

# The impact of dam failures on the development of dam safety legislation and policy in the 1970s

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**Abstract**--What leads to a dam safety law being passed? Tireless work promoting dam safety and associated public safety impacts, or an actual disaster? The 1970s was perhaps the most significant decade for development of dam safety laws and regulations in the United States. This eventful time is often attributed to the dam failures that occurred in these years, most notably, Buffalo Creek (WV) in 1972, Teton Dam (ID) in 1976, and Kelly Barnes Dam (GA) in 1977. This paper highlights the status of dam safety laws and guidelines at that time and how they were affected by these significant disasters, and also examines the roles of the technical and non-technical communities that worked tirelessly prior to and after the disasters to make significant legislative change.

## I. INTRODUCTION

In the early 1970s, dam safety practices varied widely from state to state. Some states had no dam safety laws at all and many lacked the funding to implement the laws they had. Most laws in place did not include inspection of existing dams, but instead focused on processes for permitting new dam construction [1]. No national laws had been passed related to Dam Safety at that time. Several federal laws were passed that funded the construction of specific dams, but no laws or funding were provided for inspection of the existing dams. No national inventory of dams existed either, so the scope of dam safety needs was unknown. Large dam failures earlier in the century influenced some changes in state dam safety law; for example, the 1911 failure of Austin Dam led to Pennsylvania passing the nation's first dam safety law in 1913 [2]. California dam safety legislation was also updated when St. Francis Dam failed in 1928 [3, 4]. But no failure had led to a national dam safety law.

## II. BUFFALO CREEK AND HEARINGS

On February 26, 1972, the Pittston Coal Company's coal slurry impoundment dam #3 failed killing 125 people downstream [5]. The aftermath was visible on news programs throughout the nation, making the influence of the disaster extend far beyond the borders of West Virginia. Part of this extensive visibility was due, in part, to the fact that the West Virginia victims sued the New York based coal company, which required the trial to be heard in federal court [6].

This national attention extended to the halls of Congress, and on May 30 and 31, 1972, hearings were held before the U.S. Senate Committee on Labor and Public Welfare [7]. They were presided by Senator Harrison Williams of New Jersey. (Side note, he would later resign from the senate in 1981 after being convicted of taking bribes in the FBI's Abscam sting operation [8].)

He opened the hearings with the following:

The hearings these next two days will focus on the reasons why 118 people were killed in the Buffalo Creek Valley on February 26, 1972, when several refuse dams belonging to the Pittston Co.'s Buffalo Mining Division collapsed and released more than 175 million gallons of water and coal mine refuse into the 17-mile Buffalo Creek.

In addition to the 118 people killed, seven are still missing, 523 people were injured, more than 500 homes were totally destroyed, more than 500 homes were damaged and over 1,000 automobiles were destroyed. The highway and the railroad serving the valley were rendered useless and all power and telephone service was destroyed.

In order to appreciate the force of the debris-laden flood, one only has to see the railroad rails that were twisted and bent like pretzels. The terror and horror are still vividly reflected in the faces of the women and the children that lived in the valley. The widespread devastation, destruction, and killing was first labeled by some as "an act of God", a statement that all too frequently these days is the first judgment about these disasters. Time and time again in the course of our committee's work under the mine safety laws, and other

safety statutes, we have been told that these tragedies are a part of the business with the implication that they are to be naturally expected. We have already, in previous investigations and hearings, learned that the disasters that claimed so many lives at Farmington, W. Va., and Hyden, Ky., were “man-made”, and our inquiry is designed to show in detail how this disaster took place [7].

This led to further investigation of the disaster and a desire to create national law for the safety of dams. As part of events moving toward that goal, a hearing was held before the Senate Committee on Interior and Insular Affairs on July 20, 1972 [4]. It was chaired by Henry “Scoop” Jackson, a senator from the state of Washington who, at the time, was running for the Democratic presidential nomination [9].

Senator Jackson’s opening remarks included:

In recent months, this Nation has experienced a series of tragic floods. On Feb. 26, the most disastrous flood in West Virginia’s history swept through the Buffalo Creek Valley. At least 118 lives were lost - the exact total may never be known - damage exceeded \$50 million, and 4,000 people were left homeless. The intensity of the Buffalo Creek flood had been increased from that of an average 10-year-frequency flood to about 40 times the intensity of a 50-year-frequency flood because of the failure of dams constructed of coal waste in connection with a mining operation. In June, over 200 people were killed by a flood in the vicinity of Rapid City, S. Dak. Again, the severity of the damage was greatly increased by the failure of the Canyon Lake Dam. Meanwhile, the city of Sturgis, S. Dak., narrowly escaped destruction when the imminent failure of the abandoned Fort Meade Dam above the town was discovered and forestalled by emergency action...These occurrences point up the grim fact that there are innumerable dams in existence throughout the United States which are under no effective public control to insure that they were competently designed and constructed initially, that they are being adequately inspected and maintained, or that the design remains adequate under current hydrologic conditions in the watershed. The safety of these impoundments should be a matter of great concern to public officials...Unfortunately, there is no uniformity among state laws regulating dams...The U.S. Committee on Large Dams surveyed existing state law and report that the majority of the states either had not enacted laws adequate to safeguard the public or did not fully support the laws already enacted [4].

Further, Utah Senator Wallace Bennett presented a draft bill to have the Water Resources Council take the lead in developing a federal dam safety program. Established in 1965, the Council was made up of department and agency heads who monitored national and regional water supplies; coordinated federal, state, regional and river basin water programs; and administered a grant program to states for water resources planning [10]. Senator Bennett stated:

At the request of the Governor of a State, the Water Resources Council, together with State officials, would prepare a technical assistance plan to assure the safety of water storage and control structures in the state. Technical assistance would be provided by the Bureau of Reclamation, the Geological Survey, the Army Corps of Engineers and the Soil Conservation Service to support the State program of licensing and inspection. Each State would have to provide that it has adequate safety laws and methods for implementation of those laws as a precondition for Federal assistance. An annual sum of \$5,000,000 would be authorized for the administration of the program [4].

This would require the cooperation of the Secretaries of the Interior, Army and Agriculture. In fact, the Water Resource Council was chaired by the Secretary of the Interior, Rogers Morton [11]. However, in written testimony the Assistant Secretary of the Interior wrote:

We recommend that the bill not be enacted... This Department concurs in the view underlying the bill that increased attention should be given to assuring the safety of dams. We have directed continuing efforts toward assuring the safety of Federal dams under purview of this Department, and we are working with the Departments of the Army and of Agriculture and other agencies concerned with safety for all Federal dams. However, our joint efforts have not reached the point where this Department is prepared to make recommendations to this Committee.

Non-Federal dams also should receive increased attention. At present, some States do not have effective programs for licensing and inspection of water shortage and control structures. Modern meteorological and hydrological techniques plus additional years of precipitation and runoff experience may reveal that the

maximum probable floods at some dams are substantially greater than estimated when the structures were designed and constructed. Many non-Federal dams have been inadequately engineered and have not been periodically maintained or inspected.

We feel however, that safety of non-Federal dams is primarily a State responsibility. S. 449 recognizes this but would encourage States to assume that responsibility by offering Federal technical assistance on a non-reimbursable basis.

We do not know at this time enough about the dimensions of the non-Federal dam problem to determine the extent of Federal involvement, if any, which may be justified. Technical assistance of the type contemplated is generally available from Federal agencies or from private consultants [4].

Similar letters were read from the Office of Management and Budget, Department of the Agriculture, and the Water Resources Council itself, all recommending the bill not be enacted. The Army Corps of Engineers also provided testimony not recommending enactment. Several states also testified, but they were in support of the bill.

The hearings also made it clear that the Bureau of Reclamation was taking the lead on drafting national dam safety standards. The following exchange occurred during the hearing between Utah Senator Frank Moss and W. H. Keating, Assistant Commissioner of the Bureau of Reclamation:

Senator Moss: Mr. Keating, you note that the executive branch, after some years of consultation, is not yet prepared to recommend a policy for the safety of federally owned and operated dams. How long do you think we will be waiting for a recommendation on the safety of dams?

Mr. Keating: Hopefully not too long. We have had several meetings among the Federal agencies trying to determine uniform safety standards for dams. Hopefully, we can determine an acceptable formula for sharing of costs, i.e., how much of the costs would be nonreimbursable and charged to the safety of dams and how much would be charged to the owner of the dam or the entity which must finally pay for it and the irrigation benefit. This is our real prime concern, how the costs are divided.

Senator Moss: Are you close to the point where you are going to make some recommendation to the Congress on that?

Mr. Keating: Not in terms of days or weeks, but I don't think it is something that is going to drag on for years [4].

At that point it was determined that the actions outlined in the legislation should not rely on the Water Resources Council, but instead, should be under the sole purview of the Secretary of the Army. It is not entirely clear, but the following exchange between Senator Moss and Wallace Maughan, Director of the Water Resources Council, may have played a part in that decision.

Senator Moss: Well, can any of you gentlemen tell me what the executive branch is doing to develop viable alternatives to S. 3449? Is this simply a problem to pass off to the States, or are you will and able to do something?

Mr. Maughan: It is my understanding in a number of cases, and West Virginia is one of them, there have been some efforts by the Corps of Engineers, for instance, to help the State of West Virginia out in its inspection program to some degree, and there are other efforts to do this in certain areas [4].

As the process moved forward, the focus came onto the Corps of Engineers to take the lead. Neil Parrett, who worked with the Corps in Washington D.C. in 1972, recalls, "One Friday our congressional liaison came running in and stated that Congress needed to know the number of dams in America and how much money it would cost to fix those dams. At that point we hadn't done any inventory so our boss asked each of the Division Chiefs to go into a room and write our best guess for each number on a piece of paper. He gathered the papers together, took the average, and sent it to Congress. I don't recall the exact number, but after we did our inventory in 1975, it turned out we were very close [12]."

### **III. PUBLIC LAW 92-367**

Legislation worked its way through Congress for several months and on August 8, 1972, Public Law 92-367 was signed into law [13]. It was given several names and is now known as the "National Dam Inspection Act."

The law defined a dam as any artificial barrier that impounds or diverts water that is 25 or more in height or has an impounding capacity at maximum water storage elevation of 50 acre-feet or more. It excluded any structure less than six feet

regardless of storage capacity.

It required an inspection of all dams except those under the jurisdiction of the Bureau of Reclamation, the Tennessee Valley Authority, and International Boundary and Water Commission. It also excluded dams that were constructed under the Federal Power Act, those that had been inspected in the 12 months prior to the signing of the bill if requested for exclusion by the Governor, and those that the Army determined would not pose a threat to human life or property. Despite such a mighty undertaking, no funding was approved at the time for inspections, nor were any deadlines or frequency of inspections established.

President Nixon even expressed concerns about this legislation. In a statement released on August 9<sup>th</sup>, the day after the law became official, he remarked, in part:

The objective of this bill – to reduce the risk of dam failures – is highly desirable, as we have learned from painful experience. I think the particulars of this bill are most unfortunate, however, for they depart from the sound principle that the safety of non-Federal dams should primarily rest with the States.

This bill is also marred because it was enacted hastily, without benefit of committee hearings, advice from the concerned agencies of the executive branch, or comments by the affected States. As a result, the bill ignores the fact that some States are already conducting effective safety programs. More than 28,000 dams may be involved, but the bill fails to establish any inspection priorities. And the cost of the program may run as high as \$100 million [14].

Another interesting note is that section 4 of the bill outlines what failure modes the Army should consider when determining if the structure constitutes a danger to human life or property. It does not use the term ‘failure modes’, but states:

For the purpose of determining whether a dam (including the waters impounded by such dam) constitutes a danger to human life or property, the Secretary shall take into consideration the possibility that the dam might be endangered by overtopping, seepage, settlement, erosion, sediment, cracking, earth movement, earthquakes, failure of bulkheads, flashboard, gates on conduits, or other conditions which exist or which might occur in any area in the vicinity of the dam [13].

The bill also required that the Secretary of the Army prepare a report to Congress due by July 1, 1974 that would include:

1. An inventory of all dams located in the United States;
2. A review of each inspection made, the recommendations furnished to the Governor of the State in which such dam is located, and information as to the implementation of such recommendation;
3. Recommendations for a comprehensive national program for the inspection, and regulation for safety purpose of dams of the Nation, and the respective responsibilities which should be assumed by Federal, state, and local governments and by public and private interests [13].

#### **IV. 1975 REPORT – NATIONAL PROGRAM OF INSPECTION OF DAMS**

The report required by P.L. 92-367 was delivered to Congress several months late in May 1975 [15]. The report did include an inventory of dams that was prepared based on survey responses from each state. The final inventory number was 49,329 dams, as defined by the Act. However, this number could hardly be considered comprehensive. Fifty-five surveys were sent out to States and Territories. All responded except the Virgin Islands and American Samoa. But even among those that responded, 10 states stated that the total number was unknown, so the inventory did not include any dams in Alaska, Delaware, Hawaii, Georgia, Maine, Mississippi, Missouri, South Carolina, Virginia and West Virginia [15, page A-2].

The inventory also did not include Alabama, which stated it had zero dams in the state. This is an interesting point because the letter from Alabama Governor George Wallace that accompanied the state’s survey noted that, “As you are probably aware, on February 10, 1975, the earthen dam at the Walter Bouldin Hydro Plant suddenly and inexplicably collapsed [15, page ix].” So, it appeared the only dam in the state of Alabama had already failed just months before the publication of this report.

Despite the likelihood of the 49,000+ number being extremely underestimated (since it did not account for at least 11 states’ dams), it was the number that was used to estimate workloads and budgets for the next several years.

As to the number of dams that posed risk to human life, the 1975 Report stated:

The report presents the first Federal study of the problems of the safety of dams on a nationwide scale. It reveals that approximately 20,000 of the 49,329 dams of the Nation are so located that failure or misoperation of the discharge facilities could result in loss of human life and appreciable or greater property damage. The report also finds that existing dam safety programs in most states and in some Federal agencies are either non-existent or inadequate to protect the public from the hazards created by dams [15, page vii].

Of the 20,000 dams identified that could result in loss of life, 9,000 were estimated to be high hazard dams (loss of one human life is likely if the dam fails) and 11,000 were estimated to be significant hazard dams (no probable loss of human life but possible economic loss, environmental damage, disruption of lifeline facilities, or impact on other concerns if the dam fails).

The recommendation for a comprehensive inspection program in summary included:

1. That the responsibility be on the states to execute the program except for dams under federal authority. Those would be performed by the federal agency owning and operating the dams.
2. The inspection of all existing dams having a high or significant hazard potential would be inspected under the current National Dam Safety Program.
3. Federal agencies possessing technical expertise should be authorized to furnish assistance upon request of the states.
4. Authority and funds should be provided the Chief of Engineers to maintain the National Dam Inventory [15].

The Army estimated an annual cost of \$73,500,000 or an average of \$1,500 per dam per year to run the program. Since this estimate was per dam, the bulk of the estimate, \$65,500,000, was for non-Federal dams. In order to perform the initial inspections on all high or significant hazard dams the Army requested \$30,000,000 over a five-year period, or \$5,000 per dam to complete this work. The report also included guidelines for safety inspections and evaluations of the dams that could be used to perform these inspections.

In referring to the actual inspections, the report stated:

No inspections authorized by Public Law 92-367 have been performed due to limited funding and the belief is that such inspections of non-Federal dams should be accomplished by the concerned States as part of their normal responsibilities [15, page vi].

It is unknown if the Army did not perform inspections because of a lack of funding or the belief that it was a state responsibility, but it was clear that no inspections had been done by the time this report was published in 1975. As noted above, the Army, despite the belief that it was a state responsibility, did in fact recommend a program that included the Corps performing initial inspections on all high and significant hazard dams.

The report also recommended a model law for the states to follow in developing their inspection programs. Published by the United States Committee on Large Dams in 1970, this model law contained five major points [15, pages 10-11]. The first three, all related to construction, can be summarized as 'review plans, oversee construction, and require as-builts.' The last two points related to inspection. One stated that dams should have a detailed inspection at least every five years, while the other advised that notices should be issued to ensure owners performed proper maintenance on their dams, revised their operating procedures, or take other actions – including breaching a dam – if such an action it was deemed necessary.

For federal dams it made clear that:

While various alternatives regarding the responsibility for supervising the safety of Federal dams are available, only one alternative is deemed acceptable and practicable. This alternative would require the Federal agency owning or operating the dam, owning the land on which the dam is located, or which has existing regulatory jurisdiction over the dam, to assume the responsibility [15, page 12].

If agencies did not have the expertise, the report states they could go to those agencies that do, directly listing the Army Corps of Engineers and Bureau of Reclamation as examples [15, page 12].

After the report was submitted to Congress, the Army requested funds to implement the program and put forth additional

proposed legislation; however, no further action was taken at the time [16, pages 4-5].

#### **V. TETON DAM AND HEARINGS**

On June 5, 1976 Teton Dam, a Bureau of Reclamation dam in Idaho, failed during its first fill, killing 11 people. This failure rekindled an interest in dam safety, but with an increased focus on federal dams and their associated safety programs.

On August 5, 1976, Congressional hearings chaired by California Congressman Leo Ryan were held on Teton Dam [17]. He opened the hearings remarking on a site visit he had taken to Teton:

I felt, as I looked at the remains of the dam there in that valley, that it is a gigantic monument to human failure – and to the failure of government. We cannot excuse this disaster by calling it an ‘act of God.’ This was not a natural disaster. We did this ourselves. Through the agencies of our Federal Government, we designed and built this dam and we selected the site where it should be built. Our geologists, engineers, administrators, and experts selected the site for and designed and built this disaster [18, page 2].

As noted previously, in the 1972 hearings, the Bureau of Reclamation representative remarked that they were not days or weeks away from developing Federal dam safety guidelines, but he did not think it was something that was going to drag on for years. However, this disaster occurred more than four years later and federal agencies were not any closer to accomplishing this goal. The impact of this failure and the subsequent hearings would again turn attention to conceiving – and implementing – Federal dam safety guidelines.

#### **VI. JIMMY CARTER, THE LA TIMES AND MORE HEARINGS**

In November 1976, a few months after Teton Dam failed, Georgia Governor and peanut farmer Jimmy Carter was elected as the 39th President of the United States. Early in his term, President Carter designated dams as an important issue, and wanted many dam projects cut, resulting in a water project “hit list”.

This “hit list” (Figure 1) included projects from the first day of his presidency that Carter targeted for removal from the federal budget. Figure 2 shows a letter from the President to New York Congressman Jerome Ambro seeking support to remove these projects from funding consideration in 1977.

However, the budget for that fiscal year would include funding for most of these projects.

## Costs of 'Hit List' Water Projects

	(in millions)	Allocated To Date	Estimated Total Federal Cost
<b>Projects to Be Deleted</b>	<b>Percentage Completed</b>	<b>\$</b>	<b>\$</b>
	9%	7.5	81.5
Applegate Lake, Ore.	50	10.1	20.3
Atchafalaya Navigation Project, La.	27	4.5	14.5
Bayou Bodcau, La. ‡	5	4.7	93.2
Cache River Basin, Ark.	15	32.0	142.0
Columbia Dam, Tenn.	6	5.4	87.9
Fruitland Mesa Dam, Colo. †	2	2.1	86.0
Grove Lake, Kan. †	30	17.1	55.7
Hillsdale Lake, Kan.	33	18.5	55.4
La Forge Lake, Wis. †	6	0.2	31.5
Lukfata Lake, Okla. †	28	35.3	124.0
Meramec Park Lake, Mo. †	8	21.1	276.0
Russell Lake, Ga. and S.C.	5	4.1	75.8
Savery and Pot Hook Dams, Colo. and Wyo. †	7	3.7	55.7
Tallahala Creek Dam, Miss.	19	10.9	53.6
Yatesville Dam, Ky. †			
<b>Projects to Be Deleted, Pending Re-Evaluation</b>			
	20	233.0	1,131.0
Auburn Dam-Folsom South Unit, Calif.	5	6.5	145.7
Narrows Unit Dam, Colo. †	18	89.1	504.6
<b>Projects to Be Modified*</b>	<b>Percentage Completed</b>	<b>Estimated Savings Due to Modification</b>	<b>Original Cost to Complete</b>
	19%	\$659.8	\$ 862.7
Bonneville Unit, Central Utah Project, Utah	25	333.0	1,679.1
Central Arizona Project, Ariz. †	29	302.0	609.7
Garrison Diversion Project, N.D.	1	24.0	286.3
Mississippi River Gulf Outlet, La. ‡	31	135.0	271.4
Tensas Basin, Ark. and La. ‡			

SOURCE: The White House

Figure 1: The 'hit list' of water projects submitted to Congress by President Carter. Photo taken at the Jimmy Carter Presidential Library and Museum, 2/1/2017.

June 9, 1977

FI 4  
FG 32  
FG 33-2  
FG 14-3  
FI 1-2

To Congressman Jerome Ambro

On April 27, you and 142 of your colleagues in the House of Representatives voted to trim the Budget target by \$100 million for spending on unnecessary water resource projects. You and I share the same concern that we eliminate needless spending in this area.

On April 18, after a thorough review of ongoing water projects, I recommended to the Congress that 18 projects be deleted from funding and that 5 be modified. This action would save the American taxpayer almost \$200 million in FY 78 and about \$4 billion overall.

However, the House Appropriations Committee has reported out a bill for your consideration which funds nearly all of these projects. In addition, funds have been added for construction starts on 20 additional projects for which we did not budget at all.

If wasteful spending is to be curtailed and necessary programs financed, we will need to work together to eliminate needless and counter-productive projects. I personally appreciate your assistance in this effort.

Sincerely,

**JIMMY CARTER**

Figure 2: Letter from President Carter to New York Congressman Jerome Ambro. Photo taken at the Jimmy Carter Presidential Library and Museum, 2/1/2017.

While the President worked to limit future dam construction, much of the nation was still focused on Dam Safety; and on March 13-18, 1977, the Los Angeles Times ran a series of articles on dam safety by reporter Gaylord Shaw. The lead to the series read, "For more than 50 years, government agencies and private developers have been busy damming up the nation's rivers and streams - curbing floods, storing water, generating power, creating recreation areas. But now, a month-long times investigation shows, many of these dams have become time bombs. Aging, defective, inadequate to hold back the severe floods they are likely to face, scores of dams across the country pose threats of catastrophe. Today, in the first of two articles, the Times explores the problems with federal dams. Monday: the smaller but far more haphazard world of private dams." The initial article ends with a Corps of Engineers official stating, "The level of concern for dam safety always seems to be in direct proportion to the length of time since the last dam disaster [19]."

These articles clearly did not go unnoticed by the President as a copy was found in his personal secretary's files in his Presidential Library. They also did not go unnoticed by Congress, as only two days after the initial article ran, Congressional hearings (chaired once again by California Congressman Ryan) on dam safety were again initiated [16]. These articles would even be discussed on the last day of hearings.

The hearings would spotlight questions about why the nation was not further along in its dam safety program development after the 1972 law was passed. Ryan opened the hearings, in part, by saying:

In 1972, the Congress enacted the Federal Dam Inspection Act. We called for a nationwide inspection



of all dams. That came as a result of dam failures and our attention being called to the problem at that time. It is now five years later and none of those inspections has been performed. We want to know why not. There is no national program for dam safety and inspection. And, again, we want to know why not. We hope that through these hearings we can begin to construct the foundations for a national program of dam safety. We hope that we can obtain some idea of the magnitude of the problem, examine some of the alternative solutions, weigh the costs, and determine the appropriate Federal, State, and private responsibilities. If we are unable to learn from our failures and disasters, we must be resigned to suffer them again and again [16, page 2].

About a month after the hearings began, a Presidential Memo on Dam Safety was submitted on April 23, 1977 to all Federal agencies that were involved in dam construction and operation. It called for a review of the current dam safety programs in each agency. An interagency report and proposed federal guidelines for dam safety were due to the President on October 1, 1977; these would be followed by an independent panel review, and finalized by October 1, 1978 [20].

Dr. Bruce Tschantz, a professor at the University of Tennessee, was instrumental in developing guidelines for this task and in getting Tennessee to enact the "Safe Dams Act of 1973". His notoriety increased as he was interviewed in Gaylord Shaw's articles and provided key testimony in the 1977 Congressional hearings. Now the Carter Administration looked to him to help coordinate and keep the federal agencies on target to meet the President's October deadline. He began working with Dr. Phil Smith under Frank Press, Director of the White House's Office of Science and Technology Policy (OSTP) in early 1977.

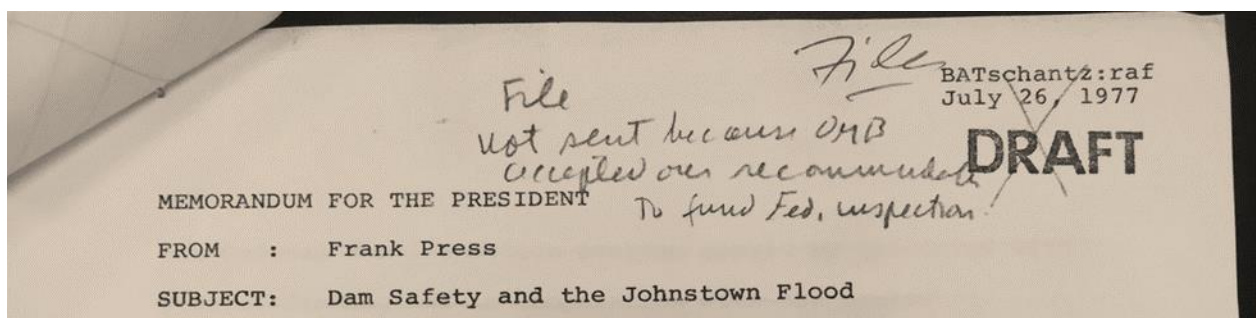
While he worked on the federal guidelines, he continued to emphasize the idea that greater focus should be on the state programs. As stated in the 1977 hearings, his research showed, "About half of the states have little to no effective safety control on about a third of the Nation's dams...It appears that the intent of the national dam safety program will not be realized until a satisfactory partnership is embraced among the owners...the states, which recognize their obligation to regulate...and finally the Federal Government [16, page 75]."

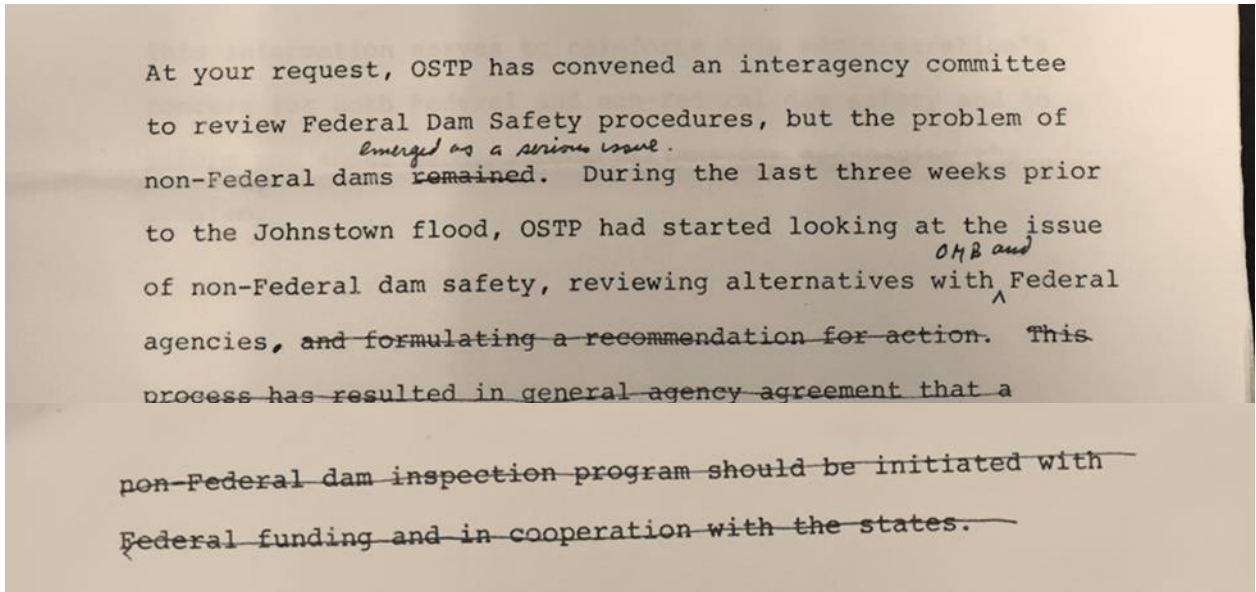
In an official memo to the Office of Management and Budget (OMB) on July 13, 1977, Dr. Tschantz's office recommended that funds be set aside to begin the inspection program for non-federal dams that was authorized in the 1972 law [21]. He also outlined four options for doing so in an issue paper dated July 6, 1977. OMB did not agree; in fact, when it was suggested in a July meeting, an OMB official got upset, and ended the meeting while cursing, saying, "non-federal dam safety is the responsibility of the states.... [22]" A few weeks later, on July 20, 1977, seven non-federal dams failed in Pennsylvania, causing what is known as Johnstown Flood of 1977 and killing 85 people [23].

After years of talking about draft federal guidelines and inspections, a draft was finally in place in October 1977 awaiting review board. However, no inspections had been completed by that time, and many states still remained without substantial dam safety laws or funding to enforce those laws.

Despite the deaths in Johnstown (caused by the failure of Laurel Run Dam and subsequently, six other dams downstream), OMB called the event an "act of God" and still questioned funding the inspection program. Figure 3 shows edits OMB made to a draft memo from OSTP Director Frank Press to the President dated July 26, 1977; however, a note on the top of the memo said, "Not sent because OMB accepted our recommendations to fund inspections."

The result, in fact, was a new proposal to include \$15 million in FY 1978 funding to perform inspections. Now that OMB agreed to this approach, the bill for funding could begin the House and the Senate reviews toward approval.



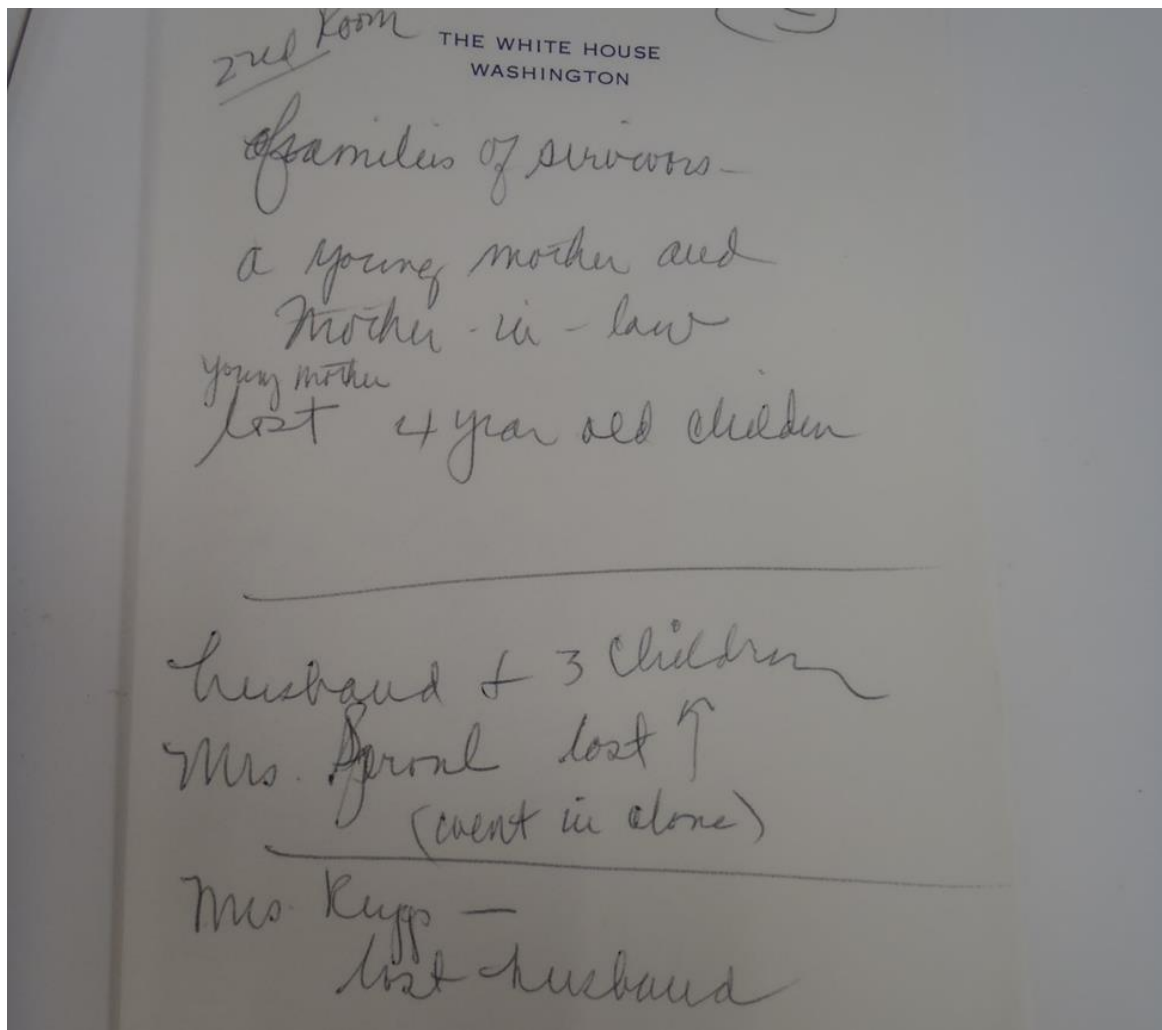


**Figure 3: Handwritten note and excerpts from two pages of a draft memo dated July 26, 1977. OMB had struck out specific wording that had stated agreement on funding the inspection program. Photo taken at Jimmy Carter Presidential Library, 2/1/2017.**

## VII. KELLY BARNES DAM AND THE AFTERMATH

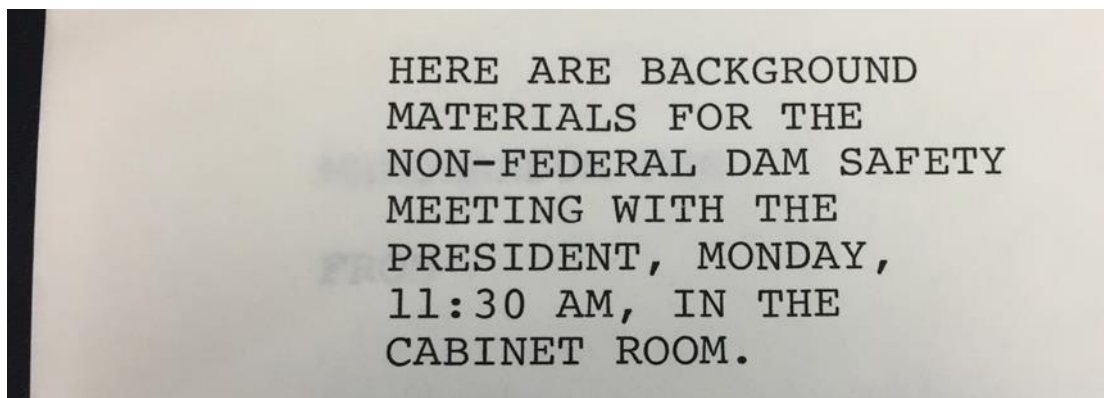
In the early hours of November 6, 1978 in Toccoa Falls, Georgia, Kelly Barnes Dam failed, flooding the Toccoa Falls Bible College. Within minutes, 39 people were dead, including many children. Rosalynn Carter heard of the disaster while at church and was flown there within hours [24].

What she witnessed was devastating. She scribbled notes in a notebook she kept as she met survivors. Figure 4 shows some of her notes from the day she was on-site.



**Figure 4:** Some of Rosalynn Carter's personal notes taken while on-site during the Toccoa Falls disaster. Photo taken at the Jimmy Carter Presidential Library, 2/1/2017.

Her involvement led to quick action by the President who on the next day, Nov. 7, 1977, had a meeting in the cabinet room with OSTP Director Press. Photo 5 shows the cover page to the briefing material for this meeting.



**Figure 5:** Cover page for briefing material for meeting with the President the day after Kelly Barnes Dam failed. Photo taken at the Jimmy Carter Presidential Library, 2/1/2017.

The briefing material contained four options that were outlined in an official memo dated the next day November 8, 1977 [25]. The work of Dr. Tschantz was vital in pulling these options together so quickly. The four options were outlined as follows

in a draft memo from Kathy Fletcher, a domestic policy staffer, to the President. Each option is followed by cost implications and the offices or agencies support that option [26].

1. Status quo (no federal role; would have to rescind \$15 million appropriated for FY 78).
2. One-year program to inspect most urgent high hazard dams with recommendations to Congress at the end of the year for a more comprehensive program (\$15 million in FY 78, undetermined thereafter). (Corps of Engineers)
3. Three to four-year program to inspect all high hazard dams, on a one-time basis, followed by capability to assist states on a reimbursable basis thereafter (approximately \$60 million total, starting with \$15 million in FY 78). (OMB, DPS [Department of Public Safety], and OSTP)
4. Matching grant program to states so that they develop the capability to conduct their own inspections and dam safety program (the cost might be as much as \$50 million per year). (Department of Agriculture)

These options did not change substantially in the next several drafts that would follow in the next few days. The price tag for option 3 went from \$60 M to \$70-\$100, and on December 2, 1977, the President announced:

I have 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 if they fail. The inspection program...will take approximately four years. We will make \$15 million available for the program during this fiscal year, and hope to be able to inspect 1,800 non-federal dams during that year. It is impossible to predict the total cost of the program precisely, but we tentatively estimate it to be 70 million dollars. Because the inspection program will not resolve specific dam safety problems and will not relieve the states or owners of these structures of their responsibilities for public safety, we will ask for Governors to agree, prior to these inspections, to take certain steps toward establishing an adequate state program for dam safety. States that agree to take these steps will be given priority for federal inspections and technical assistance [27].

These became known as Type I inspections and thousands were performed over the next few years. Many professionals in the field of dam safety began their careers training for and performing these inspections.

### **VIII. THE REST OF THE STORY**

Congressman Ryan would remain an advocate for dam safety until his tragic death one year after the Kelly Barnes failure when he was assassinated while investigating the Peoples Temple in Jonestown, Guyana.

Gaylord Shaw, the LA Times journalist, in 1978 received a Pulitzer Prize for his articles on dam safety [28].

Neil Parrett, the young employee in Washington D.C. who was working for the Army Corps of Engineers would go onto help draft the Reclamation Dam Safety Act, which would pass on November 2, 1978 in some midnight deals. The day before Congress was set to go into recess, Parrett was told by his Congressional liaison that the Reclamation Dam Safety Act, which he was working on, would not pass. He went home disappointed and decided when he got back he would try again by taking out the riders on the bill that had been added by various Senators and Congressmen. When he came in the next day, to his surprise, the bill had passed in a midnight session along with funding for the Department of Energy. President Carter had wanted funding for Energy, but it was stuck in committee, needing one additional vote to pass. One of the holdouts, B.F. Sisk, a retiring congressman from Fresno, CA, was asked what could be done to get him to switch his vote. His district included some water districts with Reclamation loans that would be forgiven if the Reclamation Dam Safety Act passed; he confirmed that if the Act was passed, he would change his vote. So both Reclamation Dam Safety Act and funding for Department of Energy moved forward. Sisk was also a major political force in the United States Congress for the creation of the Central Valley Project that eventually developed into a \$37 billion water system that continues to serve California's 400-mile-long Central Valley [29]. Neil Parrett would become the first chief of Dam Safety in the Bureau of Reclamation [12].

Dr. Bruce Tschantz would complete the review and finalize the first Federal Guidelines for Dam Safety, and then go on to be appointed the first Chief of the Office of Dam Safety when President Carter created the office as part of FEMA in 1980 [22]. He remained committed to the need for State programs to address non-federal dams and knew it would not happen until there was an organization to foster collaboration among state officials. As Office of Dam Safety Chief, he funded a National Research Council Committee on Safety of Non-Federal Dams. A 1982 report by this Committee not only pointed out the need for better laws, but also the need for interstate communication.

In January 1983, Charles Gardner of the North Carolina Department of Natural Resources, Bill Bivins of FEMA, Dr. Tschantz and few others met to discuss the concept of a national association of dam safety officials and the formation of an

organizing committee. Further coordination led to the first national conference for ASDSO in 1984 [30], and resulted in every state except Alabama having dam safety laws and programs established by early 1990s.

## **IX. CONCLUSION**

As Sam Miles, a Corps of Engineers official who helped draft the proposed guidelines, remarked in one of the Los Angeles Times articles, “The level of concern for dam safety always seems to be in direct proportion to the length of time since the last dam disaster.” History shows he is correct. Unfortunately, if one waits for a disaster to occur before taking action, by the time a plan is put together so much time has passed that no action will take place. Real progress is made when tireless work and accomplishments move forward without the catalyst of a disaster or failure. As dam safety professionals, we must continually be prepared to take action when and if the level of concern does rise. Clearly, the failure of Georgia’s Kelly Barnes Dam and other incidents raised the level of concern in our nation. The fact that we had a President from Georgia whose wife was on-site in the couple’s home state during the aftermath increased the likelihood of action. But if Dr. Tschantz and his colleagues had not done such extensive work prior to the failure of Laurel Run and Kelly Barnes, would the funding for Type I inspections have fallen into place? Would he even have been in a place to make such recommendations if he had not pressed for positive change in the field of dam safety from 1970 on? Would many of those who were trained to conduct type I inspections and their apprentices be in the industry today? Would ASDSO exist without these efforts during and between crises? It is clear that real progress is made by consistent efforts even when the concern is not on the horizon.

## **X. FUTURE WORK**

This paper has outlined much of the history of Federal dam safety policy during the 1970s. Further work could be done to expand the narrative history of dam safety policy prior to 1970 and in following decades. While some of this knowledge may be well known in the industry, compiling it for those unfamiliar with the program’s origins could be of value. This could include research on the factors that led to creation of the model law in 1970. It could also include some of the history of dam organizations that predated this timeframe. Much of this information has been written in brief history documents on organizations’ webpages or in papers covering specific failures. The author believes papers such as this that combine such histories, failures and information from other found documents and research can be valuable.

Also, as is evident throughout this paper, United States policy has been inclined toward State regulation of non-federal dams versus Federal regulation of such dams. Therefore, a similar history could be compiled for each state. An example is the work done by Dr. Andrew T. Rose on structures and policies in Pennsylvania [3]. This would be an extensive project, but would benefit dam safety officials by enhancing the understanding of dam safety history and policy now and in the future.

The National Inventory of Dams is an important topic for dam safety. This paper briefly touched on the subject. A history of various inventory efforts that have been completed to date, the methods of how each was done, and how the National Inventory of Dams is presently used, funded and maintained would also bring tremendous insight and value to the industry.

Much of this research examines the history of dam safety and bygone events. Some may consider these trivial because many in the industry experienced these incidents or political eras, and therefore consider them, not historical research, but common knowledge. This is the exact reason such papers or research is so vital. Those who consider it common knowledge or first-hand experience are retiring or passing on. Thus, having published documentation of these historical events, policies and actions will help maintain the knowledge base to improve decision-making and policy development for future generations that will inherit this vital and beneficial infrastructure.

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