



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

April 8, 2010

Notice of Inspection with Maintenance

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

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

Dear Mr. Braun:

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 March 24, 2010. The inspection revealed the following maintenance problems, which must be addressed:

- There was seepage noted on several locations on the downstream slope 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 are continuing to list your dam in the HIGH 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 Dan		COUNTY Rutherford	NO. 003	INSPECTED BY DK, CK	DATE 3/24/10
OWNER Town of Lake hure		ADDRESS PO Box 42, Lakehure 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 ☐ Other	
HAZARD DESCRIPTION Hwy 64/74, Bus + Res. downstream				HAZARD CLASS ☐ Low (A) ☐ Intermediate (B) ☒ High (C)	
REMARKS		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 - lake full pond - some cracking + spalling at buttress connections
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. Unevel ☐ 9. Misalignment ☐ 10. Has overtopped	COVER: ☐ Vegetation ☐ Gravel ☒ Concrete ☐ Asphalt ☐ Other
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 - seepage is regularly monitored - all bays had some wetness - spalling to dam face; many locations
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. Undermining ☒ 10. Wetness ☐ 20. Other	COVER: ☐ Vegetation ☐ Rip rap ☒ Concrete ☒ Other bedrock - from seepage in bays

State of North Carolina
Department of Environment
and Natural Resources

Asheville Regional Office
2090 U. S. Highway 70
Swannanoa, NC 28778
Telephone: (828)296-4500
FAX Number: (828)299-7043



FAX Transmittal

Date: 10/19/09
To: Chris Braund
From: Darlene Kucken
FAX Number: 828-625-8371

Number of Pages (including cover page): 6

See enclosed letters from last
two inspections + correspondence.
If you need anything else,
call me at 828-296-4613.

- Chris
Braund
828-625-
8371

North Carolina Department of Environment and Natural Resources

Division of Land Resources

November 23, 2009

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: **Cherokee**
 Distance Downstream: **1.0**

Inspection Information

*Last Inspection Date: **04/27/2009**
 *Type Inspection: **Routine**
 *Inspector(s): **Rick Allred**
 *Next Routine Inspection: **04/27/2010**
 Comments:

Spillways

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**
 Spillway Capacity (cfs): **54,000**
 Minimum Flow Requirement (cfs): **0**
 Normal Pool Elevation:
 Storage Area (ac): **60,800**
 Surface Area (ac): **740**
 Normal Pool Capacity (ac-ft): **19,295**
 Maximum 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**

Access

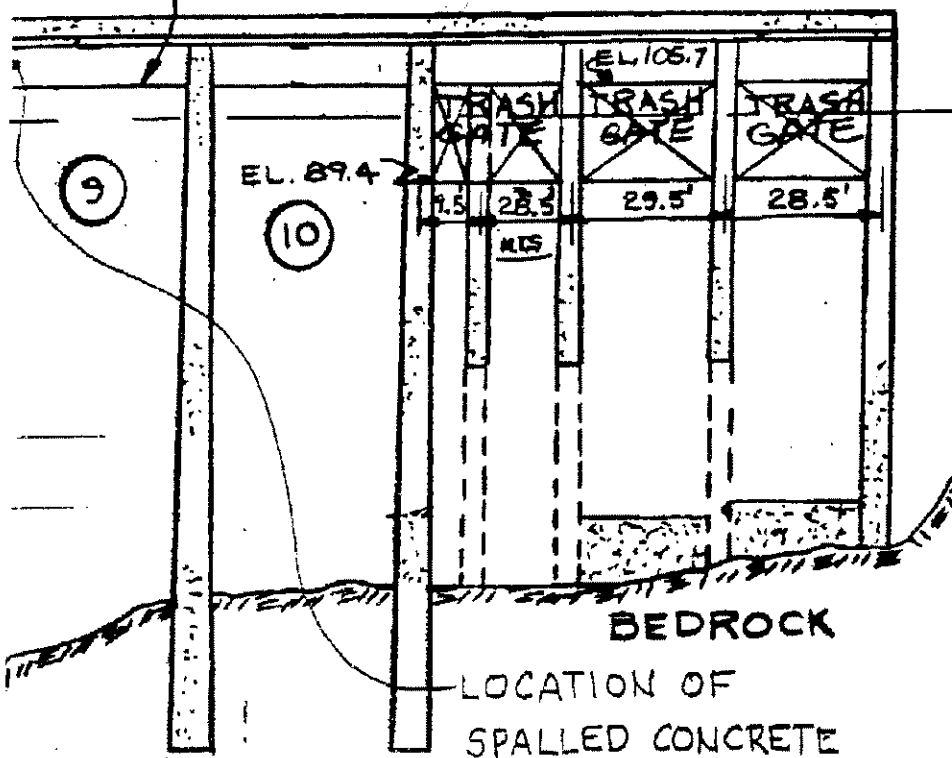
Primary Spillway **Other**
 ogee weir with 3 tainter gates and one small trash gate
 Emergency Spillway **Other**
 5 arches 7.4 feet above normal pool
 Emergency Spillway **Other**
 2 arches with crests 5.4 feet above normal pool

Address: **Town Of Lake Lure** P. O. Box 255 **828-625-9983**
 Attn: **Willie Grimes, Mgr**
 Lake Lure, NC 28746 *Chris Brown, mgr*

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

SSING OVER TOP OF DAM

..113.4 ARCHES 9&10 CREST EL. 105.4



WEIR &
LIFT STATION
BAY
VATION

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

MAIN

LAKE LURE DAM
RUTHERFORD COUNTY, N. C.

DOWNSTREAM ELEVATION

DRAWN BY
Ach

DATE
6-12-81

DWG NO.
1909-7-7

FIG. 2



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

May 4, 2009

Notice of Inspection with Monitoring

Town of Lake Lure
Attn: H. M. "Chuck" Place, III, Town Manager
PO Box 255
Lake Lure, NC 28746

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

Dear Mr. Place:

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 27, 2009. The inspection revealed the following maintenance problems, which must be addressed:

- There was seepage noted on several sections of the dam. You should monitor this seepage 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. The Town should make plans to repair and resurface the downstream face of the dam in the near future. Plans for any concrete repair must have prior approval from the State Dam Safety Engineer.

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 are listing your dam in the "(HIGH) Hazard" category.

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DAM SAFETY INSPECTION REPORT

NAME LAKE LURE		COUNTY RUTHERFORD	NO. 603	INSPECTED BY RMA	DATE 4/27/09
OWNER TOWN OF LAKE LURE		ADDRESS PO BOX 42 LAKE LURE, NC 28746			PHONE
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 HWY 6A/74, BUS. & RES. DOWNSTREAM				HAZARD CLASS ☐ Low (A) ☐ Intermediate (B) ☒ High (C)	
REMARKS PIN STOCK CHARGED - POWER BEING NOT PRODUCED		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 UPSTREAM FACE DUE IMPOUNDMENT
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 CARETAKER STATED SEEPAGE @ BAY #10 HAD DECREASED TO PRIOR EARTH QUAKE RATE - THEY MONITOR SEEPAGE OUTLET PIPE TWICE WEEKLY - OBSERVE EVERY DAY FROM ACROSS RIVER - SEEP @ BAY #3 3:15GPM - SEEP @ BAY #7 3:20GPM - WETNESS IN ALL BAYS - SPALLING APPARENT IN MOST BAYS - LT. TRASH GATE LEAKING
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 BED ROCK SEEPAGE & WETNESS IN BAYS EXCEPT #1 & #2

HAZARD CLASSIFICATION DATA FORM FOR DAMS

DAM NAME LAKE LURE DAM COUNTY RUTHERFORD NUMBER 003RIVER/STREAM BROAD RIVER QUADRANGLE LAKE LUREDAM HEIGHT 129 SURFACE AREA (ACRES) 746 STORAGE CAPACITY (ACRE FT.) 32,295

PRIMARY DOWNSTREAM LAND USE:



WOODLAND



AGRICULTURAL



RESIDENTIAL



INDUSTRIAL/COMMERCIAL

DOWNSTREAM IMPROVEMENTS:



DWELLINGS



BUILDINGS



ROADS



UTILITIES

DOWNSTREAM IMPROVEMENT DATA:

TYPE IMPROVEMENT	DISTANCE DOWNSTREAM	FLOODPLAIN WIDTH	CHANNEL SLOPE	ELEVATION ABOVE FLOODPLAIN	BREACH WAVE ELEVATION	CULVERT/BRIDGE DIMENSIONS	TRAFFIC COUNT	SIGHT DISTANCE
TREATMENT PLANT	0.34 MI.	293'	2%	13'	~50'			
HWY 6A/7A	0.40 MI	297'	2%	14'	~50'			0.09 MI.

DESCRIBE POTENTIAL FOR LOSS OF LIFE AND STRUCTURAL OR ENVIRONMENTAL DAMAGE TO EXISTING OR POTENTIAL FUTURE

DOWNSTREAM IMPROVEMENTS: US HWY 6A/7A, TREATMENT PLANT,
COMMERCIAL BUSINESSES & RESIDENTS

RECOMMENDED HAZARD CLASSIFICATION:



LOW



INTERMEDIATE



HIGH

BY RICK ALLREDTITLE ENVOR. SP.DATE 9/27/09

CONCURRED BY

TITLE

DATE



Chip / Wayne / FLU

North Carolina Department of Environment and Natural Resources
North Carolina Sedimentation Control Commission

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

Michael F. Easley, Governor
William G. Ross Jr., Secretary

January 3, 2008

H. M. "Chuck" Place, III, Town Manager
Town of Lake Lure
PO Box 255
Lake Lure, NC 28746

Dear Mr. Place:

After a small earthquake shook the Lake Lure area on the morning of December 7, 2007, Mr. Ron Morgan reported to the Dam Safety office in Raleigh, late in the afternoon, that the seepage through arch 10 of the Lake Lure Dam appeared to have increased. It is our understanding that no attempt had been made to measure the quantity of seepage prior to the earthquake; therefore, there is no benchmark seepage flow to determine if there is an actual increase in seepage after the quake and if so, how much.

At the request of Devine Tarbell & Associates, Inc., consulting engineers for the Town, a cutoff wall with an outlet pipe was constructed across the exit channel from arch 10 and the post earthquake flow was first measured on December 12, 2007 and found to be 18 gallons per minute. On December 20, 2007, the Dam Safety office received a call from Mr. Morgan to report an increase in the seepage flow on December 19, 2007 to 25 gallons per minute.

On December 21, 2007, Dr. Kenneth B. Taylor, PG and W. Hubert Hawkins, PE met with you and others (See attached report for list of attendees) at Lake Lure to observe the apparent increase in seepage through arch 10. A report of their site visit was prepared and a copy is enclosed for the Town file.

As a follow-up to the site visit by Dr. Taylor and Mr. Hawkins, we request the Town proceed with the following action items:

1. Install a thermometer, preferably a minimum-maximum reading unit, near where the seepage is measured. Temperature readings should be recorded with each seepage measurement.
2. Obtain a stability analysis of the dam using the appropriate earthquake loadings and the dynamic response analysis method.

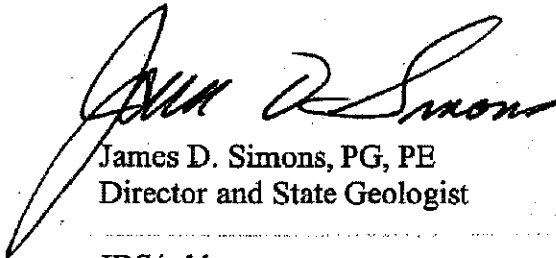
1612 Mail Service Center, Raleigh, North Carolina 27699-1612 • 919-733-4574 / FAX: 919-733-2876
512 North Salisbury Street, Raleigh, North Carolina, 27604

JAN 14 2008

Mr. Place
January 3, 2008
Page 2

3. Obtain an underwater video inspection of the upstream face of the dam with special attention given to the leaking joints.
4. Have a Professional Engineer, registered in North Carolina, prepare a plan for the removal of the tree (bush) in the top join of arch 10. This plan must be submitted to Dam Safety for review and approval.

Sincerely,



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

JDS/whh

Enclosure

cc: Ms. Janet Boyer, PE
Mr. Ronald J. Morgan
Mr. Edwin C. Luttrell, PE

Lake Lure Dam Site Visit

On Friday, December 21, 2007 Hubert Hawkins and Kenneth Taylor traveled from Raleigh to Lake Lure in Rutherford County to meet with town officials concerning an increase in the flow of water from cracks between lifts following the earthquake of December 7, 2007.

Background: The Lake Lure Dam was constructed in 1926. On December 7, 2007 at 06:07 am (EST) [11:07 UTC] a small 3.1 magnitude earthquake shook the area. The USGS reported the location at 35.320°N, 82.190°W at a depth of 8.1 km (5.0 miles). This location is 14 km (9 miles) due South of the Town of Lake Lure. From that direction, maximum compressive forces from the primary or "P" waves generated by the earthquake would be at a maximum parallel to the crest of the dam.

As of 12/31/2007, 561 felt reports had been posted to the USGS website with the maximum averaged intensity of ground motion of IV for Mill Spring, N.C. The intensity of ground motion is related to the Modified Mercalli Intensity Scale with that level of shaking being easily felt and identified, as an earthquake but would not be strong enough to cause damage.

At 5:10 pm on December 7, 2007, Mr. Ron Morgan, Fire and Emergency Management Coordinator with the Town of Lake Lure reported to that State Emergency Operations Center (State EOC). He requested someone from the State Dam Safety Program contact him due the earthquake that morning. The dam operator noticed that a leak they normally have has increased. DLR staff visited Lake Lure on Saturday, December 8. The volume of leak was determined by measuring the flow from the dam gallery pool directly below the leak. A flow rate of 18 gallons per minute (gpm) was reported.

On December 20, 2007, the Town reported an increase in the measured leak flow of 25 gpm. At that rate, a five-gallon bucket sample would fill in 20 seconds. Based on that change in flow rate, Hawkins and Taylor made the trip to Lake Lure from Raleigh. Seismic records from seismograph stations located in North Carolina, Tennessee and South Carolina were reviewed from USGS, University of Memphis and University of South Carolina on-line, real-time data collection systems via the web. The review showed that no other earthquake had occurred since December 7, 2007 in the area.

Site Visit:

Hawkins and Taylor arrived around 10:30 am at Rom Morgan's Office. The other representatives participating in the site visit were:

Mr. Barry Davis, Rutherford County Emergency Services Director (telephone: 828-287-6075);

Mr. Ronald J. Morgan, Fire & Emergency Management Coordinator, Town of Lake Lure (phone: 828-625-9333, cell: 828-442-2123);

Mr. Randy Hardin, Assistant Fire Coordinator, Town of Lake Lure;

Mr. H.M. (Chuck) Place, III, City Manager, Town of Lake Lure; and

Dr. B. Alex Grenoble, P.E., Devine Tarbell & Associates, Inc, the Town's engineering contractor (phone: 704-377-4182).

The group traveled to the downstream side of the dam and walked to the dam gallery where the leak was occurring. This gallery is the northernmost emergency spillway and has the abandoned public sewage system wet well at the bottom of the gallery. A permanent pool of water of unknown depth is at the bottom of the gallery. Calcium carbonate stalactites, some almost a foot in length were observed around the gallery. None showed evidence of breakage from the recent earthquake.

The leaking cracks were observed by binoculars and the flow was documented with digital photographs. William, the dam hydro operator and his assistant, joined the group at the dam gallery and the flow was measured at 25 gpm. The water was flowing from 3 to 5 places along a 20 to 30-foot section of the 3rd lift joint, as measured from the top of the dam. It was difficult to see if water was leaking from lower lift joints because sheet flow from higher lifts obscured the view along the dam face.

William indicated that the flow was "higher after the earthquake" and that today's flow was the same or slightly higher from yesterday. The water in the pool was clear. No data had been collected on the lowest daily temperature. Dr. Grenoble indicated that collecting additional data might demonstrate that the increase in flow may be due to temperature – when concrete shrinks, the joints can open up and flow would increase.

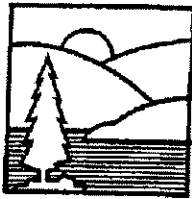
There are several place along the joints were moss grows and in one location, a small tree is growing out of the top lift joint below the dam. The dam operators indicated that even with the gates fully opened and the maximum power generation, the lake cannot be lowered to a level to expose the joints on the upstream side of the dam.

The group then traveled by vehicle to the top of the dam for a walking inspection. One of the three spillway gates was opened two inches. Dr. Grenoble did not share any concerns and indicated he would submit a report with a recommendation to fix the problem.

Report submitted by:

Dr. Kenneth B. Taylor, PG – Chief
North Carolina Geological Survey
Division of Land Resources
N.C. Department of Environment
and Natural Resources (NCDENR)
1612 Mail Service Center
Raleigh, NC 27699-1612

phone: (919) 733-2423
cell: (919) 390-4767
fax: (919) 733-0900
email: kenneth.b.taylor@ncmail.net



Incorporated 1927

TOWN OF LAKE LURE
Office of the Town Manager

MEMORANDUM

To: Mayor and Town Council

From: H. M. Place III, AICP, Town Manager 

Subject: Dam Inspection Report and Budget Amendment

Date: January 2, 2008

Attached is the *Independent Consultant Post Earthquake - Dam Safety Inspection* report prepared by Edwin C. Luttrell, P.E. of Devine Tarbell and Associates, Inc. (DTA - our dam engineering firm) and a consulting services agreement for a followup inspection by DTA. The inspection and report was commissioned by you in December after William discovered a leak that appeared to be coming from a construction joint. This joint, along with many others, has been seeping for years, but this was a greater quantity of water than normal and with our area having just experienced a magnitude 3.1 earthquake early that morning, William was justifiably concerned that it might actually be a new crack in the dam structure. As part of our emergency procedures, I called Ed Luttrell, our dam engineer from Devine Tarbell Associates and asked him to come look at the dam structure as soon as possible. The report is the result of that inspection and a followup inspection by DTA.

Regarding the followup inspection, we spent several hours with Hubert Hawkins and Dr. Ken Taylor of the Land Quality Section of DENR and Dr. Alex Grenoble of DTA looking at the dam just before Christmas. William had reported an increase in water flow from the seepage so we notified the state and our engineer of the change. Mr. Hawkins is an engineer and Dr. Taylor a seismologist with DENR and both expressed an interest in seeing the dam first hand. Dr. Grenoble is Southeast Regional Manager for DTA and represented that firm in place of Ed Luttrell who was on vacation. Much to our relief, all three engineers stated several times that there does not appear to be a serious problem and they did not recommend any action other than daily monitoring of the flow and placing a thermometer at the discharge pipe to determine if there is a direct correlation between ambient temperature and flow. They theorize that the lower air and water temperature caused some contraction of the concrete, thereby allowing more water to flow. William checked the flow while they were there and came up with about 25 gal/min. When asked at what point we should take further action, they agreed that if the flow doubled, they should be notified again.

Earthquake expert Dr. Taylor pointed out that arched barrel dams like ours are excellent in withstanding the pressure of water on their face, but are susceptible to side pressures such as might have been exerted by the earthquake 9 miles due south of our north-south oriented structure. He did not find any evidence that our dam had been damaged by the event, however, the inspection report states that NCDENR will likely require an assessment of seismic risk and stability be conducted.

MEMORANDUM

To: Mayor and Town Council
Subject: Dam Inspection Report and Budget Amendment
Date: January 2, 2008
Page 2

Once again the engineers all agreed that we were taking appropriate steps to stay on top of things. The report states, "The continued commitment to emergency preparedness by Town staff is commendable. It was prudent to react after the earthquake" and "Response was timely and thorough."

You have already approved the expenditure of funds for the report, however you will need to approve a budget amendment in the amount of \$1300 for the subsequent inspection by Dr. Grenoble and authorize me to sign the attached service agreement.

xc: Ed Luttrell, P. E., DTA
William Grimes, Director of Utilities
Ron Morgan, Fire Coordinator & Emergency Management Officer
Sam Karr, Finance Officer
Mary Flack, Town Clerk
File - Utilities/Dam

S:\HYDRO\Dam inspection report - memo to TC.wpd



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

Michael F. Easley, Governor
James D. Simons, PG, PE

William G. Ross, Jr., Secretary
Janet S. Boyer, Regional Engineer

June 30, 2006

Town of Lake Lure
Post Office Box 255
Lake Lure, NC 28746

RE: Lake Lure Dam – Rutherford County

The Dam Safety Law of 1967 provides for the certification and inspection of dams in the interest of public safety. Our records indicate you are the owner of the referenced dam, which was inspected by personnel of this office on June 29, 2006. The inspection revealed the following maintenance problems, which must be addressed:

1. There was seepage noted on many areas of the dam. Excessive seepage promotes deterioration of the concrete, which can lead to failure of the dam.
2. There is extensive spalling of concrete surfaces and reinforcement bars are showing in several areas.
3. The Town shall take action to address necessary maintenance and renovations for the Dam. A qualified Dam safety engineer familiar with large concrete structures shall provide plans and supervise all activities. Plans shall be submitted and approved by the Raleigh Central Office prior to commencement of any construction activity. A study by the engineer of the conditions noted in the inspection shall be submitted by January 1, 2007.

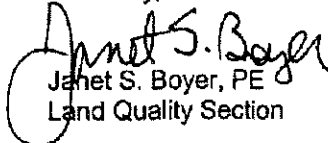
The potential for property damage and loss of life downstream in the event that your dam fails was also investigated. It was determined that sudden failure of your dam could result in serious property damage and possible loss of life. Please be advised that though we make every reasonable effort to determine 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.

Although the inspections by our staff are relatively infrequent and offer no absolute safety guarantees, we hope that you will use the information provided in this letter as you fulfill your obligation to safely maintain and operate your dam. In order to keep records up-to-date and serve you better, please notify this office concerning any changes in address or ownership. Your cooperation is appreciated.

If you have an emergency situation during non-office hours, you should notify the Division of Emergency Management's State Warning Point at 1-800-662-7956. They will notify the appropriate personnel in this office of the situation.

Should you have any questions concerning this inspection, please contact me at (828) 296-4500 during normal office hours.

Sincerely,


Janet S. Boyer, PE
Land Quality Section

2090 US Highway 70, Swannanoa, North Carolina, 28778-8211
Telephone 828-296-4500 Fax 828-299-7034
www.enr.state.nc.us

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North Carolina Department of Environment and Natural Resources

Division of Land Resources

Land Quality Section

July 06, 2006

Lake Lure Dam, RUTHE-003-High

General Information

Alternate names:
*Status: IMPOUNDING
*Dam Type: Arch
Dam Purposes: Hydroelectric
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: Uree
Distance Downstream: 1.0

Details

*Structural Height (ft): 124
Normal Freeboard (ft): 2
*Hydraulic Height (ft): 122
*Crest Length (ft): 480
*Crest Width (ft):
*Stream Slope XH:1V: 3
*Downstream Slope: 2
*Max Spillway Capacity (cfs):
*Low Flow Requirement (cfs):
*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

Inspection Information

*Last Inspection Date: 06/30/2006
*Type Inspection: Follow Up
*Inspector(s): Wayne Watkins
*Next Routine Inspection: 03/29/2007
Comments:
Seepage, spalling and need to obtain engineering recommendations from Town to DENR by Jan. 1, 2007.

Enforcement

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

Hazard Information

*Hazard Class High
*Hazard Description Unknown

pillways

owner Town Of Lake Lure

P. O. Box 255
Attn: Willie Grimes, Mgr
Lake Lure, NC 28746

828-625-9983

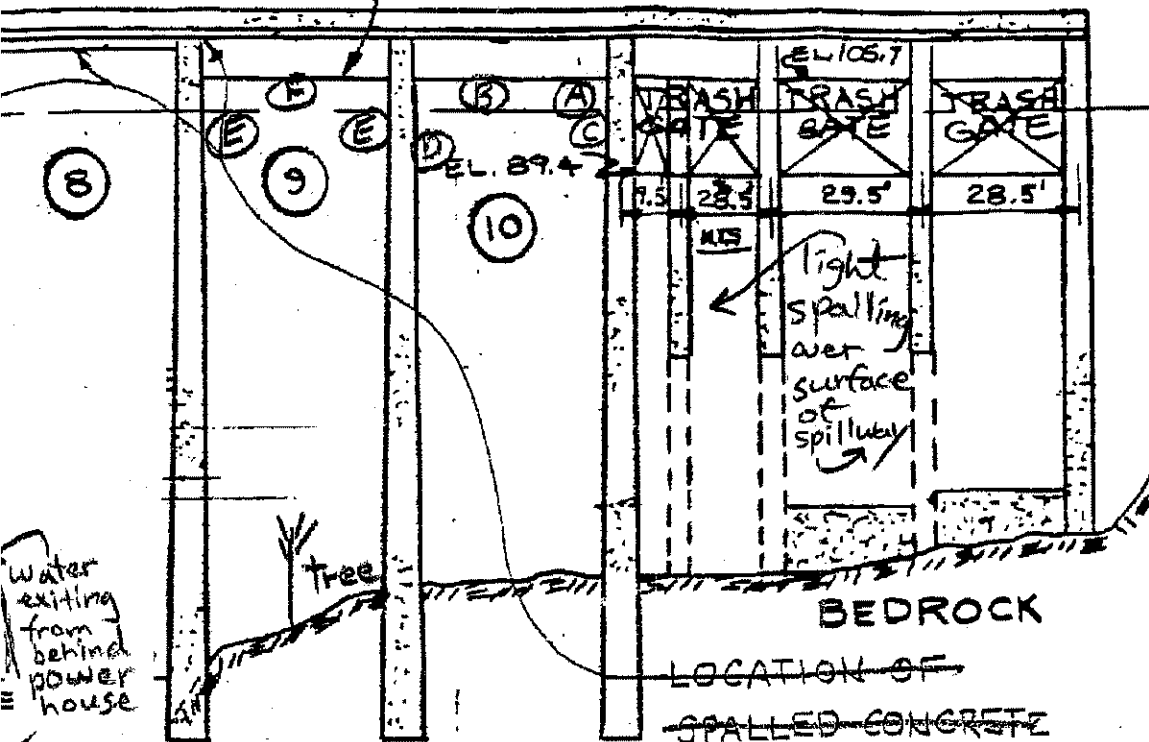
Directions: FROM LAKE LURE 64-74 EAST TAKE SR1306(BUFFALO RD) TO LEFT. ROAD CROSSES DAM.

seepage between arch and buttress of about 1/2 gal/min. light seepage between Arch and buttress to the right of the bay. efflorescence bushes in the top joint.

- (A) Seepage in the cond joint from the top is more than previously noted. It is leaking near the left and center of the bay looking downstream. About 1.5 gal/min. at the left. About 2 gal/min in the center.
- (B) Bushes in 2nd joint from the top of the Arch.

H.WAY CROSSING OVER TOP OF DAM

CREST EL. 113.4 ARCHES 9 & 10 CREST EL. 105.4



M ELEVATION

SCALE

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

MAIN

LAKE LURE DAM
RUTHERFORD COUNTY, N. C.

DOWNSTREAM ELEVATION

DRAWN BY
ACH

DATE
6-12-81

DWG NO. 1909-7-7

FIG. 2



RECEIVED

JUL - 5 2006

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

Michael F. Easley, Governor
James D. Simons, PG, PE

William G. Ross, Jr., Secretary
Janet S. Boyer, Regional Engineer

June 30, 2006

Town of Lake Lure
Post Office Box 255
Lake Lure, NC 28746

RE: Lake Lure Dam - Rutherford County

The Dam Safety Law of 1967 provides for the certification and inspection of dams in the interest of public safety. Our records indicate you are the owner of the referenced dam, which was inspected by personnel of this office on June 29, 2006. The inspection revealed the following maintenance problems, which must be addressed:

1. There was seepage noted on many areas of the dam. Excessive seepage promotes deterioration of the concrete, which can lead to failure of the dam.
2. There is extensive spalling of concrete surfaces and reinforcement bars are showing in several areas.
3. The Town shall take action to address necessary maintenance and renovations for the Dam. A qualified Dam safety engineer familiar with large concrete structures shall provide plans and supervise all activities. Plans shall be submitted and approved by the Raleigh Central Office prior to commencement of any construction activity. A study by the engineer of the conditions noted in the inspection shall be submitted by January 1, 2007.

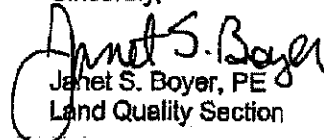
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Should you have any questions concerning this inspection, please contact me at (828) 296-4500 during normal office hours.

Sincerely,


Janet S. Boyer, PE
Land Quality Section

2090 US Highway 70, Swannanoa, North Carolina, 28778-8211
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North Carolina Department of Environment and Natural Resources
Division of Land Resources
Land Quality Section

Michael F. Easley, Governor
James D. Simons, PG, PE

William G. Ross, Jr., Secretary
Janet S. Boyer, Regional Engineer

March 31, 2006

Town of Lake Lure
Post Office Box 255
Lake Lure, NC 28746

RE: Lake Lure Dam -- Rutherford County

The Dam Safety Law of 1967 provides for the certification and inspection of dams in the interest of public safety. Our records indicate you are the owner of the referenced dam, which was inspected by personnel of this office on March 30, 2006. The inspection revealed the following maintenance problems, which must be addressed:

1. There was seepage noted on many areas of the dam. Excessive seepage can cause failure of the dam.
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APR - 3 2006

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

Michael F. Easley, Governor
James D. Simons, PG, PE

William G. Ross, Jr., Secretary
Janet S. Boyer, Regional Engineer

March 31, 2006

Town of Lake Lure
Post Office Box 255
Lake Lure, NC 28746

TO WILLIAM FOR COMMENTS
4.3.06

RE: Lake Lure Dam - Rutherford County

The Dam Safety Law of 1967 provides for the certification and inspection of dams in the interest of public safety. Our records indicate you are the owner of the referenced dam, which was inspected by personnel of this office on March 30, 2006. The inspection revealed the following maintenance problems, which must be addressed:

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Sincerely,

Janet Boyer for
Janet Boyer
Land Quality Section

2090 US Highway 70, Swannanoa, North Carolina, 28778-8211
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DAM SAFETY INSPECTION REPORT

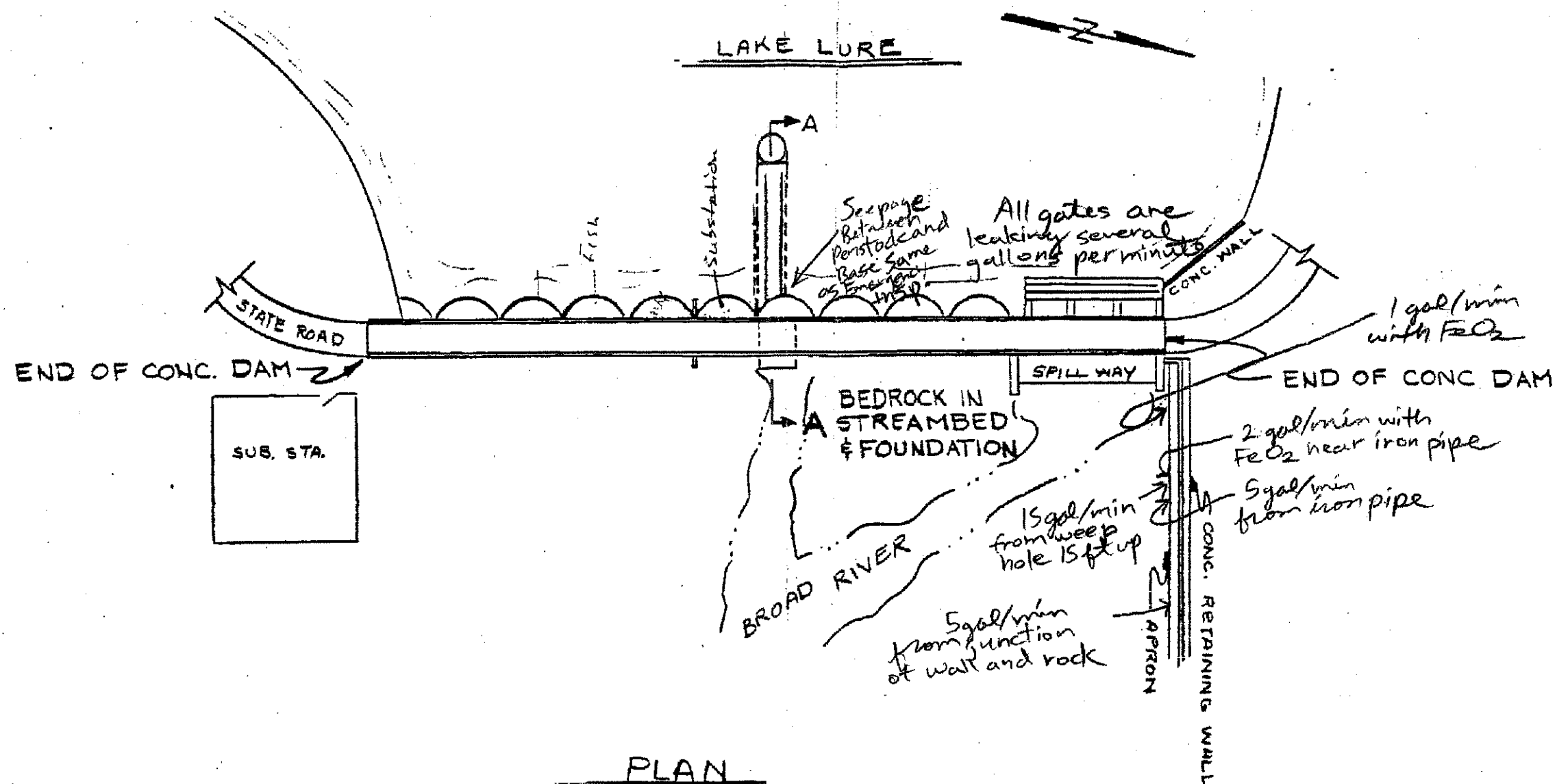
NAME <i>Lake Luke Dam</i>		COUNTY <i>Rutherford</i>	NO. <i>003</i>	INSPECTED BY <i>WATKINS</i>	DATE <i>3.29.06</i>
OWNER <i>Town of Lake Luke</i>		ADDRESS <i>P.O. Box 255 Lake Luke NC 28746</i>			
TYPE DAM ☐ Embankment ☐ Concrete gravity ☒ Concrete arch ☐ Other ☐ Concrete buttress ☐ Stone masonry		TYPE INSPECTION ☐ Initial ☐ Followup ☒ Periodic ☐ Other		SITE CONDITIONS ☒ Dry ☐ Snowcover ☐ Wet ☐ Other	
HAZARD DESCRIPTION				HAZARD CLASS ☐ Low (A) ☐ Intermediate (B) ☒ High (C)	
REMARKS <i>NORMAL POOL</i>				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 <i>15. CONCRETE SPALLING. 18. REINFORCEMENT EXPOSED. 12. CRACKS ARE PRESENT IN CONC.</i>
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 <i>ROAD</i> <i>12. SPALLING OF CONCRETE.</i>
DOWNSTREAM SLOPE / FACE	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bells ☐ 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 <i>11. SEEPAGE NOTED IN MANY AREAS. 15. CONCRETE SURFACES SPALLING AND EFFLORESCENCE NOTED.</i>
TOE CONTACT	☐ 1. None ☒ 11. Seepage ☐ 2. Trees ☐ 12. Bells ☐ 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 <i>11. SEEPAGE IN ALL BAYS. THE MAJOR SEEPAGE IS IN BAY # 3, 4 + 5 * ABUTMENT (LEFT) CONCRETE WALL ADJACENT SPILLWAY HAS A LARGE FLOW IN SIDE WALL. (10+6AM EST.)</i>

DAM SAFETY INSPECTION REPORT

NAME <i>Lake Lane Dam</i>		COUNTY <i>Wishnup</i>	NO. <i>003</i>	INSPECTED BY <i>SEP</i>	DATE <i>3/16/05</i>
OWNER <i>County of Lake Lane</i>		ADDRESS <i>P.O. Box 255 Lake Lane NC 28746</i>			
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				HAZARD CLASS ☐ Low (A) ☐ Intermediate (B) ☒ High (C)	
REMARKS				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 <i>Spalling noted in annual plane</i>
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. Unevel ☐ 9. Misalignment ☐ 10. Has overtopped	COVER: ☐ Vegetation ☐ Gravel ☐ Concrete ☐ Asphalt ☐ Other <i>Spalling noted</i>
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 <i>spalling and rebar are showing in several places</i>
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



PLAN
NOT TO SCALE

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

MAIN

LAKE LURE DAM
RUTHERFORD COUNTY, N.C.

PLAN

DRAWN BY
ACH

DATE
6-12-81

DWG NO. 1909-7-7

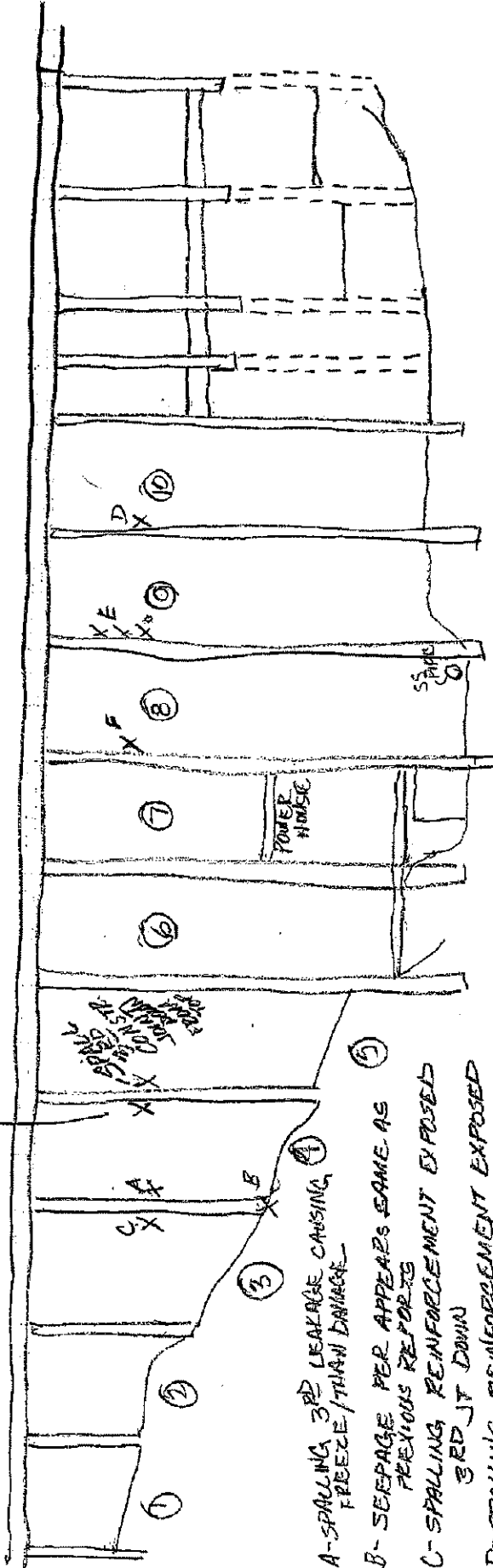
FIG. 1

DAM SAFETY INSPECTION REPORT

NAME LAKE LURE		COUNTY WILKES COUNTY	NO. 003	INSPECTED BY MRP, PMA	DATE 1/21/04	
OWNER TOWN OF LAKE LURE		ADDRESS PO BOX 255, LAKE LURE, NC 28446			PHONE	
TYPE DAM ☐ Concrete gravity ☐ Concrete arch ☐ Other ☐ Embankment ☒ Concrete buttress ☐ Stone masonry		TYPE INSPECTION ☒ Periodic ☐ Other ☐ Initial ☐ Followup		SITE CONDITIONS ☐ Wet ☐ Other ☒ Dry ☐ Snowcover		
HAZARD DESCRIPTION				HAZARD CLASS ☐ Low (A) ☐ Intermediate (B) ☒ High (C)		
REMARKS REMOVE TREES GROWING IN THE BOY OF THE DAM. PLANS SHOULD BE MADE TO RESURFACE THE DAM & ADDRESS THE SPALLING LOCATIONS BY A FE SPECIALIZED CONC. BUTTRESS DAMS			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			
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 SEE ATTACHED SHEET			
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			
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LAKE LURE

SPILL 3
3RD DOWN
FROM TOP



A-SPALLING 3RD LEAKAGE CAUSING
FREEZE/THAW DAMAGE

B-SEEPAGE PER APPEARS SAME AS
PREVIOUS REPORTS

C-SPALLING REINFORCEMENT EXPOSED
3RD JT DOWN

D-SPALLING REINFORCEMENT EXPOSED
2ND JT DOWN

E-SPALLING TOP DOWN THEN 3RD JT

F-SPALLING BETWEEN 2ND & 3RD JTS



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

Charles H. Gardner, P.G., P.E.
Director and State Geologist

Michael F. Easley, Governor
William G. Ross Jr., Secretary

November 5, 2001

Mr. William Grimes
Town of Lake Lure
Post Office Box 255
Lake Lure, North Carolina 28746

RE: Lake Lure Dam
Rutherford County
RUTHE-003

Dear Mr. Grimes:

In response to the increased national security alerts since September 11, 2001, I am writing to you and other owners of large high hazard potential (Class C) dams. Although I am not aware of any specific threats or attacks to dams thus far, national security experts warn that dams could be a potential target for additional attacks.

Most dams are massive in nature, and are not very susceptible to sabotage, but some dams are more vulnerable to failure from terrorist attack than others. It is suggested that you seek your engineering consultant's advice concerning the need for security measures at your dam. In some cases, it may be prudent to consider additional security measures to discourage acts of terrorism that would be intended to cause failure of the dam. Security measures may include such things as fencing, motion sensors, additional security staff, remote video cameras or installation of gates on access roads to the dam. You should report any suspicious activity at your dam to local law enforcement agencies.

This potential threat reinforces the importance of emergency action plans for dams, and presents an excellent opportunity to review, update or develop an emergency action plan for your dam. Guidelines for developing emergency action plans for large, high hazard potential dams such as yours have been developed by various Federal agencies, including the Federal Emergency Management Agency and the Federal Energy Regulatory Commission. We will be happy to help you secure a copy of these guidelines.

Geological Survey • Land Quality • Geodetic Survey • Center for Geographic Information & Analysis

Division of Land Resources • 1612 Mail Service Center, Raleigh, North Carolina 27699-1612

512 North Salisbury Street, Raleigh, North Carolina 27604

919-733-3833 \ FAX: 919-715-8801 \ Internet: www.dlr.enr.state.nc.us/dlr.htm

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✓
Memo To Richard Phillips

From Max Fowler

Lake Lure Dam Phones

August 30, 2001

Please Include the following contacts and phone numbers in the database for Lake Lure Dam

William Grimes, manager (828) 625-9227

Ron Morgan (828) 625-9333