



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 20, 2000

Mr. James Scarola, Vice President  
Shearon Harris Nuclear Power Plant  
Carolina Power & Light Company  
Post Office Box 165, Mail Code: Zone 1  
New Hill, North Carolina 27562-0165

SUBJECT: RESULTS OF DAM SAFETY AUDIT RELATED TO THE CATEGORY I  
AUXILIARY RESERVOIR DAM AT THE SHEARON HARRIS NUCLEAR  
POWER PLANT

Dear Mr. Scarola:

On July 28, 1999, an audit of the Category I Auxiliary Dam was conducted at the Shearon Harris Nuclear Power Plant. The NRC staff has evaluated the final report from its technical assistance contractor, the Federal Energy Regulatory Commission (FERC), related to this audit. On the basis of the audit, no actions were identified that need to be taken at this time to assure the continued safety of the Category I Auxiliary Reservoir Dam consistent with the Federal Guidelines for Dam Safety (1979) and the Dam Safety Program Act defined in the Water Resources Act of 1996. Although no action items were identified in this audit, it is requested that you acknowledge receipt of this letter within 180 days of receipt. No direct response to FERC is required.

Although the conclusion of the audit was that there were no conditions observed that would indicate any immediate concerns regarding the integrity of the dam and associated control facilities, you are advised to continue programmatic observation, monitoring, and maintenance activities. Also, it is requested that you review the data on page 2 of the FERC report and provide the staff any corrections or missing information.

An original copy of the FERC report, dated June 13, 2000, which contains color photographs taken of various areas that were inspected during the audit, is enclosed. As noted in the report, representatives of Carolina Power & Light accompanied the Office of Nuclear Material Safety and Safeguards and FERC personnel during this audit and participated in the discussions.

If you have any questions regarding the report, please contact me at (301) 415-1373.

Sincerely,

Richard J. Laufer, Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosure: As stated

cc w/encl: See next page

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/RA/

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**FEDERAL ENERGY REGULATORY COMMISSION  
ATLANTA REGIONAL OFFICE  
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Atlanta, Georgia 30340  
(770) 452-3800  
JUN 13 2000**

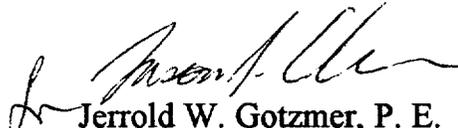
Mr. Dan Gillen  
NRC Dam Safety Officer  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Dear Mr. Gillen:

Enclosed is the final report of the inspection of the Harris Nuclear Station Auxiliary Reservoir dam. The staff of the Federal Energy Regulatory Commission (FERC) conducted the inspection on July 28, 1999, and prepared the report. Staff inspected all of the water retaining structures associated with the dam and reviewed available records on operation and instrumentation of the dam. The inspection revealed no conditions that represent an immediate threat to the safety and permanence of the project structures. No new recommendations for continuing maintenance were made as a result of this inspection. All recommendations from the previous (1995) FERC inspection have been addressed. An exit meeting was held on the afternoon following the inspection.

We thank you for this opportunity to be of service to the Nuclear Regulatory Commission. If you have any questions on the report, or if we may be of further assistance, please contact this office at (770) 452-3800.

Sincerely,

  
Jerrold W. Gotzmer, P. E.  
Director

Enclosure

OPERATION INSPECTION REPORT  
for  
THE NUCLEAR REGULATORY COMMISSION

Inspection by  
THE FEDERAL ENERGY REGULATORY COMMISSION  
Atlanta Regional Office

Date of inspection July 28, 1999

Dam (name) Auxiliary Reservoir Dam

Location Harris Nuclear Station Wake North Carolina  
(Facility) (County) (State)

NRC Licensed Project Shearon Harris Nuclear Station

Licensee Carolina Power and Light Company (CP&L)

Features of the Dam and Impoundment Inspected Embankment,  
Spillway, and Reservoir

Inspected by Robert L. Bryant

Accompanied by Messrs. Dan Rom (NRC-HQ); Billy Pridgen and  
Charles Smart (CP&L)

Weather Clear, temperature approximately 90 °F (32°C)

Summary

Based on observations made during the inspection, discussions with NRC representatives and CP&L employees, and a review of project design documents, maintenance and instrumentation records, no conditions were found that might be considered an immediate threat to the safety and permanence of the project structures. No new operation and maintenance recommendations were made as a result of the current inspection. Operation and maintenance recommendations made during a previous FERC inspection have been implemented.

An engineering data sheet, a project location map, and site plan follow this report. Photograph location map precedes the photographs attached to the report.

Submitted: 06/12/2000, William R. Ross, P.E.

**Auxiliary Reservoir Dam  
Engineering Data**

**Dam:**

Type ..... Random rockfill with impervious core  
Length at crest ..... 3900 ft  
Width at crest ..... 20 ft  
Maximum height ..... 50 ft  
Crest elevation ..... 260.0 ft  
Upstream slope ..... 2.5H:1V  
Downstream slope ..... 2.5H:1V  
Slope protection ... Riprap on upstream and downstream slopes

**Spillway:**

Type .... Uncontrolled, reinforced concrete over in-situ rock  
Length ..... 170 ft  
Crest elevation ..... 252 ft  
Normal tailwater elevation ..... 220 ft  
Downstream slope ..... 3.33H:1V

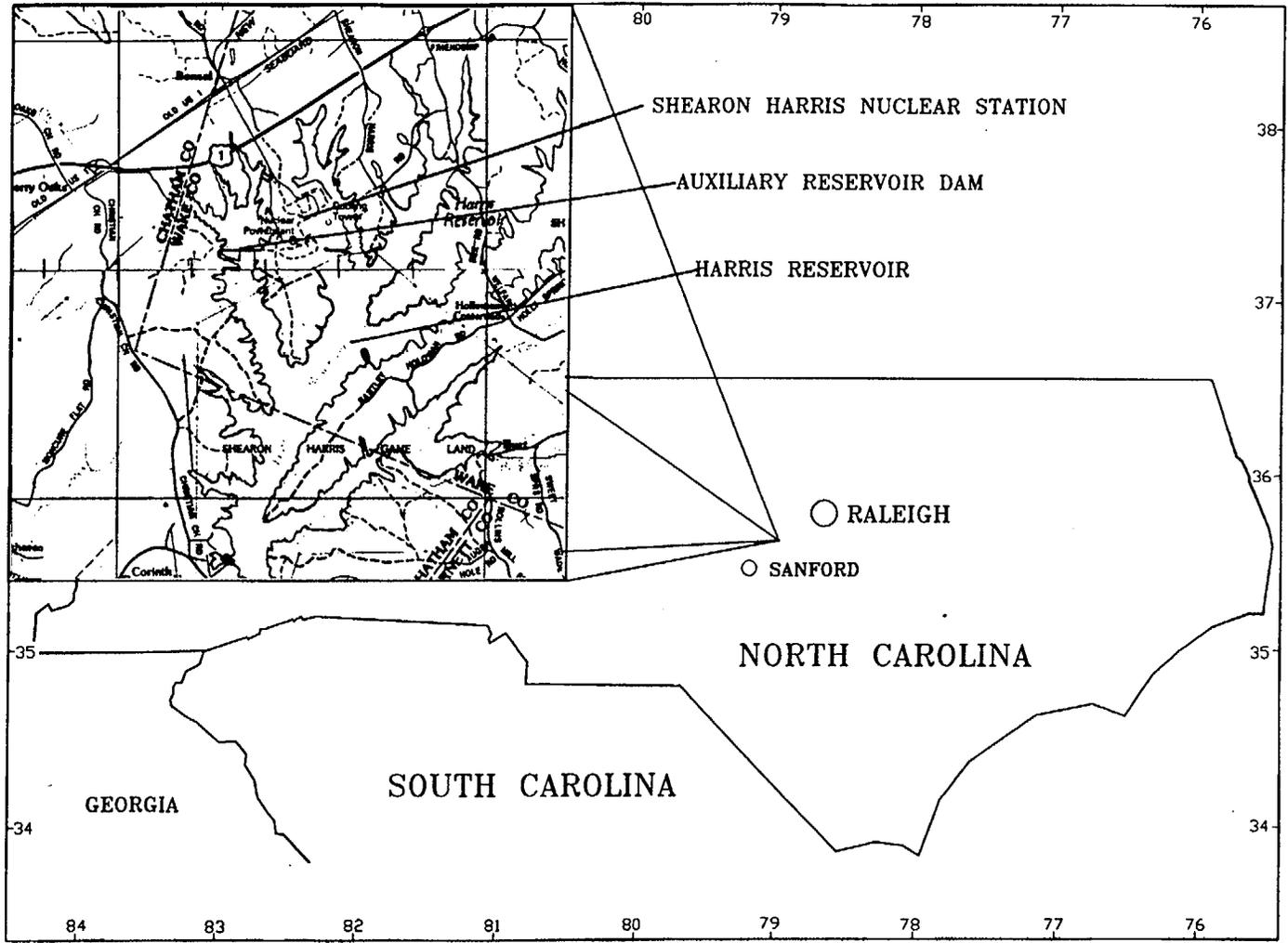
**Reservoir:**

Drainage area ..... 2.43 mi  
Normal water surface elevation ..... 252.0 ft  
Surface area @ el. 252.0 ft. ... 0.63 mi  
Volume @ el. 252.0 ft. .... 5,000 acre-ft  
Maximum storm surcharge ..... 6.0 ft

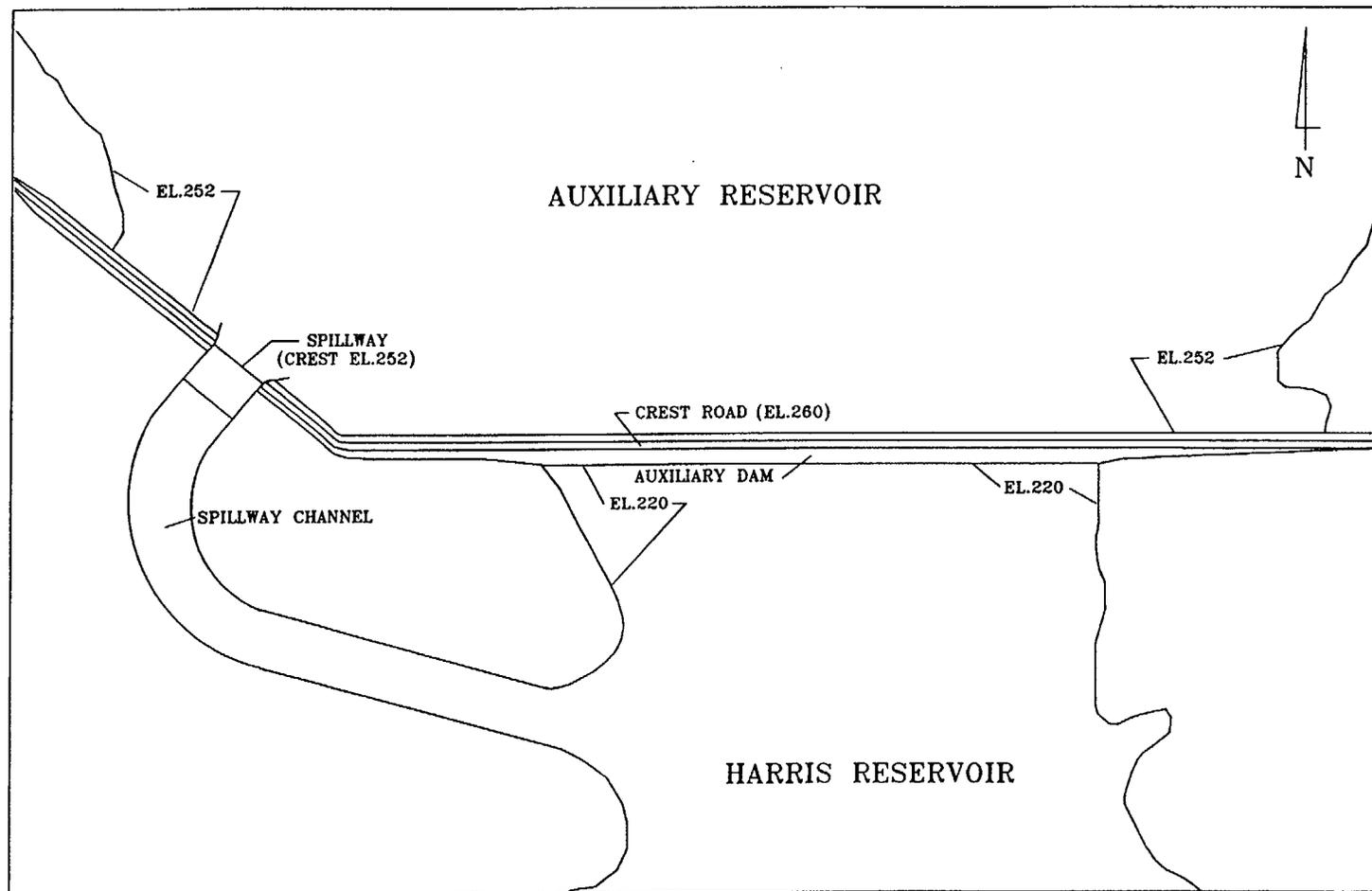
**Hazard Potential Classification:** ..... Low

**Location:** ..... 78°58'18"W Longitude, 35°37'44"N Latitude

**NOTE: All elevations are mean sea level.**



SHEARON HARRIS NUCLEAR STATION  
PROJECT LOCATION MAP



SHEARON HARRIS AUXILIARY RESERVOIR DAM  
SITE PLAN

**A. Safety of the Project.** The auxiliary reservoir was constructed by building a dam across the flood plain of Tom Jack Creek. After clearing the site, a cutoff trench was excavated into the bedrock (siltstone). A grout curtain was injected into the foundation rock along the centerline of the dam. The dam was constructed of random rock fill with a central impervious core. The core is protected on each side by transition filters. The rockfill (clay shale) was obtained from excavation of the spillway channel and from local borrow areas. The dam's slopes are protected by riprap in the areas potentially affected by wave action. Since the clay shale used in the rockfill tends to deteriorate when exposed to the weather, large stones selected from the random fill are used to protect the surface of the remaining rockfill. A gravel surface road is located along the crest of the dam, but does not cross the spillway.

**1. Dams, Dikes, and Appurtenant Structures.** All of the structures accessible by walking were inspected. The inspection team walked the crest and downstream toe of the dam and both abutments. The spillway was inspected from the dam. No conditions were observed that should be considered an immediate threat to the safety and permanence of the project structures.

**a. Auxiliary Reservoir Dam.** Both upstream and downstream slopes of the dam are protected by riprap (Photographs 2 and 4). No sign of movement such as sliding, sloughing, or subsidence was detected on either of the slopes. The crest and gravel roadway along the top of the dam also appeared to be in good condition (Photograph 3). There was no sign of cracking, sliding, or settlement along the crest.

One seepage area was found at the dam's downstream toe on the right side of the Harris Reservoir shoreline (Photograph 7). Plants (vegetation) in the vicinity indicate that the area is continuously wet. The licensee checks this area during regularly scheduled inspections of the dam. No sloughing or sliding of the slope was noted around the area.

During the previous FERC inspection, one eroded area was found on the dam's downstream slope near the left side of the spillway. The licensee has repaired this area and protected it with riprap (Photograph 9).

**b. Spillway.** The spillway is an uncontrolled, ungated, overflow type structure (Photographs 10 to 13). The reinforced concrete structure is located near the right (west) abutment of the dam. The reinforced concrete training walls extend from within the reservoir, across the dam, and along the downstream slope into the outlet channel (Photograph 12). Overflow from the auxiliary reservoir passes over the spillway crest, along an outlet channel and into the main reservoir (Harris Reservoir). A boat barrier is located upstream of the spillway

(Photograph 11). The spillway, abutment walls, and outlet channel (Photograph 13) appeared to be stable and in good condition.

c. **Abutments.** Both abutments were checked for seepage and none was found. The licensee has reworked the areas downstream of the abutments by removing trees and other vegetation and grading to improve drainage (Photographs 2 and 8).

d. **Reservoir.** Portions of the reservoir shoreline were inspected from the dam and abutments. No indications of active shoreline erosion or accumulations of floating trash or debris were observed.

2. **Instrumentation.** Project instrumentation includes surface monuments and piezometers. Surface monuments located along the crest of the dam are used to monitor horizontal and vertical movement. Piezometers are located along the crest of the dam and downstream of the toe. Photograph 3 shows a typical location of a survey reference point and/or piezometer with protective barriers.

The piezometers located along the crest measure pore pressures at or near the interface of the impervious core and foundation. Because these piezometers are located near the interface, it is difficult to determine if readings represent water levels in the foundation or in the core.

Monuments were initially surveyed and the results recorded quarterly. In 1995, the frequency of surveys was reduced to semi-annually. The most recent survey was made in January 1999. A review of the survey results for the past 7 years indicates no unusual trends in deflection or elevation. Graphical results of recent surveys are presented in Attachment 1.

Piezometer readings are also made and recorded semi-annually. Field observations and instrumentation data reviews made during the inspection revealed no anomalies or trends. Graphical results of recent piezometer readings are presented in Attachment 1.

3. **Hazard Potential Classification.** The location of the auxiliary dam on the Harris Reservoir mitigates the hazard potential for the auxiliary dam. Failure of the auxiliary dam would increase the surface elevation of the Harris Reservoir by approximately 1.5 feet which is not considered a significant increase in water surface elevation. The auxiliary dam is therefore classified as a low hazard potential dam. No conditions were observed during this inspection that would warrant a change of hazard potential classification.

4. **Independent Consultant's Safety Inspection Report.** Prior to 1990 (1981-1986), annual consultant's inspections were made by EBASCO. Law Engineering Testing Company made the first five-year independent consultant's inspection in December 1990.

Law Engineering and Environmental Services, Inc. made the second five-year independent consultant's inspection in June 1995. The 1995 inspection found the auxiliary dam and spillway to be "in acceptable condition".

5. Licensee's Inspection Program. The licensee's inspection schedule appears to be appropriate for the project size and complexity. The following table summarizes the licensee's inspection program:

Inspection	Frequency	Performed By	Last Inspection
Visual	Quarterly	CP&L-HESS	-
Piezometers	Semi-annually	CP&L-HESS	July 1999
Monuments	Semi-annually	CP&L-HESS	January 1999
Operation Safety	5-Year	Consultant	06/21/95

*HESS - Harris Engineering Support Section*

B. Operation and Maintenance. The project appeared to be efficiently operated and well maintained. The auxiliary reservoir level was at the spillway crest, approximate elevation 252.0 feet. Tailwater elevation (surface elevation of the Harris Reservoir) was approximately 220.0 feet.

1. Dams, Dikes, and Appurtenant Structures. The riprap protecting the dam's slopes appeared to be in good condition and relatively free of vegetative growth. The downstream slope is protected by riprap near the waterline (Harris Reservoir) and by large rock selected from the random rockfill and placed on the upper surface of the slope.

Since the previous FERC inspection, the areas immediately downstream of the dam have been cleared of trees and other vegetation. The areas have been graded and shaped to improve drainage and have been grassed (Photographs 2 and 8)

2. Spillway Gates and Standby Power. The spillway has no gates. Overflow from the reservoir passes over the spillway crest, along the outlet channel, and into the Harris Reservoir.

3. Power Plants. There is no hydroelectric plant at this site. The auxiliary reservoir provides emergency cooling water for the nuclear power plant.

4. Reservoir. Areas of the reservoir observed during this inspection appear to be clean and free of debris. No signs of erosion were evident to the inspection team. Operation and maintenance of the reservoir appear to be in accordance with good engineering practice.

5. Records. CP&L maintain design, construction, and as-built drawings and operation records at the site. Design and construction records are also maintained at the NRC-HQ offices in Washington, D. C.

6. Emergency Action Plan. Since the auxiliary reservoir dam is classified as a low hazard potential dam, no emergency action plan is required.

C. Environmental, Public Use, and Safety. No environmental, public use, or safety problems were observed during the inspection. The dam and reservoir are closed to the public. The area is fenced and access road gates are locked. A warning sign is placed beside the spillway and a boat barrier is located upstream of the spillway (Photograph 11). The boat barrier is for the protection of environmental staff who conduct tests and studies on the lake. Existing public safety devices appear adequate and are properly maintained. No additional actions to protect life and property were required as a result of the inspection.

D. Matters of Commission Interest.

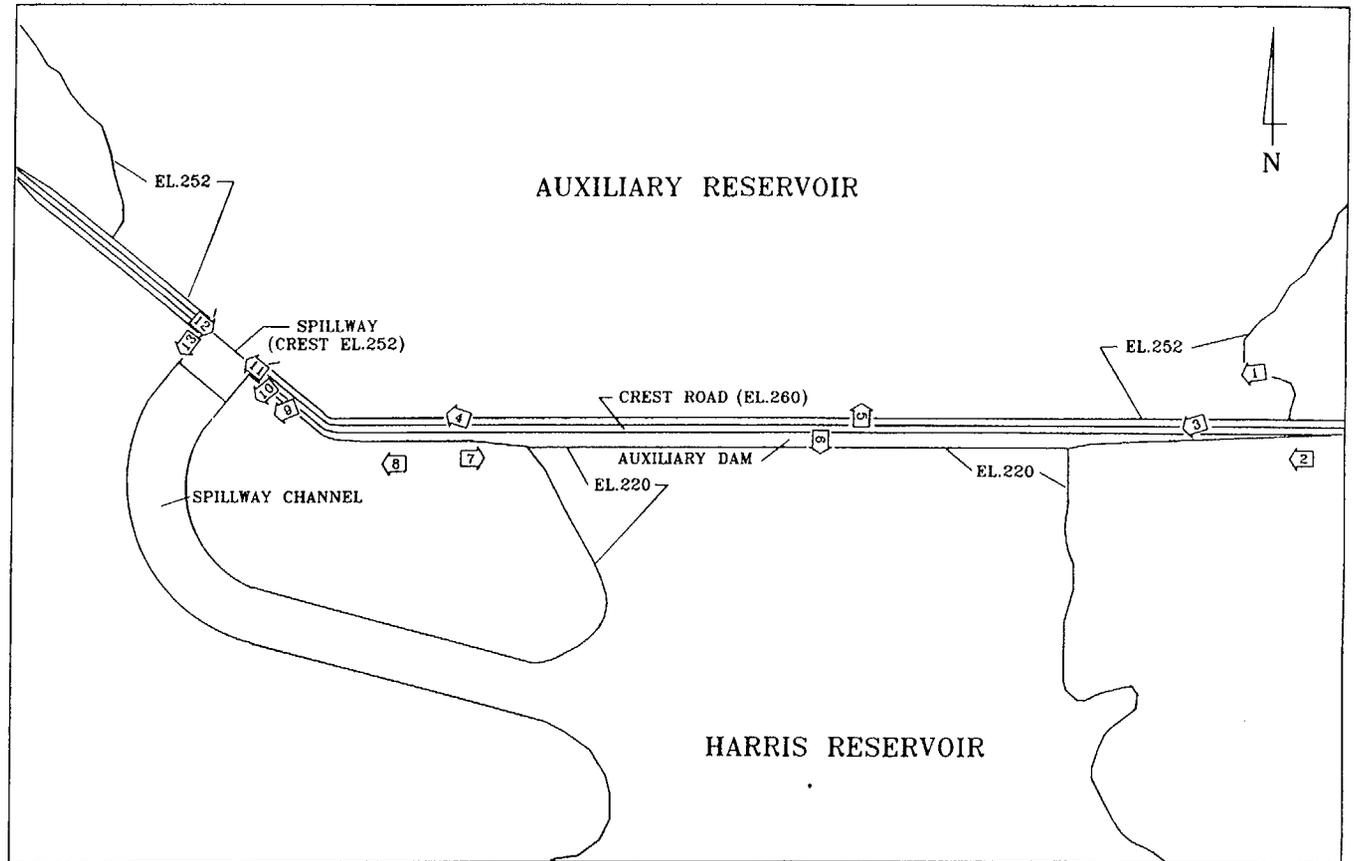
1. Additions, Betterments, Leases, Retirements, or Needed Extensions. Not Applicable.

2. Requiring Commission Action. Not Applicable.

3. Project Compliance. Not Applicable.

E. Findings and Followup Actions. The inspection team observed no conditions that might adversely affect the immediate safety and permanence of the project structures. All recommendations from previous inspections have been implemented. No new recommendations were made as a result of the current inspection.

This report includes three (3) figures and thirteen (13) photographs.



SHEARON HARRIS AUXILIARY RESERVOIR DAM  
 PHOTOGRAPH LOCATION MAP



**Photograph 1**

**07/28/99**

Upstream slope of the auxiliary dam as seen from near the boat ramp on the left abutment.



**Photograph 2**

**07/28/99**

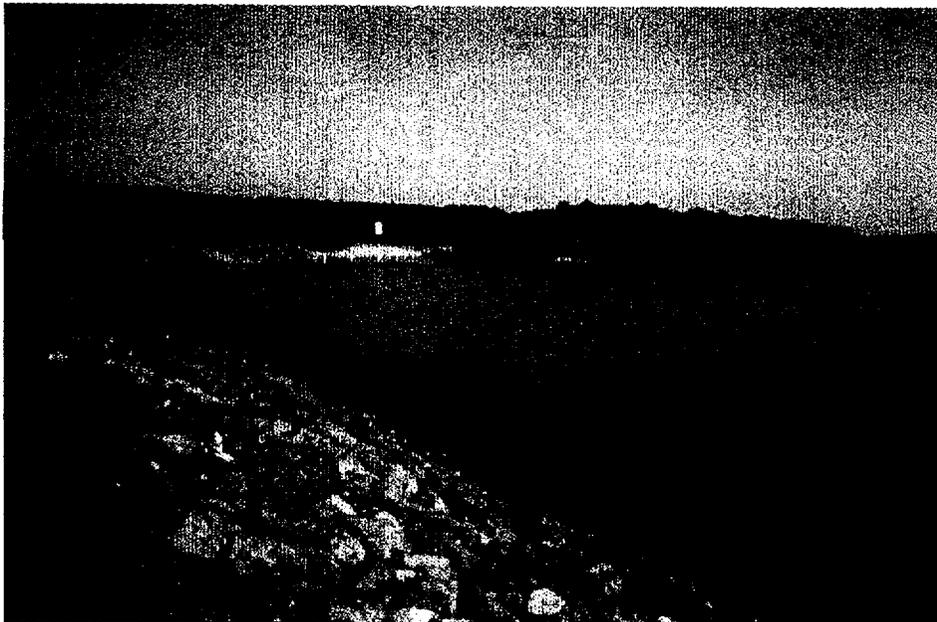
New drainage swale and grass downstream of the dam as seen from near the left abutment.



**Photograph 3**

**07/28/99**

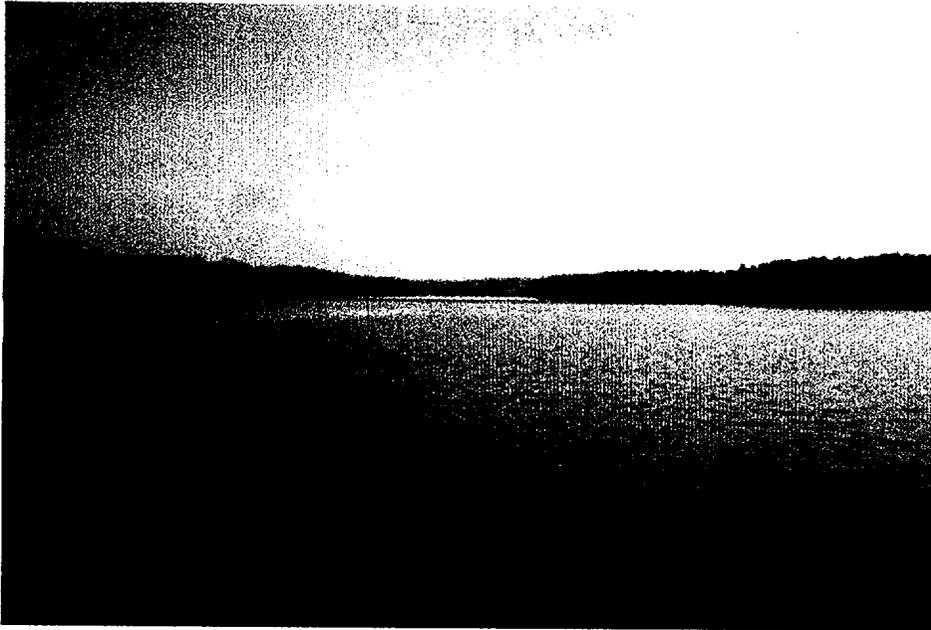
Barricades on top of the dam. The barricades protect monuments and piezometers.



**Photograph 4**

**07/28/99**

View of the upstream side of the dam looking toward the spillway and right abutment.



**Photograph 5**

**07/28/99**

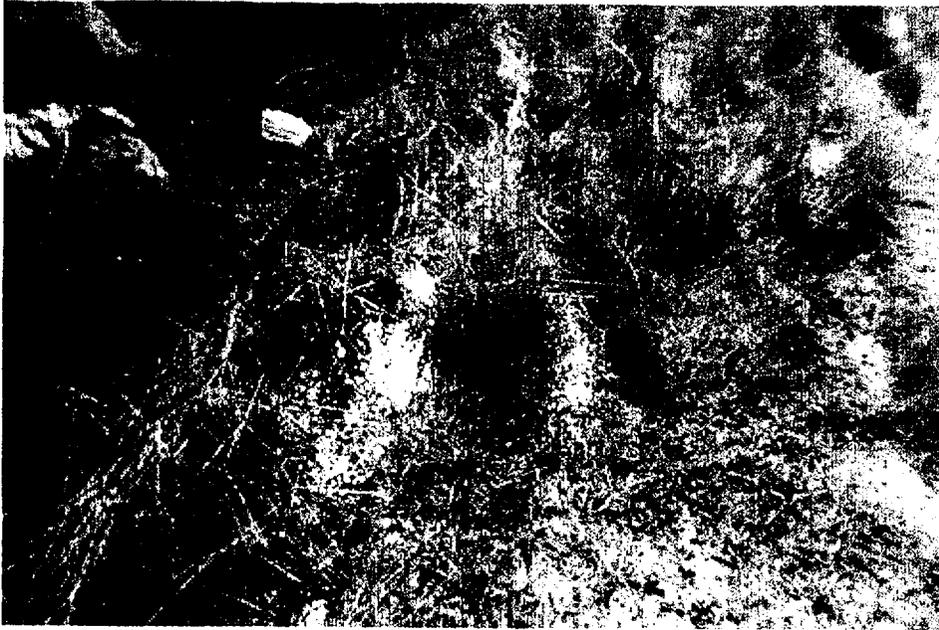
View of the auxiliary reservoir looking upstream from near the center of the dam.



**Photograph 6**

**07/28/99**

View of Harris Reservoir looking downstream from near the center of the auxiliary dam.



**Photograph 7**

**07/28/99**

Seepage area at the toe of the downstream slope near the right shore of Harris Reservoir.



**Photograph 8**

**07/28/99**

The area downstream of the embankment has been cleared, graded to drain, and grassed.



**Photograph 9**

**07/28/99**

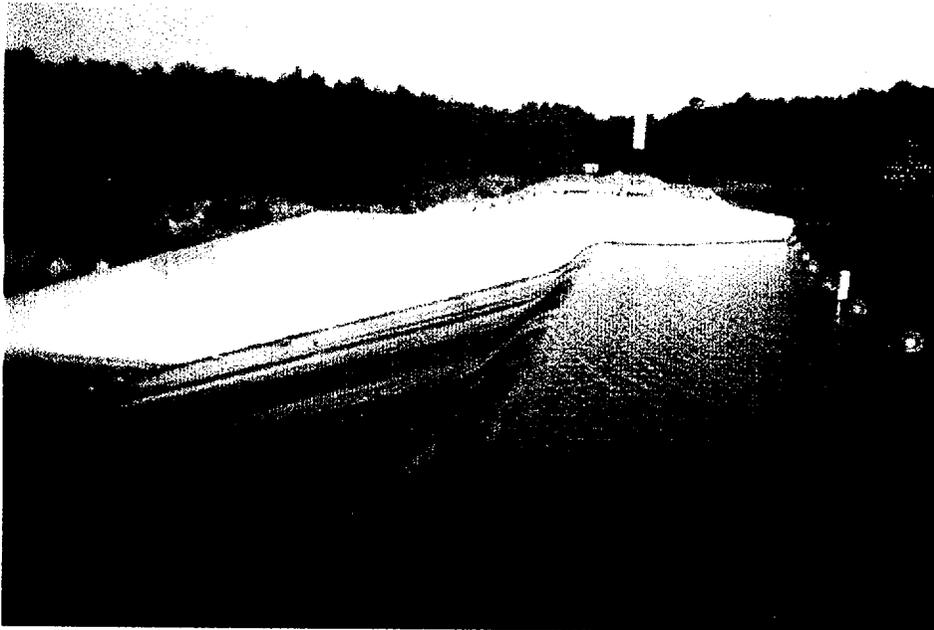
Previously eroded area near the left side of the spillway. The area has been repaired and protected with riprap.



**Photograph 10**

**07/28/99**

Embankment, left spillway training wall, and spillway channel.



**Photograph 11**

**07/28/99**

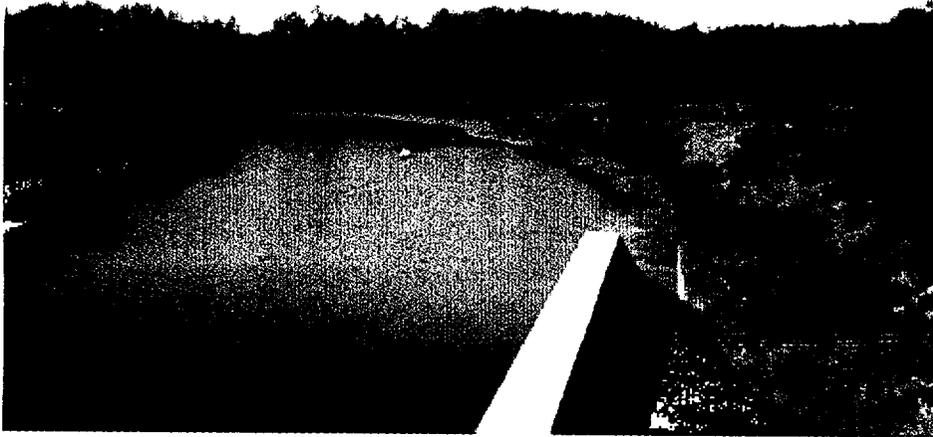
Spillway as seen from the left training wall.  
Note the boat barrier and warning sign.



**Photograph 12**

**07/28/99**

Spillway as seen from the right side. Note the  
guardrail above the crest on the far side.



**Photograph 13**

**07/28/99**

Spillway outlet channel as seen from the top of the dam.

Mr. James Scarola  
Carolina Power & Light Company

Shearon Harris Nuclear Power Plant  
Unit 1

cc:

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