

DAM SAFETY
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ISSUE DEFINITION

There are over 49,000 public and private dams in the United States which provide numerous benefits such as flood protection, water supply storage, and recreation. 89% of these are non-Federal, while the remainder are Federal. Many are old and sometimes in a state of disrepair and, if not periodically inspected and maintained, pose a considerable threat to human life and property. In fact, 40% of the Nation's dams represent a hazard potential to either life or property, according to a Corps of Engineers report.

Dam failures or near failures in the early 1970s caused about 355 deaths and extensive property damage. This situation was the catalyst for the passage of the 1972 National Dam Safety Inspection Act (P.L. 92-367). The Act set four principal goals:

- (1) inspect most of the dams in the Nation,
- (2) inventory all dams conforming to the size criteria specified by the law,
- (3) report inspection results to State Governors, and
- (4) recommend to the Congress a comprehensive national program for dam safety.

The chief goal of the Act — implementation of an inspection program — was not undertaken until 1978. The two previous Administrations did not request funds for it and the Congress did not fund the program on its own initiative.

The most recent dam failures are: the Kelly Barnes Dam failure near Toccoa Falls, Georgia, in November 1977; the collapse of the Teton Dam in Idaho in 1976; and the collapse of the Water Bouldin Dam in Alabama in 1975. In his April 1977 environmental message, President Carter asked for the coordination and implementation of an effective dam safety program. In December 1977, in the aftermath of the Toccoa disaster, the President instructed Federal officials to start inspecting high hazard dams and to encourage States to assume responsibility for the safety of private dams within their borders.

The principal question in the implementation of a national dam safety program is whether the Federal Government or the States should have primary responsibility for inspections. Associated issues are liability in the event of dam failure and whether the States have the technical and financial capability to implement an effective dam safety program. Finally, given the limited availability of financial and manpower resources, how should priorities for inspecting dams be set?

In the 95th Congress, two laws were enacted which affected dam safety: P.L. 95-96 included \$15 million for FY78 for the Corps of Engineers to begin a dam safety inspection program; P.L. 95-578 authorized the Secretary of the Interior to modify Bureau of Reclamation dams in order to preserve structural safety. This latter law, however, did not authorize the modification for safety reasons of Corps of Engineers or privately owned dams.

BACKGROUND AND POLICY ANALYSIS

In the early 1970s several events prompted the passage of legislation aimed at establishing a national dam safety program. a 1972 flood near Rapid City, South Dakota, caused the failure of the Canyon Lake Dam, resulting in 230 deaths and \$100 million in property damage. Failure of an unengineered coal waste dam in the Buffalo Creek Valley of West Virginia in 1972 resulted in 125 deaths, \$50 million in property damage, and 4,000 people left homeless. A large number of dams in the Northeastern United States were threatened by Hurricane Agnes in 1972. The near failure of the Lower van Norman Dam in California in 1971 threatened 80,000 people.

THE NATIONAL DAM SAFETY ACT

Following hearings during the spring and summer of 1972 and in response to the 355 dam failure-related deaths that year, Congress enacted the National Dam Safety Inspection Act (P.L. 92-367), which was signed into law on Aug. 8, 1972.

The principal purpose of the National Dam Safety Inspection Act was to implement a dam inspection program to be conducted by the Federal Government. Under the law, the Secretary of the Army, acting through the Corps of Engineers, was directed to inspect all dams except:

- (1) dams under the jurisdiction of the Bureau of Reclamation, the Tennessee Valley Authority, and the International Boundary and Water Commission;
- (2) dams constructed pursuant to licenses issued under the authority of the Federal Power Act;
- (3) dams inspected by a State agency within the 12-month period immediately preceding the enactment of the law and for which the Governor of the respective State requested exclusion; and
- (4) dams determined by the Secretary of the Army not to pose any threat to human life and property.

The law further required the Secretary to report to the Congress by July 1974 on his activities under the law. The report was to include:

- (1) an inventory of all dams located in the United States;
- (2) a review of each dam inspection made;
- (3) recommendations for a comprehensive national program for the inspection and regulation of dams for safety purposes, indicating the respective responsibilities that should be assumed by the Federal, State, and local governments, and by public and private interests.

In addition, the Secretary was directed to report inspection results for each State to the Governor.

The law defined the term "dam" to mean any structure that impounds or diverts water, that is 25 or more feet high or has an impounding capacity of 50 or more acre-feet. The law specifically excludes any barrier that is six or less feet high or has an impounding capacity of less than 15 acre-feet.

Progress in Implementing the Act

While considerable progress has been made in fulfilling the dam inventory requirement of P.L. 92-367, progress has been much slower in inspecting the Nation's dams. The Act required the reporting of these activities to Congress. In July of 1974 the Secretary of the Army submitted a letter to the Congress advising of the progress in fulfilling the requirements of the National Dam Safety Inspection Act. The completed inspection report, together with proposed legislation, was transmitted to Congress in April and November of 1976 and referred to the House Committee on Public Works and the Senate Committee on the Environment and Public Works. It reviewed progress toward two principal goals of the Act -- dam inventory and dam inspections.

Dam Inventory. A national dam inventory was completed and was included in the Corps' report to Congress. The report revealed that, of the 49,326 dams inventoried, 89% were non-Federal dams and 11% were Federal dams or on Federal lands and therefore subject to some Federal regulation. The downstream hazard potential, which indicates the potential for loss of life or property resulting from failure of the dam or mis-operation of the facility, was recorded for 76% of the dams inventoried. No hazard potential information was available for the remaining 24% of the dams inventoried. Of the 76% of the dams with a recorded hazard potential, 11% had a high hazard potential, 15% a significant hazard potential, and 50% a low hazard potential. The report further indicated that only 18% of the dams inventoried had been inspected under existing Federal or State authority. President Carter announced in December 1977 that the Federal government would update the National Dam Inventory.

An important question resulting from that inventory is whether all the dams need to be inspected. In a May 1975 report to the Secretary of the Army, the Corps recommended that inspections should be accomplished by Federal agencies and States for an estimated 40%, or approximately 20,000, dams from the inventory representing a high or significant hazard potential. This figure is derived from adding to the dams which have a recorded high or significant hazard potential an estimate of the number of high and significant hazard potential dams from those with no available hazard potential information. In December 1977, the President directed the Secretary of the Army to commence at once the inspection of more than 9,000 non-Federal dams that present a high potential for loss of life and property.

Dam Inspection. Until 1978, no progress has been made in inspecting as required by the Act, in part because of controversy as to whether the Federal Government or the States should be responsible for dam inspection.

In his July 1974 letter to Congress, the Secretary of the Army indicated that States should be encouraged to conduct an adequate dam safety inspection program, and that the Corps of Engineers, upon request, would assist any State in establishing or strengthening a dam inspection program. The Corps' proposed guidelines for the national inspection program were promulgated in

the "Federal Register" on Aug. 28, 1974. According to a GAO report, the Corps of Engineers has originally intended to undertake a sample dam inspection program, and in December of 1972 the Undersecretary of the Army requested \$5 million to initiate such a program. This request was rejected by the Office of Management and Budget (OMB), which issued a policy in January of 1973 stating:

- (1) Inspections were to be accomplished by the States.
- (2) The Corps would develop inspection guidelines to be included in the national program.
- (3) Upon request the Army Department would provide to State governors advice for correcting or eliminating any hazardous conditions found by the States.

The November 1976 Corps report to Congress emphasized that the responsibility for dam safety should rest with dam owners: Federal agencies should be responsible for the inspection of dams within their jurisdiction, while the States should be responsible for non-Federal dams within their jurisdiction. Although the report included a Model Law for State Supervision of Dams and recommended guidelines for safety inspection of dams, no significant financial incentives to encourage States to provide effective dam safety programs for non-Federal dams were recommended.

The White House released a statement on Apr. 23, 1977, emphasizing the Carter Administration's commitment to an effective dam safety program. Citing the Teton Dam collapse as evidence of the need for an effective dam safety program, President Carter stated his commitment to upgrading the Nation's Federal dam safety and inspection program and working with Congress to develop legislation to ensure that every State has an adequate dam safety program for both existing and proposed dams. The November 1977 report "Improving Federal Dam Safety," prepared by the Federal Coordinating Council for Engineering and Technology as required by the President's April statement, contained recommendations which were the basis for his initial program.

In December 1977, following the Toccoa disaster, President Carter announced a Federal program to stimulate the development of State-level dam safety inspection programs. The Federal Government will commence initial inspections of 9,000 non-Federal high risk dams and the Secretaries of Interior and Agriculture will cooperate with the Secretary of the Army in developing technical criteria and guidelines for inspections and in assisting the States. Instead of substituting Federal dam safety responsibility for State-level responsibility, the Administration intends to use this program "to establish a partnership with the States in developing State programs." The Federal program will be accomplished in four years, will involve no assumption of Federal liability, and will be limited to initial inspections only.

In its 1979 report of the first year of non-Federal dam inspections, the Corps of Engineers claimed a "serious national problem with safety of non-Federal dams." The report found that of 1793 non-Federal dams inspected 345 were unsafe. 26 of these unsafe dams were designated as emergency cases that required immediate corrective action. 25 of these dams were breached and partially or completely drained to eliminate the potential for immediate failure of the structure.

The White House also requested an independent review of the safety of Federal dams. An independent review panel in the Office of Science Technology and Policy completed the Federal Dam Safety Report of the OSTP Independent Review Panel in December 1978. The report stated that all agencies should make a "clear assignment of the dam safety responsibility to a specific individual or group..." and recommended the creation of a Federal Dam Safety Office.

Funding. Insufficient funding has undermined some of the goals of the National Dam Safety Inspection Act. Although some money was requested and appropriated for some provisions of the Act (such as the dam inventory, preparation of the report to Congress, and draft legislation), no funds were requested for dam inspections by the two previous Administrations. A report issued by the General Accounting Office in June 1977 stated that a request for \$5 million by the Corps of Engineers in December 1972 to begin inspections mandated by the Congress was rejected by OMB. In August 1977 the Congress enacted appropriations legislation (Public Works for Water and Power Development and Energy Research Appropriation—P.L. 95-96), which included \$15 million for FY78 for the Corps of Engineers to begin a Dam Safety Program.

An issue raised is whether the financial and manpower capability is available to implement an effective dam safety program. On the basis of a questionnaire sent to the States and territories, the Corps concluded that 11 States and territories are without a dam safety program, and that many States with existing programs have inadequate statutes and/or staffs. Testifying at the hearings before the House in March and June of 1977, Dr. Bruce Tschantz, Professor at the University of Tennessee and noted dam expert, claimed that University of Tennessee State surveys combined with data generated by the Corps questionnaire reveal that the States are unanimous in their desire to be responsible for administering their own dam safety and inspection programs. He reported that while at least eight States have adequate funding and qualified manpower to enforce existing laws and regulations, half of all the States have little or no effective control over about one-third of the Nation's dams. Two-thirds of the States expressed a strong need for financial and/or other forms of assistance to support an adequate dam safety program. In its 1979 report of the first year of the inspection program for non-Federal dams, the Corps of Engineers stated that 40 of the 53 States and territories have effective dam safety legislation, but only 20 have the capability to administer their own dam safety programs.

An associated issue of the current inspection program is the liability in the event of dam failure. The National Dam Inspection Act places liability on the owner or operator of the dam, and relieves the Federal government of such liability. The President's December announcement reiterates the liability concept contained in the Act:

...the Federal inspection program does not create any liability in the United States for actions associated with these operations and does not relieve an owner or operator of a dam of the legal duties, obligations, or liabilities to the ownership or operation of the dam.

Because of the technical manpower requirements, it is unlikely that the Federal government and States will have sufficient qualified personnel to conduct initial or subsequent inspections in an efficient and timely manner,

and therefore it will be necessary for private sector consultants to participate in the inspection program. Representatives of the consulting firms testifying at the Feb. 3, 1978, hearings before the Senate Committee on Public Works sought to minimize the liability of the private sector. A representative of the American Society of Civil Engineers stated "All private engineering organizations carry normal insurance for errors and omissions...I know of none that can accept the risks of the potential liability of a catastrophic occurrence after an evaluation of a structure. The basic liability must rest with the owner." The American Consulting Engineers Council maintained that the liability of an independent engineer should be no greater than the liability of a Federal or State employee who performs the same service.

In December 1977, the Administration announced the beginning of the four-year program: 1800 non-Federal dams would be inspected the first year, and 7200 additional non-Federal dams would be inspected over the next three years. In its report of the first year of the inspection program, released in early 1979, the Corps of Engineers estimated the total cost of the program to be \$100 million. \$18 million was allocated for the program in FY78, and \$25 million in FY79.

ACTIVITIES OF THE 95TH CONGRESS

In the 95th Congress, one authorization enactment and two appropriations enactments affected the nation's dam safety. P.L. 95-578 authorized \$100 million for use by the Secretary of the Interior in the rehabilitation and repair of unsafe Bureau of Reclamation dams. P.L. 95-482, the FY79 Energy and Water Appropriation Act, included \$3 million for the rehabilitation and repair of five Bureau of Reclamation dams and \$1 million to conduct safety inspections of other Bureau dams. P.L. 95-96 included \$15 million for the Corps of Engineers to begin a dam safety inspection program.

The 95th Congress did not produce any enactments authorizing rehabilitation and repair of Corps of Engineers or privately owned dams, an incentive program to induce active participation of the States in the National dam safety program, and resolution of the liability and insurance issues associated with dam safety inspections. These are fertile areas for legislation in the 96th Congress.

ACTIVITIES OF THE 96TH CONGRESS

The principal Senate bill for dam safety reform in the 96th Congress is S. 540, which proposes to amend P.L. 92-367 to provide Federal assistance to the States for the development and implementation of effective dam safety programs. The Corps of Engineers would be authorized to distribute among the States \$15 million in each of the fiscal years 1980, 1981, and 1982. Part of the money would be distributed equally, the other portion on the basis of the number of dams in each State. Grants would be limited to 50% of a State's program costs. A Dam Safety Review Board would be established by S. 540 and S. 703 to review the existing Federal dam safety procedures as well as the implementation and effectiveness of approved State dam safety programs. S. 540 and S. 703 would assure the availability of dam liability insurance or authorizing the Federal government to provide insurance companies with reinsurance or guarantees on any dam liability insurance in States that have an approved program. S. 540 and S. 703 both provide \$2 million over three years for the training of dam safety inspectors and \$3 million over three

years for research. S. 703 contains a provision to facilitate on-site inspections for the Corps of Engineers. H.R. 4788, as adopted by the House, contains an amendment requiring States to have dam safety programs before carrying out the restoration of non-Federal dams in hazardous condition.

LEGISLATION

H.R. 2354 (Shuster)

Amends P.L. 92-367 to provide Federal assistance to the states for the development and implementation of effective dam safety programs. Introduced Feb. 22, 1979; referred to Committee on Public Works and Transportation.

H.R. 4788 (Roberts et al.)

The water resources projects authorization bill, as passed by the House Feb. 5, 1980, contains an amendment which requires States to have dam safety programs before carrying out the restoration of non-Federal dams in hazardous condition.

S. 540 (McClure)

Amends P.L. 92-367 to provide federal assistance to the states for the development and implementation of effective dam safety programs. Establishes a Federal Dam Safety Review Board. Introduced Mar. 5, 1979; referred to Committee on Environment and Public Works,

S. 703 (Gravel et al.)

Amends P.L. 92-367 in same manner as S. 540, and additionally contains provisions to facilitate for Corps of Engineers on-site inspections. Introduced Mar. 21, 1979; referred to Committee on Environment and Public Works.

HEARINGS

U.S. Congress. Senate. Committee on Environment and Public Works. Subcommittee on Water Resources. Hearings on dam safety. Hearings, 95th Congress, 2nd session. Feb. 3, 1978.

U.S. Congress. House. Committee on Government Operations. Subcommittee on Energy, Environment, and Natural Resources. Hearings on dam safety. Hearings, 95th Congress, 1st session. March 15, 17; June 30, 1977. Washington, U.S. Govt. Print. Off., 1977.

U.S. Congress. Congress. Senate. Human Resources Committee. Subcommittee on Labor. Hearings to investigate reasons for collapse of Buffalo Creek Dam on Feb. 26, 1972. Hearings, 92d Congress, 2d session. May 30, 31, 1972. Washington, U.S. Govt. Print. Off., 1972.

U.S. Congress. House. Committee on Public Works. Subcommittee on Flood Control and Internal Development. Hearings in Rapid City (S.D.) to investigate the extent of devastation

in flood-affected areas of South Dakota and determine need for changes in relief and flood prevention legislation. Includes report on Rapid City, S.D. Hearings (92d Congress, 2d session. June 27, 1972. Washington, U.S. Govt. Print. Off., 1972. Serial no. 92-42.

REPORTS AND CONGRESSIONAL DOCUMENTS

- U.S. Army Corps of Engineers, "National Program of Inspection of Dams," v. IV, a report to the Secretary of the Army (May 1975).
- U.S. Congress. House. Committee on Appropriations, Public Works for Water and Power Development and Energy Research. Appropriation (95th Congress, 1st session. House. Report no. 95-379).
Earmarks \$15 million for Corps of Engineers to proceed with Dam Safety Program.
- U.S. Congress. House. Committee on Public Works. Report on National Inspection of Dams. Washington, U.S. Govt. Print. Off., 1972. (92d Congress, 2d session. House. Report no. 92-1232). 3 p.
- U.S. Congress. Senate. Committee on Energy and Natural Resources. Subcommittee on Energy Research and Development. Teton Dam failure. Washington, U.S. Govt. Print. Off., 1977. (95th Congress, 1st session. Senate. Report no. 95-34)

CHRONOLOGY OF EVENTS

- 12/02/77 -- Carter Administration instructed Federal officials to begin inspection of 9,000 non-Federal dams with ultimate goal of State assumption of inspection program.
- 11/06/77 -- The Kelly Barnes Dam collapsed near Toccoa, Georgia.
- 04/23/77 -- President Carter, in his environmental message, stated dam safety policy.
- 11/16/76 -- Corps of Engineers submitted to Congress draft legislation and the fifth volume of its four-volume report in fulfillment of the requirements of P.L. 92-367.
- 06/02/76 -- Teton Dam failure occurred.
- 04/02/76 -- Corps of Engineers submitted to Congress four volumes of five-volume report in fulfillment of the requirements of P.L. 92-367.
- 08/28/74 -- Corps of Engineers promulgated proposed guidelines for the national dam inspection program in the Federal Register (40 CFR 168).
- 08/08/72 -- National Dam Safety Inspection Act (P.L. 92-367)

signed into law. Provided for an inventory and inspection of the Nation's dams to be conducted by the Corps of Engineers. Corps of Engineers to submit a report to the Congress that recommends national dam safety programs.

06/09/72 -- Flooding near Rapid City, South Dakota, caused failure of Canyon Lake Dam.

02/16/72 -- Failure of Buffalo Creek Valley Dam in West Virginia occurred.

ADDITIONAL REFERENCE SOURCES

Executive Office of the President, Federal Coordinating Council for Science, Engineering, and Technology. Improving federal dam safety. Washington, U.S. Govt. Print. Off., Nov. 15, 1977.

U.S. General Accounting Office, Report of the Comptroller General of the United States. Actions needed to increase the safety of dams built by the Bureau of Reclamation and the Corps of Engineers. Washington, General Accounting Office, June 3, 1977.

U.S. General Accounting Office, Report by the Comptroller General of the United States. Slow progress in developing and implementing a national dam safety program. Washington, General Accounting Office, June 29, 1977.

U.S. General Accounting Office, Report by the Comptroller General of the United States. Need for national dam safety program. Report number CED-79-30. Washington, General Accounting Office, 1979.