Part 504 – Special Investigations, Studies, and Reports

Subpart B – Emergency Spillway Performance

504.10 General

A. Thousands of auxiliary spillways have been installed since 1954, when NRCS began using the present procedure for design. More are installed each year. Major spillway flows can be expected at several structures each year.

B. Current auxiliary spillway criteria is outlined in Title 210, National Engineering Handbook (NEH), Part 628, "Dams," and is based on judgment and experience gained over the years. However, most research and field evaluations to date have been on structures with drainage areas of less than 10 square miles. Further research is needed, but laboratory model studies are not always directly applicable and large field models or prototype studies are only now being undertaken. An alternative is to make field studies of the operation of existing structures.

C. The purpose of auxiliary spillway performance and overtopping analyses studies is to carry out a continuing program to provide information that will be helpful in confirming or improving existing design criteria, give an indication of the upper limits of applicability of various types of spillways and earthen embankments, and show the extent and cost of spillway and embankment maintenance required after flood flows.

504.11 Scope

A study must be made of any earth, rock (except massive, unweathered rock), or vegetated spillway built since 1954 if it is determined that the information from an auxiliary spillway, overtopping flow, or both would help with continued Agricultural Research Service research and development of the models used by NRCS. The need for a study will be made on a case-by-case basis by contacting the Director, Conservation Engineering Division (CED), if any of the following conditions occurred:

(1) The water surface in the reservoir has reached an elevation above the crest of the auxiliary spillway of 3 feet or more.
(2) The auxiliary spillway has suffered severe damage, has approached breaching, or has breached to any degree.
(3) The auxiliary spillway has sustained continuous discharge for 7 days or more.
(4) Flow resulted in overtopping of the embankment.

504.12 Reporting Major Flows

If conditions require a study (see section 504.11 of this subpart), the Director, CED, must be notified. This notification may be sent by email and must include the watershed names; site names, site numbers, or both; and preliminary flow data. Notification must be made as soon as possible in order to aid in data collection efforts if further investigation is required.

504.13 Assignments

The Director, CED, determines the need to develop performance studies on a case-by-case basis. If it is determined that a study is needed, it is to be made by qualified engineers. The Director, CED, will coordinate with the State conservation engineer (SCE) to formulate members of the evaluation team. Hydrologists, hydraulic engineers, and geologists are needed in various parts of the evaluation.

504.14 Procedures

If an auxiliary spillway study, overtopping study, or both are needed, the performance study should be made as soon after the occurrence as practical. The study and the report must consider and document the—

(1) Name of the watershed.
(2) Name or number of the structure and inventory number
(3) Location (State and latitude and longitude to nearest degree and minute).
(4) Date built.
(5) Drainage area in square miles.
(6) Height of dam.
(7) Plan and profile along the auxiliary spillway centerline from entrance to streambed.
(8) Cross sections at control section and at selected points in the exit channel showing the depth and width of the constructed spillway.
(9) Profiles along the embankment top, starting from the upstream side of the top and across the embankment back slope at intervals that show the erosion that occurred, and embankment cross sections at selected locations that show the length of back slope at different intersection points along the profile.
(10) Geologic map and profiles of the embankment, the auxiliary spillway control section and the exit channel, or both.
(11) Statement regarding the condition of the embankment, the auxiliary spillway, or both before the flood event, including the density and type of vegetation.
(12) A copy of the last maintenance and inspection report before the storm.
(13) Photographs, if available, of prestorm conditions.
(14) Date of flood.
(15) Rainfall depths for various durations according to either official rain gages or a "bucket survey," and the related frequency for each duration.
(16) Runoff; if a stream gage is available, U.S. Geological Survey provisional data should be included.
(17) Observed or reconstructed inflow and outflow hydrographs at the structure, including maximum reservoir stage and duration of overtopping, auxiliary spillway flow, or both.
(18) Physical factors of drainage area related to a weighted "curve number," including antecedent moisture and vegetative cover conditions immediately preceding the storm.
(19) Description of the damage on the embankment, in the auxiliary spillway, or both, including location, depth, and severity of erosion.
(20) Photographs of poststorm conditions in the spillway and downstream.
(21) Estimate of volume of soil and rock eroded from various sections of the spillway.
(22) An estimate of the cost to repair the spillway.
(23) Any other pertinent information.

504.15 Report

A. A separate spillway flow report is required for every flood event meeting the conditions in section 504.11 of this subpart. If a storm event affects many structures over a wide area, a reconnaissance may be made to determine the need for making a field study on every structure. If this situation occurs, the SCE must advise the Director, CED, and reach agreement on the studies needed. An auxiliary spillway performance study does not alter circumstances under which a problem or deficiency study may be required.

B. A report must be prepared for each site, except as provided in the preceding paragraph. A copy of each report must be submitted to the Director, CED. After the report has been approved and

accepted, a copy is submitted to the State Conservationist, the State agency responsible for dam safety, and to the owner or sponsor of the structure.

504.16 Review and Approval

A. The SCE must approve the report before it is sent to the Director, CED.

B. The Director, CED, notifies the State Conservationist of acceptance of the report or of additional data required.