

VOLUME II

PHASE I

REPRODUCTION OF NC DAM SAFETY PROGRAM INSPECTION & REPORT FILES (1973 – 2017) LAKE LURE DAM AND APPURTENANCES

North Carolina ID No. RUTHE-003

Federal ID No. NC – 100

Project No. ME-16-006

Prepared For:

TOWN OF LAKE LURE

Post Office Box 255

2948 Memorial Highway (US Highway 64/NC Highway 9)

Lake Lure, Rutherford County, North Carolina 28746

(828) 625-9396 – Telephone

(828) 625-9983 – Telephone

(828) 625-8371 - Facsimile

Attention: Mr. Ron Nally, Town Manager

<townmgr@townoflakelure.com>

Prepared By:

Marks Enterprises of NC, PLLC

1 Palatka Street

Arden, North Carolina 28704

Attention: B. Dan Marks, Ph.D., P.E., Principal

(828) 231-0598

drbdan@bellsouth.net

September 1, 2017

NCDENR Letters



ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

TRACY DAVIS
Director

August 9, 2017

**NOTICE OF INSPECTION
with Maintenance**

Town of Lake Lure
ATTN: Ron Nalley, Town Manager
PO Box 255
Lake Lure, NC 28746

RE: Lake Lure Dam, State ID No. RUTHE-003
Hazard Potential: High; Rutherford County

Dear Mr. Nalley:

The "Dam Safety Law of 1967, as amended" provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our records indicate you are the owner of the referenced dam that was inspected by personnel of this office on May 10, 2017. The inspection revealed the following maintenance problems which must be addressed:

- There was seepage noted on several locations on the downstream face of the dam. You should continue to inspect the seepage periodically and notify this office if it increases.
- There is extensive spalling of concrete surfaces and exposure of metal reinforcement on the downstream face of the dam. There are cracks and spalling on the upstream buttress joints. The Town of Lake Lure should develop plans to repair and resurface these areas. Plans for concrete repairs must have prior approval from the State Dam Safety Engineer prior to conducting the repair work.
- There is a propane tank which needs to be removed away from the buttress of the dam to a safe distance from the dam.
- We request that the monitoring results (temperature and leak flow rate) be recorded and records be available during future inspections.

In addition, the following items were noted as issues to be addressed in our previous letters:

- We recommended that you provide numbering on the face of each of the bays to aid in any emergency response situation. We understand this numbering system was designed and will be installed shortly.

During this inspection we also investigated the potential for property damage and loss of life in the event your dam fails. This investigation determined that failure of your dam could result in serious property

damage and possible loss of life. Therefore, we will continue to list your dam in the "HIGH Hazard" category.

The November 2006 Independent Consultant Dam Safety Inspection Report (the DTA Report) by DTA recommended a comprehensive visual inspection by a qualified dam safety engineering consultant within two years. In addition, this report recommended that similar independent consultant inspections be conducted at five year intervals following the first inspection. The DTA Post Earthquake Dam Safety Inspection - December 2007 Report also supported these recommendations. Please respond to our office as to whether or not this initial inspection was conducted and subsequent five year inspections conducted. **Please provide documentation of the inspections to our office.** If these have not been initiated, we would recommend that you have a comprehensive study of the condition of the dam performed by a qualified registered engineer or an experienced engineering firm. We would recommend that these studies be conducted every five years as supported by the recommendations in the DTA Report.

A January 3, 2008 letter from James Simons, Director of our Division at that time, also requested: 1) a stability analysis of the dam using the appropriate earthquake loadings and the dynamic response analysis method; and 2) an underwater video inspection of the upstream face of the dam with special attention given to the leaking joints. We do not have any information on file that these items were addressed. **Please provide this information to our office.** If these items have not been addressed, please schedule these accordingly.

The Division of Energy, Mineral, and Land Resources must approve any excavation, modification, or major repair of the dam. Draining the lake by cutting a notch in the dam, or otherwise breaching the dam, without prior approval, is a violation of State Law.

The "Dam Operation Maintenance and Inspection" manual published by this Department provides inspection guidelines and recommended routine dam maintenance for the owner and emergency procedures in the event of possible dam failure. A copy of this manual is available online at <http://portal.ncdenr.org/web/lr/dams> or contact this office.

Although we make every reasonable effort to determine the safety of your dam, our resources limit us to a visual inspection. We hope that you will use the information provided in this letter as you fulfill your obligation to safely maintain and operate your dam. Dams are constantly changing, their spillways and conduits deteriorate and the dam itself is under constant pressure. Therefore, you should keep a close watch on your dam and notify us if you detect any changes, especially cracks, ground movements, or changes in seepage rate or color.

In the event that a possible problem is found, you should contact a registered professional engineer and this office to inspect the dam. In order to help us keep your records up to date and, therefore, serve you better, please notify us concerning any changes in ownership. Your cooperation in this effort is greatly appreciated.

As a dam owner, you may incur liability should your dam have a problem or fail, if such results in loss of life or property damage downstream. North Carolina General Statute 143-215.31 now requires owners of dams

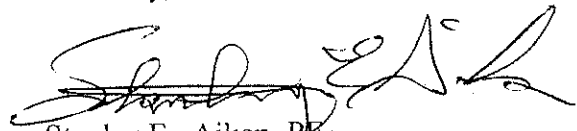
classified by the Department as high or intermediate hazard to develop an Emergency Action Plan (EAP) for their dam. The purpose of an EAP is to provide critical guidance in the event of a dam safety emergency. If you have questions regarding whether an EAP is required for your dam, please feel free to contact us.

Dam owners are required to submit their Emergency Action Plan by December 31, 2015, to the Department of Energy, Mineral, and Land Resources (DEMLR) and the Department of Public Safety (DPS) for review and approval. **As this date has passed, the Emergency Action Plan must be submitted on or before October 1, 2017.** The preferred method of submittal is through the Department of Public Safety's online EAP Development Tool (see paragraph below). EAPs may also be submitted via e-mail attachment in Adobe protected document format (.pdf) using the editable template available for download at our program's website (<http://portal.ncdenr.org/web/lr/dams>) under "Planning for a Dam Emergency." Dam owners may also meet the legal requirement for EAP submittal by preparing their EAP using the editable template and transmitting three hard copies of their EAP to the Division of Energy, Mineral, and Land Resources, ATTN: Dam Safety Program, 1612 Mail Service Center, Raleigh, North Carolina 27699-1612.

The DPS online EAP Development Tool was developed using the DEMLR Dam Safety Program's EAP template and may be accessed via internet at <https://rmp.nc.gov/portal/> (click on the "Planning Tools" tab). It provides secure storage of EAPs while allowing online access to emergency responders in the event of a dam emergency. Technical questions regarding use of the tool should be directed to the Risk Management Section of the DPS Division of Emergency Management (portalnotifications@ncdps.gov). It is our goal to have all dam EAPs stored and updated using the online tool. Dam owners with approved EAPs in other formats will be encouraged to migrate to the online tool for EAP updates in the future. Please refer to the Dam Safety Program's website for additional guidance including Frequently Asked Questions. Questions specific to your dam or EAP preparation may be directed to our Dam Safety Program staff at (919) 707-9220.

If you have an emergency situation during non-office hours, you should notify the Division of Emergency Management's State Warning Point at 1-800-858-0368. They will notify the appropriate personnel in this office of the situation. Should you have any questions concerning this inspection, please contact Darlene Kucken or me at (828) 296-4500 during normal office hours.

Sincerely,



Stanley E. Aiken, P.E.
Regional Engineer
Land Quality Section

Enclosure: EAP FAQ Document



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

March 6, 2015

**NOTICE OF INSPECTION
with Maintenance**

Town Of Lake Lure
ATTN: Chris Braund
P. O. Box 255
Lake Lure, NC 28746

RE: Lake Lure Dam, State ID No. RUTHE-003
Hazard Potential: High; Rutherford County

Dear Mr. Braund:

The "Dam Safety Law of 1967, as amended" provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our records indicate you are the owner of the referenced dam that was inspected by personnel of this office on February 27, 2015. The lake level was lowered by several feet at the time of inspection. The inspection revealed the following maintenance problems that should be addressed:

- There was seepage noted on several locations on the downstream face of the dam. You should continue to inspect the seepage periodically and notify this office if it increases.
- There is extensive spalling of concrete surfaces and exposure of metal reinforcement on the downstream face of the dam. There are cracks and spalling on the upstream buttress joints. The Town of Lake Lure should develop plans to repair and resurface these areas. Plans for concrete repairs must have prior approval from the State Dam Safety Engineer prior to conducting the repair work.
- There is a propane tank which needs to be removed away from the buttress of the dam to a safe distance from the dam. We understand this work is planned to be completed after an engineered inspection.
- We request that the monitoring results (temperature and leak flow rate) be recorded and records be available during future inspections.

In addition, the following items were noted as issues to be addressed in our previous letters:

Division of Energy, Mineral, and Land Resources - Land Quality Section
Asheville Regional Office, 2090 US Highway 70, Swannanoa, North Carolina, 28778-8211
Telephone 828-296-4500 Fax 828-299-7043

<http://portal.ncdenr.org/web/lr/>

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watch on your dam and notify us if you detect any changes, especially cracks, ground movements, or changes in seepage rate or color.

In the event that a possible problem is found, you should contact a registered professional engineer and this office to inspect the dam. In order to help us keep your records up to date and, therefore, serve you better, please notify us concerning any changes in ownership. Your cooperation in this effort is greatly appreciated.

As a dam owner, you may incur liability should your dam have a problem or fail, if such results in loss of life or property damage downstream. An Emergency Action Plan (EAP) may be invaluable in guiding you through a crisis situation should you have an emergency that could affect the stability of your dam, such as heavy rain, slope failures, or other natural hazards. The Coal Ash Management Act of 2014, signed into law on September 20, 2014, requires all owners of high and intermediate hazard dams to submit Emergency Action Plans (EAPs) to the NC DENR and the NC Department of Public Safety (DPS) no later than March 1, 2015. You should have received a letter regarding this new requirement in November (a copy is attached for your information). North Carolina has recently completed and adopted a web-based EAP Development Tool for dams that will assist dam owners in complying with the new statutory requirement. This EAP Development Tool is now available for all North Carolina dam owners at <https://staging.ncem.org/DamEAP/Default.aspx>. High and intermediate hazard dam EAPs must include a downstream inundation map to be approved in the EAP Development Tool. Inundation maps must depict areas affected by a dam failure and a sudden release of the impoundment; and according to the N.C. Board of Engineers and Land Surveyors, all inundation maps must be sealed by a professional engineer. The DPS's Division of Emergency Management, through professional engineers under contract, may also offer this mapping service for dam owners in the near future at a reasonable cost. Please note that once you enter the EAP Development Tool website, you will be directed to create a "NCID" which will allow you secure access to the EAP Development Tool. For questions regarding access or use of the EAP Development Tool, please contact Mr. Ken Ashe, PE, CFM of the Division of Emergency Management at Ken.Ashe@ncdps.gov or (919)825-2297.

If you have an emergency situation during non-office hours, you should notify the Division of Emergency Management's State Warning Point at 1-800-858-0368. They will notify the appropriate personnel in this office of the situation. Should you have any questions concerning this inspection, please contact Darlene Kucken or me at (828) 296-4500 during normal office hours.

Sincerely,


Laura C. Herbert, PE
Regional Engineer

Enclosure

Ec: Mr. Steve McEvoy, PE, NC Dam Safety Engineer

DAM SAFETY INSPECTION REPORT

Name Lake Lure Dam		County Rutherford	No. 003	Inspected By DK	Date 2/27/2015
Owner Town of Lake Lure c/o Chris Braund			Address PO Box 255 Lake Lure, NC 28746		Phone No.
Type of Dam ☐ Concrete Gravity ☐ Concrete Arch ☐ Other ☐ Embankment ☒ Concrete Buttress ☐ Stone Masonry		Type of Inspection ☐ Follow up ☒ Periodic ☐ Other		Site Conditions ☐ Dry ☐ Snow Cover ☒ Wet ☐ Other	
Hazard Description same as 4/27/2009		Condition Assessment ☐ Satisfactory ☒ Fair ☐ Poor ☐ Unsatisfactory ☐ Not rated		Hazard Class ☐ Low (A) ☐ Intermediate (B) ☒ High (C)	
Remarks water level drawn down about 8 feet for triennial shoreline repair work			Action ☐ None ☒ Maintenance ☐ Monitoring ☐ Minor Repair ☐ Engineering		Recommendations ☒ Inspection letter ☐ Inspection by DSE ☐ Deficiency letter ☐ Dam safety order ☐ RE notice ☐ Enforcement ☐ Engineering study ☐ Periodic reinspection ☐ Inspection by RE ☐ Other reinspection
AREA	PROBLEMS		COMMENTS		
UPSTREAM SLOPE / FACE	☒ 1. None ☐ 11. Displaced rip rap ☐ 2. Trees ☐ 12. Cracks ☐ 3. High bushes ☐ 13. Undermining ☐ 4. Burrows ☐ 14. Holes ☐ 5. Wave erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☐ 10. Sparse rip rap		COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Asphalt ☐ Other 		
TOP OF DAM	☐ 1. None ☒ 11. Cracks ☐ 2. Trees ☒ 12. Spalling ☐ 3. High bushes ☐ 13. Deteriorated joints ☐ 4. Burrows ☐ 14. Displaced joints ☐ 5. Ruts ☐ 15. Exposed reinforcement ☐ 6. Livestock damage ☐ 16. Other ☐ 7. Depressions ☐ 8. Uneven ☐ 9. Misalignment ☐ 10. Has overtopped		COVER: ☐ Vegetation ☐ Gravel ☒ Concrete ☒ Asphalt ☐ Other as previously noted		
DOWNSTREAM SLOPE / FACE	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Boils ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☒ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☒ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☒ 10. Wetness		COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Other as previously noted		
TOE CONTACT	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Boils ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☒ 10. Wetness		COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☒ Otherbedrock as previously noted		

Herbert, Laura C

RUTH - 003

From: Jennifer Polardino <jennifer.polardino@ferc.gov>
Sent: Wednesday, March 26, 2014 10:26 AM
To: Herbert, Laura C
Subject: Turner Shoals, Tuxedo, and Lake Lure Hydroelectric Projects
Attachments: Lake Lure Hydroelectric Project.rtf; Turner Shoals Hydropower Project.rtf; ~~Tuxedo Hydropower Project.rtf~~

Laura,

In reference to our phone conversation today, March 26, 2014, about the Turner Shoals, Tuxedo, and Lake Lure Hydroelectric Projects, I have attached the Orders Finding Licensing Not Required for the projects.

The Turner Shoals and Tuxedo Hydroelectric Projects, which are located on the Green River, were determined to be not under our jurisdiction because the projects were constructed pre-1935 construction, and the particular stretch they are on at the Green River is non-navigable. If there is ever evidence of post-1935 construction for the projects or if they would ever to increase in capacity; however, they would have to undergo the process of applying for a Declaration of Intention to determine whether or not it should be licensed.

In the Order Ruling on Declaration of Intention and Finding Licensing Not Required for Lake Lure, it states that the project is located on a Commerce Clause Waterway; however, the project was constructed pre-1935 on a non-navigable water. If there is ever evidence of post-1935 construction for the project or if it would ever to increase in capacity; however, it would have to undergo the process of applying for a Declaration of Intention to determine whether or not it could be licensed.

I hope this provides some clarity. Please see our link at our website for guidance on how we determine whether or not a project is under our jurisdiction at: <http://www.ferc.gov/industries/hydropower/gen-info/comp-admin/jur-deter.asp>.

If you have any further questions, please feel free to reach me through e-mail at: Jennifer.Polardino@ferc.gov or phone at: (202)502-6437.

Thanks,

Jennifer Polardino
Historian
Office of Energy Projects
Federal Energy Regulatory Commission
(202) 502-6437
Jennifer.Polardino@ferc.gov



North Carolina Department of Environment and Natural Resources *F*

Pat McCrory
Governor

John E. Skvarla, III
Secretary

May 12, 2014

**NOTICE OF INSPECTION
with Maintenance**

Town Of Lake Lure
ATTN: Chris Braund
P. O. Box 255
Lake Lure, North Carolina 28746

RE: Lake Lure Dam, State ID No. RUTHE-003
Hazard Potential: High; Rutherford County

Dear Mr. Braund:

The "Dam Safety Law of 1967, as amended" provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our records indicate you are the owner of the referenced dam that was inspected by personnel of this office on April 30, 2014. The inspection revealed the following maintenance problems that should be addressed:

- There was seepage noted on several locations on the downstream face of the dam. You should continue to inspect the seepage periodically and notify this office if it increases.
- There is extensive spalling of concrete surfaces and exposure of metal reinforcement on the downstream face of the dam. There are cracks and spalling on the upstream buttress joints. The Town of Lake Lure should develop plans to repair and resurface these areas. Plans for concrete repairs must have prior approval from the State Dam Safety Engineer prior to conducting the repair work.
- Remove the propane tank away from the buttress of the dam to a safe distance from the dam. We understand this work is planned to be completed after a new turn-around area is built.
- We request that the monitoring results (temperature and leak flow rate) be recorded and records made available during future inspections.

Division of Energy, Mineral, and Land Resources - Land Quality Section
Asheville Regional Office, 2090 US Highway 70, Swannanoa, North Carolina, 28778-8211
Telephone 828-296-4500 Fax 828-299-7043
<http://portal.ncdenr.org/group/lr/land-quality>

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Although we make every reasonable effort to determine the safety of your dam, our resources limit us to a visual inspection. We hope that you will use the information provided in this letter as you fulfill your obligation to safely maintain and operate your dam. Dams are constantly changing, their spillways and conduits deteriorate and the dam itself is under constant pressure. Therefore, you should keep a close watch on your dam and notify us if you detect any changes, especially cracks, ground movements, or changes in seepage rate or color.

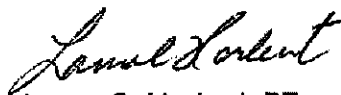
In the event that a possible problem is found, you should contact a registered professional engineer and this office to inspect the dam. In order to help us keep your records up to date and, therefore, serve you better, please notify us concerning any changes in ownership. Your cooperation in this effort is greatly appreciated.

As a dam owner, you may incur liability should your dam have a problem or fail, if such results in loss of life or property damage downstream. It is requested that an Emergency Action Plan (EAP) be prepared for your dam. The EAP may be invaluable in guiding you through a crisis situation should you have an emergency that could affect the stability of your dam, such as heavy rain, slope failures, or other natural hazards.

North Carolina has completed and adopted an EAP template for owners of high hazard dams. The template and associated guidance can be obtained by visiting the Dam Safety Programs website <http://portal.ncdenr.org/web/lr/dams> or by calling Dam Safety Program staff at (919) 707-9220. All updated EAPs shall be in this required format. Two copies of the EAP should be submitted to the Division of Energy, Mineral, and Land Resources, Attn: Dam Safety Program, 1612 Mail Service Center, Raleigh, North Carolina 27699-1612.

If you have an emergency situation during non-office hours, you should notify the Division of Emergency Management's State Warning Point at 1-800-858-0368. They will notify the appropriate personnel in this office of the situation. Should you have any questions concerning this inspection, please contact **Darlene Kucken** or me at (828) 296-4500 during normal office hours.

Sincerely,



Laura C. Herbert, PE
Regional Engineer

DAM SAFETY INSPECTION REPORT

NAME Lake hure Dam		COUNTY Ruthe	NO. 003	INSPECTED BY DIC	DATE 4/30/14
OWNER Town of Lake hure		ADDRESS PO Box 255 Lake hure NC			PHONE 28746
TYPE DAM ☐ Concrete gravity ☐ Concrete arch ☐ Other ☐ Embankment ☒ Concrete buttress ☐ Stone masonry		TYPE INSPECTION ☐ Initial ☐ Followup ☒ Periodic ☐ Other		SITE CONDITIONS ☐ Dry ☐ Snowcover ☒ Wet ☐ Other	

HAZARD DESCRIPTION same as 4/27/09	HAZARD CLASS ☐ Low (A) ☒ Intermediate (B) ☐ High (C)
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REMARKS - water level high due to recent heavy rains	ACTION ☐ None ☒ Maintenance ☐ Monitoring ☐ Minor repair ☐ Engineering	RECOMMENDATIONS ☒ Inspection by DSE ☐ Dam safety order ☐ Enlargement ☐ Periodic inspection ☐ Other reinspection ☐ Inspection by RE ☐ RE notice ☐ Engineering study ☐ Inspection by RE
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AREA	PROBLEMS	COMMENTS
UPSTREAM SLOPE	☒ 1. None ☐ 11. Displaced rip rap ☐ 2. Trees ☐ 12. Cracks ☐ 3. High bushes ☐ 13. Undermining ☐ 4. Burrows ☐ 14. Holes ☐ 5. Wave erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☐ 10. Space rip rap	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Asphalt ☐ Other - unable to inspect due to full pool
	☐ 1. None ☒ 11. Cracks ☐ 2. Trees ☒ 12. Spalling ☐ 3. High bushes ☐ 13. Deteriorated joints ☐ 4. Burrows ☐ 14. Displaced joints ☐ 5. Ruts ☐ 15. Exposed reinforcement ☐ 6. Livestock damage ☐ 16. Other ☐ 7. Depressions ☐ 8. Unlevel ☐ 9. Misalignment ☐ 10. Has overtopped	COVER: ☐ Vegetation ☐ Gravel ☒ Concrete ☐ Asphalt ☐ Other - no changes evident
TOE OF DAM	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Boils ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☒ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☒ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☒ 10. Wetness	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Other - no changes
	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Boils ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Undermining ☒ 10. Wetness ☐ 20. Other	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☒ Other bedrock - no changes

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
Asheville Regional Office

FILE ACCESS RECORD

SECTION LQS

NAME Samuel Kees

DATE/TIME 1-16-14 / 9 AM

REPRESENTING Schnabel Engineering

Guidelines for Access: *The staff of the Regional Office is dedicated to making public records in our custody readily available to the public for review and copying. We also have the responsibility to the public to safeguard these records and to carry out our day-to-day program obligations. Please read carefully the following before signing the form.*

1. Due to the large public demand for file access, we request that you call at least a day in advance to schedule an appointment for file review so you can be accommodated. Appointments are scheduled between 9:00 a.m. and 3:00 p.m. Viewing time ends at 4:45 p.m. Anyone arriving without an appointment may view the files to the extent that time and staff supervision are available.
2. You must specify files you want to review by facility name or incident number, as appropriate. The number of files that you may review at one appointment will be limited to five.
3. You may make copies of a file when the copier is not in use by the staff and if time permits. Cost is \$0.05 cents per copy when the total exceeds \$5.00. Payment is to be made by check, money order, or cash.
4. Please review attached policy dated July 5, 2013.
5. Files must be kept in the order you received them. Files may not be taken from the office. No briefcases, large totes, bags, etc. are permitted in the file review area. To remove, alter, deface, mutilate, or destroy material in public files is a misdemeanor for which you can be fined up to \$500.00.
6. In accordance with GS 25-3-512, a \$25.00 processing fee will be charged and collected for checks on which payment has been refused.
7. The customer must present a photo ID, sign-in, and receive a visitor sticker prior to reviewing files.

FACILITY NAME

COUNTY

1 Lake Lure Dam RUTHE-003

RUTHE.

2 Cascade Lake Dam TRANS-003

TRANS.

3 Sequoyah Dam (Town of Highlands) MACON-003

MACON

4

5

Schnabel Eng
Signature/Name of Firm or Business

1/16/2013
Date

9:13 AM
Time In

11:10 AM
Time Out

Please attach business card to form if available



North Carolina Department of Environment and Natural Resources
Division of Energy, Mineral, and Land Resources
Land Quality Section

F

Tracy Davis, PE, CPM
Director

Pat McCrory, Governor
John E. Skvarla, III, Secretary

May 3, 2013

NOTICE OF INSPECTION
with Maintenance

Town Of Lake Lure
ATTN: Chris Braund
P. O. Box 255
Lake Lure, North Carolina 28746

RE: Lake Lure Dam, State ID No. RUTHE-003
Hazard Potential: High; Rutherford County

Dear Mr. Braund:

The "Dam Safety Law of 1967, as amended" provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our records indicate you are the owner of the referenced dam that was inspected by personnel of this office and Steve McEvoy, P.E., State Dam Safety Engineer on April 24, 2013. This inspection was a follow-up to our inspection of February 25, 2013. The inspection revealed the following maintenance problems, in addition to those noted in the Notice of Inspection of February 26, 2013, that should be addressed:

- Remove the propane tank away from the buttress of the dam to a safe distance from the dam.
- We recommend that you monitor ambient temperature in addition to your current schedule of monitoring the leakage from Bay 10. Note that the January 3, 2008 letter from James Simon, P.E., P.G.; Director of our Division at that time, to the Town of Lake Lure asked that a thermometer, preferably a minimum-maximum reading unit, near where the seepage is measured, be installed. This letter also asked that temperature readings should be recorded with each seepage measurement. We also recommend that you repair the outlet pipe for ease of monitoring and provide a more suitable means of accessing this bay for monitoring. We would request that the monitoring results (temperature and leak flow rate) be recorded and records made available during future inspections.

Asheville Regional Office, 2090 US Highway 70, Swannanoa, North Carolina, 28778-8211

Telephone 828-296-4500 Fax 828-299-7043

<http://portal.ncdenr.org/group/ir/land-quality>

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In the event that a possible problem is found, you should contact a registered professional engineer and this office to inspect the dam. In order to help us keep your records up to date and, therefore, serve you better, please notify us concerning any changes in ownership. Your cooperation in this effort is greatly appreciated.

As a dam owner, you may incur liability should your dam have a problem or fail, if such results in loss of life or property damage downstream. It is requested that an Emergency Action Plan (EAP) be prepared for your dam. The EAP may be invaluable in guiding you through a crisis situation should you have an emergency that could affect the stability of your dam, such as heavy rain, slope failures, or other natural hazards.

North Carolina has recently completed and adopted an EAP template for owners of high hazard dams. The template and associated guidance can be obtained by visiting the Dam Safety Programs website <http://portal.ncdenr.org/web/lr/dams> or by calling Dam Safety Program staff at (919) 707-9220.

If you have an emergency situation during non-office hours, you should notify the Division of Emergency Management's State Warning Point at 1-800-858-0368. They will notify the appropriate personnel in this office of the situation. Should you have any questions concerning this inspection, please contact **Darlene Kucken** or me at (828) 296-4500 during normal office hours.

Sincerely,



Laura C. Herbert, PE
Regional Engineer

Cc: Steve McEvoy, PE, State Dam Safety Engineer, pdf via email

DAM SAFETY INSPECTION REPORT

NAME Lake hure Dam		COUNTY Ruthe	NO. 003	INSPECTED BY DK LK, S M	DATE 4/24/13
OWNER Town of lake hure 90 Chris Brown		ADDRESS PO Box 255 Lake hure NC 28746			
TYPE DAM ☐ Concrete gravity ☐ Concrete arch ☐ Other ☐ Embankment ☒ Concrete buttress ☐ Stone masonry		TYPE INSPECTION ☐ Initial ☐ Followup ☒ Other		SITE CONDITIONS ☐ Dry ☐ Snowcover ☐ Other	
HAZARD DESCRIPTION Same as 4/27/09		HAZARD CLASS ☐ Low (A) ☐ Immediate (B) ☒ High (C)			
REMARKS - EAP not yet in file - inspection conducted for Steve McEvoy		ACTION ☐ None ☒ Maintenance ☐ Monitoring ☐ Minor repair ☐ Engineering		RECOMMENDATIONS ☒ Inspection letter ☐ Deficiency letter ☐ RE notice ☐ Engineering study ☐ Inspection by RE ☐ Inspection by DSE ☐ Dam safety order ☐ Enforcement ☐ Periodic reinspection ☐ Other inspection	
AREA	PROBLEMS	COMMENTS			
UPSTREAM SLOPE / FACE	☒ 1. None ☐ 11. Displaced rip rap ☐ 2. Trees ☐ 12. Cracks ☐ 3. High bushes ☐ 13. Undermining ☐ 4. Burrows ☐ 14. Holes ☐ 5. Wave erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☐ 10. Sparse rip rap	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Asphalt ☐ Other - water level e full pool; unable to inspect			
	☐ 1. None ☒ 11. Cracks ☐ 2. Trees ☒ 12. Spalling ☐ 3. High bushes ☐ 13. Deteriorated joints ☐ 4. Burrows ☐ 14. Displaced joints ☐ 5. Ruts ☐ 15. Exposed reinforcement ☐ 6. Livestock damage ☐ 16. Other ☐ 7. Depressions ☐ 8. Unevel ☐ 9. Misalignment ☐ 10. Has overtopped	COVER: ☐ Vegetation ☐ Gravel ☒ Concrete ☐ Asphalt ☐ Other same as 2/25/13			
DOWNSTREAM SLOPE / FACE	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bolls ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☒ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☒ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☒ 10. Wetness	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Other - no changes			
	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bolls ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Undermining ☒ 10. Wetness ☐ 20. Other	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☒ Other bedrock - no changes			
TOE CONTACT					

Notice to
Inspector

Leakage in
Bay 10

Numbering

(move propane tanks
away from use
mattress)

Leak - 003

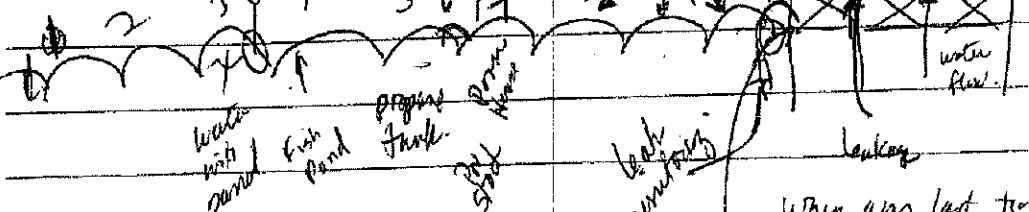
Lake

Downstream

chains need
lubrication and
temp.

Lake Lucie

Shut down



Spalling
taken care of.

maintenance on motors - chains.

When also last time
gates were operated.

Let's
in my
signature

monitor leak in Bay 10
- repair the outlet pipe for
door of monitoring
temperature gauge

monitor air
temp.
of
leakage in
Bay 10

move propane tanks
away from
mattress

when
increased
leakage
after earthquake

lost 4 months
1 million kw

- when was the last time
gates were operated.

costs near
monetary

Dispute

end of last year opened regularly
lot of maintenance at this time

- 9 to 15 gpm

- 50 to 60 gpm

gate
motors / planning to repaint

ambient

- make the gates.

- Earthquake Stability Analysis?

Flood
analysis



North Carolina Department of Environment and Natural Resources
Division of Energy, Mineral, and Land Resources
Land Quality Section

Tracy Davis, PE, CPM
Director

Pat McCrory, Governor
John E. Skvarla, III, Secretary

February 26, 2013

NOTICE OF INSPECTION

Town Of Lake Lure
ATTN: Chris Braund
P. O. Box 255
Lake Lure, North Carolina 28746

RE: Lake Lure Dam (State ID No. - RUTHE-003)
Dam Hazard Potential: High; Rutherford County

Dear Mr. Braund:

The Dam Safety Law of 1967 provides for the certification and inspection of dams in the public interest. Our records indicate you are the owner of the referenced dam, which was inspected by personnel of this office on February 25, 2013. The inspection revealed no problems that require your immediate attention. However the inspection noted the following maintenance items that should be addressed:

- There was seepage noted on several locations on the downstream face of the dam. You should continue to inspect the seepage periodically and notify this office if it increases.
- There is extensive spalling of concrete surfaces and exposure of metal reinforcement on the downstream face of the dam. There are cracks and spalling on the upstream buttress joints. The Town of Lake Lure should develop plans to repair and resurface these areas. Plans for concrete repairs must have prior approval from the State Dam Safety Engineer prior to conducting the repair work.

The potential for property damage and loss of life downstream in the event that your dam fails was also investigated. It was determined that sudden failure of your dam could result in serious property damage and possible loss of life.

Please be advised that though we make every reasonable effort to determine the safety of your dam, our resources limit us to surficial inspection. There is no certainty regarding the internal stability of the dam. Dams, and especially their spillways and conduits, deteriorate with age. Therefore, you are advised to keep a close watch on your dam and to notify this office if you detect any changes, especially cracks, ground movements, or changes in seepage rate or color.

Asheville Regional Office, 2090 US Highway 70, Swannanoa, North Carolina, 28778-8211

Telephone 828-296-4500 Fax 828-299-7043

<http://portal.ncdenr.org/group/lr/land-quality>

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DAM SAFETY INSPECTION REPORT

NAME Lake hure Dam		COUNTY Ruthe	NO. 503	INSPECTED BY DK	DATE 2/25/13
OWNER town of lake hure to Chris Braun		ADDRESS PO Box 255 Lake hure NC 28746			PHONE
TYPE DAM ☐ Embankment ☐ Concrete gravity ☐ Concrete arch ☐ Other ☒ Concrete buttress ☐ Stone masonry		TYPE INSPECTION ☐ Initial ☐ Followup ☒ Periodic ☐ Other		SITE CONDITIONS ☐ Dry ☐ Snowcover ☒ Wet ☐ Other	
HAZARD DESCRIPTION same as 4/27/09				HAZARD CLASS ☐ Low (A) ☐ Intermediate (B) ☒ High (C)	
REMARKS - EAP will be updated per Donnie - annual photos will be sent per Donnie		ACTION ☒ None ☐ Maintenance ☐ Monitoring ☐ Minor repair ☐ Engineering		RECOMMENDATIONS ☒ Inspection letter ☐ Deficiency letter ☐ RE notice ☐ Engineering study ☐ Inspection by RE ☐ Inspection by DSE ☐ Dam safety order ☐ Enforcement ☐ Periodic reinspection ☐ Other reinspection	

AREA	PROBLEMS	COMMENTS
UPSTREAM SLOPE / FACE	☒ 1. None ☐ 11. Displaced rip rap ☐ 2. Trees ☐ 12. Cracks ☐ 3. High bushes ☐ 13. Undermining ☐ 4. Burrows ☐ 14. Holes ☐ 5. Wave erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☐ 10. Sparse rip rap	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Asphalt ☐ Other - unable to inspect due to full pool
TOP OF DAM	☐ 1. None ☒ 11. Cracks ☐ 2. Trees ☒ 12. Spalling ☐ 3. High bushes ☐ 13. Deteriorated joints ☐ 4. Burrows ☐ 14. Displaced joints ☐ 5. Ruts ☐ 15. Exposed reinforcement ☐ 6. Livestock damage ☐ 16. Other ☐ 7. Depressions ☐ 8. Unlevel ☐ 9. Misalignment ☐ 10. Has overtopped	COVER: ☐ Vegetation ☐ Gravel ☒ Concrete ☐ Asphalt ☐ Other - same as noted 1/26/12
DOWNSTREAM SLOPE / FACE	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bolls ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☒ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☒ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☒ 10. Wetness	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Other - self inspection w/ photos now being conducted annually - seepage + wetness + spalling as noted 1/26/12
TOE CONTACT	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bolls ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Undermining ☒ 10. Wetness ☐ 20. Other	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☒ Other bedrock - as previously noted 1/26/12 - seepage is continuously monitored by staff; no changes in quantity or volume noted.



North Carolina Department of Environment and Natural Resources
Division of Land Resources
Land Quality Section

James D. Simons, PG, PE
Director and State Geologist

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

January 31, 2012

**NOTICE OF INSPECTION
with Maintenance**

Town Of Lake Lure
ATTN: Chris Braund
P. O. Box 255
Lake Lure, North Carolina 28746

RE: Lake Lure Dam, State ID No. RUTHE-003
Hazard Potential: High; Rutherford County

Dear Mr. Braund:

The "Dam Safety Law of 1967, as amended" provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our records indicate you are the owner of the referenced dam that was inspected by personnel of this office on January 26, 2012. The inspection revealed the following maintenance problems, which must be addressed:

- There was seepage noted on several locations on the downstream face of the dam. You should inspect the seepage periodically and notify this office if it increases.
- There is extensive spalling of concrete surfaces and exposure of metal reinforcement on the downstream face of the dam. There are cracks and spalling on the upstream buttress joints. The Town of Lake Lure should develop plans to repair and resurface these areas. Plans for concrete repairs must have prior approval from the State Dam Safety Engineer prior to conducting the repair work.

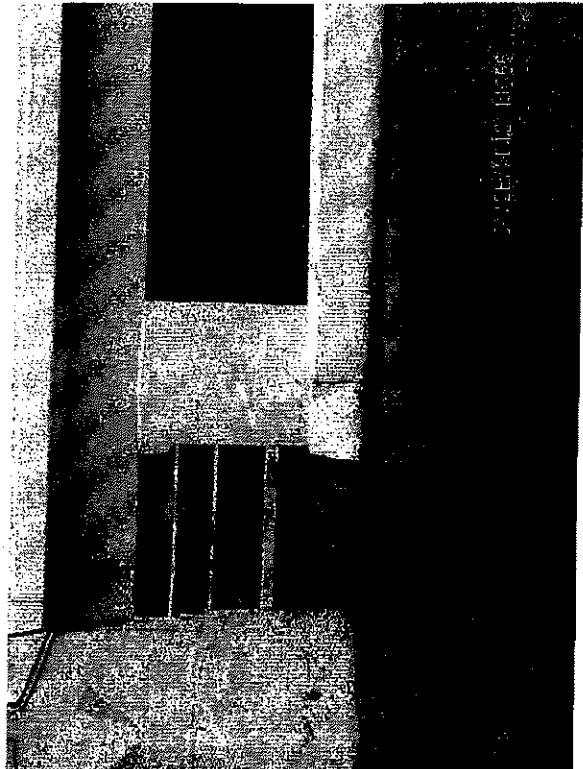
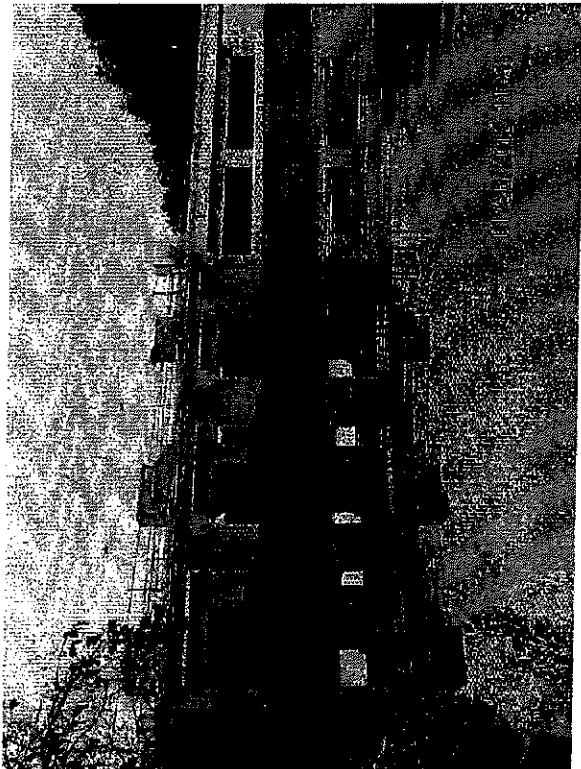
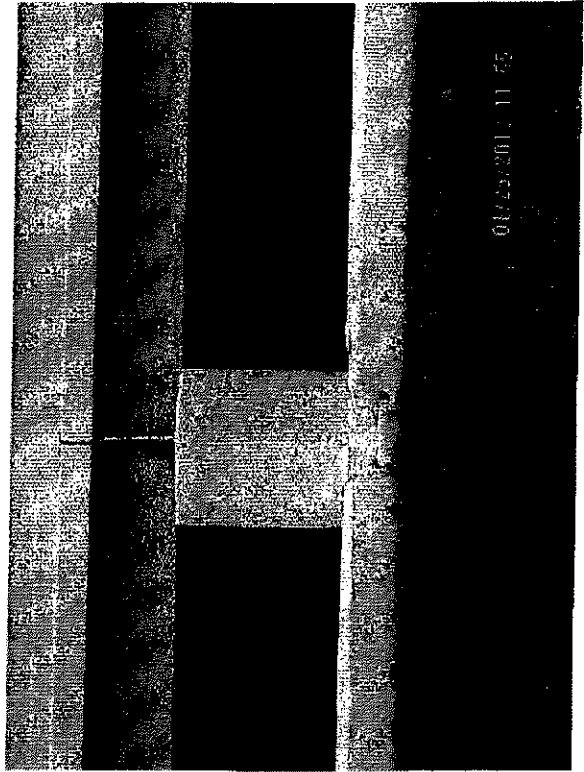
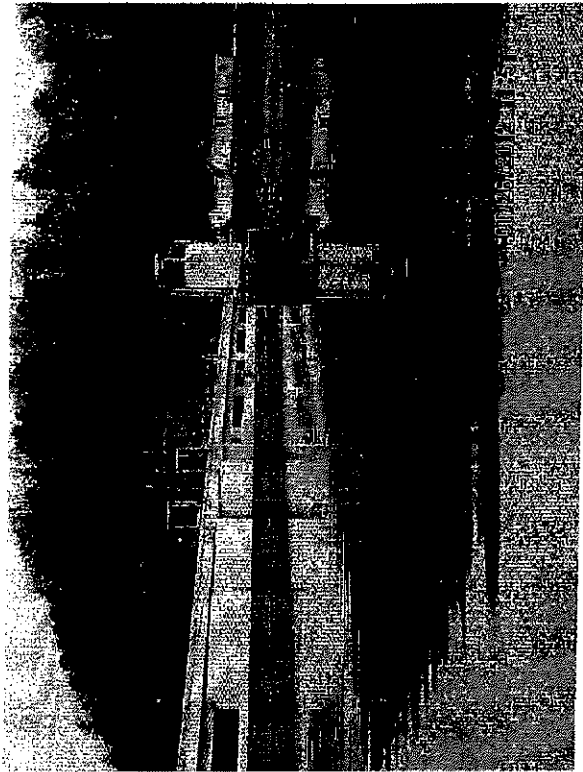
During this inspection we also investigated the potential for property damage and loss of life in the event your dam fails. This investigation determined that failure of your dam could result in serious property damage and possible loss of life. Therefore, we will continue to list your dam in the "HIGH Hazard" category.

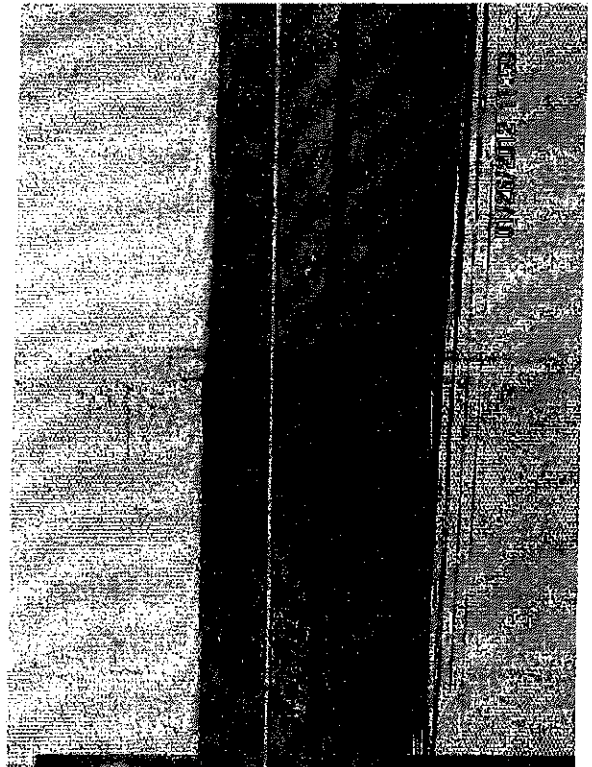
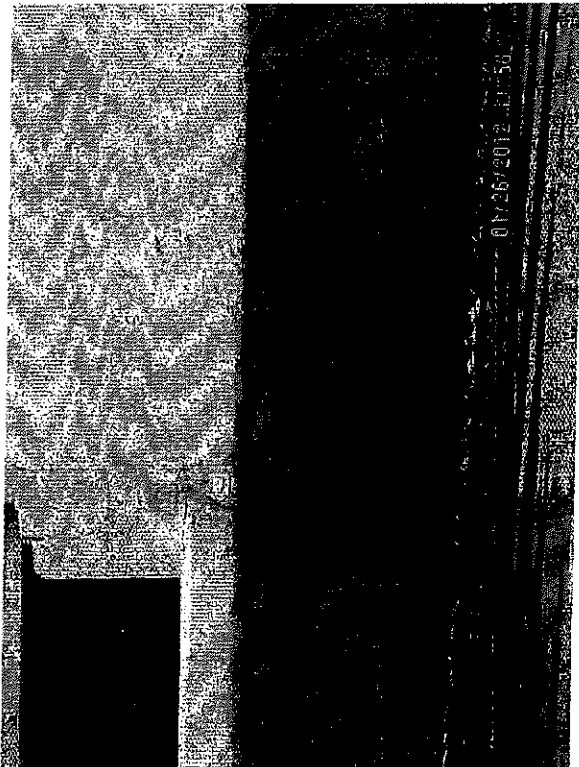
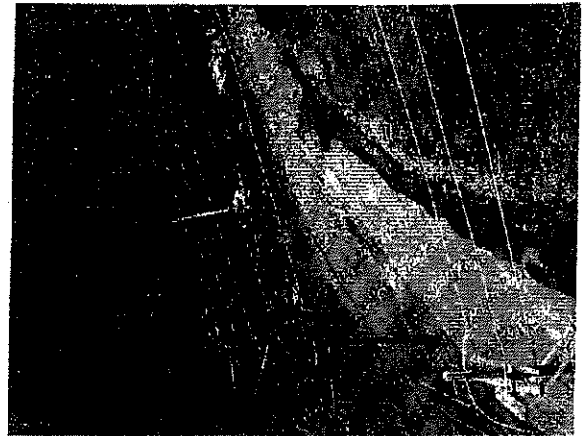
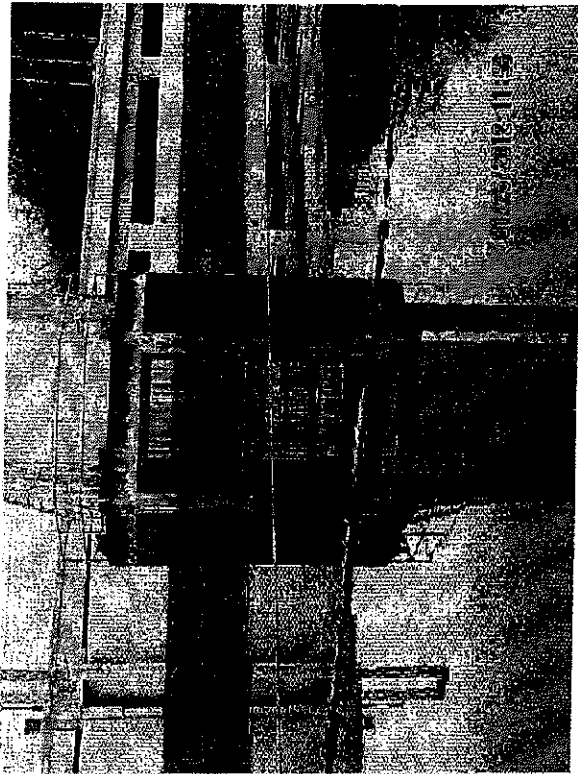
Asheville Regional Office, 2090 US Highway 70, Swannanoa, North Carolina, 28778-8211
Telephone 828-296-4500 Fax 828-299-7043

www.enr.state.nc.us

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DAM SAFETY INSPECTION PORT

NAME Lake hure Dam		COUNTY Ruthe	NO. 003	INSPECTED BY DK	DATE 1/26/12
OWNER Town of Lake hure % Chris Braunel		ADDRESS PO Box 255 Lake hure NC 28746			
TYPE DAM ☐ Embankment ☐ Concrete gravity ☐ Concrete arch ☐ Other ☒ Concrete buttress ☐ Stone masonry		TYPE INSPECTION ☐ Initial ☐ Followup ☒ Periodic ☐ Other		SITE CONDITIONS ☐ Dry ☐ Snowcover ☐ Other ☒ Wet	
HAZARD DESCRIPTION WWTP # Hwy 74/64 - NO changes			HAZARD CLASS ☐ Low (A) ☐ Intermediate (B) ☒ High (C)		
REMARKS water level down ~ 8-10'			ACTION ☐ None ☒ Maintenance ☐ Monitoring ☐ Minor repair ☐ Engineering RECOMMENDATIONS ☒ Inspection letter ☐ Deficiency letter ☐ RE notice ☐ Engineering study ☐ Inspection by RE ☐ Inspection by DSE ☐ Dam safety order ☐ Enforcement ☐ Periodic reinspection ☐ Other reinspection		

AREA	PROBLEMS	COMMENTS
UPSTREAM SLOPE / FACE	☐ 1. None ☐ 11. Displaced rip rap ☐ 2. Trees ☒ 12. Cracks ☐ 3. High bushes ☐ 13. Undermining ☐ 4. Burrows ☐ 14. Holes ☐ 5. Wave erosion ☒ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☐ 10. Sparse rip rap	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Asphalt ☐ Other - cracks & spalling - these are monitored every 3 yrs when water level is drawn down.
TOP OF DAM	☐ 1. None ☒ 11. Cracks ☐ 2. Trees ☒ 12. Spalling ☐ 3. High bushes ☐ 13. Deteriorated joints ☐ 4. Burrows ☐ 14. Displaced joints ☐ 5. Ruts ☐ 15. Exposed reinforcement ☐ 6. Livestock damage ☐ 16. Other ☐ 7. Depressions ☐ 8. Uneven ☐ 9. Misalignment ☐ 10. Has overtopped	COVER: ☐ Vegetation ☐ Gravel ☒ Concrete ☐ Asphalt ☐ Other - Road is DOT road; request for maintenance of resurfacing has been made
DOWNSTREAM SLOPE / FACE	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bolls ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☒ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☒ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☒ 10. Wetness	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Other - seepage is monitored - bays w/ wetness - spalling to face of dam
TOE CONTACT	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bolls ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Undermining ☒ 10. Wetness ☐ 20. Other	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☒ Other bedrock - from seepage in bays as previously noted on 2/11/11

North Carolina Department of Environment and Natural Resources

Division of Land Resources

January 03, 2012

Land Quality Section

Lake Lure Dam, RUTHE-003-High

General Information

Alternate names:

*Status: IMPOUNDING
 *Dam Type: Buttress
 Dam Purposes: Recreation
 Year Constructed: 1927
 Region: Asheville Regional Office
 *Quadrangle: Lake Lure
 *Latitude: 35.426
 *Longitude: -82.184
 River or Stream: Rocky Broad River
 *River Basin: Broad
 Nearest City/Town: Lure
 Distance Downstream: 1.0

Inspection Information

*Last Inspection Date: 02/11/2011
 *Type Inspection: Periodic
 *Inspector(s): Kucken, Darlene
 *Next Routine Inspection: 02/11/2012
 Comments:

Details

*Structural Height (ft): 124
 Normal Freeboard (ft): 2
 *Hydraulic Height (ft): 122
 *Crest Length (ft): 480
 *Crest Width (ft): 1
 *Upstream Slope XH:1V: 1
 *Downstream Slope: 0
 *Low Flow Requirement (cfs): 0
 *Max Spillway Capacity (cfs): 54,000
 *Normal Pool Elevation:
 *Drainage Area (ac): 60,800
 Surface Area (ac): 740
 Normal Pool Capacity (ac-ft): 32,295
 *Max Pool Capacity (ac-ft): 44,914
 Bottom Drain? N
 Bottom Drain Operable? N

Enforcement

NOD
 Deadline
 Resolved?
 DSO
 Deadline
 Resolved?
 EAP? Y
 EAP Date 11/03/1999

Hazard Information

*Hazard Class High
 *Hazard Description Unknown

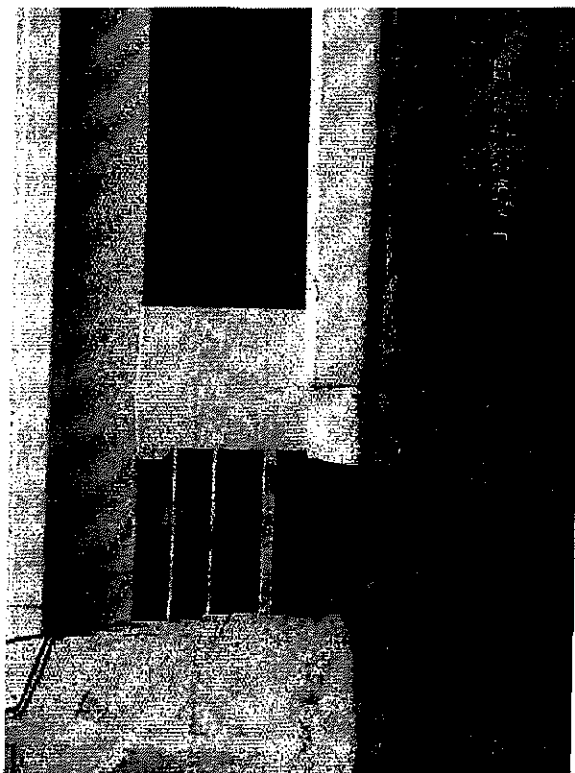
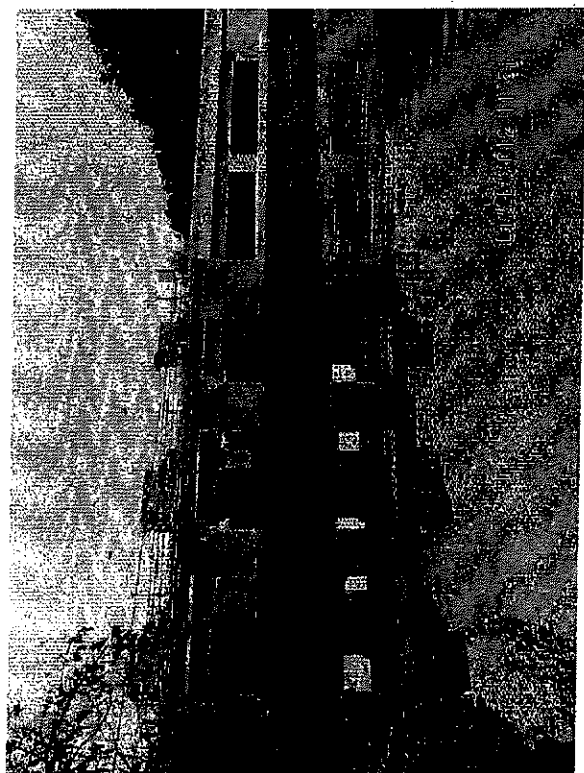
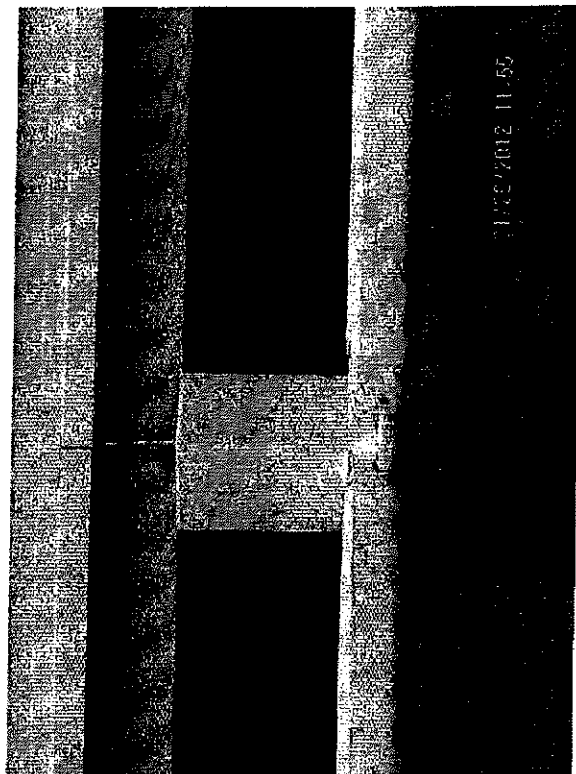
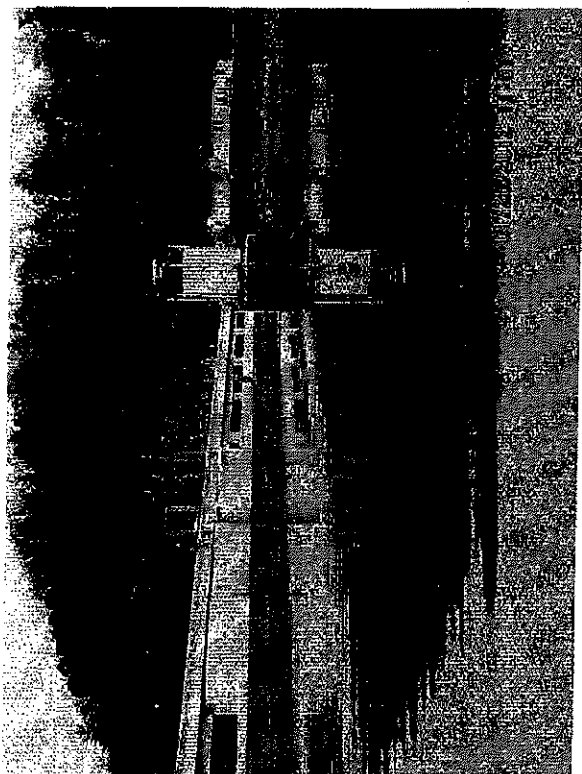
Spillways

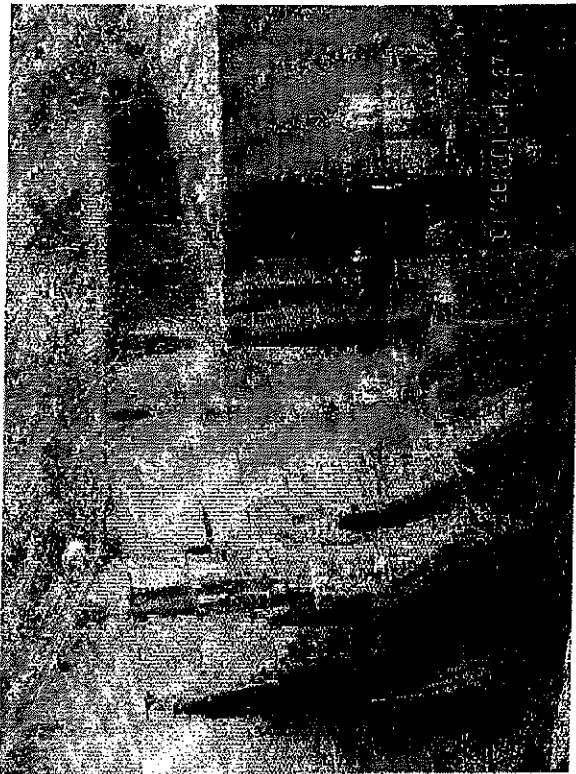
Primary Spillway Other
 ogee weir with 3 tainter gates and one small trash gate
 Emergency Spillway Other
 5 arches 7.4 feet above normal pool
 Emergency Spillway Other
 2 arches with crests 5.4 feet above normal pool

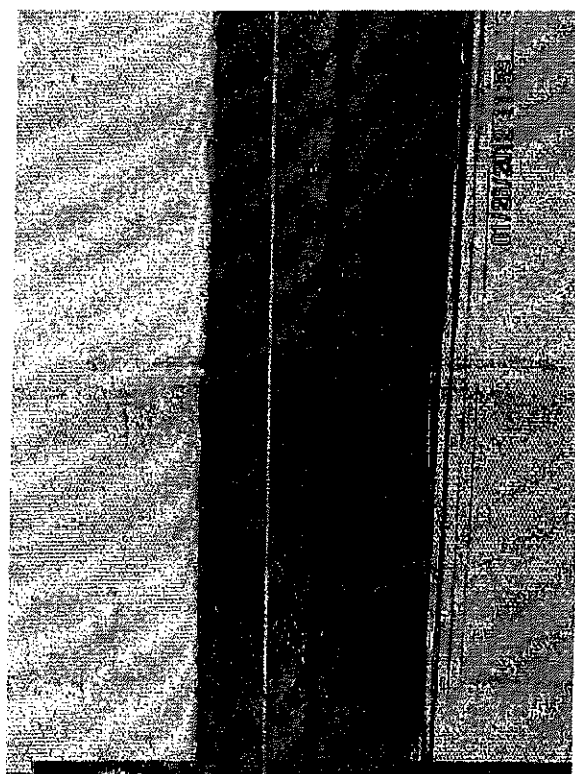
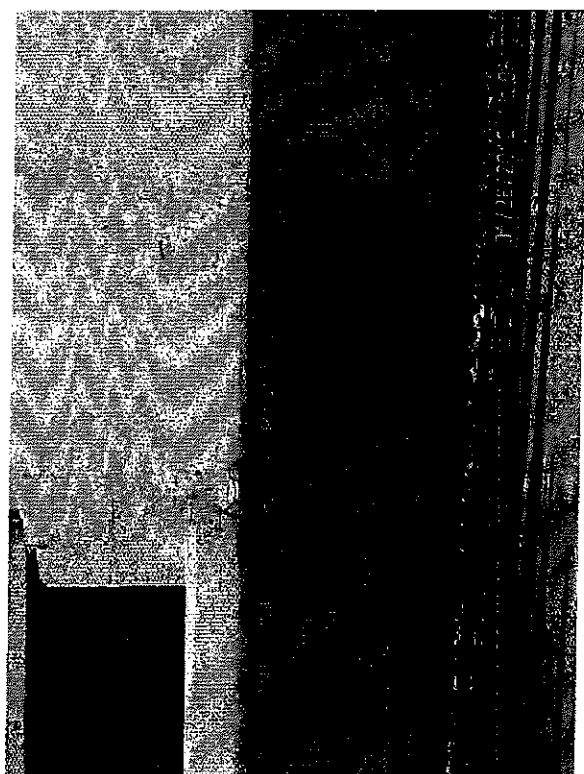
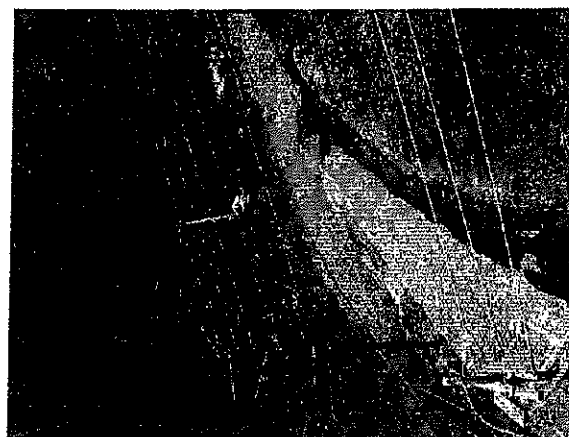
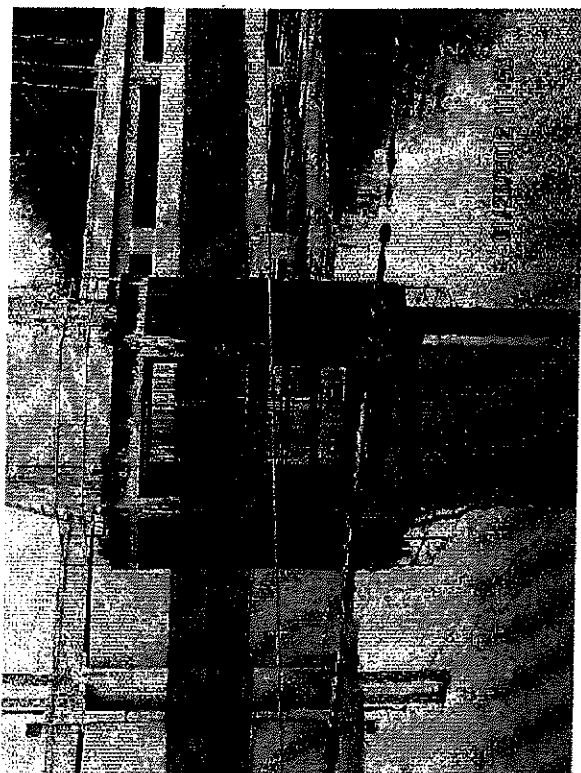
Contacts

Owner Town Of Lake Lure	P. O. Box 255	(828) 625-9983
	Attn:Chris Braund, Mgr	
	Lake Lure, NC 28746	
Emergency Rutherford County Emergency Management	294 Fairground Road	(828) 287-6075
Roger Hollifield, Director	Spindale, NC 28160-2242	

Directions: FROM LAKE LURE 64-74 EAST.TAKE SR1306(BUFFALO RD) TO LEFT.ROAD CROSSES DAM.









North Carolina Department of Environment and Natural Resources
Division of Land Resources
Land Quality Section

James D. Simons, PG, PE
Director and State Geologist

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

February 16, 2011

Notice of Inspection with Maintenance

Town Of Lake Lure
ATTN: Chris Braund
P. O. Box 255
Lake Lure, NC 28746

RE: **Lake Lure Dam, State ID No. RUTHE-003**
Hazard Potential: High; Rutherford County

Dear Mr. Braund:

The "Dam Safety Law of 1967, as amended" provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our records indicate you are the owner of the referenced dam that was inspected by personnel of this office on February 11, 2011. The inspection revealed the following maintenance problems, which must be addressed:

- There was seepage noted on several locations on the downstream face of the dam. You should inspect the seepage periodically and notify this office if it increases.
- There is extensive spalling of concrete surfaces and exposure of metal reinforcement on the downstream face of the dam. There are cracks and spalling on the upstream buttress joints. The Town of Lake Lure should develop plans to repair and resurface these areas. Plans for concrete repairs must have prior approval from the State Dam Safety Engineer prior to conducting the repair work.

During this inspection we also investigated the potential for property damage and loss of life in the event your dam fails. This investigation determined that failure of your dam could result in serious property damage and possible loss of life. Therefore, we will continue to list your dam in the "HIGH Hazard" category.

2090 US Highway 70, Swannanoa, North Carolina, 28778-8211
Telephone 828-296-4500 Fax 828-299-7043
www.enr.state.nc.us

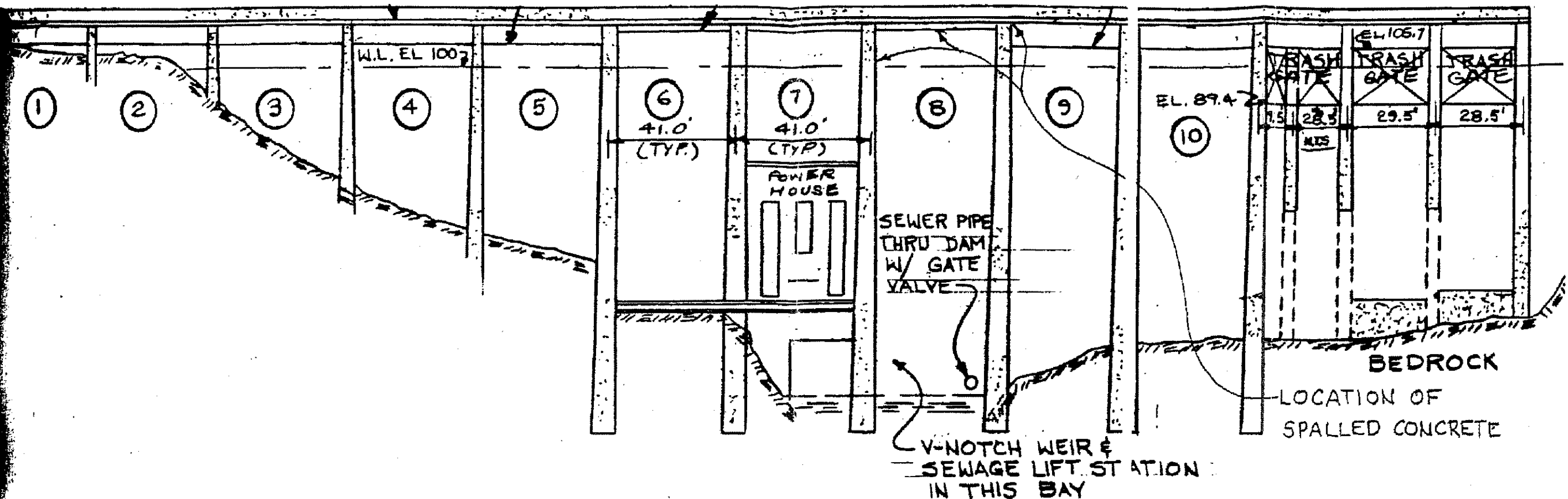
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DAM SAFETY INSPECTION REPORT

NAME Lake hure Dam		COUNTY Ruthe	NO. 003	INSPECTED BY DK, CK	DATE 2/11/11
OWNER Town of Lake hure <i>Attn: Chris Brown</i>		ADDRESS P.O. Box 255 Lake hure NC 28746			
TYPE DAM ☐ Embankment ☐ Concrete gravity ☐ Concrete arch ☐ Other ☒ Concrete buttress ☐ Stone masonry		TYPE INSPECTION ☐ Initial ☐ Followup ☒ Periodic ☐ Other		SITE CONDITIONS ☐ Dry ☐ Snowcover ☒ Wet ☐ Low (A) ☒ High (C)	
HAZARD DESCRIPTION treatment plant / Hwy 64/74					
REMARKS water level @ n.p.					
		ACTION ☐ None ☒ Maintenance ☐ Monitoring ☐ Minor repair ☐ Engineering		RECOMMENDATIONS ☒ Inspection letter ☐ Inspection by DSE ☐ Deficiency letter ☐ Dam safety order ☐ RE notice ☐ Enforcement ☐ Engineering study ☐ Periodic reinspection ☐ Inspection by RE ☐ Other reinspection	

AREA	PROBLEMS	COMMENTS
UPSTREAM SLOPE / FACE	☐ 1. None ☐ 11. Displaced rip rap ☐ 2. Trees ☐ 12. Cracks ☐ 3. High bushes ☐ 13. Undermining ☐ 4. Burrows ☐ 14. Holes ☐ 5. Wave erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☐ 10. Sparse rip rap	COVER: ☐ Vegetation ☐ Rip rap ☐ Concrete ☐ Asphalt ☐ Other - unable to inspect due to water level
TOP OF DAM	☒ 1. None ☐ 11. Cracks ☐ 2. Trees ☐ 12. Spalling ☐ 3. High bushes ☐ 13. Deteriorated joints ☐ 4. Burrows ☐ 14. Displaced joints ☐ 5. Ruts ☐ 15. Exposed reinforcement ☐ 6. Livestock damage ☐ 16. Other ☐ 7. Depressions ☐ 8. Uneven ☐ 9. Misalignment ☐ 10. Has overtopped	COVER: ☐ Vegetation ☐ Gravel ☒ Concrete ☐ Asphalt ☐ Other
DOWNSTREAM SLOPE / FACE	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bolls ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☒ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☒ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Other ☒ 10. Wetness	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☐ Other - seepage is monitored - bays w/ wetness - spalling to face of dam
TOE CONTACT	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bolls ☐ 3. High bushes ☐ 13. Cracks ☐ 4. Burrows ☐ 14. Holes ☐ 5. Erosion ☐ 15. Spalling ☐ 6. Livestock damage ☐ 16. Displaced joints ☐ 7. Slides ☐ 17. Deteriorated joints ☐ 8. Depressions ☐ 18. Exposed reinforcement ☐ 9. Bulges ☐ 19. Undermining ☒ 10. Wetness ☐ 20. Other	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☒ Other bedrock - from seepage in bays



DOWNSTREAM ELEVATION

NOT TO SCALE

N.C. DEPT. OF NAT. RES. & COMM. DEV.

(MAIN)

LAKE LURE DAM
RUTHERFORD COUNTY, N. C.

DOWNSTREAM ELEVATION

DRWN BY
ICH

DATE
6-12-81

DWG NO.
1909-7-7

FIG. 2