 08907
Leatherwood Creek No. 6

Conditions at Time of Inspection

Orifice flow cut-off for duration of riser and outfall conduit inspections.

Riser - Approximate height 20 feet.

Concrete condition generally appears to be satisfactory. Top slab of riser is cracked. No visible leaks. The sluice gate does not appear to be leaking.

Outfall Conduit - 24 inch diameter concrete, 210 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Pipe joints appear to be tight.

Embankment Drains - 6 inch diameter corrugated metal pipe (left and right)

Televised against flow up to pipe bend located 54 feet from downstream end, both left and right sides. Both pipes clogged with reddish brown silt size material which was flushed out with a power washer prior to televising. Wash water tailings did not include any fragments of bitumastic coating from the pipe. Settlement has possibly caused pipe sag, as evidenced by partially submerged conditions 15 to 20 feet into drains. Pipe condition appears to be satisfactory. Perforations were visible in the upstream 25 feet of the right drain.

Apparent Intent of Design

Review of the 1964 as-built embankment drain details along with results of the design phase slope stability analysis in the 1981 Phase I inspection report revealed the following:

1. The left drain is capped at the end. Eventhough there is no pipe extending through a filter on the left side of the embankment, a 54 foot length of B.C.C.M.P. extending parallel to the principal spillway is shown to be perforated to within 24 feet of the outlet end. Also, a connecting 3 foot wide trench drain of gravelly sand extends about 50 feet up the left abutment.

2. Both the right and left embankment drains are shown to be sloped at 0.75% along alignments parallel to the principal spillway. Beyond the 90° elbow (termination of TV inspection), the right drain pipe extends 260 feet right on a 0.5% slope.

Video Tape No. 6
Leatherwood Creek No. 6 Continued

3. By design, the minimum cover over the perforated pipes is 12 inches. The plans specify "Lay Perforations Down". Filter limits were specified within a band of gravelly sand gradations.

4. Compressible foundation materials were to be replaced with compacted backfill beneath the outfall conduit and parallel embankment drains. Trench drains parallel to the crest were also excavated through the most compressible natural materials and the undercut was backfilled with filter sand.

5. The slope stability analysis during design was based upon the Swedish Circle Method. Assuming a fully developed phreatic line, the computed factor of safety for a 2 ½:1 downstream slope was 1.43 using the lowest strength materials tested. Assuming operable drains, the designers computed a 2.0 factor of safety. The as-built downstream slope also included a 15 foot berm to satisfy short-term stability requirements for end of construction conditions.

Video Tape No. 7
Dam No. 08902
Leatherwood Creek No. 5

Conditions at Time of Inspection

Orifice flow temporarily cut-off for duration of riser and outfall conduit inspections.

Riser - Approximate height 36 feet.

Concrete condition generally appears to be satisfactory, with one minor spall in corner of upstream wall (possibly related to form removal). The sluice gate does not appear to be leaking.

Outfall Conduit - 36 inch diameter concrete, 332 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Pipe joints appear to be tight.

Embankment Drains - 6 inch diameter corrugated metal pipe (left and right)

Televised against flow up to bend located 75 feet from downstream end, both left and right sides. Viewing poor beyond root mass located 24 feet into left drain and sag located 40 feet into right drain. Submerged conditions beyond 24 and 40 feet, respectively, may be the result of settlement. Visible pipe condition appears to be satisfactory.

Apparent Intent of Design

Review of the 1981 Phase I Inspection Report revealed the following:

1. Both the left and right embankment drains are shown to be 80 feet long B.C.C.M.P. parallel to the principal spillway, with perforations to within 30 feet of the outlet.

2. Both of the drains are shown to be sloped at 0.75% along alignments parallel to the principal spillway. Beyond the 90° elbow (termination of TV inspection), drains extend about 20 feet and 80 feet parallel to the crest on the left and right sides, respectively.

3. By design, the filter surrounding the perforated drain pipes consists of a coarse filter material (gravel) with a minimum 12 inch cover on the pipe, followed by a minimum 12 inch cover of fine filter material (sand).

4. The design report contains recommendations for a trench drain to control the phreatic line and relieve pressures from seepage through the partially weathered rock. Design phase slope stability calculations were based upon the Swedish Circle method and indicated a 1.47 downstream slope factor of safety with no drain.

Video Tape No. 8
Dam No. 04504
Johns Creek No. 4

Conditions at Time of Inspection

No flow through riser at time of inspection. Pool level several inches below invert of cold water pipe. Water bailed into riser to float a leader line through the conduit prior to televising.

Riser - Approximate height 39 feet.

Concrete condition generally appears to be satisfactory. Aggregate surfaces exposed below the orifice (normal pool) level, about 21 feet below the top. Surface patching noted on left wall, about 1 foot below the orifice. No evidence of leakage.

Outfall Conduit - 30 inch diameter concrete, 278 feet long.

Evidence of crack repairs throughout the full length of conduit. Minor cracks noted in crown of pipe. None of the cracks appear to be leaking. Joints of pipe appear to be tight.

Embankment Drains - 6 inch diameter corrugated metal pipe (left and right).

Both of the embankment drains outlet through the left and right side walls of an impact basin. Unable to televise beyond a second bend located about 4 feet inside of both drains.

Apparent Intent of Design

The original design report conclusions contained within the 1979 Phase I Inspection Report indicate the need for a drain to control the phreatic line and prevent piping in the deep boulder areas of both abutments. Perforated pipe outlets were to be extended across the flood plain section, and blind trenches up the abutments. A 1.57 factor of safety was computed for the 2½:1 downstream slope with an embankment drain. Computations were reportedly based on total stress soil parameters.

Video Tape No. 9
Dam No. 04501
Johns Creek No. 2

Conditions at Time of Inspection

Pool level about 12 inches below orifice at time of inspection. Cold water intake pipe flow was temporarily cut-off for the duration of riser and outfall conduit inspections.

Riser - Approximate height 32 feet.

Concrete condition generally appears to be satisfactory, with exposed aggregate faces and some minor pitting at depths in excess of about 17 feet from the top. Noted zones of concrete deterioration are relatively minor, generally occurring in corners, and as such are possibly related to form removal during construction. The worst areas appeared to be only isolated spalls, ¼ inch to 1 inch deep along the interior right wall, 20 to 25 feet below the top. A few hairline cracks were noted in the upstream wall, but there was no evidence of leakage. The sluice gate does not appear to be leaking.

Outfall Conduit - 30 inch diameter concrete, 289 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Longitudinal minor hairline cracks were noted in the pipe segment located 34 feet from downstream end. Joints of pipe generally appear to be tight, even though the joints are not grout sealed. Reddish brown staining along crown of conduit at 6th joint downstream from riser (208 feet upstream of plunge pool) provides evidence of possible leakage. As shown by plates 5 and 6, the joint does not appear to be leaking at present, despite its location, which is probably below the phreatic line.

Embankment Drains - 6 inch diameter corrugated metal pipe (left and right).

Right - reddish brown silt size material was partially clogging outlet of right drain. Elected to flush drain before attempting to televise. Flushed drain to bend at 57 feet. Very little of the flush water returned to the outlet end. Initially the tailings were reddish brown and silty, but eventually the tailings turned into a brown, medium to coarse graded sand. Successfully televised full length of drain on withdrawal phase of second attempt. The visible portions of the corrugated metal pipe appear to be in satisfactory condition. Based on side wall staining, estimated that the pipe was about half clogged with sand prior to flushing. Sand is suspected to be from the filter, but source of migration from perforations or a break in pipe was not observed. At 57 feet, pipe bends left (toward embankment right).

Left - Drain appeared to be clean at outlet end. Attempted to televise, but televising revealed pipe was approximately 75% blocked with sand at a distance of 11 feet from outlet end. Televised 39 feet into drain from outlet before sand blockage prohibited further advance of camera. Conditions shown by plate 7 are as viewed from the 39 foot (camera refusal) mark prior to flushing the pipe. Upon flushing, almost none of the flush water was returned at the outlet end, but the flushing did clear the

Video Take No. 9
Johns Creek No. 2 continued

pipe sufficiently to permit successful televising the camera withdrawal phase from a point 50 feet from the outlet end. As viewed, the drain is completely clogged with sand at 50 feet, (7 feet downstream of the 90° elbow location in the right drain). The visible portions of the corrugated metal pipe appear to be in satisfactory condition. Cracks in the bituminous coating appear to be visible in the crown of pipe but perforations were not observed and are probably obscured by the soil infilling, which generally covers at least the bottom half of the drain pipe. Full depth clogging at the drain elbow provides reason to suspect a primary source of filter material migration from the left embankment portion of the drain.

Apparent Intent of Design

Foundation drain details are not included within the 1979 Phase I Inspection Report. The selected as-built plans included within that document do, however, indicate that the foundation drain extends left and right of the principal spillway along a line coinciding with the interface of the shale core and compacted downstream shell. The available information does not indicate where the pipes are terminated, but it appears that a 12 foot wide drainage blanket extends into the base of the core material and blind trenches extend up the relatively steep abutments. The design report recommended the use of fine concrete aggregate for the drain construction, which is consistent with the visual gradation of sand observed within the drain pipes. Specified perforation sizes are not known for the embankment drains at this site. However, if the pipe perforations are 3/16 inch diameter, e.g., as per the as-built plans for Union Springs Dam (which was also built in 1967), then migration of the filter sand into the drain pipes could readily occur without an intermediate coarser filter medium covering the perforations.

The design report indicated the conduit can be placed on bedrock. The sixth joint downstream of the riser where staining was observed on the pipe crown (reference plates 5 and 6) is very likely the first joint downstream of the cut off trench, which contains compressible soils.

Original design stability analysis were performed using a modification of the Swedish Circle Method, assuming that the location of the phreatic line is controlled by drainage. Calculated factors of safety for the zoned embankment downstream 2½:1 slope are not legible in the Phase I Report.

Video Tape No. 10
Dam No. 01513
South River No. 24
Happy Hollow

Conditions at the Time of Inspection

Wier flow temporarily cut-off for duration of riser and outfall conduit inspections.

Riser - Approximate Height 14 feet.

Riser replaced as part of 1984 dam rehabilitation. Concrete condition appears to be satisfactory. No deficiencies noted. Sluice gate condition appears to be good and has reportedly been operated in the past 2 years. Stem and guides are inside of the riser.

Outfall Conduit - 24 inch diameter concrete, 185 foot long.

Concrete surfaces appear to be in satisfactory condition. Conduit was replaced in 1984 (note casting dates on interior of pipe). Joints are sealed and tight.

Embankment Drains - 6 inch diameter corrugated metal pipe (left and right).

The portion of drains parallel to principal spillway were replaced during the 1984 dam rehabilitation.

Left - televised against flow up to right angle pipe bend located 68 feet from downstream end and also televised withdrawal. Helical CMP is generally clean and judged to be in satisfactory condition. Double line of perforations (lower right, embankment left) in the range from 54 to 62 feet from the outlet end. Perforated portion appears to have been embedded in crushed stone.

Right - televised against flow up to right angle pipe bend located 72 feet from downstream end and also televised withdrawal. Helical CMP is generally clean and judged to be in satisfactory condition. Double line of perforations (lower left, embankment right) in the range from 66 to 68 feet from the outlet end. Perforated portion appears to have been embedded in crushed stone. A tear in the crown of pipe was noted 26 feet from downstream end. The tear does not appear to be leaking, nor is there evidence of soil migration into the drain at this location

Apparent Intent of Design

The 1984 as-built plans indicate that the dam rehabilitation was completed May 30, 1985. The embankment drain replacements parallel to the outfall conduit were indicated to be non-perforated,

Video Tape No. 10
Happy Hollow Continued

even though perforations were observed on both the left and right sides. At the bend where televising ended, the new drains were connected to the existing trench drain which extends 109 feet left and right parallel to the dam crest, connecting to blind trenches at each abutment. Filter material surrounding the drain pipe was specified as a clean sand and gravel mixture with a 2 foot minimum cover on the pipe.

Video Tape No. 10
Dam No. 01502
South River No. 25
Toms Branch

Conditions at Time of Inspection

Flow over wier (about 2 inches) was temporarily cut-off for the duration of riser and outfall conduit inspections.

Riser - Approximate Height 17 feet.

Adjacent landowner reports that the riser was replaced about 10 years ago because of deteriorating concrete. Existing concrete surfaces appear to be surface treated with a sealer inside and outside. Concrete condition appears to be generally satisfactory, with some evidence of minor pitting. Construction joints are tight with no apparent evidence of leakage. The sluice gate does not appear to be leaking.

Outfall Conduit - 24 inch diameter concrete, 371 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Exposed aggregate faces throughout the length of conduit, but little evidence of pitting. Circumferential crack in pipe segment located 81 feet from downstream end. Joints of pipe appear to be tight.

Embankment Drain - 2 inch diameter iron pipe (left only).

Televised up to capped off end of pipe located 17 feet from downstream end. The pipe is either ductile iron or cast iron and does not appear to have any perforations or potential source of infiltration. Conditions within the upstream end of pipe are shown by plate 8.

Apparent Intent of Design

The typical sections contained within the 1978 Phase I Inspection Report indicate that the design includes an embankment drain. However, the design phase stability analyses are not available to indicate the dependence of the original design on drainage conditions created by the embankment drain. If built in accordance with the 1956 design plans, the dam would have a 10 inch diameter non-perforated corrugated metal pipe outlet on the left side, extending 138 feet back into the embankment. From that point, the plans indicate 10 inch perforated pipes extending right and left, 64 feet and 340 feet, respectively, with connecting 4 foot by 4 foot bank drains extending an additional 21 feet up the right abutment and 48 feet up the left abutment. There is no indication that these features were constructed.

Video Tape No. 11
Dam No. 01501
South River No. 26
Inch Branch

Conditions at Time of Inspection

Riser flow temporarily cut-off for duration of riser and outfall conduit inspections.

Riser - Approximate Height 15 feet.

Concrete surfaces are pitted and are judged to be in poor condition, yet remain serviceable. No leakage observed at construction joints. No leaks observed at sluice gate. Operator stem is missing.

Outfall Conduit - 24 inch diameter concrete, 309 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Pipe joints appear to be tight.

Embankment Drain - 8 inch diameter corrugated metal pipe (left only).

Reddish brown silt size material was present at outlet end, but the drain did not appear to need flushing in order to televise. At 10 feet from outlet end, televising revealed a blockage of about 90%. Sampling from the camera revealed that the blockage consisted of brown silt with no sand constituent. After several forced attempts to advance the camera beyond the blockage, televising was possible to a point 45 feet from the downstream end before the camera advance was again blocked by the rough edges of a pipe joint. Plate 9 shows apparent evidence of soil migration through the pipe joint at that location. The video footage count on the photograph at that point is incorrect.

Apparent Intent of Design

As-built drawings contained in the 1980 Phase I Inspection Report indicate that the embankment drain consists of a 144 foot length of 8 inch, non-perforated corrugated metal pipe, which connects to perforated pipe beyond a 60° "Y" located at the filter trench. An 8 inch perforated pipe extends 132 feet towards the left side of the embankment and 148.6 feet towards the right, with 4 foot by 4 foot bank drains extending an additional 80 feet up the left and right abutments. The perforated pipe was positioned in the center of a 4'6" square filter trench containing river run sand and gravel. According to the Phase I Inspection Report, design phase stability calculations are unavailable.

Video Tape No. 12
Dam No. 01508
South River No. 23
Robinson Hollow

Conditions at Time of Inspection

Very slight riser flow. Used rags to temporarily impede flow for duration of riser and outfall conduit inspections.

Riser - Approximate height 16 feet.

Concrete surfaces are pitted and are judged to be in poor condition, yet remain serviceable. No leakage observed at construction joints. No leakage observed at sluice gate.

Outfall Conduit - 24 inch diameter concrete, 306 feet long.

Concrete surfaces generally appear to be in satisfactory condition, with some minor aggregate exposure throughout length of pipe. Pipe joints generally appear to be tight, however, grout at joints is typically missing or cracked.

Embankment Drains - 8 inch diameter corrugated metal pipe (left and right).

Left- clear flow, but drain outlet partially clogged with reddish brown silt size material. Pipe was flushed with power washer. Wash water tailings reddish brown initially then brown. All of tailings appear to be silt with no sand. Camera was advanced to refusal at 62 feet from downstream end, but viewing was not possible beyond 10 feet where water within an apparent sag in the pipe submerges the camera.

Right- embankment seepage right of outlet conduit was investigated by removing soil and rock slough covering the outlet of a right embankment drain. Flow was clear, but pipe outlet partially clogged with reddish brown silt size material. First attempts to televise drain revealed that the drain was more than 50% clogged. Flushed drain with a power washer. Washwater tailings revealed reddish brown silt to brown and included numerous items of debris, specifically wood fragments, crushed aggregate, and bituminous coating from the pipe. After flushing, televising was possible up to a bend located 121 feet from the outlet end. Pipe appears to be in satisfactory condition, with bituminous coating losses near the outlet end. Siltation within the drain extends the full length up to the bend at 121 feet. Conditions at about 100 feet from the outlet are shown by plate 10.

Apparent Intent of Design

The 1979 Phase I Inspection Report indicates that the design data and as-built records for this 1956 dam were not available for review.

Video Tape No. 13
Dam No. 01511
South River No. 4
Lofton

Conditions at Time of Inspection

Less than an inch depth of flow into riser, not including the 1 inch garden hose siphon clamped over the side wall. No blockage of flow required for inspection.

Riser - Approximate height 18 feet.

Interior concrete surfaces are pitted and exterior exposures of aggregate and reinforcing steel were observed in the supports for the top slab of the riser. The riser concrete is judged to be in poor condition, yet the structure remains serviceable. Concrete conditions are shown by plates 11 and 12. No leaks were observed in the concrete riser or at the sluice gate.

Outfall Conduit - 24 inch diameter concrete, 316 feet long.

Concrete surfaces appear to be in satisfactory condition. Joints of pipe generally appear to be tight, however, grout seals at the joints are somewhat deteriorated.

Embankment Drains

Not applicable.

Video Tape No. 14
Dam No. 01512
South River No. 11
Canada Run

Conditions at Time of Inspection

No flow through primary spillway.

Riser - Approximate height 9 feet.

Concrete surfaces appear to be in satisfactory condition. No apparent leaks in riser walls. The sluice gate does not appear to be leaking.

Outfall Conduit - 24 inch diameter concrete, 179 feet long.

Concrete surfaces generally appear to be in satisfactory condition. Joints of pipe appear to be tight.

Embankment Drain - 8 inch diameter corrugated metal pipe (left only).

Flushing not required prior to televising. Televised up to the "Y" connection located 62 feet from downstream end. The corrugated metal pipe appears to be in satisfactory condition. Reddish brown silt in bottom 20% of pipe throughout entire run. Surface of dry silt appears to contain ripples, possibly indicative of wave action. The surface appearance may suggest that the silt was either deposited or riffled on the surface by receding tailwater which submerged the outlet end.

Apparent Intent of Design

As-built drawings contained in the 1978 phase I Inspection Report indicate that the embankment drain consists of a 64 foot length of 8 inch non-perforated corrugated metal pipe, which connects to a 67° "Y" located at the filter trench. A 6 inch perforated pipe extends 200 feet towards the left side of the embankment and 300 feet towards the right, with 4 foot by 4 foot bank drains extending an additional 25 feet up the left and right abutments. The perforated pipe was positioned in the center of a 4 feet square filter trench containing clean sand and gravel. According to the Phase I Inspection Report, design phase stability calculations are unavailable.

APPENDIX B

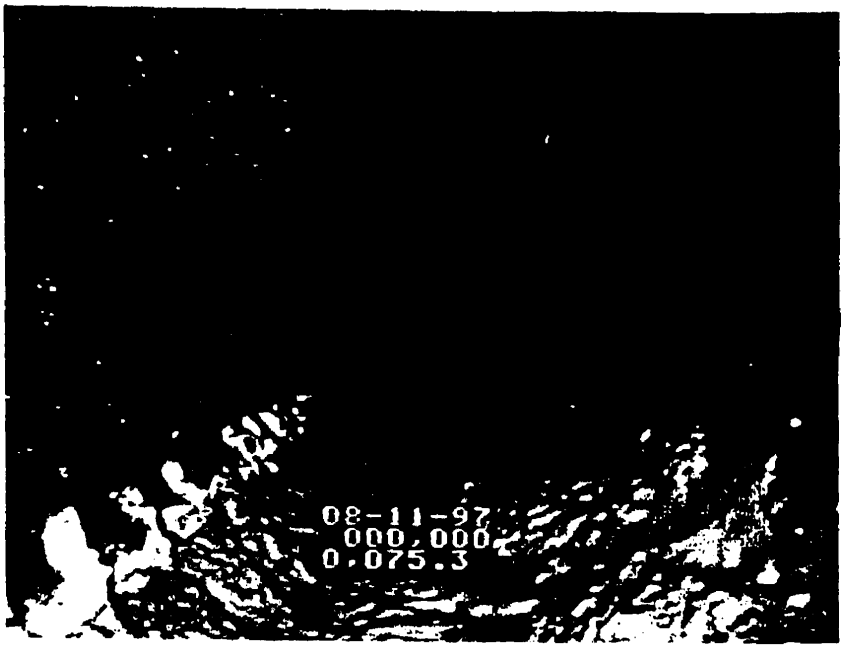


PLATE 1 - UNION SPRINGS
Left embankment drain, 75 feet from outlet end. Note perforations left and right, with staining to the ⅓ full level just below perforations.

PLATE 2 - UNION SPRINGS
Left embankment drain, 104 feet from outlet end. Note double line of perforations on right side only (embankment left). Staining on left transitions from ⅓ full to ½ full within 3 feet of bend to right (embankment left).

PLATE 3 - BRIERY BRANCH
Segment of riser leak, interior left wall, 34 feet below top. Note rubber matting in hole to stem flow.

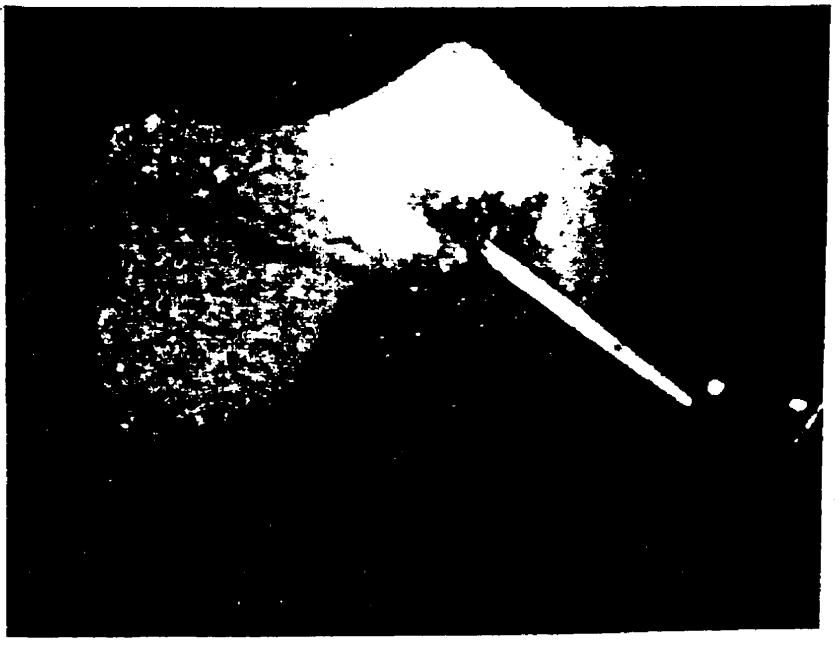


PLATE 4 -HEARTHSTONE
Riser Leak, interior downstream wall, 36 feet below top.

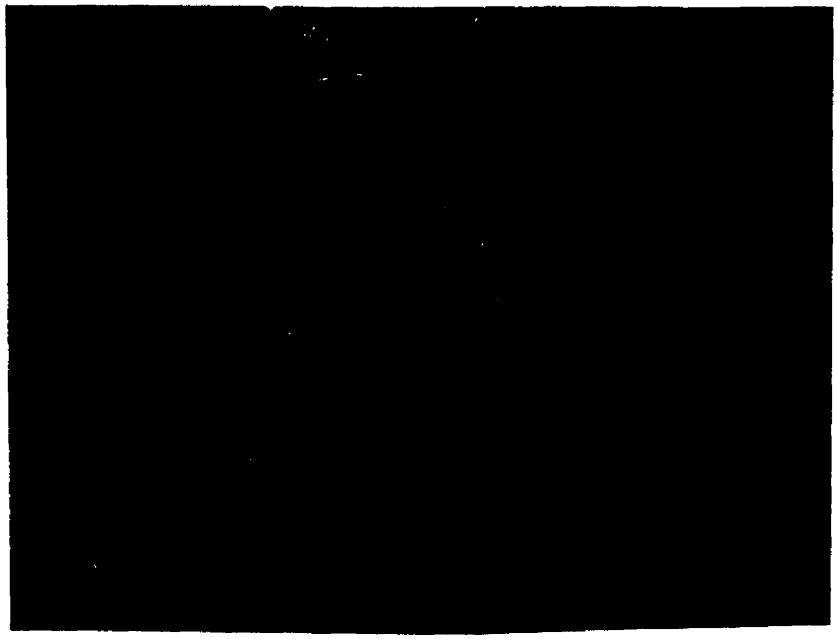


PLATE 5 - JOHNS CREEK NO. 2
Outfall conduit joint staining at crown -- 208 feet from downstream end.

PLATE 6 - JOHNS CREEK NO. 2
Outfall conduit joint staining at 208 feet from downstream end, straight on view.

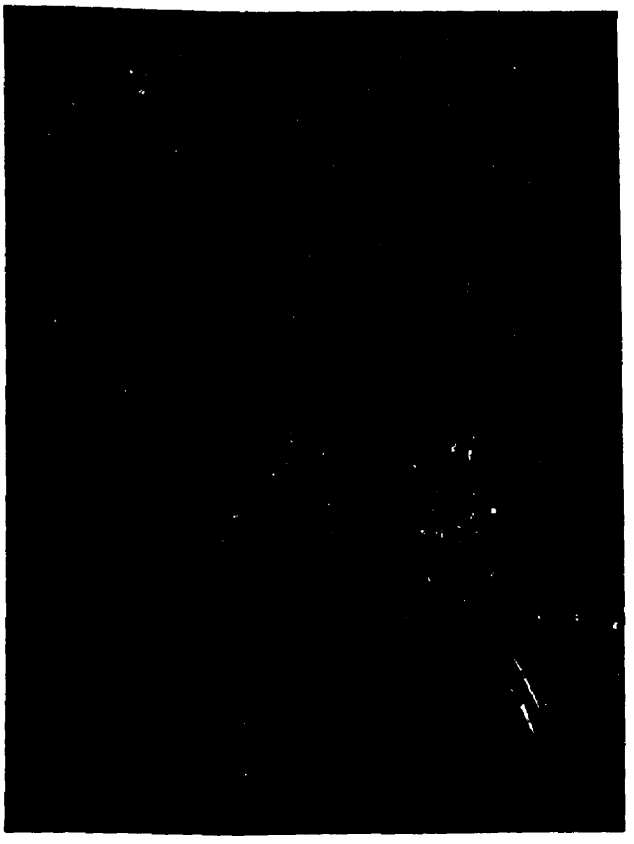


PLATE 7 - JOHNS CREEK
NO. 2
Left embankment drain sand clog as viewed 39 feet from outlet end prior to flushing.

PLATE 8 - TOMS
BRANCH
Embankment drain (2 inch iron pipe) as viewed near end cap, 17 feet from outlet end. No perforations or apparent source of inflow.

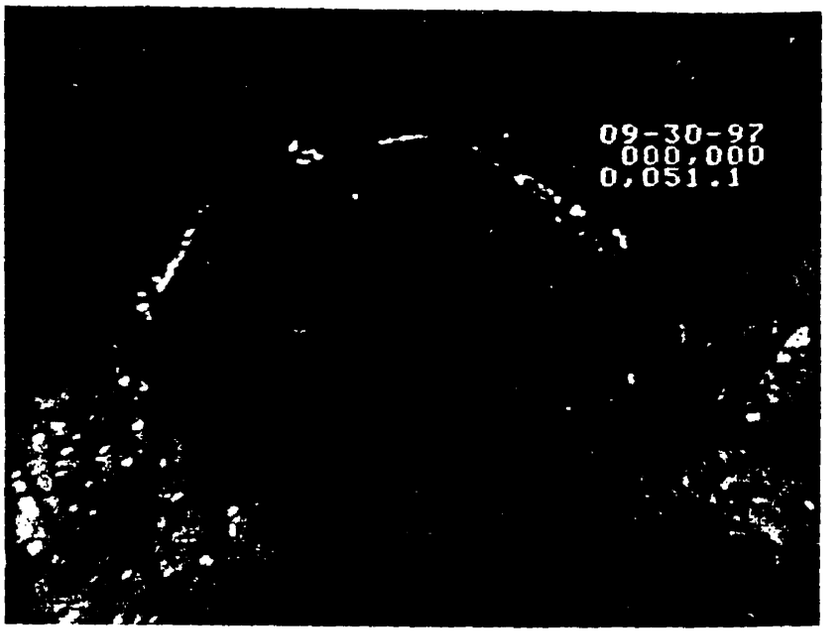
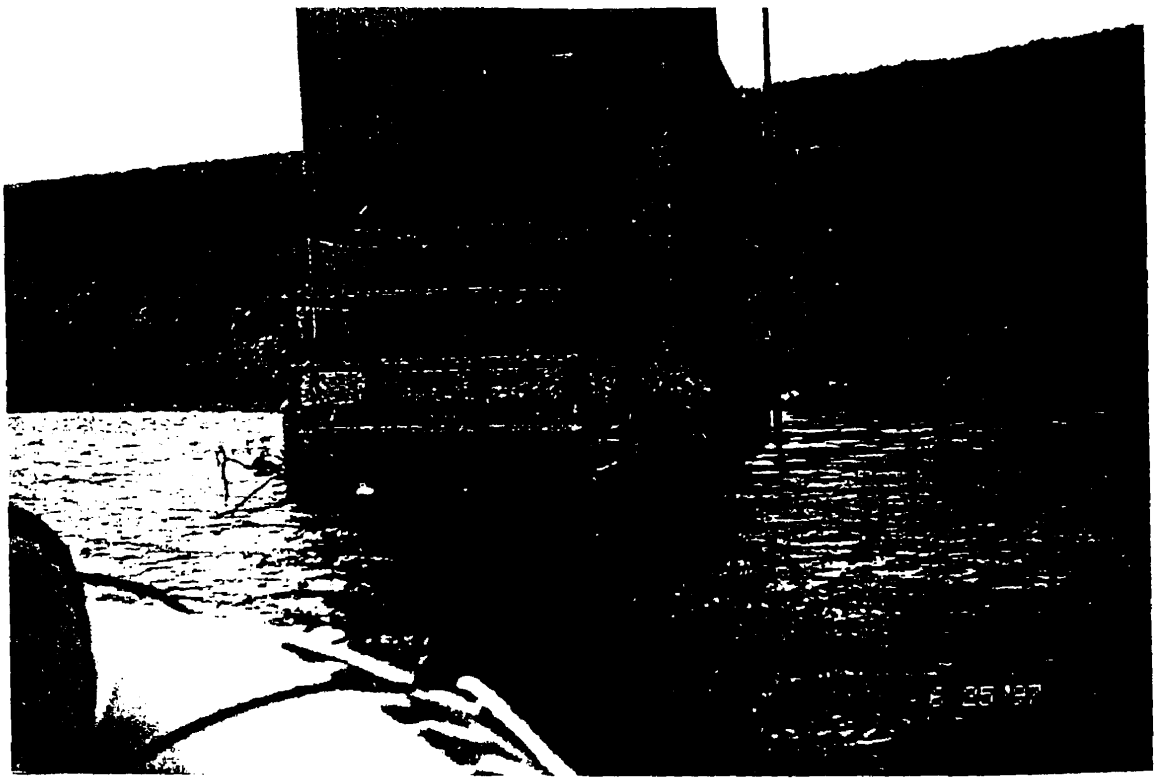


PLATE 9 - INCH BRANCH
Soil migration through embankment drain joint, 45 feet from outlet end.

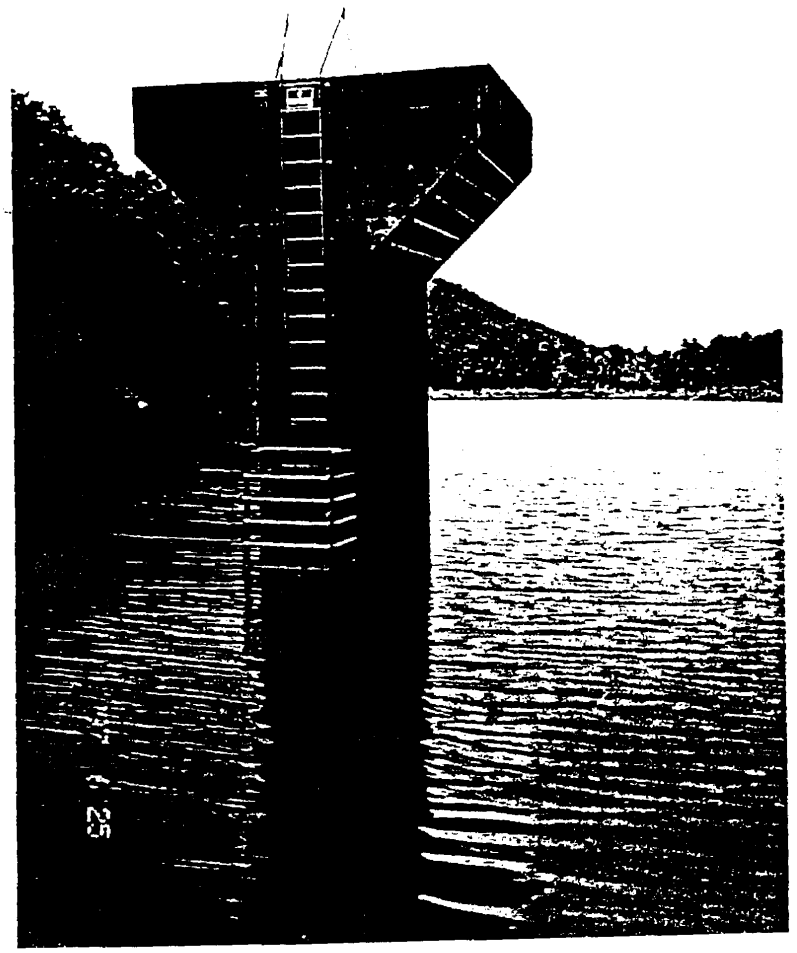
PLATE 10 - ROBINSON HOLLOW
Right embankment drain siltation as viewed about 100 feet from outlet end.

PLATE 11 - LOFTON
Deterioration of concrete, interior wall of riser near top. Note pitting and friable condition revealed by chipping with a hammer.

PLATE 12 - LOFTON
Loss of concrete section and exposed reinforcing steel on exterior of riser at the waterline.

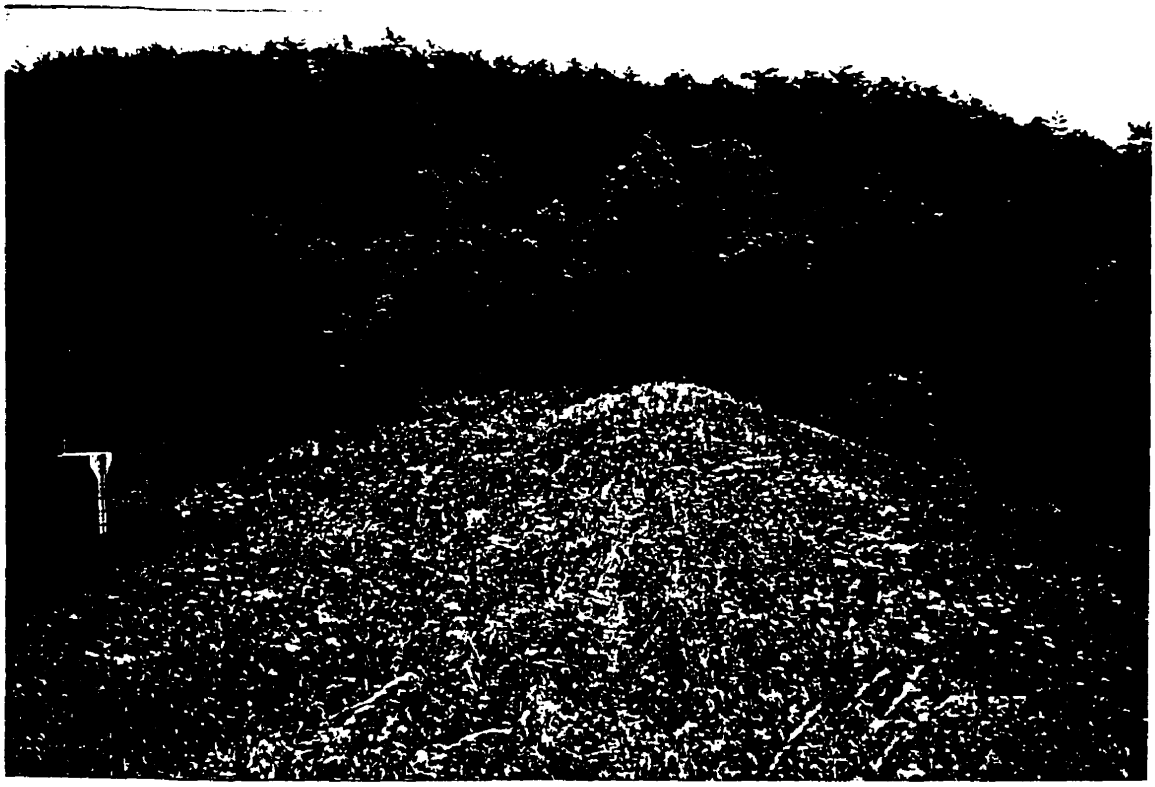


Johns Creek Dam No. 1, McDaniels Lake Dam No. 04502

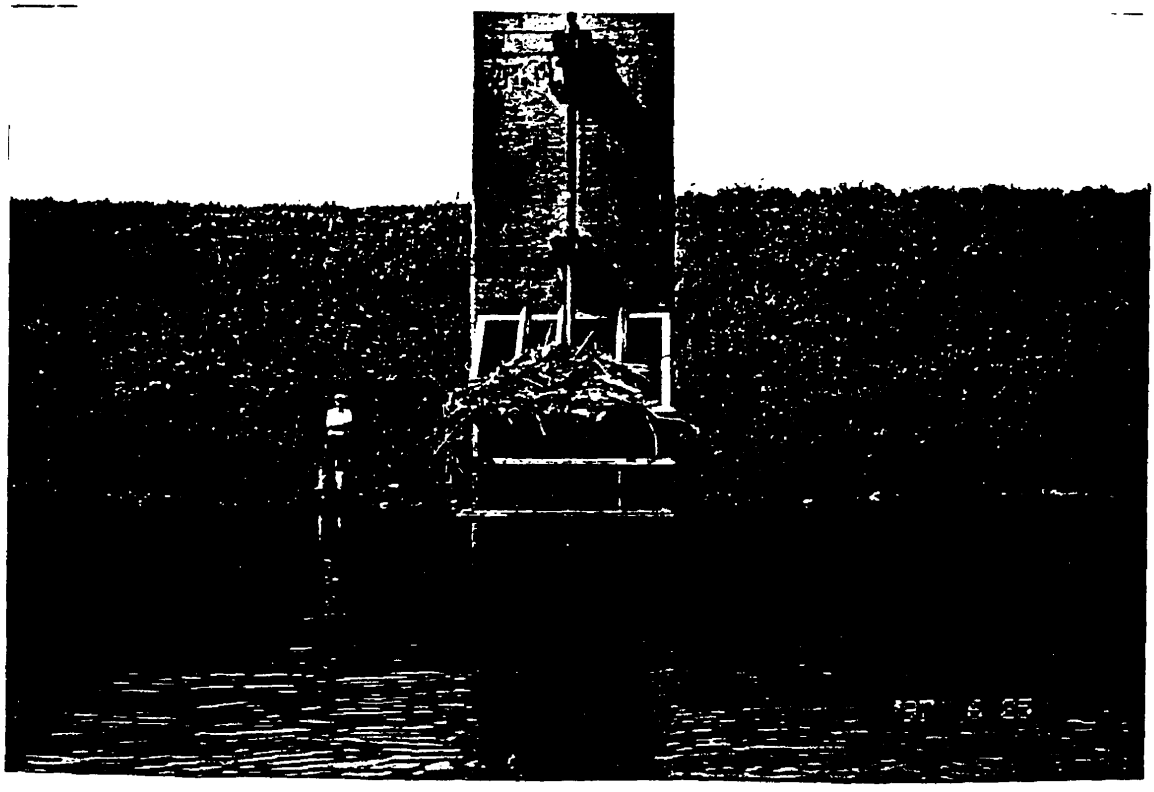


Johns Creek Dam No. 2 Dam No. 04501

Johns Creek Dam No. 3
Dam No. 04503

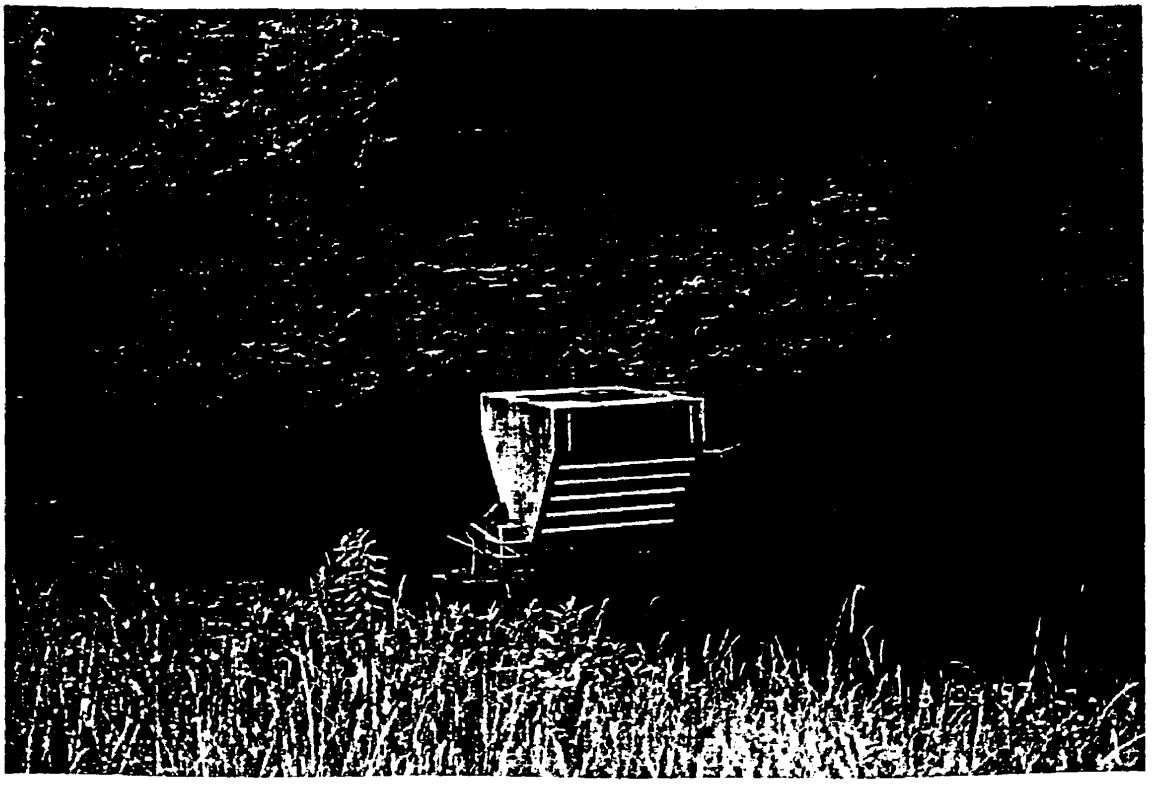


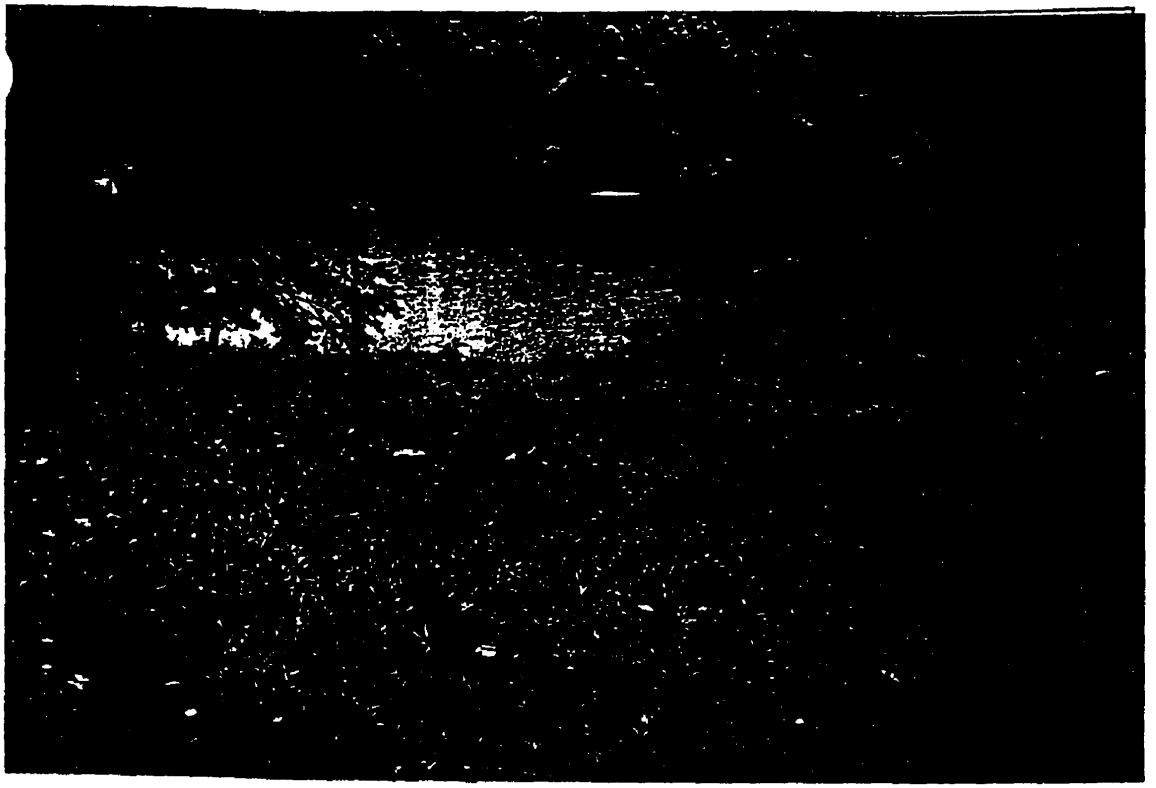
Johns Creek Dam No. 4
Dam No. 04504



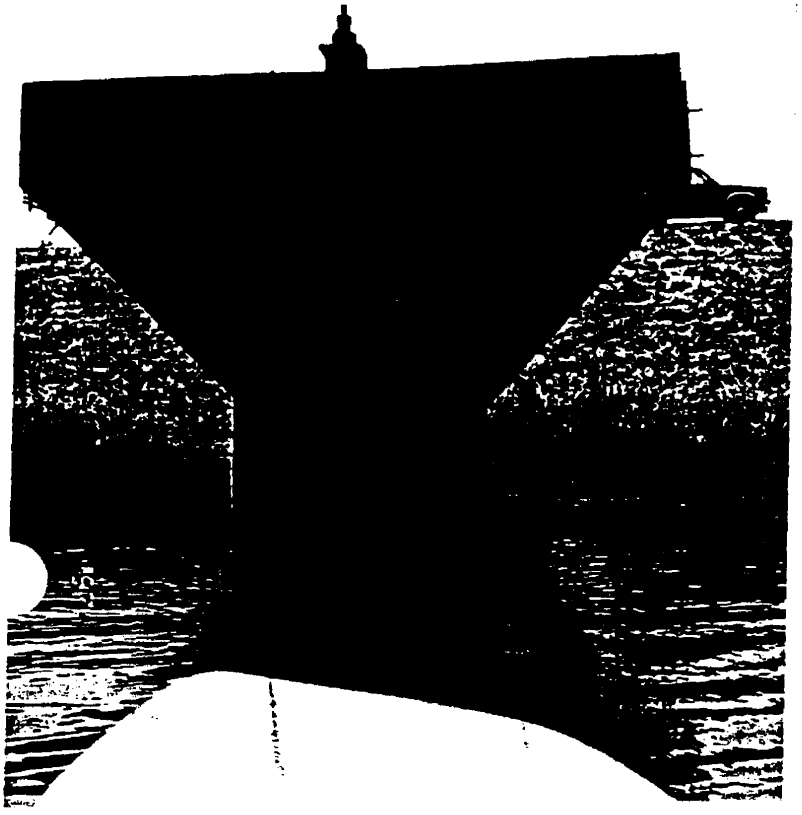
Leatherwood Creek Dam No. 2
Dam No. 08905

Leatherwood Creek Dam No. 3
Dam No. 08904



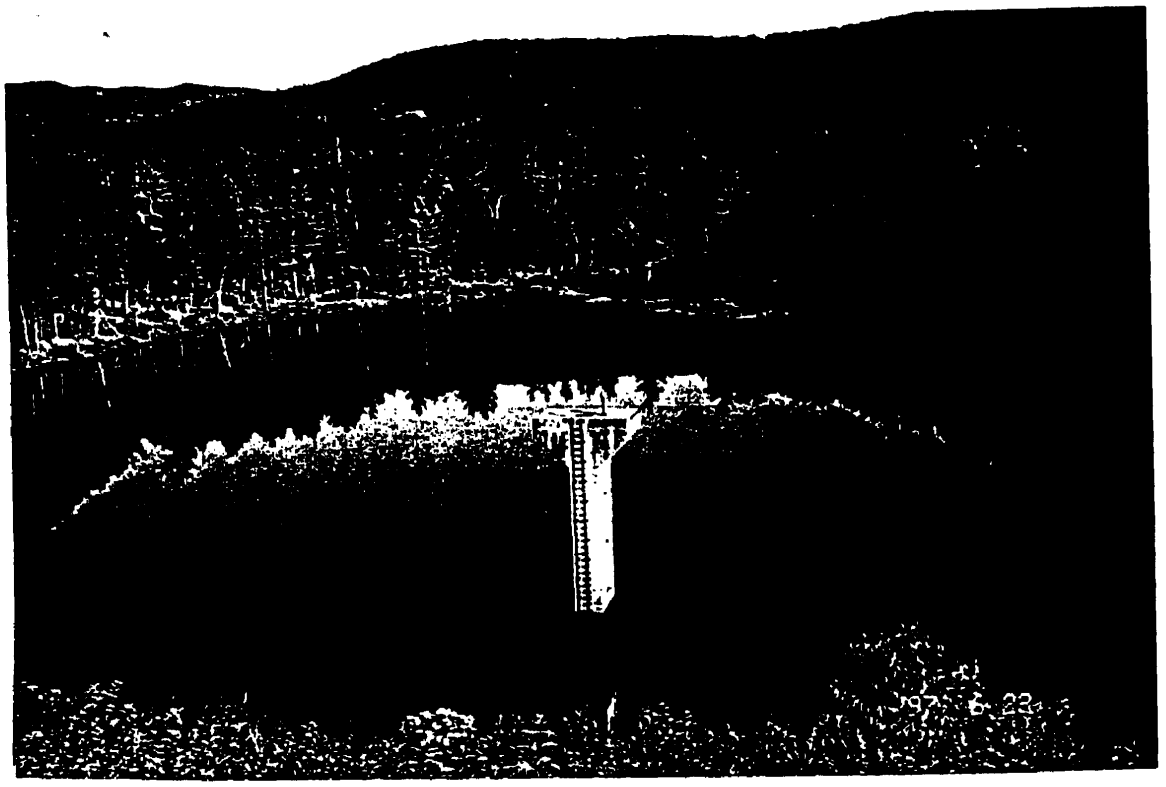


Leatherwood Creek Dam No. 5 Dam No. 08902

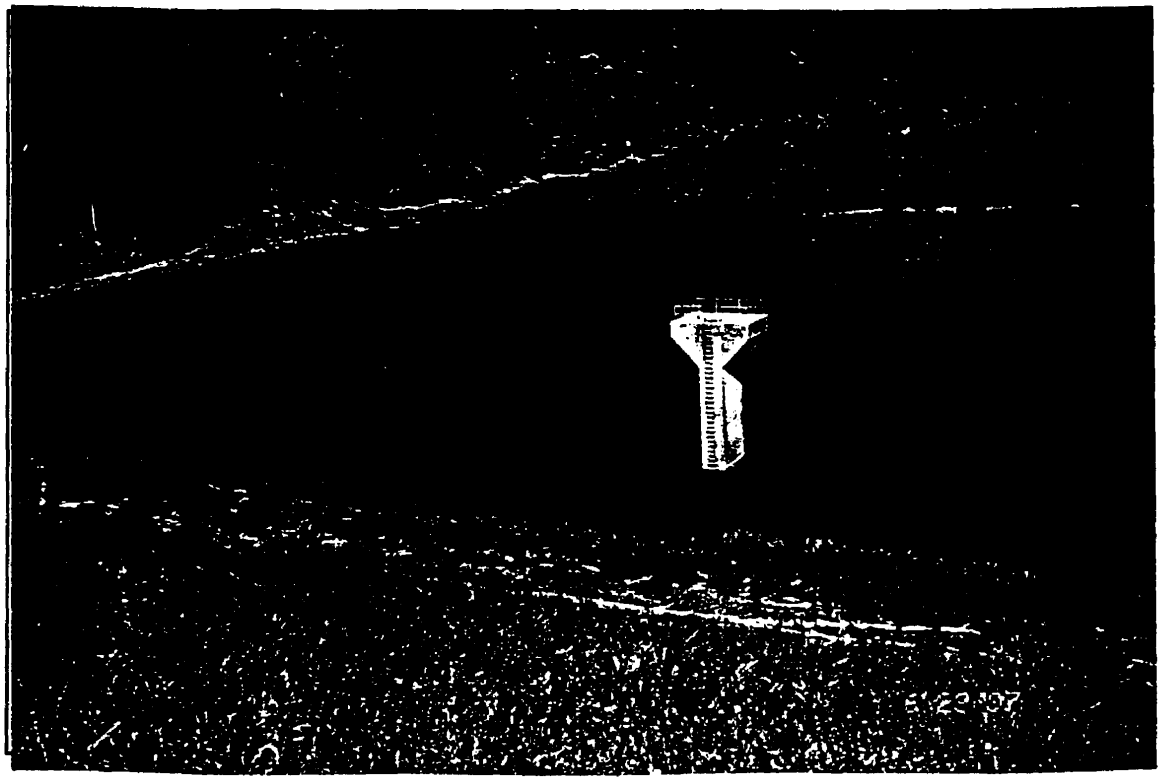


Leatherwood Creek Dam No. 6 Laurel Park Dam No. 08907

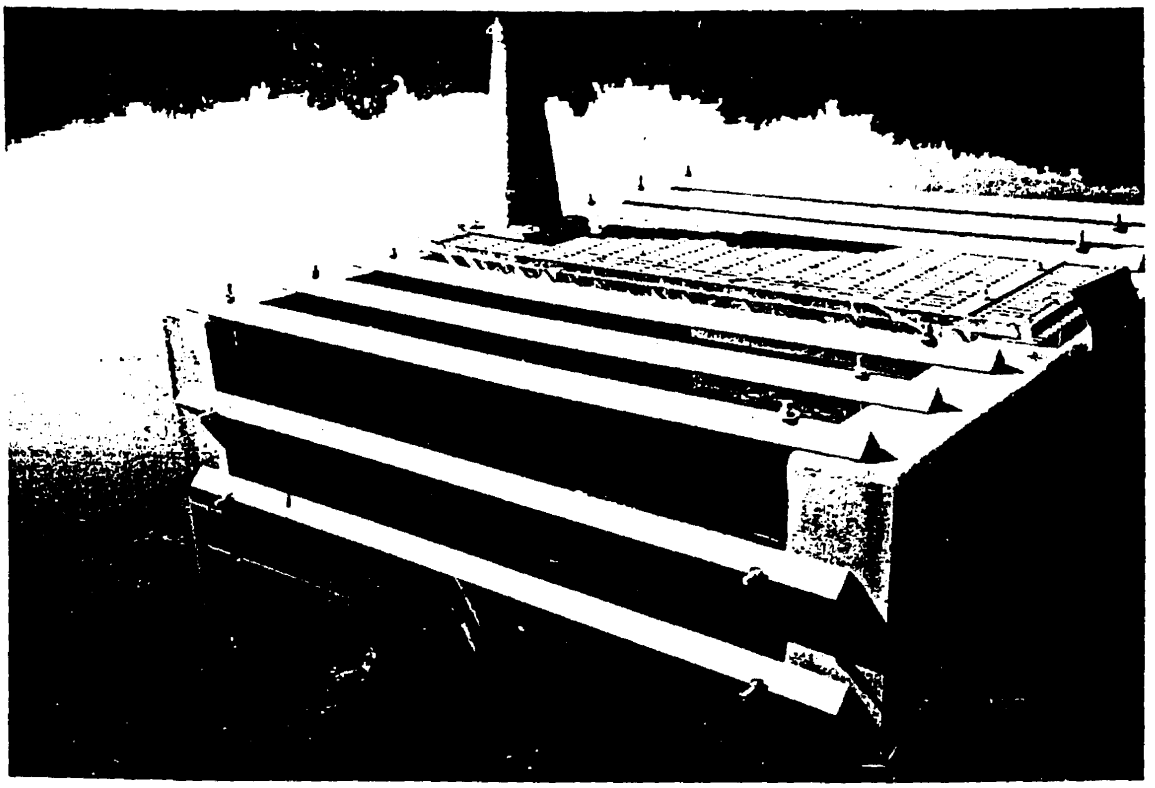
Lower North River No. 80, Union Springs Dam
Dam No. 16501



Lower North River No. 78, Briery Branch
Dam No. 16502

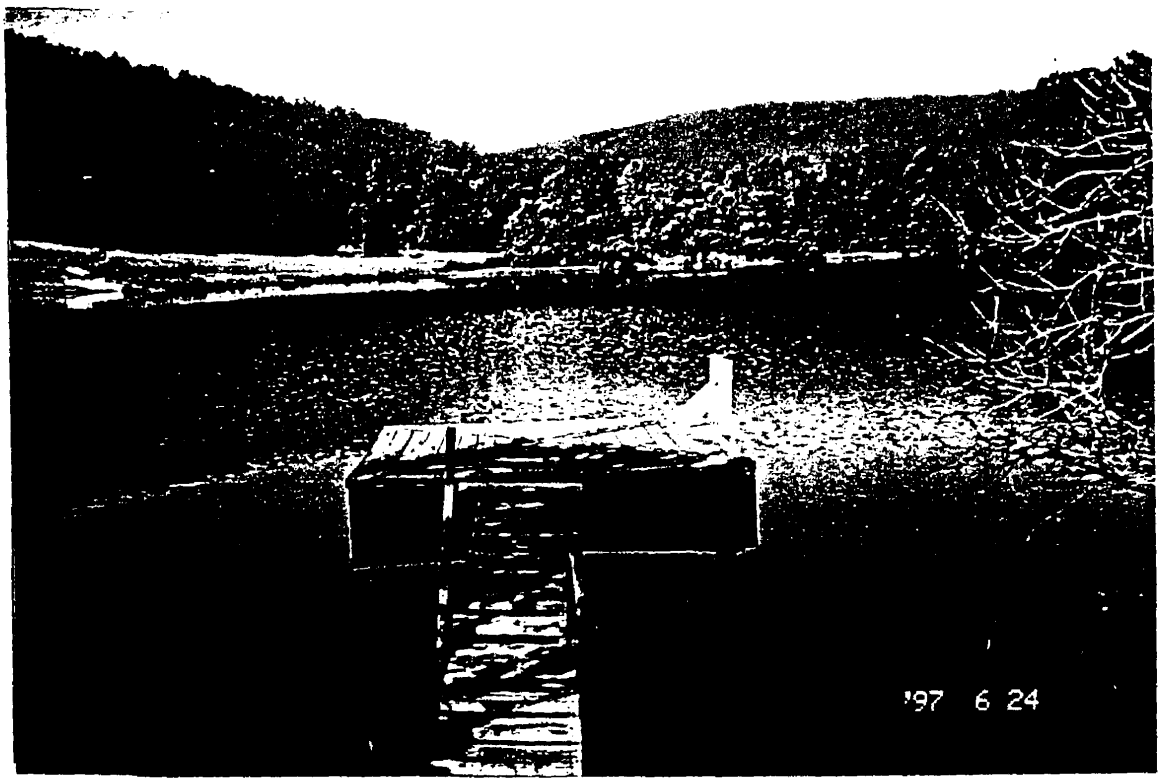


South River Dam No. 24, Happy Hollow
Dam No. 01513

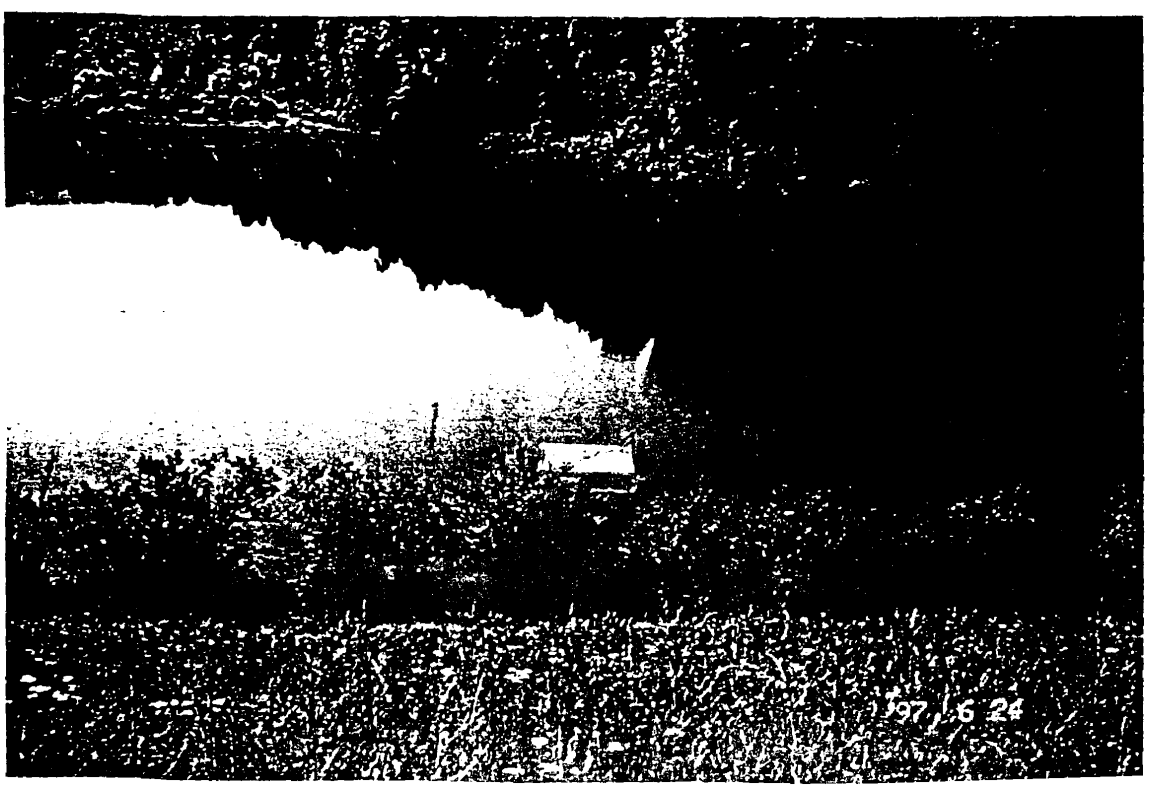


South River Dam No. 25, Toms Branch
Dam No. 01502

South River Dam No. 26, Inch Branch
Dam No. 01501

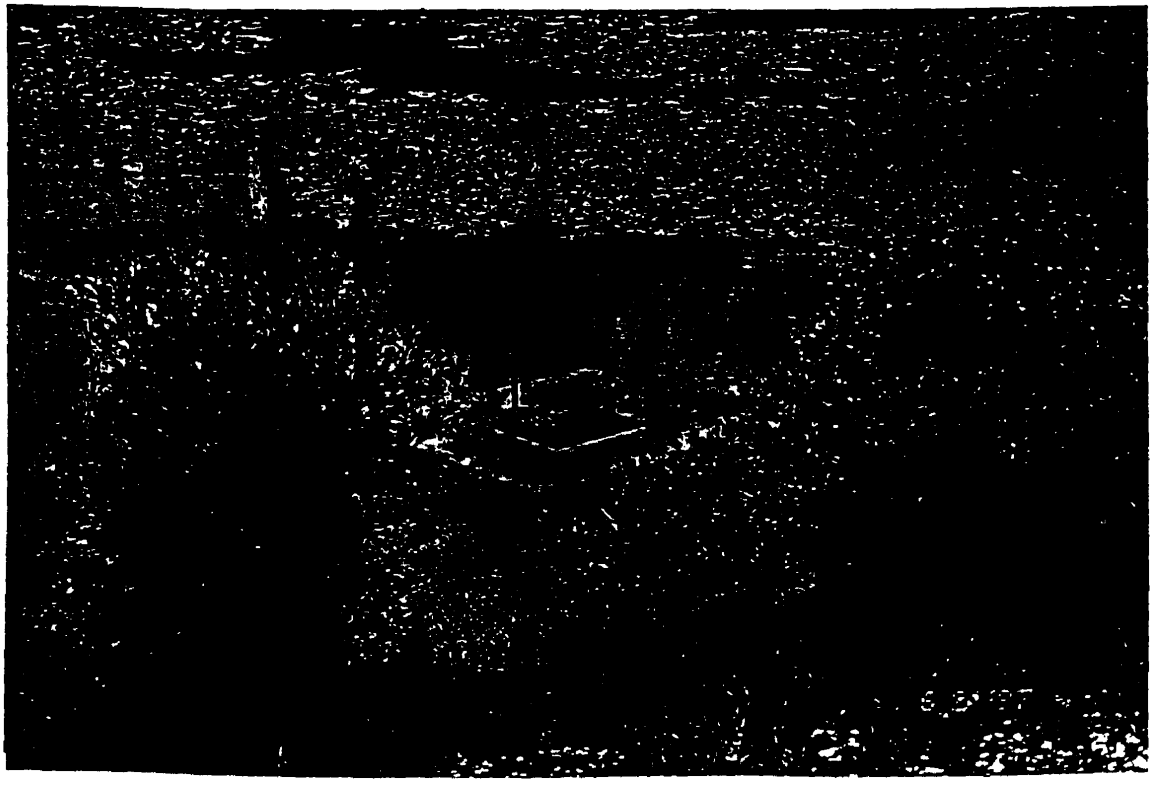


South River Dam No. 23, Robinson Hollow
Dam No. 01508



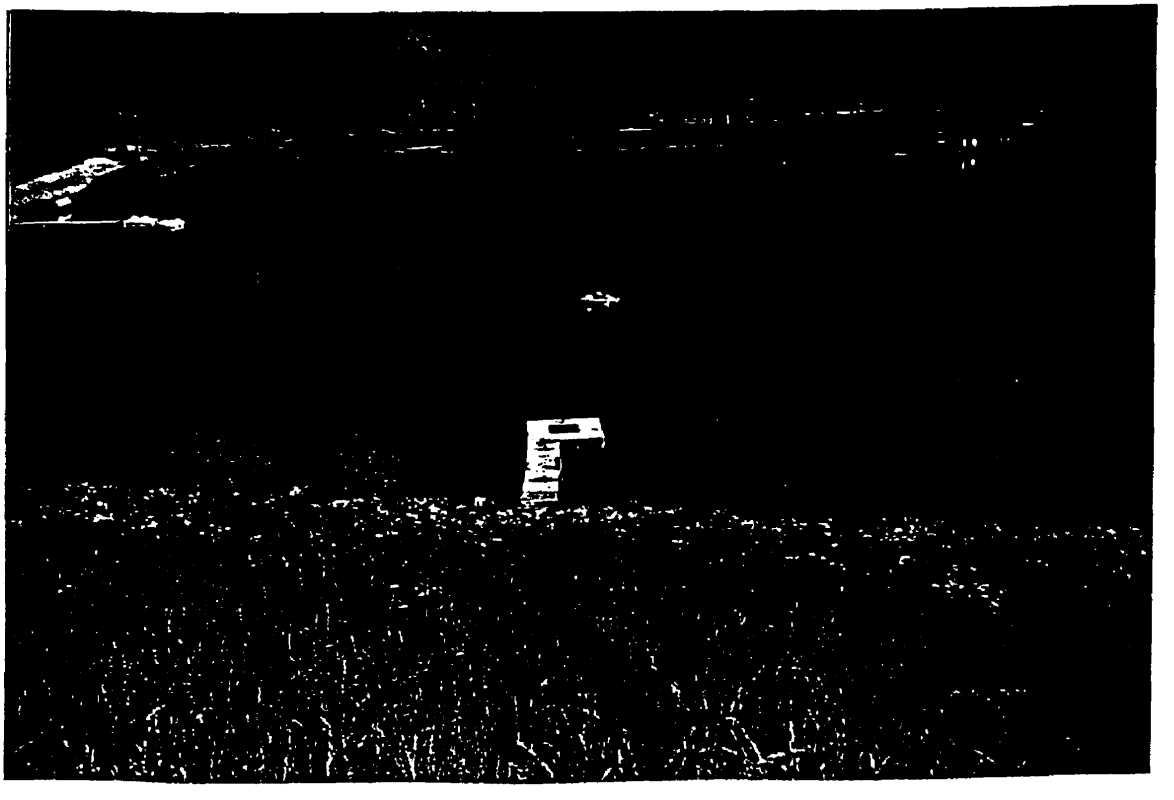
South River Dam No. 7, Wilda
Dam No. 01522

South River Dam No. 11, Canada Run
Dam No. 01512

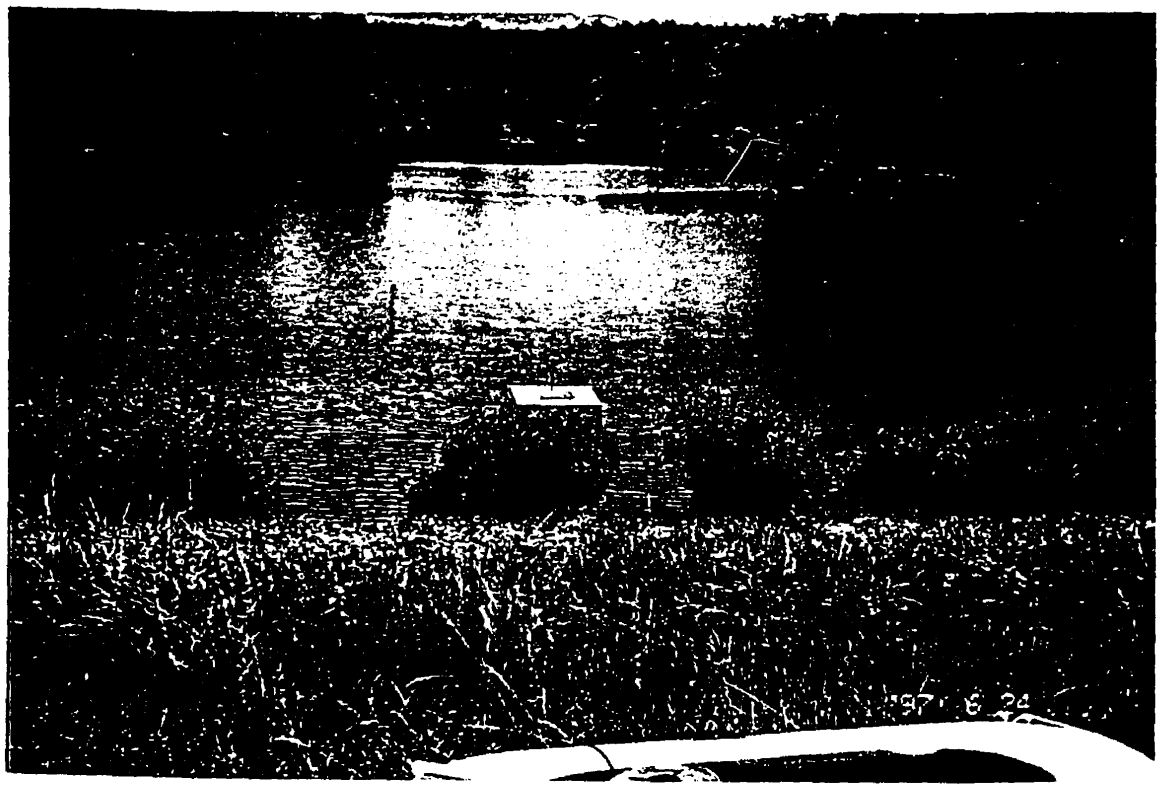


South River Dam No. 19, Waynesboro Nursery
Dam No 01514

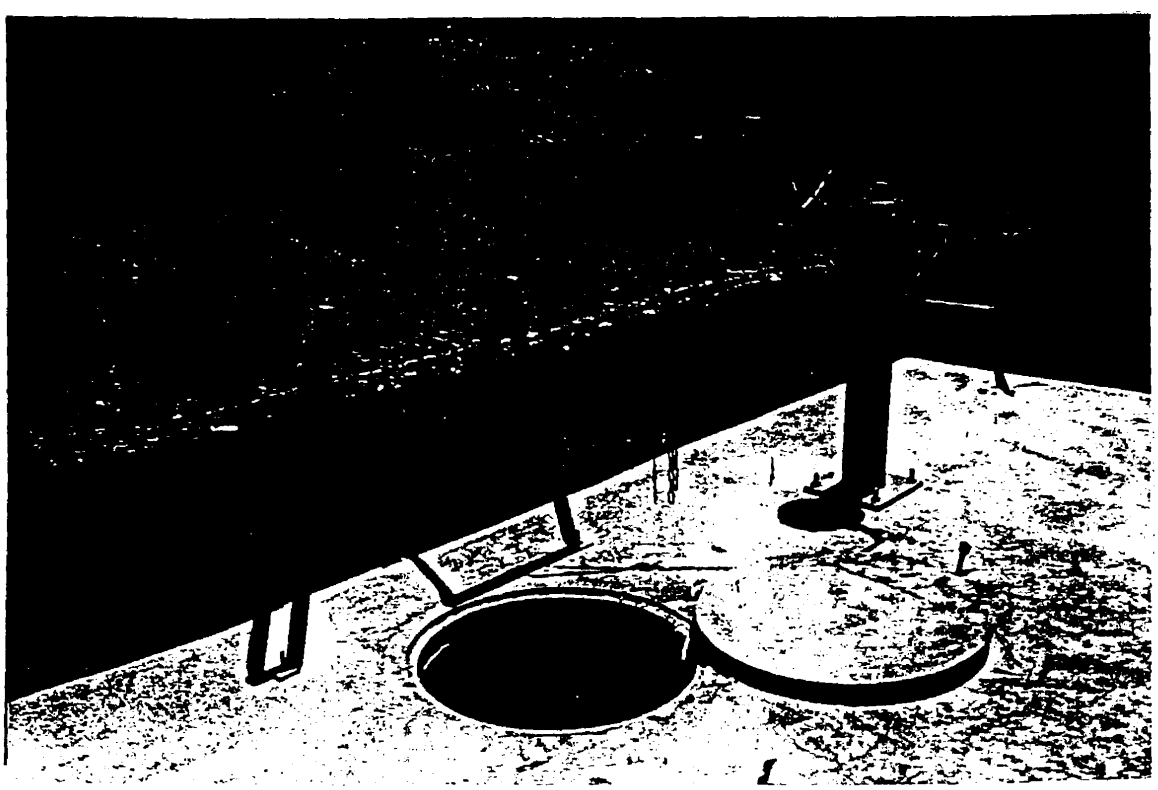
South River Dam No. 6, Sengers Mountain Lake
Dam No. 01509



South River Dam No. 4, Lofton Lake
Dam No. 01511



Upper North River Dam No. 77, Hearthstone Lake
Dam No. 01507



APPE[illegible]X C

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 11, 1997 TIME : 1100

LOCATION: DAM NO. 16501, LOWER NORTH RIVER NO. 80, UNION SPRINGS

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 01

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	5	Begin at top of opening downstream side of intake tower.
0+02	2	35	
0+53		905	Top of riser to top of downstream side of intake tower outlet pipe.
+		905	Left side wall of intake tower. Invert of gate opening is 51'. Gate opening is 3' wide x 2.5' high.
+			Rubber in good condition and no evidence of leakage. 1.8' wall thickness. Invert to 12" pipe
+			is 31'.
+		1664	All left side wall.
+		1665	Begin upstream wall.
0+51		2255	29' square opening.
+		2256	Right side wall.
+		2503	
+			Minor pitting of concrete mostly at 30' to bottom of intake. All measurements from top of riser.
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_01]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN. *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN. *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNE[illegible]MING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 11, 1997 TIME : 1330

LOCATION: DAM NO. 16501, LOWER NORTH RIVER NO. 80, UNION SPRINGS

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 30", RCP, 437 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 01

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	2780	
0+02	2	2905	
1+73	49	3466	
4+37		4251	
+		4305	12' sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
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85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
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90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 11, 1997 TIME : 1745

LOCATION: DAM NO. 16501, LOWER NORTH RIVER NO. 80, UNION SPRINGS

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 08", CMP, 107 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 01

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	4303	Corrugated pipe.
0+02	2	4327	
0+09		4349	Deposits.
0+67	27		
1+07		4628	Bend in pipe to the right.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_03]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH
2	DOWNSTREAM MH

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 11, 1997 TIME : 1815

LOCATION: DAM NO. 16501, LOWER NORTH RIVER NO. 80, UNION SPRINGS

TELEVISING : RIGHT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 08", CMP, 111 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 01

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	4630	Corrugated pipe.
0+02	2	4651	
0+12			Possible hole or lining torn.
0+22			Debris on left side of pipe.
1+11		4900	Line is plugged off at this point.
+			
+			From 0+39 to plug debris build-up.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_04]

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-OO

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT [illegible]ING, INC. SHEET 1 [illegible]

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 12, 1997 TIME : 1055

LOCATION: DAM NO. 16502, LOWER NORTH RIVER NO. 78, BRIERY BRANCH

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 02

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	5	Downstream wall.
0+02	2	35	Downstream wall.
+		700	Downstream wall.
+		701	Left side wall.
0+34			Two holes in wall with near horizontal crack leaking estimated 2500 gpd. Also, prior to televising
+			both holes on left side wall were partially blocked with rags and rubber matting. Leaks are
+			worse than they appear on video.
0+32			12" line plugged off. Crack begins at one hole and leads to another.
+		1170	Bottom intake pipe at 0+32'.
+		1171	Upstream wall.
+		1640	Right side gate valve opening 36" gate valve appears to be in good condition; no leakage.
+		1884	
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 OF 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 12, 1997 TIME : 1400

LOCATION: DAM NO. 16502, LOWER NORTH RIVER NO. 78, BRIERY BRANCH

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 36", RCP, 470 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 02

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	2157	
0+02	2	2200	
1+38		2617	Possible hair line crack.
1+70		2756	Possible hair line crack. Possible seepage.
3+83		3520	Possible crack in pipe.
4+70		3729	
+		3745	8' and 12' pipe sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_06]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT !ING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 13, 1997 TIME : 1000

LOCATION: DAM NO. 01507, UPPER NORTH RIVER NO. 77, HEARTHSTONE

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 03

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+		5	Downstream wall.
+		35	
0+25			Minor crack.
0+26			Minor crack.
0+29			Possible seepage through joint, 3" penetration into joint.
0+33			Seepage through wall and cracks.
0+34			Seepage through wall. Hole in wall 1" penetration.
0+36			Hole in wall leaking an estimated 10,000 gpd. 4" penetration.
0+49			Bottom of intake.
+		1172	Downstream wall.
+		1173	Left sidewall.
+		1548	Left sidewall.
+		1549	Upstream wall.
0+22		1835	Invert to square opening is 22'.
0+44			Hole in wall, leaking estimated 3,000 gpd. 13" penetration at an angle.
0+48		2193	Gate valve opening is 5" from bottom. 35" deep. No leakage.
0+41		2345	Rightside wall.
0+28			Top of slope upstream.
0+26			Minor crack 3' from downstream. 5' from w.p. stream corner.
0+23			Minor crack.
+			Minor crack top slab.
+		2887	

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 13, 1997 TIME : 1230

LOCATION: DAM NO. 01507, UPPER NORTH RIVER NO. 77, HEARTHSTONE

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 48", RCP, 570 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 03

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	3118	
0+02	2		
0+43	49		
0+90	51		
2+37			Begin minor cracks.
2+43			End minor cracks.
2+48	49		
2+65			Minor crack.
3+00			Minor crack.
3+27	49		Minor crack at joint.
3+43	49		Minor crack at joint.
5+70			
+		4501	12' pipe sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_08]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT FLEMING, INC. SHEET 1 OF 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 13, 1997 TIME : 1230

LOCATION: DAM NO. 01514, SOUTH RIVER NO. 19, WAYNESBORO NURSERY

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 04

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+		5	Downstream wall.
+		35	8' from bottom of intake to top of riser slab.
+		318	Left side wall.
+		382	Upstream wall.
+		507	Right side wall.
+		590	
+			
+		591	Outside of intake tower.
+		592	Left wall
+		686	Upstream wall.
+		935	
+		936	Right side wall.
+		1079	Downstream wall.
+		1270	3' from top hairline crack.
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[illegible]

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYP.

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE H&W

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNE[illegible]4ING, INC. SHEET 1[illegible]1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 14, 1997 TIME : 1000

LOCATION: DAM NO. 01514, SOUTH RIVER NO. 19, WAYNESBORO NURSERY

TELEVISING : OUTFALL CONDUIT STATIONING FROM : RISER PIPE : 24", RCP, 194 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 04

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	1270	
0+02	2	1300	
1+94		2008	15' pipe sections.
+		2025	
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_10]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE #=##

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNET [illegible]ING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 14, 1997 TIME : 1145

LOCATION: DAM NO. 01514, SOUTH RIVER NO. 19, WAYNESBORO NURSERY

TELEVISING : RIGHT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 10", CMP, 72 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 04

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	2025	Corrugated pipe.
0+02	2	2048	
0+72		2272	Pipe bends to the left.
+		2290	
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_11]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN. RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 OF 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 14, 1997 TIME : 1420

LOCATION: DAM NO. 01522, SOUTH RIVER NO. 7, WILDA

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 04

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+		2287	Downstream wall.
+		2355	Left side wall.
+		2406	Upstream wall.
+		2527	Sock in gate valve plugging hole shut.
+		2528	Right side wall.
+		2615	
+			
+		2616	Outside intake tower.
+			Downstream wall.
+		2644	Left side wall.
+		2670	Upstream wall.
+		2740	Right side wall.
+		2782	
+			Total depth 13'.
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_12]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANN[illegible]4ING, INC. SHEET [illegible]

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 14, 1997 TIME : 1500

LOCATION: DAM NO. 01522, SOUTH RIVER NO. 7, WILDA

TELEVISING : OUTFALL CONDUIT STATIONING FROM : RISER PIPE : 24", RCP, 253 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 04

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	2780	
0+02	2	2803	
2+53		3395	15' pipe sections.
+		3408	
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_13]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN - AIR TEST PASS
92	SERVICE CONN - AIR TEST FAIL
93	SERVICE CONN - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN - WATER SATURATION TEST PASS
95	SERVICE CONN - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE U+M

1	UPSTREAM MH
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNET [illegible]ING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 14, 1997 TIME : 1600

LOCATION: DAM NO. 01522, SOUTH RIVER NO. 7, WILDA

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 98 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 04

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00			Corrugated pipe.
0+02			
0+98			Bend in pipe.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT ING, INC. SHEET 1 O

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 15, 1997 TIME : 0940

LOCATION: DAM NO. 01509, SOUTH RIVER NO. 6, SENGERS MOUNTAIN LAKE

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 05

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00		5	Downstream wall.
+		35	
+		123	Left side wall.
+			
+		190	Upstream wall.
+		247	Gate valve, no leakage.
+		260	Right side wall.
+			
+		374	Outside intake tower.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_15]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [redacted]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNET MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 15, 1997 TIME : 1315

LOCATION: DAM NO. 01509, SOUTH RIVER NO. 6, SENGERS MOUNTAIN LAKE

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 24", RCP, 343 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 05

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	539	
0+02	2	550	
3+43	3	1540	15' pipe sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_16]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT FLEMING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : AUGUST 15, 1997 TIME : 1315

LOCATION: DAM NO. 01509, SOUTH RIVER NO. 6, SENGERS MOUNTAIN LAKE

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 123 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 05

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	1540	Corrugated pipe.
0+02	2	1551	
+			
1+23		1834	Bend in pipe.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_16.2]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNET 1ING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 22, 1997 TIME : 0900

LOCATION: DAM NO. 08907, LEATHERWOOD CREEK NO. 6

TELEVISING : RISER INTERIOR STATIONING FROM : TOP RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 06

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+		0	Total depth is 19.7' 2' x 6' opening.
+		35	Downstream wall is 7.9' to top of intake.
+			Opening of intake is 2 x 13.
0+15		570	Seam in wall. No leakage.
+			17.2' to top of outfall pipe.
+		687	Left side wall.
+		905	Bottom of slab. Left side crack.
0+17		910	Upstream wall.
+			Top of gate valve. Gate valve has no leakage.
+		1235	Right side wall.
+		1419	Bottom of slab crack.
+		1445	End.
+			
+		1445	Outside intake tower.
+		1608	
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_17]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT ING, INC. SHEET 1 OF

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 22, 1997 TIME : 1030

LOCATION: DAM NO. 08907, LEATHERWOOD CREEK NO. 6

TELEVISING : OUTFALL CONDUIT STATIONING FROM : OUTLET END PIPE : 24", RCP, 212 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 06

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	1610	
0+02	2	1640	
2+10	3		
2+12	4		16' sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 22, 1997 TIME :

LOCATION: DAM NO. 08907, LEATHERWOOD CREEK NO. 6

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 54 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 06

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+02	2		
0+20	29		
0+53	30		
0+54			Appeared to be bend in pipe. (As-built plans indicate pipe terminates.)
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_19]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT /ING, INC. SHEET 1 Of 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 22, 1997 TIME : _____

LOCATION: DAM NO. 08907, LEATHERWOOD CREEK NO. 6

TELEVISING : RIGHT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 54 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 06

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+02	2		
0+15	29		
0+29	30		Perforations in pipe begins.
0+54			Bend in pipe.
+			
+			
+			
+			
+			
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+			
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+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_20]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN. *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I+M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNET NG, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 23, 1997 TIME :

LOCATION: DAM NO. 08902, LEATHERWOOD CREEK NO. 5

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 07

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 36'.
+		0	Downstream wall.
+		520	
+		521	Left side wall.
+		760	
+		761	Upstream wall.
0+12			Concrete span 1/2" deep. 12'.
+		1210	34' top of gate valve. No leakage.
+		1227	Right side wall.
+		1410	End
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN. *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN. *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT I NG, INC. SHEET 1 OI

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 23, 1997 TIME :

LOCATION: DAM NO. 08902, LEATHERWOOD CREEK NO. 5

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 36", RCP, 334 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 07

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	1680	
0+02	2	1711	
3+32	3		
3+34	4		
+			16' sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
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+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

|31246\TVLOGS\TVLOG_22|

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I+O

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNE[illegible]IING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 23, 1997 TIME :

LOCATION: DAM NO. 08902, LEATHERWOOD CREEK NO. 5

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 75 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 07

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+02	2		
0+24			Mass of fine roots at sag in pipe.
0+75			Cannot advance camera any further; appears to be pipe bend.
+			
+			Roots are blocking flow.
+			
+			
+			
+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_23]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT F NG, INC. SHEET 1 OF

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 23, 1997 TIME :

LOCATION: DAM NO. 08902, LEATHERWOOD CREEK NO. 5

TELEVISING : RIGHT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 75 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 07

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+02	2		
0+40	29		
0+75			Bend in pipe.
+			
+			Possible sag at 0+40, but fine root mass may be blocking flow.
+			
+			
+			
+			
+			
+			
+			
+			
+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_24]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT [illegible]ING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 24, 1997 TIME : 1100

LOCATION: DAM NO. 04504, JOHNS CREEK NO. 4

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 08

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 39'
+		5	Downstream wall.
+		691	Left side wall.
+			22' patchwork done.
+			20' seam.
+		1120	Upstream wall.
+			19' top of intake.
+			21' bottom of intake.
+			35' top of valve.
+		1720	Right side wall.
+			21' cold water pipe. Water level 5" below pipe.
+		2131	End.
+			
+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

\31246\TVLOGS\TVLOG_25\

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I+M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT F \NG, INC. SHEET 1 OI

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 24, 1997 TIME : 1100

LOCATION: DAM NO. 04504, JOHNS CREEK NO. 4

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 30", RCP, 280 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 08

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		
0+02	2		
0+64			Minor cracks.
2+78	3		
2+80	4		16' pipe sections. Also appears to be minor shear cracks or repairs made
+			to cracks throughout the entire run.
+			
+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_26]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROJ. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT F[illegible]IG, INC. SHEET 1 OF

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 24, 1997 TIME :

LOCATION: DAM NO. 04504, JOHNS CREEK NO. 4

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 4 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 08

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+02	2		
0+41			Bend in pipe.
0+03			Bend in pipe.
0+04			Cannot continue due to bends.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_27]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROJ. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-NO

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT , NG, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 24, 1997 TIME : _____

LOCATION: DAM NO. 04504, JOHNS CREEK NO. 4

TELEVISING : RIGHT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 4 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 08

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+01			Bend in pipe.
0+04			Unable to continue due to another bend in pipe.
+			
+			
+			
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+			
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+			
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+			
+			
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+			
+			
+			
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+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_28]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN. *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN. *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT F G, INC. SHEET 1 OF

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 25, 1997 TIME : 0950

LOCATION: DAM NO. 04501, JOHNS CREEK NO. 2

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 08

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 32'.
+			Downstream wall.
+			13' horizontal construction form mark.
+			15' missing nut to bolt on trash rack.
+			17' minor deterioration of concrete (exposed aggregate and pitting in corner).
+			19' top of inlet for cold water pipe.
+			13" opening 13" x 20". 8" cold water pipe.
+			30' to top of outfall pipe.
+		743	Left side wall.
+			24' horizontal form mark.
+		1025	Upstream wall.
+			14' minor deterioration of concrete about 1' long.
+			17' deterioration starts and goes to bottom.
+			21' possible crack (hairline).
+			30' top of gate valve.
+		1491	Right side wall.
+			25'. 1" deep spall.
+			20'. 12" wide vertical spall with 1/4" penetration.
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN. *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN. *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I+O

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT ... MING, INC. SHEET 1 ... 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 25, 1997 TIME : _____

LOCATION: DAM NO. 04501, JOHNS CREEK NO. 2

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 30", RCP, 291 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 09

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		
0+02	2		
0+34			Minor cracks at joint.
2+89	3		
2+91	4		16' sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_30]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 1+00

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT 'ING, INC. SHEET 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 25, 1997 TIME :

LOCATION: DAM NO. 04501, JOHNS CREEK NO. 2

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 50 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 09

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe. Also has sand material in pipe.
0+11			Lots of sand. 3/4 pipe.
0+39			6" of sand.
0+50			Unable to continue due to sand.
+			
+			
+			
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+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_31]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT ... 'NG, INC. SHEET 1 OF

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 25, 1997 TIME :

LOCATION: DAM NO. 04501, JOHNS CREEK NO. 2

TELEVISING : RIGHT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 57 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 09

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe. Also sand material removed from pipe.
0+57			Bend in pipe.
+			
+			
+			
+			
+			
+			
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+			
+			
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+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_32]

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 C. 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 29, 1997 TIME : 0830

LOCATION: DAM NO. 01513, SOUTH RIVER NO. 24, HAPPY HOLLOW

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 10

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 14'.
+			12' to top of gate valve. No leakage.
+		266	Downstream wall.
+		267	Left side wall.
+		397	Upstream wall.
+		677	Right side wall.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_33]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG. *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNE MING, INC. SHEET 1 - 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 29, 1997 TIME : 0935

LOCATION: DAM NO. 01513, SOUTH RIVER NO. 24, HAPPY HOLLOW

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 24", RCP, 185 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 10

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	801	
0+02	2	831	
1+83	3	1459	
1+85	4	1485	19' sections.
+			
+			
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+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

{31246\TVLOGS\TVLOG_34}

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH
2	DOWNSTREAM MH

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 29, 1997 TIME : 0935

LOCATION: DAM NO. 01513, SOUTH RIVER NO. 24, HAPPY HOLLOW

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 68 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 10

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	1484	Corrugated pipe.
0+02	2	1502	
0+54			Perforation begins.
0+62			Perforation ends.
0+67			Pipe joint.
0+68			Bend in pipe.
+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_35]

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN. *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN. *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT IING, INC. SHEET 1 (

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 29, 1997 TIME : 0935

LOCATION: DAM NO. 01513, SOUTH RIVER NO. 24, HAPPY HOLLOW

TELEVISING : RIGHT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 06", CMP, 72 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 10

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	2160	Corrugated pipe.
0+02	2	2181	
0+66			Slight gap at joint. Also begin perforations.
0+68			End perforations.
0+72			Bend in pipe.
0+26			Minor split in pipe.
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

{31246\TVLOGS\TVLOG_36}

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT FLEMING, INC. SHEET 1 (1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 29, 1997 TIME : 1310

LOCATION: DAM NO. 01502, SOUTH RIVER NO. 25, TOMS BRANCH

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 10

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 17'.
+			15' top of gate valve.
+		2853	Downstream wall.
+		2855	Left side wall.
+			15' construction joint.
+		2974	Upstream wall. Concrete pitting 6'.
+			15' minor pitting above gate valve.
+		3087	Right side wall.
+		3181	
+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_37]

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN. RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED. *** GALLONS OF GROUT
34	JOINT - NOT TESTED. UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN. *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN. *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 29, 1997 TIME : 1310

LOCATION: DAM NO. 01502, SOUTH RIVER NO. 25, TOMS BRANCH

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 24", CMP, 373 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 10

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	3258	
0+02	2	3270	
0+81		3474	Possible shear crack.
3+71	3	4259	
3+73	4	4275	16' sections.
+			Also, exposed aggregate throughout entire run.
+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

\31246\TVLOGS\TVLOG_38\

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT, *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT FLEMING, INC. SHEET 1 OF

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 29, 1997 TIME : 1310

LOCATION: DAM NO. 01502, SOUTH RIVER NO. 25, TOMS BRANCH

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 02", CIP or DIP, 17 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 10

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	4275	2" pipe. (Video tape audio refers to as 4" -- 2" is correct.)
0+02	2	4291	
0+17		4398	Line is capped off at end (no inflow source?)
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_39]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE I-M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 30, 1997 TIME : 0900

LOCATION: DAM NO. 01501, SOUTH RIVER NO. 26, INCH BRANCH

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 11

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 15'.
+		347	Downstream wall.
+		348	Left wall.
+		560	Upstream wall.
+			13' top of gate valve, no stem on intake tower.
+			Right side wall.
+		873	Intake tower concrete is pitted on all walls.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_40]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT NG, INC. SHEET 1 O

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 30, 1997 TIME : 0900

LOCATION: DAM NO. 01501, SOUTH RIVER NO. 26, INCH BRANCH

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 24", RCP, 311 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 11

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	1115	
0+02	2	1130	
3+09	3	2289	
3+11	4	2305	16' sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_41]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT IING, INC. SHEET 1 C 1

TELEVISION INSPECTION LOG

CLIENT : **DIVISION OF DAM SAFETY** JOB # : **31246** DATE : **SEPTEMBER 30, 1997** TIME : **0900**

LOCATION: **DAM NO. 01501, SOUTH RIVER NO. 26, INCH BRANCH**

TELEVISING : **LEFT EMBANKMENT DRAIN** STATIONING FROM : **OUTLET END** PIPE : **08", CMP, 45 FT**

DUTY : 1 RIG NO. **346** OPERATOR **JLP** VIDEO TAPE: **11**

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	2302	Corrugated pipe.
0+02	2	2325	
0+45		2735	Joint slightly separated with soil coming into pipe through joint.
+			Cannot continue televising beyond bent edge of joint.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_42]

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 OF 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 30, 1997 TIME : 0900

LOCATION: DAM NO. 01508, SOUTH RIVER NO. 23, ROBINSON HOLLOW

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 12

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 16'.
+			Downstream wall.
+		745	Left side wall.
+		920	Upstream wall. 14' to top of gate valve.
+		1200	Right side wall.
+		1416	End.
+			
+			Concrete within entire tower is pitted.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_43]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 0+00

1	UPSTREAM MH
2	DOWNSTREAM MH

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT ...MING, INC. SHEET 1 O:

TELEVISION IN... CTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 30, 1997 TIME : 0900

LOCATION: DAM NO. 01508, SOUTH RIVER NO. 23, ROBINSON HOLLOW

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 24", RCP, 308 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 12

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		
0+02	2		
3+06	3		
3+08	4		16' sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

31246\TVLOGS\TVLOG_44]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT FLEMING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 30, 1997 TIME :

LOCATION: DAM NO. 01508, SOUTH RIVER NO. 23, ROBINSON HOLLOW

TELEVISING : RIGHT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 08", CMP, 121 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 12

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+02			
1+21			Bend in pipe.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

I:\1246\TVLOGS\TVLOG_45I

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT I . .ING, INC. SHEET 1 O. __

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : SEPTEMBER 30, 1997 TIME : ____

LOCATION: DAM NO. 01508, SOUTH RIVER NO. 23, ROBINSON HOLLOW

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 08", CMP, 10 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 12

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+02	2		
0+10	29		Sag.
+			
+			Had camera up line 62', but no visibility. Possible bend at 62'.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_46]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN. *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN. *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE 1+00

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : OCTOBER 1, 1997 TIME :

LOCATION: DAM NO. 01511, SOUTH RIVER NO. 4, LOFTON

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE :

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 13

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 18'.
+		133	Downstream wall.
+		134	Left side wall.
+		266	Upstream wall.
+		444	Right side wall.
+			
+			Also, concrete is pitted, all 4 walls.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_47]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNET MING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : OCTOBER 1, 1997 TIME :

LOCATION: DAM NO. 01511, SOUTH RIVER NO. 4, LOFTON

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 24", RCP, 318 FT

DUTY : 1 RIG NO. PORTABLE OPERATOR JLP VIDEO TAPE: 13

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		
0+02	2		
3+16	3		
3+18	4		16' sections.
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_48]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN, *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT F NG, INC. SHEET 1 OI

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : OCTOBER 2, 1997 TIME : _____

LOCATION: DAM NO. 01512, SOUTH RIVER NO. 11, CANADA RUN

TELEVISING : RISER INTERIOR STATIONING FROM : TOP OF RISER PIPE : _____

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 14

STATION	CODE	VIDEO FOOTAGE	COMMENTS
+			Total depth 9'.
+		119	Downstream wall.
+		120	Left side wall.
+		237	Upstream wall.
+		502	Right side wall.
+		754	
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			
+			

SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

[31246\TVLOGS\TVLOG_49]

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

JOINT INFORMATION

CODE	COMMENTS
21	JOINT
22	JOINT - LEAKING
23	JOINT - SLIGHT ROOT PENETRATION
24	JOINT - MODERATE ROOT PENETRATION
25	JOINT - SEVERE ROOT PENETRATION
26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
48	PERIPHERAL LEAK AROUND CUT-IN SERVICE CONNECTION
49	CRACKED PIPE AT JOINT
50	SHEAR CRACK
51	LINEAR CRACK
52	BEGIN LINEAR CRACK
53	END LINEAR CRACK
54	MULTIPLE CRACKS
55	BEGIN MULTIPLE CRACKS
56	END MULTIPLE CRACKS
57	CRUSHED PIPE
58	BEGIN CRUSHED PIPE
59	END CRUSHED PIPE
60	PIECES MISSING (*** -SIDE)
61	HOLE IN PIPE
62	CHANGE IN PIPE TYPE FROM TO
63	CHANGE IN PIPE SECTION LENGTH FROM *** FEET TO *** FEET
64	CHANGE OF DIRECTION ***
65	INSIGNIFICANT FLOW OBSERVED
66	FLOW APPEARS TO BE EXFILTRATING
67	BEGIN
68	END
69	CONTINUES
70	SLIGHT ROOT PENETRATION
71	MODERATE ROOT PENETRATION
72	SEVERE ROOT PENETRATION

SERVICE INFORMATION

CODE	COMMENTS
80	SERVICE CONN., *** O'CLOCK POSITION, WYE OR TEE
81	SERVICE CONN., *** O'CLOCK POSITION, CUT-IN, PROT. *** -INCHES
82	HOUSE NO.
83	SERVICE CONNECTION CRACKED
84	SLIGHT ROOT PENETRATION
85	MODERATE ROOT PENETRATION
86	SEVERE ROOT PENETRATION
87	INTERMITTENT FLOW, POSSIBLE SUMP PUMP CONNECTED
88	INTERMITTENT FLOW, SUMP PUMP CONNECTED, VERIFIED
89	INSIGNIFICANT FLOW OBSERVED
90	FLOW IS USAGE
91	SERVICE CONN. - AIR TEST PASS
92	SERVICE CONN. - AIR TEST FAIL
93	SERVICE CONN. - NOT TESTED, NO CLEANOUT ACCESS
94	SERVICE CONN. - WATER SATURATION TEST PASS
95	SERVICE CONN. - WATER SATURATION TEST FAIL

MANHOLE TYPE

1	BRICK
2	PRECAST
3	BLOCK
4	OTHER

MANHOLE [illegible]

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

1	VCP
2	ACP
3	RCP
4	CIP OR DIP
5	PVC
6	OTHER

DUTY

1	TV ONLY
2	TV & AIR TEST
3	TV, AIR TEST & REPAIR
4	TV & REPAIR

GANNETT 4ING, INC. SHEET 1 1

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : OCTOBER 2, 1997 TIME :

LOCATION: DAM NO. 01512, SOUTH RIVER NO. 11, CANADA RUN

TELEVISING : OUTFALL CONDUIT STATIONING FROM : DOWNSTREAM END PIPE : 24", RCP, 181 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 14

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1	964	
0+02	2	978	
1+79	3	1703	
1+81	4	1721	16' sections.
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

\31246\TVLOGS\TVLOG_SC\

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

RUN INFORMATION

CODE	COMMENTS
1	BEGIN RUN
2	BEGIN PIPE
3	END PIPE
4	END RUN, RUN CONSISTS OF *** FOOT PIPE SECTIONS
5	END TELEVISUAL INSPECTION
6	SAME POINT AS ENCOUNTERED ON PREVIOUS SETUP
7	RUN HAS NOT BEEN CLEANED PRIOR TO INSPECTION
8	RUN HAS BEEN CLEANED PRIOR TO INSPECTION
9	RUN REQUIRES CLEANING
10	FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
11	BALANCE OF FLOW CAN BE ATTRIBUTED TO GENERAL JOINT LEAKAGE
12	EXTERNAL REPAIR REQUIRED
13	CAN BE INTERNALLY REPAIRED
14	PIPE DEFLECTION THRU RUN OBSERVED
15	UNABLE TO CONTINUE DUE TO ***

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26	JOINT - WIDE OR OPEN
27	JOINT - VERTICALLY MISALIGNED
28	JOINT - HORIZONTALLY MISALIGNED
29	JOINT - BEGIN SAG
30	JOINT - END SAG
31	JOINT - AIR TEST PASS
32	JOINT - AIR TEST FAIL
33	JOINT - REPAIRED, *** GALLONS OF GROUT
34	JOINT - NOT TESTED, UNABLE TO ISOLATE
35	JOINT - INSIGNIFICANT FLOW OBSERVED
36	JOINT - FLOW APPEARS TO BE EXFILTRATING

*** TYPE DATA IN COMMENTS

MAINLINE INFORMATION

CODE	COMMENTS
45	APPARENT CRITICAL POINT OF SAG, *** -INCHES OF LIQUID
46	DROP CONNECTION AT 6 O'CLOCK
47	CRACKED PIPE AT SERVICE CONNECTION
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MANHOLE TYPE

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2	PRECAST
3	BLOCK
4	OTHER

MANHOLE H&M

1	UPSTREAM MH.
2	DOWNSTREAM MH.

PIPE TYPE

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DUTY

1	TV ONLY
2	TV & AIR TEST
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4	TV & REPAIR

GANNETT IING, INC. SHEET 1 (

TELEVISION INSPECTION LOG

CLIENT : DIVISION OF DAM SAFETY JOB # : 31246 DATE : OCTOBER 2, 1997 TIME :

LOCATION: DAM NO. 01512, SOUTH RIVER NO. 11, CANADA RUN

TELEVISING : LEFT EMBANKMENT DRAIN STATIONING FROM : OUTLET END PIPE : 08", CMP, 63 FT

DUTY : 1 RIG NO. 346 OPERATOR JLP VIDEO TAPE: 14

STATION	CODE	VIDEO FOOTAGE	COMMENTS
0+00	1		Corrugated pipe.
0+02	2		
0+62			Service connection from both sides 3 o'clock and 9 o'clock pipe plugged off.
0+63			
+			Also, sand in bottom of pipe throughout entire run.
+			
+			
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+			
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+			
+			
+			
+			
+			
+			
+			
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SEE BACK FOR CODES FOR: MANHOLE TYPE, MANHOLE 0+00, PIPE TYPE, DUTY AND LOOKUP CODES.

GANNETT FLEMING, INC.

TELEVISUAL INSPECTION LOOKUP CODES

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CODE	COMMENTS
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01	SERVICE CONN, *** O'CLOCK POSITION, CUT-IN, PROJ. *** -INCHES
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MANHOLE TYPE

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3	BLOCK
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MANHOLE [illegible]

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