

CESAS-EN
DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
P.O. BOX 889
SAVANNAH, GEORGIA 31402-0889

DISTRICT REGULATION
NO. 1130-2-5

27 Jan 04

Project Operations
DAM SAFETY MANAGEMENT POLICY

1. Purpose. This regulation defines the responsibility and establishes the procedures for the Savannah District Dam Safety Assurance Program.
2. Applicability. This regulation applies to all offices of Engineering Division (EN), Operations Division (OP), and the Emergency Management Division (EM) that have the responsibility for the safety, operation, and maintenance of the Corps dams within the Savannah District civil boundaries. Specific dams include the Hartwell Dam, Clemson Upper and Lower Diversion Dams, Richard B. Russell Dam, J. Strom Thurmond Dam, the New Savannah Bluff Lock and Dam, and the Savannah River Tide Gate Structure.
3. References.
 - a. DP 1130-2-16, Savannah River Emergency Action Plan, Volume I, December 1997, with Change 3, 10 August 2001.
 - b. EP 1110-2-13, Dam Safety Preparedness, 28 June 1996.
 - c. DR 385-1-1, Safety, General Policy, 12 June 1997.
 - d. ER 1110-2-100, Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures, 15 February 1995.
 - e. ER 1110-2-101, Reporting of Evidence of Distress of Civil Works Structures, 15 March 1996.
 - f. ER 1110-2-110, Instrumentation for Safety Evaluations of Civil Works Projects, 8 July 1985.
 - g. ER 1110-2-111, Periodic Safety Inspection and Continuing Evaluation of USACE Bridges, 31 August 2002.
 - h. Savannah River Basin Water Control Manual, 1996.
 - i. Duke Power Company Emergency Action Plans for Hydroelectric Stations, 31 December 2002.

This regulation supersedes DR 1130-2-5, 14 July 2000

4. Organization.

a. Dam Safety Officer. The Dam Safety Officer for the Savannah District is the Chief, Engineering Division. The duties of the Dam Safety Officer are as follows:

- (1) Overall review of the Dam Safety Assurance Program for federally owned dams.
- (2) Establish and chair the Dam Safety Panel.
- (3) Evaluate recommendations of the Dam Safety Panel and direct all necessary actions.
- (4) Ensure Savannah District project personnel receive dam safety training every 2 years.
- (5) As required or upon request, issue a report to the South Atlantic Division Dam Safety Officer.
- (6) Act on behalf of the Dam Safety Program Manager in his/her absence to convene panel meetings in the event of emergency conditions.

b. Dam Safety Panel.

- (1) The Dam Safety Panel Members are as follows:
 - (a) Chief, Engineering Division (EN) – Savannah District Dam Safety Officer
 - (b) Chief, Programs and Project Management Division (PM)
 - (c) Chief, Geotechnical and HTRW Branch (EN-G)
 - (d) Chief, Hydrology and Hydraulics Branch (EN-H)
 - (e) Chief, Design Branch (EN-D)
 - (f) Chief, Operations Division (OP)
 - (g) Chief, Hydropower Section (OP-SH)
 - (h) Chief, Natural Resource and Environmental Support Section (OP-SR)
 - (i) Natural Disaster Manager (EM)
 - (j) Security Officer (SL)
 - (k) Dam Safety Program Manager (EN-H)

(2) Dam Safety Panel Functions. The functions of the Dam Safety Panel are to meet every 6 months (April and October), or as necessary, to discuss the Dam Safety Assurance Program and make recommendations to the Dam Safety Officer. Topics will include, but will not be limited to reports, procedures, assignments, funding, and actions taken. Members of the Dam Safety Panel are responsible to the Dam Safety Officer for ensuring necessary input and actions from their respective element.

(3) Dam Safety Panel Meetings. The panel shall typically convene during the months of April and October. The Dam Safety Panel Members will be notified by e-mail) at least 30 calendar days in advance of the meeting date by the Dam Safety Program Manager. During these meetings, the panel will review and discuss reports submitted since the last panel meeting, funding, assignments, training, issues, concerns, and FY goals and accomplishments.

c. Dam Safety Program Manager. The Dam Safety Program Manager will be designated by the Chief, Engineering Division (Dam Safety Officer) and reside under EN-H. The responsibilities of this individual are as follows:

(1) Coordinate agenda and notify Dam Safety Panel Members of all periodic and special panel meetings.

(2) Prepare and distribute a memorandum for record for each dam safety panel meeting within 30 calendar days.

(3) Administer the Savannah District dam safety assurance program which is comprised of scheduling work items and managing the civil O&M funds provided for each Fiscal Year.

(4) Coordinate dam safety training courses with the Dam Safety Panel Members, project offices, and trainers.

(5) Schedule and coordinate all periodic dam inspections and reports with EN and OP elements.

(6) Act as the point of contact for the Dam Safety Panel for all documents relative to the Dam Safety Panel's area of concern including, but not limited to the following:

(a) Water Control Manual

(b) Project O&M Manuals

(c) Savannah River Emergency Action Plan

(d) Reservoir Filling Design Memoranda

(e) Periodic Inspection and Surveillance Reports

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(7) Maintain all dam safety files and Training Aids for Dam Safety (TADS) relative to the Dam Safety Assurance Program. The files and TADS will be kept in the Hydrology and Hydraulics Branch (EN-H). Anyone that wishes to obtain a file should contact the Dam Safety Program Manager in EN-H at extension 5783.

(8) Perform other related duties as requested by the Dam Safety Officer and Dam Safety Panel Members.

(9) Prepare memorandums for the Savannah District Dam Safety Officer for issuance to the South Atlantic Division Dam Safety Officer (or Program Manager) as required or requested.

(10) Prepare and present the Savannah District Dam Safety Assurance Program annual report to South Atlantic Division.

(11) Advise the Dam Safety Officer of any impediments to the execution of the Dam Safety Assurance Program or problems with implementation of the Dam Safety Panel recommendations and decisions.

d. Dam Safety Management Responsibility.

(1) Engineering Division in coordination with Operations Division is responsible for scheduling training to be conducted at project sites every 2 years and more frequently if warranted. Engineering Division is responsible for establishing the dam safety training program for Savannah District personnel in accordance with Chapter 7 of EP 1110-2-13 (ref. 3.b.).

(2) Engineering Division in coordination with Operations Division will be responsible for developing and updating the Savannah River Emergency Action Plan.

(3) Operations Division personnel at each project will be responsible for routine inspection of Corps dams in accordance with the project Operations and Maintenance Manual.

(4) Engineering Division with assistance from Operations Division will be responsible for "periodic inspection and continuing evaluation of completed civil works structures" (see ER 1110-2-100, paragraph 7, and ER 1110-2-110). The inspections and preparation of reports will be scheduled and coordinated by the Dam Safety Program Manager.

(5) Emergency Management Division is responsible for coordination with state and local officials in the development of evacuation plans for Corps dams within the Savannah District. Engineering Division is responsible for the development and updating of the dam failure inundation maps to be used in developing the evacuation plans. The actual development of an evacuation plan is the responsibility of state and local officials. Emergency Management Division should identify and contact appropriate state and/or local officials and suggest that

evacuation plans be developed as part of the overall Dam Safety Assurance Program in accordance with the latest guidelines.

5. Operational Training and Emergency Action Plan Exercise.

a. Operational Training. Dam safety training workshops will be held for the Hartwell, Richard B. Russell, and J. Strom Thurmond Dam personnel every 2 years. Workshops should be conducted during the month of September and alternate among the sites every other training session. The purpose of these workshops is to instruct and familiarize Savannah District project and office personnel in dam safety. Instruction will be in accordance with Chapter 7 of EP 1110-2-13.

b. Emergency Action Plan Exercise. Operational emergency action plan exercises for emergency situations will be conducted periodically and developed in accordance with paragraph 6-5. of EP 1110-2-13. Typically, real time emergency exercises will be conducted every 2 years in the month of June.

6. Inspections and Reports.

a. Inspections.

(1) Normal Conditions: Project natural resource management personnel will make formal monthly inspections of the earth embankments of each dam to assure the safety of the project and downstream occupants. Project power plant personnel will make formal monthly inspections of the power plant and concrete dam at each project to assure the safety of the project and operating reliability. A trained inspector, an individual who has attended a formal training workshop that is conducted every 2 years, will look specifically for deficiencies and signs of distress. A record of each inspection will be made indicating the date of inspection, the inspector's name, the abnormal or changed conditions relating to the vital area, and the name of the person to whom a report was made regarding such conditions. The record shall also contain any other pertinent information about such conditions, including any remedial measures and other actions taken. Inspection criteria, including structure and embankment instrumentation data, shall be developed by EN personnel for these inspections and will be discussed with and distributed to the appropriate project personnel. The inspection criteria will be reviewed during each formal training workshop. The method and extent of internal notification of completed inspections shall be included in the Savannah River Emergency Action Plan.

(2) Abnormal Conditions: Where abnormal or changed conditions have been detected (wet spots, seepage boils, settlement, sloughs, subsidence, etc.) and have been reported either in writing or by telephone to the Soils Section (EN-GS), the Soils Section will recommend more frequent inspections or other actions to be taken. Meanwhile, inspections of the earth embankments shall be made daily by the project natural resource management personnel. A soils engineer of the Soils Section shall inspect such areas within a week of being reported, or immediately if conditions warrant. Upon completion of the inspection, the Soils Section shall

notify the Dam Safety Program Manager of these inspections and their conclusions. If deemed appropriate, the Dam Safety Program Manager will convene a Dam Safety Panel meeting in order to inform the members of findings.

b. Reports. The following paragraphs outline procedures and responsibilities for preparation of reports relating to dam safety.

(1) Earth Embankments. The Chief, Soils Section, shall be furnished the data collected on earth dams as shown in Appendix A, Routine Inspections. The Soils Section will be responsible for interpreting, evaluating, and reporting the furnished data in accordance with paragraphs 9 and 10 of ER 1110-2-110. A soils engineer of the Soils Section will accompany the project natural resource management inspection personnel annually on full inspections of the earth embankments of Hartwell Dam, Clemson Upper and Lower Diversion Dams, Richard B. Russell Dam, and J. Strom Thurmond Dam. A soils engineer of the Soils Section will accompany the Engineers Depot Maintenance Mechanic Supervisor on periodic 2-year inspections of the earth embankments of the Savannah River Tide Gate Structure. These inspections should be scheduled during the winter or early spring to take advantage of minimal vegetation. Forms of the Earth Embankment Report shall be used, i.e. 1) Earth Embankment Visual Inspection Checklist, SAS Form 1161, May 1986; and/or 2) Earth Embankment Visual Inspection Specific Area Comments, SAS Form 1161a, May 1986. Other earth embankment inspection forms should no longer be used.

(2) Concrete Dams. The Lead Structural Engineer (EN-DAS/S) will receive completed reports on concrete dam structures as shown in Appendix A, Routine Inspections. The format for concrete structure reports will be 1) Hartwell Concrete Dam Safety Program Checklist, SAS Form 15, April 1982; and 2) Clarks Hill (J. Strom Thurmond) Concrete Dam Safety Program Checklist, SAS Form 15a, April 1982. These checklists are available from the Records Management Administrator (IM-P). There is no formal checklist for Richard B. Russell Dam, but the SAS Forms 15 or 15a can be used as guides for Russell reports. The Power Project Manager will forward all completed forms to the requesting office.

(3) Data Requests and Reports.

(a) Initiating Requests for Data. Request for data on earth embankments will be initiated by the Chief, Soils Section, to the Operations Project Manager or his/her designated representative at each project. Request for data on the concrete dams will be initiated by the Lead Structural Engineer to the Power Project Manager or his/her designated representative at each project. Request for data on seismic instrumentation will be initiated by the Chief, Geology and Hydrogeology Section (EN-GG), to the Operations Project Manager or his/her designated representative at each project.

(b) Data Collection and Submission. The requested data will be collected and assembled by appropriate personnel at each project, and furnished directly to the requesting office or entered into the web-based database that has been developed for direct input by project personnel.

Structural and earth embankment instrumentation data schedules for data received monthly will be forwarded to the projects.

(c) Data Review and Report Writing. The review of data and any report writing will be accomplished by the requesting office. A copy of reports on normal conditions will be forwarded to the Dam Safety Program Manager in EN-H with a copy to the Operations Project Manager. A copy of reports on abnormal conditions will be forwarded immediately to the Dam Safety Program Manager with a copy to the Operations Project Manager. The Dam Safety Program Manager will convene the Dam Safety Panel if conditions warrant.

(d) Inspection Reports. The Dam Safety Program Manager will forward all intermediate inspection reports (i.e. trip reports) to the Dam Safety Panel Members and to other elements as deemed necessary.

c. Seismic Reports. The Geology and Hydrogeology Section (EN-GG) will prepare seismic reports as shown in Appendix A, Routine Inspections.

7. Emergency Action Plan. The preparation of the Savannah River Emergency Action Plan (EAP) for Hartwell Dam, Richard B. Russell Dam, and J. Strom Thurmond Dam shall be the responsibility of Engineering Division assisted by Operations Division. Copies of the EAP will be retained at both district and project offices. The EAP shall include the following information:

a. Emergency Notification Procedure. Supplementing ER 1110-2-101, written procedures for local reporting and notification of abnormal conditions are contained in the EAP. These procedures will provide for the safety of people in the vicinity of the dam and for remedial assistance to the dam. Notification and reporting procedures as identified in the EAP shall be reviewed in January and June of each year with federal, state, and local agencies; and with upstream and downstream non-federal dam operators at the field level. The Emergency Notification Procedure shall be updated as required. The Dam Safety Program Manager is to coordinate this review and updating.

b. A descriptive list of conditions leading to emergency situations and guidelines for remedial measures.

c. Reservoir dewatering procedures.

d. Dam failure inundation maps. (Volume III of the EAP.)

e. Listings of suppliers, contractors, locations, types and quantities of emergency repair materials and equipment. The listings (Appendix F of EAP) shall be reviewed by June of each year by the Operations Project Manager of each project and updated as appropriate and forwarded to the Dam Safety Program Manager in EN-H.

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f. Details outlining responsibilities for inspection and execution of emergency repairs.

8. Technical Reference Material.

a. The Savannah River Emergency Action Plan, DP 1130-2-16, pertinent technical information and copies of the latest periodic inspection report prepared under ER 1110-2-100 will be kept at the project for ready reference. In addition, the following will be supplemental to the engineering data now required to be kept at the project site by Appendix A of ER 1110-2-100:

- (1) The Savannah River Basin Water Control Manual.
- (2) Emergency Operations Instructions.
- (3) ER 1110-2-100 with Division and/or District Supplements thereto.
- (4) List of completed contracts for repair or replacement of dam features.

(5) A narrative summary of the critical features of each dam shall be prepared (as part of the EAP) to include design features with safety limits, the more probable failure modes that could lead to structure failure, and a history of problems and how they adversely affect the structure under stress.

b. Operations Division in coordination with Engineering Division will be responsible for maintaining the above referenced material in a current and effective condition.

9. District Point of Contact. Donald Smith, Dam Safety Program Manager, (912) 652-5783.

3 Appendices
Appendix A – Routine Inspections
Appendix B – Special Inspections
Appendix C – Alignment Surveys

/s/
ROGER A. GERBER
Colonel, EN
Commanding

DISTRIBUTION A
Plus
EN-H (10)
EM (5)
IM-P (1)
OP (10)

APPENDIX A
ROUTINE INSPECTIONS

Report Activity/Form	Office	Name of Dam	Frequency*/Remarks (Months)
<u>Earth Embankments:</u> EN-GS			
Embankment Surfaces/ SAS Form 1161		Hartwell	1/GA & SC Embk
SAS Form 1161a		Clemson	1/Diversion Dam
		Richard B. Russell	1/GA & SC Embk
		J. Strom Thurmond	1/GA & SC Embk
		Tide Gate Structure	24/GA & SC Embk
<u>Piezometer Readings**/No Form</u>			
		Hartwell	3
		Clemson	3
		Richard B. Russell	3
		J. Strom Thurmond	3
<u>Inclinometers/No Form</u>			
		Richard B. Russell	12
<u>Seismic:</u> EN-GG			
<u>Seismic Reports/No form</u>			
		Hartwell	6
		Richard B. Russell	6
		J. Strom Thurmond	6
<u>Concrete Structures:</u> EN-DAS/S			
<u>Crack Strain Gage/</u>			
SAS Form 1188		Hartwell	1
SAS Form 1186a		Richard B. Russell	2
SAS Form 1189		J. Strom Thurmond	1
No Form		New Savannah Lock & Dam	1

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Report Activity/Form	Office	Name of Dam	Frequency*/Remarks (Months)
Uplift Cell/ SAS Form 1187	EN-DAS/S	Hartwell	1
SAS Form 1184		Richard B. Russell	1
No Form		J. Strom Thurmond	1
Interior Drainage/ SAS Form 1183		Hartwell	1
No Form		Richard B. Russell	1
SAS Form 1182		J. Strom Thurmond	1
Plumb Bob/ No Form		Hartwell	1
No Form		Richard B. Russell	1
SAS Form 1185		J. Strom Thurmond	1
Slope Indicators/ No Form		Richard B. Russell	6
Foundation Drains – Flow & Depth/ SAS Form 1181		Hartwell	60
		Richard B. Russell	60
		J. Strom Thurmond	60

Any irregular activities noted by field personnel in the concrete structure will be inspected immediately by a structural engineer and the Dam Safety Program Manager, and in-turn, the Dam Safety Panel will be notified of these inspections and their conclusions.

* Any changes to this frequency must be approved by the Dam Safety Panel.

** An additional reading should be taken any time a pool elevation exceeds an elevation higher than previously recorded.

APPENDIX B
 SPECIAL INSPECTIONS

Report Activity/Form	Office	Name of Dam	Frequency*/Remarks Months)
Micrometer Target Ratios & Vehicle Levels**/ No Form	EN-DAS/S	Hartwell	60 Top of Dam
		Richard B. Russell	30 Top of Dam
		J. Strom Thurmond	30 Top of Dam
		New Savh Bluff Lock & Dam	30 Dam Pier
Trilateration**/ No Form		Hartwell	60
		Richard B. Russell	30
		J. Strom Thurmond	30
		New Savh Bluff Lock & Dam	30

Any irregular activities noted by field personnel in the concrete structure will be inspected immediately by a structural engineer and the Dam Safety Program Manager, and in-turn, the Dam Safety Panel will be notified of these inspections and their conclusions.

* Any changes to this frequency must be approved by the Dam Safety Panel.

** These inspections must be requested by the Lead Structural Engineer, EN-DAS/S.

APPENDIX C
 ALIGNMENT SURVEYS

Report Activity/Form	Office	Name of Dam	Frequency*/Remarks (Months)
Alignment Survey	EN-DAS/S	Hartwell	48 Concrete Dam
		Richard B. Russell	48 Concrete Dam
		J. Strom Thurmond	48 Concrete Dam
		New Sav. Bluff Lock & Dam	48 Concrete Dam & Lock

Any irregular activities noted by field personnel in the concrete structure will be inspected immediately by a structural engineer and the Dam Safety Program Manager, and in-turn, the Dam Safety Panel will be notified of these inspections and their conclusions.

* Any changes to this frequency must be approved by the Dam Safety Panel.