STATE ENGINEER'S THIRD ANNUAL REPORT TO THE GENERAL ASSEMBLY ON DAM SAFETY FOR F. Y. 85-86

November 1, 1986

OFFICE OF THE STATE ENGINEER
DIVISION OF WATER RESOURCES

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Governor

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The Honorable Richard D. Lamm
Governor, State of Colorado
State Capitol Building
Denver, Colorado

The Honorable Ted Strickland
President of the Senate
Colorado State Senate
Denver, Colorado

The Honorable Bev Bledsoe
Speaker of the House
Colorado House of Representatives
Denver, Colorado

Gentlemen:

Pursuant to Section 37-87-114.4, C.R.S. 1973 (1986 Supp.), I am pleased to transmit the enclosed report describing the activities of the State Engineer with respect to dam safety in Colorado for fiscal year 1985-1986.

Colorado's dam safety program continues to grow stronger as a result of increased resources made available by the General Assembly and as a result of increased awareness by the dam owners of their responsibilities.

I still believe our dam safety program can be improved by continued education of the dam owner and public, additional staffing (2.0 FTE), and additional funds ($5,000) for on-going training of our professional staff, and additional funds ($30,000) for rental of "All-Terrain Vehicles" and a helicopter for efficient access to remote areas as described in detail in the report.

If you have any questions, please feel free to call upon me at any time.

Sincerely,

Jeris A. Danielson
State Engineer

JAD/AEP:svm/8720H:

Enclosure

cc: Senate Majority Leader Dan Noble
Senate Minority Leader Ray Peterson
House Majority Leader Ron Strahle
House Minority Leader Larry E. Trujillo
Senator Tilman Bishop, Chairman
Senate Ag Committee
Representative Walt Younglund, Chairman
House Ag Committee
Senator Cliff Dodge, Chairman
Joint Budget Committee
Representative Bob Leon Kirscht, Vice-Chairman
Joint Budget Committee
Senator James Beatty, Joint Budget Committee
Senator John Beno, Joint Budget Committee
Representative Elwood Gillis, Joint Budget Committee
Representative Wilma Webb, Joint Budget Committee

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STATE ENGINEER'S THIRD ANNUAL REPORT TO THE GENERAL ASSEMBLY ON DAM SAFETY FOR FY 85-86

INTRODUCTION

Statutory Provisions

Colorado's Dam Safety Program is administered by the State Engineer in accordance with Title 37, Article 87, of C.R.S. (1973)(1985 Supp.), and the Livestock Water Tank Act, Title 35, Article 49 of C.R.S. (1973), as amended. Rules and Regulations for filing plans and specifications for the construction of reservoir dams, and standard specifications for Livestock Water Tanks and Erosion Control Dams, establish the procedures and requirements of the State Engineer for administration of these statutes.

This report is submitted in compliance with Section 37-87-114.4, C.R.S. (1985 Supp.) concerning the activities of the State Engineer and the Division of Water Resources relating to Sections 37-87-105 to 37-87-114, C.R.S. (1973)(1985 Supp.).

Organization

Implementation of the dam safety program is done by the State Engineer through the Dam Safety Branch.

The branch is organized into three units, two being field engineering units (FEU), and the other, a design review and construction inspection unit (DRCIU). Each unit is led by a Supervising Water Resource Engineer. (See Appendix A for tables and charts of the personnel and organization of the branch.)

The Field Engineering Units' principal duties are to conduct Safety Evaluations of Existing Dams (SEED),[1] design review and construction inspection of repairs,[2] and investigation of complaints on the safety of dams.[3] They investigate the construction of dams in violation of Section 37-87-105(1) and (4), C.R.S., (1973)(1985 Supp.), assist the Department of Health in the inspection of tailing dams, and conduct training on the inspection of dams for division personnel, dam owners, interested agencies, engineers, and the public. They also do other related work as assigned.

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[1]Per Section 37-87-107, C.R.S. (1973)(1985 Supp.)
[2]Per Section 37-87-105(4), C.R.S. (1973)(1985 Supp.)
[3]Per Section 37-87-109, C.R.S. (1973)

The Design Review and Construction Inspection Unit's principal duties are to review the plans and specifications for the construction, alteration, modification, repair, and enlargement of reservoirs or dams in accordance with Section 37-87-105, C.R.S. (1973)(1985 Supp.) (this involves a comprehensive engineering review of the plans and specifications to assure that a safe design has been developed), and to inspect the construction of the work. It processes the Livestock Water Tank and Erosion Control Dam applications per Section 35-49-101 through 116, C.R.S. (1973) and Section 37-87-122, C.R.S. (1973). The Unit assists the Department of Health in the technical evaluation of tailing impoundments through a "Memorandum of Understanding," and participates in the State's "Joint Review Process" with the Department of Natural Resources. They also do other related work as assigned.

Goals and Objectives of the Program

The primary goal of the State Engineer with respect to dam safety is to provide maximum public safety against dam failures within the resources of his office. Towards this goal, the resources are directed at the safety inspection of each high and moderate hazard non-federal dam and reservoir on an annual basis, and the safety inspection of each low hazard non-federal dam and reservoir on a five-year basis. The program concentrates on "jurisdictional" dams and reservoirs as defined in Section 37-87-105 C.R.S. (1973)(1985 Supp.) which are greater than 10 feet high at the spillway, or greater than 20 acres in surface area at the high water line, or greater than 100 acre-feet in capacity at the high water line.

Safety inspections are made of U.S. Bureau of Reclamation and U.S. Corps of Engineers dams on a cooperative basis, their safety inspections being carried out in accordance with the "Federal Guidelines on Dam Safety." Arrangements are made with other federal agencies for the safety inspection of their dams by the Bureau of Reclamation, the Corps of Engineers, their own forces, consulting engineers, or by the State Engineer. When other than State Engineer personnel conduct the safety inspections, the agencies submit the findings/recommendations and follow-up to the State Engineer in order to assure the safety of these dams.

A related objective is the inspection of construction for compliance with approved plans, and to assure that plans are adequate for the site conditions. Inspections are made of the foundation, outlet works, spillways, and final construction as a minimum. Interim inspections are made as necessary.

An adjunct to the inspection objectives, but an important element of the dam safety program, is the goal to have each owner of high hazard dams prepare an Emergency Preparedness Plan to combat any incident which would jeopardize the safety of the dams, and to give warning to appropriate emergency preparedness agencies/officials so they may mobilize their plans for mitigating the consequences of dam-break flooding.

The following Table 1 shows the ownership of jurisdictional dams in Colorado by owner; and Table 2 shows the distribution of dams in the state by Water Division and hazard rating.

TABLE 1

JURISDICTIONAL[1] DAM OWNERSHIP STATUS
IN COLORADO

HAZARD RATING	TYPE OF OWNER				
	FEDERAL	STATE	OTHER GOV'T.	PRIVATE	TOTAL
HIGH (Class I)	36	11	77	127	251
MODERATE (Class II)	12	23	67	234	336
LOW (Class III)	52	39	144	1,101	1,336
TOTAL	100	73	288	1,462	1,923

[1]Greater than ten feet high to spillway, or 20 acres in surface area at the high water line, or 100 acre-feet in capacity at the high water line.

TABLE 2

DISTRIBUTION OF DAMS BY IRRIGATION DIVISION/HAZARD

DIVISION	NON-FEDERAL			FEDERAL			TOTAL		
	H	M	L	H	M	L	H	M	L
I	112	135	479	13	8	15	125	143	494
II	32	51	235	5	3	11	37	54	246
III	9	13	53	1	0	5	10	13	58
IV	21	41	185	7	0	7	28	41	192
V	23	45	148	7	0	8	30	45	156
VI	9	19	132	0	1	5	9	20	137
VII	9	20	52	3	0	1	12	20	53
	215	324	1,284	36	12	52	251	336	1,336
TOTALS			1,823			100			1,923

H = High Hazard = Class I - loss of human life is expected in the event of failure of the dam, while the reservoir is at the high water line.

M = Moderate Hazard = Class II - significant damage to improved property is expected in the event of failure of the dam while the reservoir is at the high water line, but no loss of human life is expected.

L = Low Hazard = Class III - loss of human life is not expected, and damage to improved property is expected to be small, in the event of failure of the dam while the reservoir is at high water line.

APPROVAL OF PLANS AND SPECIFICATIONS FOR CONSTRUCTION OF DAMS AND RESERVOIRS

During FY 85-86, the State Engineer received plans for six new dams, and 45 plans for alteration, modification, repair, or enlargement. Seven change orders to previously approved plans were also reviewed and all were approved within the time frame. Eighty-nine separate reviews of the submitted plans were done, and nineteen separate hydrology studies were also received for determination of the inflow design flood for spillway designs. Estimated cost of construction for the submitted plans was $52,254,741. Two thousand four hundred and fifty-eight dollars ($2,458.00) was collected for the examination and filing of the submitted plans.

Thirty-three sets of plans and specifications were approved by the State Engineer for construction during FY 85-86. Fifteen of them were for high hazard dams, thirteen for moderate hazard, and five for low hazard dams. (See Appendix B for lists of dams which were approved by Water Division/District, and use.)

Nine special studies associated with dams were also performed, including geotechnical reports, feasibility reports, subdivision plans, and requests from the Department of Health, and Division of Mined Land Reclamation.

Upon completion of construction, the owner's engineer submits copies of the "AS-BUILT" plans, showing the changes made during construction. These plans are reviewed by the engineer who monitored the construction for completeness before being accepted for filing. The superceded plans are disposed of and the "AS-BUILT" plans serve as the public record as provided by the statutes.

Section 37-87-114.5, C.R.S. (1985 Supp.) exempts certain structures from the State Engineer's approval. They are, structures not designed or operated for the purpose of storing water, mill tailing impoundments permitted under Article 32 or 33 of Title 34, C.R.S. (Minerals or Coal Mines), uranium mill tailing and liquid impoundment structures permitted under Article 11 of Title 25, C.R.S., siltation structures permitted under Article 33 of Title 34, C.R.S. (Coal Mines), and structures which store water only below the natural surface of the ground.

In order to prevent administrative problems arising from the construction of small dams which do not fall under the jurisdiction of the State Engineer's review and approval, Section 37-87-125, C.R.S. (1985 Supp.) requires that a notice of intent to construct an impoundment must be submitted to the State Engineer prior to beginning construction. The State Engineer has developed a form for submitting the notice, which is directed to the Division Engineer of the Division that the impoundment is located in for processing. The notification also serves to address any dam safety issues which are evident.

SAFETY INSPECTIONS AND CONSTRUCTION OBSERVATION

Scheduling

Jurisdictional dams identified for inspection in accordance with the objectives of the State Engineer are assigned to the field engineers on a geographic and hazard related basis. The field engineers each schedule the inspection of approximately 85 separate dams each "inspection year," which begins about April 1 and ends about November 1. Subsequent follow-up and problem solving results in additional inspections each year. Within the planned schedules are the inclusion of all the high and moderate hazard dams, and approximately one-fifth of the low ones. Inspection of Federal dams are integrated with these schedules. In addition, the State Engineer has executed a memorandum of understanding with the Regional Forester, Rocky Mountain Region, USDA Forest Service, concerning the statutory obligations each has in regard to the administration and safety of dams on National Forest lands in Colorado. The memorandum of understanding provides for the exchange of information, assuring access to dams (e.g. wilderness areas), scheduling of the inspection of Forest Service dams, and the joint review for approval of plans and specifications. The two field engineering units, therefore, collectively conduct about 990 safety inspections on an "inspection year" basis, which is equivalent to a fiscal year in the amount planned.

In addition, engineering personnel in the Division Engineers' offices are assigned low hazard dams for safety inspection to supplement the dam safety branch's schedules. This assures that at least one-fifth of the low hazard dams receive an inspection on a five-year schedule. The safety inspections are coordinated and supervised by the chiefs of the field engineering units to assure continuity.

Scope

A safety inspection involves more than just a visit to the dam. The site visit is preceded by a review of the file and history of performance, and coordination with the owner, division staff, and other interested parties so they may take part in the inspection. (The statute specifies that a safety inspection include the review of previous inspection reports and drawings, site inspection of the dam, spillways, outlet facilities, seepage control and measurement system, and permanent monument or monitoring installations.)

The findings of the inspection are documented on a report form which rates the conditions observed of the several components of the dam and reservoir. The overall conditions are rated as satisfactory, conditionally satisfactory, or unsatisfactory (unsafe) for full storage, and a recommendation is made on the safe storage level. The report also enumerates the several repair and maintenance items which the owner must attend to, and specifies the several engineering and monitoring requirements necessary to assure the safety of the dam. (A copy of the "ENGINEERS INSPECTION REPORT" is in Appendix C.

An invoice for the cost of the inspection is also prepared in accordance with the provisions of the statutes, the payment being due within 30 days of receipt by the owner.

If the safety inspection finds that the overall conditions are unsafe, an order is written by the State Engineer restricting the storage in the reservoir to a safe level. If the findings are conditionally satisfactory, full storage is recommended contingent upon appropriate monitoring provisions being provided by the owner.

Restriction orders are accompanied by orders to rehabilitate the dam to make it safe for full storage, or to breach the dam.

Orders to repair or maintain the dam usually require the reinspection of the dam in order to verify that the work has been done in a workmanlike manner. Reinspections normally occur to assure follow-up of the State Engineer's orders, or by request from the owner.

In the event the owner fails to comply with an order to make a dam safe, a breach order will be issued to remove the hazard created by the dam and reservoir. This subject will be covered in more detail later in this report under "RESULTS OF SAFETY INSPECTIONS, AND ENFORCEMENT PROCEEDINGS," where the attorney general is requested to commence proceedings against owners refusing to obey the written orders of the State Engineer.

Number of Inspections

During FY 85-86, a total of 997 safety inspections were conducted (and 84 construction inspections) for a total of 1,081. This included 225 safety inspections of high hazard dams, 292 safety inspections of moderate hazard dams, and 480 safety inspections of low hazard dams (including Federal dams). The objective of inspecting all high and moderate hazard dams on an annual basis is an "inspection year" objective versus a fiscal year one. This objective was reached for "inspection year" 1985 and is expected for 1986.

Results of Safety Inspections

The 997 safety inspections resulted in the issuance of 86 restriction orders due to unsafe conditions during FY 85-86. Twenty-six former restrictions were removed, and 44 revised.

As of June 30, 1986, there were a total of 326 restriction orders in effect. The following tables show the cause for restrictions by category and hazard rating in Table 3, and by category and Irrigation Division in Table 4.

TABLE 3

CAUSE FOR RESTRICTION BY CATEGORY/HAZARD[1]

HAZARD	CATEGORY A	B	C	D	TOTAL
HIGH	18 (-10)[2]	4 (-20)	11 (0)	10 (+100)	43 (+5)
MODERATE	25 (+14)	36 (+9)	9 (0)	13 (+116)	83 (+19)
LOW	75 (+39)	85 (+40)	18 (+38)	22 (+29)	200 (+38)
TOTAL	118 (+23)	125 (+26)	38 (+15)	45 (+60)	326 (+27)[3]

TABLE 4

CAUSE FOR RESTRICTIONS BY CATEGORY/IRRIGATION DIVISION[1]

DIVISION	CATEGORY A	B	C	D	TOTAL	NO. OF NON-FEDERAL DAMS
1	40	57	13	18	128	726
2	18	13	6	3	40	318
3	3	7	1	0	11	75
4	16	14	8	11	49	247
5	29	22	7	6	64	216
6	8	8	1	5	22	160
7	4	4	2	2	12	81
TOTAL	118	125	38	45	326[2]	1,823

A - Inadequate Spillway/Freeboard
B - Structural Problem (Deteriorated appurtenances, cracking, erosion, scarps, sinkholes, deteriorated riprap, etc.
C - Leakage/Piping Conditions
D - Stability (Slides, saturated slopes)

[1]In effect as of June 30, 1986
[2](%) change from FY 84-85
[3]All non-Federal dams

The approximate amount of storage lost due to restrictions was 158,982 acre-feet. Even though the number of restrictions increased, the total amount of storage lost decreased due to several restrictions of large storage being removed. A list of the storage restrictions by name, former water district, amount of restriction, date, reason, hazard rating, and approximate storage lost is contained in Appendix D.

The greatest problems causing the unsafe conditions according to the tables are inadequate spillway capacity-insufficient freeboard (freeboard is the vertical distance between the bottom of the spillway and the crest of the dam), and structural deficiencies. As a single category, inadequate spillway capacity represents almost half of these deficiencies; it being judged by hydrologic standards related to a dam's "hazard" to the floodplain. The State Engineer's hydrologic requirements for spillway flood capacity range from the 100-year flood to the Probable Maximum Flood (PMF); any spillway capacity less than the PMF requiring demonstration that the overtopping failure of the dam will be insignificant on the floodplain. The number of stability problems increased markedly, especially for high and moderate hazard dams.

The increase in the amount of restrictions, especially of low hazard dams, appears partially due to the increased number of inspections performed by the increased staff. The several problems and deficiencies at low hazard dams are being identified and remedial measures being taken.

With inadequate spillways identified as a frequent deficiency concerning the safety of dams in Colorado, a large number of orders issued by the State Engineer to dam owners is the need to repair and enlarge spillways. For "inspection year" 1986, all dams are being evaluated for hydrologic adequacy in accordance with the following policy: All dams must pass a 100-year flood with one foot of residual freeboard. For high and moderate hazard dams that cannot do this, the dam is restricted to a level that can handle the 100-year event, and an order issued to upgrade the spillway (to the PMF, if needed). For low hazard dams that cannot pass the 50-year flood, the dam is restricted to handle the 50-year event, and an order issued to upgrade the spillway (to at least the 100-year event). If a low hazard dam will pass the 50-year event but not the 100-year event, an order is issued to upgrade the spillway to the 100-year event. In each case, the owner has the alternative to partially or fully breach the dam. These policies will be applied until the revised rules and regulations are promulgated, upon which the hydrologic requirements will be enforced.

In cases where the restriction orders cannot be enforced during flooding due to inadequate outlet capacity, and the owner has not complied with the orders to rehabilitate the dam, orders are issued to partially breach the dam by cutting the spillway down to the restricted level. The work must be done under the supervision of a registered professional engineer, and the spillway must be able to pass the 100-year flood.

In the event the owner does not comply with any of the above orders, another order is issued to completely breach the dam. The breach must be of sufficient width to pass abnormal flood flows without surcharging the reservoir basin, and must pass the 100-year event at less than five feet of depth.

Following is a list of dams which were breached during the fiscal year 85-86:

NAME	COUNTY	DIV./DIST.	DESCRIPTION
Green Lake #2	Boulder	1/6	To 17 Ft. Below Dam Crest
Mammoth Creek	Gilpin	1/6	Total Breach
Prince #1	Boulder	1/6	To 4 Ft. Below Dam Crest
Last Chance	Jefferson	1/6	To 4 Ft. Below Dam Crest
Homewood Park	Jefferson	1/8	To 5 Ft. Below Dam Crest
Womack #2	Delta	4/40	To 4 Ft. Below Dam Crest
Womack #3	Delta	4/40	To 4 Ft. Below Dam Crest
Hoaglund #1	Summitt	5/36	To 22.0 Ft. Below Dam Crest
Binco	Grand	5/50	To 5 Ft. Below Dam Crest
Burbach	Grand	5/50	To 5.5 Ft. Below Dam Crest
Craven	Grand	5/50	To 7 Ft. Below Dam Crest
Pinney	Grand	5/50	To 3 Ft. Below Dam Crest
Saraceno	Grand	5/50	To 6 Ft. Below Dam Crest
Huntington	Grand	5/51	To 5.5 Ft. Below Dam Crest
Soda Creek	Grand	5/51	To 5 Ft. Below Dam Crest
Sterner	Routt	5/53	To 10.5 Ft. Below Dam Crest

USE OF APPROPRIATED FUNDS

The Legislature, for FY 85-86, budgeted by separate line item $794,549 for dam safety personal services. The Division of Water Resources allocated $27,000 for operating costs, and $14,700 for travel and subsistence to the Dam Safety Branch.

Dam Safety personal services expenditures for the fiscal year were $794,549. Total operating expenditures were $22,597 and $16,363 for travel and subsistence. A reduction in operating costs occurred during this fiscal year compared to last year for several reasons. They were: transfer of rent for parking vehicles to another cost center ($4,455); transfer of postage cost to another cost center ($457); less newspaper advertising costs for recruitment of staff ($278); reduction in office supply costs ($867); reduction in photograph processing by using Safeway store processing ($956); no field equipment costs ($553); reduction in educational training costs ($1,276); and no cost for production of dam safety manuals ($4,872).

Although travel costs exceeded the allocation, they were less than the previous fiscal year due to efficient utilization of existing funding. The dam safety branch was successful in accomplishing the reduction through planning for efficient trips and using commercial air lines for traveling to the western slope, which increased the amount of time to make inspections and reduce overnight stays. The reduction in educational training programs also reduced the travel costs.

No capital expenditures were made during the fiscal year.

RECEIPTS GENERATED FOR COSTS OF INSPECTION AND FILING OF PLANS

Fees collected by the State Engineer for dam safety were $38,199.90 for safety inspections and construction observation, and $2,458.00 for filing plans and specifications. Invoices totaling $52,312.08 were issued for safety inspections during the period.

RULES AND REGULATIONS

No regulations were promulgated during the fiscal year. Existing rules and regulations were promulgated in 1967 and are in force. With the passage of HB-1052 (1984), and HB 1186(1986), preparation of revised regulations is nearly complete. Pending completion of staff review and approval of the draft regulations by the State Engineer, the basis and purpose of the rules will be prepared for public hearings in February 1987, in accordance with Section 24-4-103, C.R.S. (1973).

ENFORCEMENT ORDERS AND PROCEEDINGS

During the fiscal year, the State Engineer was involved in two enforcement proceedings under Section 37-87-114 , C.R.S. (1973)(1985 Supp.). Following is a brief description of each case.

1. Hidden Lake/aka Mayham Reservoir, Adams County

   Hidden Lake is located in the vicinity of 65th Avenue and Lowell Boulevard in Adams County. It is an eight-foot high, 492 acre-foot, low hazard structure.

   This is a continuation of a case reported on in the 1985 report. Since that time, the suit in the Water Court, Water Division 1 (Case No. 83CW109), on the ownership of the reservoir was decided. On March 5, 1985, the Water Court issued a Memorandum of Decision on Case No. 83CW109 (and related cases) that the Mayham Reservoir Corporation had title to the reservoir. The State Engineer subsequently ordered the owner (Mayham Reservoir Corporation) to rehabilitate the dam or completely breach it. The Corporation's attorney responded that the State Engineer and the Corporation were still subject to the jurisdiction of the Court and could not comply. On April 25, 1986, the Court ordered the Joint Motion for Dismissal Without Prejudice. (The State Engineer subsequently ordered the owner to rehabilitate the spillway (breach) to protect it from erosion.)

2. Hoagland #1 Dam, Summit County

   Hoagland #1 Dam is located on Elliot Creek, a tributary to Martin Creek, about three miles above the confluence with the Blue River just below Green Mountain Reservoir. It is a 36-foot high, 325 acre-foot, low hazard structure.

On July 29, 1985, the State Engineer ordered the dam to be breached to a point eleven feet below the crest of the dam and protected against erosion, and to investigate the cause of a partial failure of the left abutment and repair it. The condition of the dam and spillway were considered unsafe for full storage. Due to no action by the owner, on November 27, 1985, the attorney general, upon request of the State Engineer, filed for preliminary and permanent injunction in the District Court, Summit County, Colorado, to have the defendant, Lazy Shamrock Ranch Partnership (owner of the dam), breach the dam to the natural ground by April 1, 1986, under the direction of an engineer, with the plan approved by the State Engineer.

On January 7, 1986, the court issued a stipulated order that on or before June 1, 1986, the owner shall breach the dam in accordance with plans and specifications first approved by the State Engineer; and, that the owner reserves the right to rehabilitate the dam instead. The owner shall appear in court within 48 hours of notice for any further proceedings necessary to protect the public safety; and, to keep open by April 1, 1986, and thereafter, all outlet and drainage facilities (to be padlocked by the State Engineer); and, the State Engineer shall review any plans for the breach or repair within ten days of receipt.

The owner began the breach and repair operation in April 25, 1986, breaching the dam to a depth of 22 feet below the crest in the vicinity of the spillway at the right abutment, and repair of the "pipe area" at the left abutment. The breach was completed by June 1, 1986, and the repair completed by June 8, 1986.

EMERGENCY PREPAREDNESS PLANS

During the National Dam Safety Program's inspection and Phase I findings/recommendations on high hazard dams, the preparation and maintenance of plans to combat incidents at dams, and to give warning to the floodplain area downstream, became a common recommendation of the reviewing professional engineers. At the conclusion of the National Dam Safety Program in 1981, the State Engineer requested that all owners of high hazard dams prepare emergency preparedness plans and provided a guideline for them to follow.

As of June 30, 1986, a total of 113 plans for high hazard dams have been filed with the State Engineer, out of the 251 Federal and non-Federal high hazard dams on file. Of the 113, thirty are for Federal dams, primarily of the Bureau of Reclamation. In addition, plans have been submitted for twenty-two moderate hazard dams (three Federal), and sixteen low hazard dams (one Federal).

During FY 86-87, the State Engineer plans to return comments on the EPP's to the owners for updating and to re-request the balance of the high hazard dam owners to prepare plans, and file them with the State Engineer. The owners will also be requested to coordinate with the Division of Disaster Emergency Services and local disaster coordinators. The requirement to prepare EPP's has been included in the proposed rules and regulations currently being developed.

DAM SAFETY DATA BASE MANAGEMENT SYSTEM

During FY 85-86, the Dam Safety Branch continued to enter data and make corrections to the data base, primarily being done by the several field engineers and a secretary. The FOCUS data base management software was acquired and installed in late June, 1986. It is being tested to learn its features and capabilities. Additional software programming is being considered for use in FY 86-87. Due to the large demand for access to the data base by the several engineers in the Dam Safety Branch, as well as the data processing done by the secretary, another PC was acquired. Also, in order for the Division Engineers' offices to access the data base, additional PC's were acquired for the seven Division Engineers' offices.

EFFECTIVENESS OF PROGRAM

As expressed by the goals and objectives of the State Engineer, the program's effectiveness can be measured by the prevention of dam failures. No failures occurred during the period of the report. Another example of the effectiveness of the dam safety program is shown in the tables of causes for restriction and the restriction list in the appendix. The identification of the unsafe conditions at the several dams and reservoirs and the subsequent restrictions to safe storage levels, prevented inevitable failures of these structures and the costly consequences thereof. The combination of the State Engineer's safety inspections, restrictions to safe storage, follow-up inspections, Emergency Preparedness Plans, and programs to make the dam owners more knowledgeable about the safe operation and maintenance of their dams through the State Engineer's "Dam Safety Manual," makes Colorado's Dam Safety Program one of the most effective in the United States.

LEGISLATION

Four bills were enacted during the fiscal year amending the reservoir statutes: One was House Bill 1010, concerning the storage of water, and relating to facilities constructed therefore, which amended Section 37-87-101, C.R.S. (1973)(1985 Supp.); another was House Bill 1185, concerning the liability for damages resulting from the flow of any water from a reservoir, which amended Section 37-87-104, C.R.S. (1973)(1985 Supp.); another was House Bill 1186, concerning probable future water flows, and relating to hazards associated therewith, which amended Section 37-87-102, C.R.S. (1973)(1985 Supp.); and the last was House Bill 1187, concerning liability of the State of Colorado, and its officers and employees, for acts or omissions regarding reservoirs. Copies of the bills are in Appendices E through H.

RECOMMENDED LEGISLATION

Section 37-87-105 - Approval of Plans for Reservoirs

Recommend adding that plans and specifications must be prepared by a Registered Professional Engineer in Colorado, in accordance with Section 12-25-101, et al., and that apparent violations of the rules of professional conduct will be reported to the state board of registration for professional engineers.

Section 37-87-106 - Cost of Inspections and Observations

Due to the variation in expenses charged for inspections while traveling throughout the state from the Denver area, an apparent inequity exists between the cost of them for each dam. (Expenses charged include salary of the inspecting engineer per hour starting at the beginning of a field trip, mileage, subsistence, and extraordinary expenses such as telephone calls, etc.). The cost of an inspection on the Western Slope, for instance, would be greater than in the Denver metropolitan area. Several dam owners have expressed their unhappiness with this disparity. Consideration should be made to making the cost of the inspection and observation more equitable among the dam owners statewide.

Section 37-87-114.5 (d) - Exemptions

Need to clarify that structures used solely for sediment control which do not permanently store water are exempt. Multi-purpose structures which store water are not exempt. Diversion dams for irrigation canals need to be specifically exempt because they have never been regulated (but could be) and have not caused any damage due to failure in the history of Colorado.

Program Funding

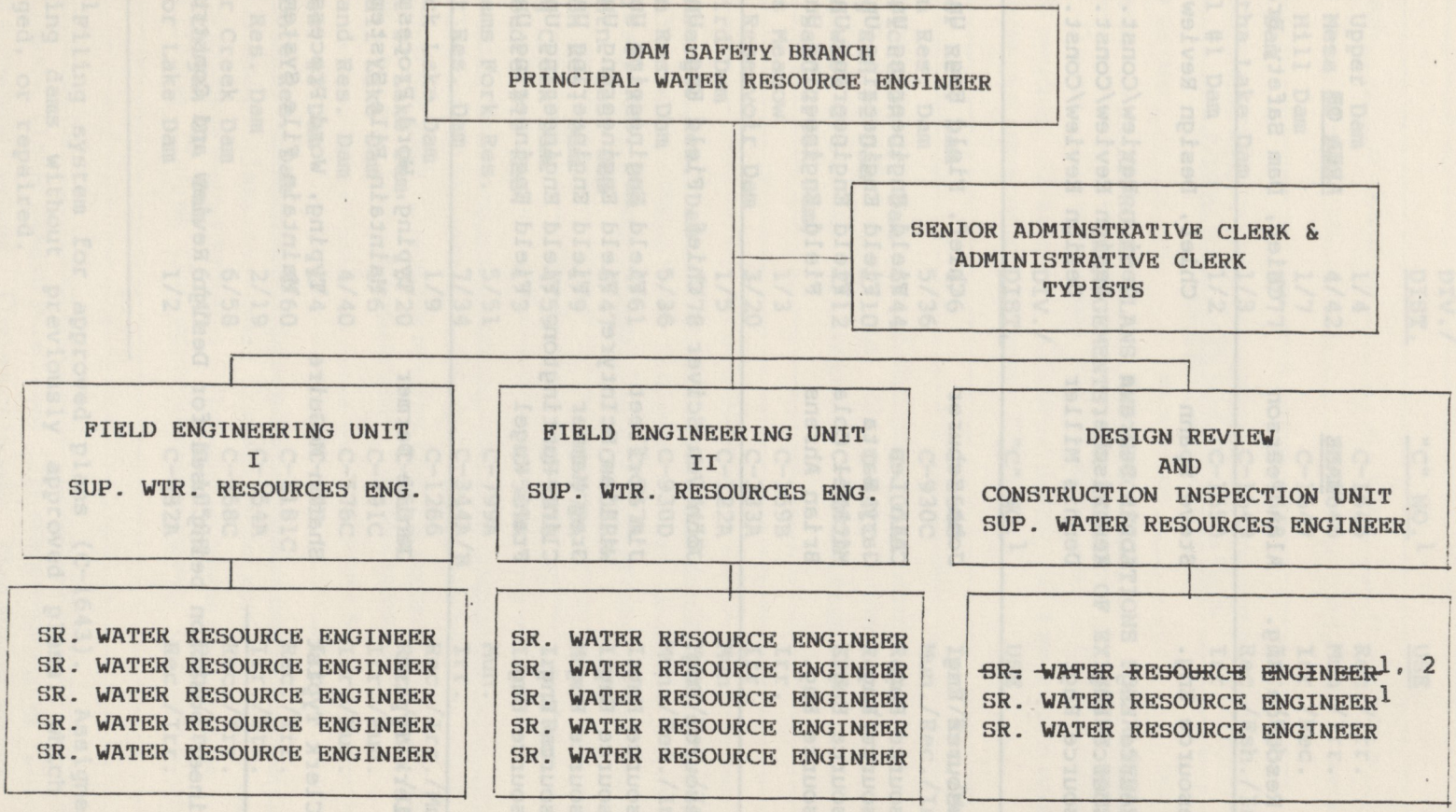
Increased funding is recommended for several areas of the dam safety program in order to maintain and improve it. One area is increased full time employees (FTE); one FTE for the Design Review Unit; and another FTE for the Dam Safety Branch's data base management system.

Due to increased emphasis on safety inspections, one of the FTE's allocated to the Design Review Unit has been transferred back to the Field Engineering Units. However, the Design Review Unit has been assigned the responsibility to inspect the construction of the plans which they review. Another FTE is needed in Design Review in order to maintain the 180 day review time limit, and to assure quality design review.

With the transfer of the dams data base to the DNR WANG VS-100 computer, and the intent to place as much relevant data as possible into the system in order to produce comprehensive management and report data, there is a need for an FTE to support the data base, the branch, and to achieve its objectives.

Rapid changes occur in the field of dam safety engineering and related disciplines. New designs of dams (and rehabilitation of dams) are utilizing new material whose behavior and properties are unknown to the staff, and several conferences are held throughout the country with the object of sharing knowledge and experience in the field of dam safety. It is proposed to establish a training plan to send our dam safety engineers to these training programs in order to maintain a knowledge of the state-of-the-art of dam safety. The estimated first year's cost for such a program would be about $5,000.

Another area is the rental of "All-Terrain Vehicles (ATV)" and helicopters to allow fast and efficient access to many dams in remote areas. It is proposed to reserve about one-fourth of the helicopter time for emergency use. Estimated first year's cost for this program is $30,000.



[1]Field Engineer position being used for Design Review & Construction Inspection.

[2]Position transferred back to Field Engineering Unit I in July, 1986.

APPENDIX A
PERSONNEL
DAM SAFETY BRANCH

TITLE	NAME	AREA OF
Principal Water Resource Eng.	Alan Pearson	Chief, Dam Safety Branch
Superv. Water Resource Eng.	Steve Spann	Chief, Design Review Unit
Senior Water Resource Eng.	Louis DeGrave	Design Review/Const. Insp.[1]
Senior Water Resource Eng.	Ken Fischer	Design Review/Const. Insp.
Senior Water Resource Eng.	Dennis Miller	Design Review/Const. Insp.[1]
Superv. Water Resource Eng.	John Schurer	Chief, Field Eng. Unit - 1
Senior Water Resource Eng.	Chin Lee	Field Engineering Unit - 1
Senior Water Resource Eng.	Gary Barta	Field Engineering Unit - 1
Senior Water Resource Eng.	Michael Cola	Field Engineering Unit - 1
Senior Water Resource Eng.	Brian Ahrens	Field Engineering Unit - 1
Superv. Water Resource Eng.	John Van Sciver	Chief, Field Eng. Unit - 2
Senior Water Resource Eng.	Jim Norfleet	Field Engineering Unit - 2
Senior Water Resource Eng.	William McIntyre	Field Engineering Unit - 2
Senior Water Resource Eng.	Greg Hammer	Field Engineering Unit - 2
Senior Water Resource Eng.	Clint Huntington	Field Engineering Unit - 2
Senior Water Resource Eng.	Frank Kugel	Field Engineering Unit - 2
Senior Admin. Clerk Typist	Janice Dermer	Typing, Word Processing, Maintain File System
Administrative Clerk Typist	Sharon McGuire	Typing, Word Processing, Maintain File System

[1]Field Engineer position being used for Design Review and Construction Inspection.

APPENDIX B

APPROVED PLANS AND SPECIFICATIONS FOR NEW DAMS OR OLD DAMS NOT PREVIOUSLY APPROVED

NAME	DIV./ DIST.	"C" NO.[1]	USE	DATE
Gates Upper Dam	1/4	C-1645	Rec./Irr.	08/14/85
Grand Mesa #8 Dam	4/42	C-1646	Mun./Irr.	09/13/85
Crown Hill Dam	1/7	C-1647	Irr./Rec.	02/28/86
Gomez Dam	7/77	C-1648	Irr./Fsh.	02/28/86
Hiawatha Lake Dam	1/3	C-1649	Rec./Fsh./Irr.	04/04/86
Signal #1 Dam	1/2	C-1650	Irr.	04/17/86

APPROVED PLANS AND SPECIFICATIONS FOR ALTERATIONS, ENLARGEMENTS, OR REPAIR OF EXISTING DAMS

NAME	DIV./ DIST.	"C" NO.[1]	USE	DATE
Boulder Res. Dam	1/6	C-666B	Irr./Rec./Mun.	07/05/85
Dillon Res. Dam	5/36	C-930C	Mun./Rec./Ind./Dom.	
Fortification Cr. Dam	6/44	C-1054A	Rec.	Breached
Spring Run #2 Dam	2/10	C-441C	Rec./Irr.	08/14/85
Cannon Wtsh C-3 (aka Sand Creek Dam)	2/12	C-1282A	ERS	09/10/85
Barnes Meadow	1/3	C-169B	Irr.	09/10/85
Fuchs Reservoir Dam	3/20	C-333A	Irr.	09/10/85
Bluebird Dam	1/5	C-122A	Mun.	09/30/85
Sullenberger Res. Dam	7/78	C-1445B	Mun./Rec./Irr./Dom.	10/10/85
Dillon Res. Dam	5/36	C-930D	Mun./Rec./Ind./Dom.	11/27/85
Buckeye #1 Res. Dam	4/61	C-567A	Irr.	12/19/85
Pole Mtn. Res. Dam	6/47	C-1088A	Irr.	12/19/85
Marston Res. Dam	1/9	C-970A	Mun.	12/31/85
Spring Creek Dam	4/59	C-977B	Irr./Rec.	12/31/85
No. Poudre #15 Res.	1/3	C-509A	Irr.	01/22/86
Williams Fork Res.	5/51	C-799A	Mun.	01/31/86
Summit Res. Dam	7/34	C-344A/B	Irr.	01/31/86
Patrick Lake Dam	1/9	C-1266	Rec./Irr./Mun.	02/28/86
Hermit #1 Lake Dam	3/20	C-1532A	Rec./Fsh./Irr.	02/28/86
Marshall Lake Dam	1/6	C-491C	Irr./Mun.	02/28/86
Overland Res. Dam	4/40	C-576C	Irr./Mun.	05/06/86
Ish Res. #3 Dam	1/4	C-14B	Irr.	05/01/86
Miramonte Res. Dam	4/60	C-1181C	Rec./Irr.	05/20/86
Model Res. Dam	2/19	C-154A	Irr./Stk.	05/20/86
Lester Creek Dam	6/58	C-968C	Rec./Irr.	05/20/86
No. Michigan Cr. Dam	6/47	C-1058B	Rec./Irr.	05/20/86
Windsor Lake Dam	1/2	C-982A	Rec./Irr.	06/23/86

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[1]Filing system for approved plans (C-1643). Assigned to new dams, and existing dams without previously approved plans, which are being altered, enlarged, or repaired.

[2]Filing system for approved plans (C-930B). Letters denote revisions to previously approved plans.

APPENDIX C

ENGINEERS INSPECTION REPORT

OFFICE OF THE STATE ENGINEER-DIVISION OF WATER RESOURCES - DAM SAFETY BRANCH
1313 Sherman Street, Room 818, Denver, CO 80203, (303) 866-3581

DAM NAME _____ W. DIV. _____ W. DIST. _____ DATE OF INSPECTION ___/___/___

DAM ID _____ FILE NO. C- _____ FOREST I.D. _____ DATE OF LAST INSPECTION ___/___/___

OWNER NAME _____ OWNER PHONE _____

ADDRESS _____ ZIP CODE _____

CONTACT NAME _____ CONTACT PHONE _____

CLASS _____ CAPACITY _____ AF SURFACE AREA _____ AC. HEIGHT _____ FT. CREST LENGTH _____ FT CREST WIDTH _____ FT.

CURRENT RESTRICTION ☐ (NO) ☐ (YES) LEVEL _____ EPP ON FILE ☐ (NO) ☐ (YES) SPWY WIDTH _____ FT. FBD. _____ FT. Z _____

INSPECTION PARTY _____ _____ _____
REPRESENTING

DIRECTIONS: MARK AN X FOR CONDITIONS FOUND **AND** UNDERLINE WORDS THAT APPLY. GIVE LOCATION AND EXTENT WITH NUMBER REFERENCE I.E. (25) ALL ALONG SLOPE, OR SHOW IT ON SKETCH.

FIELD CONDITIONS OBSERVED

WATER LEVEL - BELOW DAM CREST _____ FT., BELOW SPILLWAY _____ FT., GAGE ROD _____

GROUND MOISTURE CONDITION: DRY _____ WET _____ SNOWCOVER _____ OTHER _____

UPSTREAM SLOPE

PROBLEMS NOTED: ☐ (0) NONE ☐ (1) RIPRAP - MISSING, SPARSE, DISPLACED, WEATHERED ☐ (2) WAVE EROSION-WITH SCARPS
☐ (3) CRACKS-WITH DISPLACEMENT ☐ (4) SINKHOLE ☐ (5) APPEARS TOO STEEP ☐ (6) DEPRESSIONS OR BULGES ☐ (7) SLIDES
☐ (8) CONCRETE FACING-HOLES, CRACKS, DISPLACED, UNDERMINED ☐ (9) OTHER _____
Comments: _____

CREST

PROBLEMS NOTED: ☐ (10) NONE ☐ (11) RUTS OR PUDDLES ☐ (12) EROSION ☐ (13) CRACKS - WITH DISPLACEMENT ☐ (14) SINKHOLES
☐ (15) NOT WIDE ENOUGH ☐ (16) LOW AREA ☐ (17) MISALIGNMENT ☐ (18) INADEQUATE SURFACE DRAINAGE
☐ (19) OTHER _____
Comments: _____

DOWNSTREAM SLOPE

PROBLEMS NOTED: ☐ (20) NONE ☐ (21) LIVESTOCK DAMAGE ☐ (22) EROSION OR GULLIES ☐ (23) CRACKS - WITH DISPLACEMENT ☐ (24) SINKHOLE
☐ (25) APPEARS TOO STEEP ☐ (26) DEPRESSION OR BULGES ☐ (27) SLIDE ☐ (28) SOFT AREAS ☐ (29) OTHER _____
Comments: _____

SEEPAGE

PROBLEMS NOTED: ☐ (30) NONE ☐ (31) SATURATED EMBANKMENT AREA ☐ (32) SEEPAGE EXITS ON EMBANKMENT
☐ (33) SEEPAGE EXITS AT POINT SOURCE ☐ (34) SEEPAGE AREA AT TOE ☐ (35) FLOW ADJACENT TO OUTLET ☐ (36) SEEPAGE INCREASED/MUDDY
DRAIN OUTFALLS SEEN __No __Yes ☐ (37) FLOW INCREASED/MUDDY ☐ (38) DRAIN DRY/OBSTRUCTED
☐ (39) OTHER _____ Show location of drains on sketch and indicate amount and quality of discharge.
Comments: _____

OUTLET

PROBLEMS NOTED: ☐ (40) NONE ☐ (41) NO OUTLET FOUND ☐ (42) POOR OPERATING ACCESS ☐ (43) INOPERABLE
☐ (44) UPSTREAM OR DOWNSTREAM STRUCTURE DETERIORATED ☐ (45) OUTLET NOT OPERATED DURING INSPECTION
INTERIOR INSPECTED ☐ (120) NO ☐ (121) YES ☐ (46) CONDUIT DETERIORATED OR COLLAPSED ☐ (47) JOINTS DISPLACED ☐ (48) VALVE LEAKAGE
☐ (49) OTHER _____
Comments: _____

SPILLWAY

PROBLEMS NOTED: ☐ (50) NONE ☐ (51) NO EMERGENCY SPILLWAY FOUND ☐ (52) EROSION-WITH BACKCUTTING ☐ (53) CRACK - WITH DISPLACEMENT
☐ (54) APPEARS TO BE STRUCTURALLY INADEQUATE ☐ (55) APPEARS TOO SMALL ☐ (56) INADEQUATE FREEBOARD ☐ (57) FLOW OBSTRUCTED
☐ (58) CONCRETE DETERIORATED/UNDERMINED ☐ (59) OTHER _____
Comments: _____

See Guidelines on Back of this Sheet

Conditions Observed	GOOD	ACCEPTABLE	POOR
UPSTREAM SLOPE			
CREST			
DOWNSTREAM SLOPE			
SEEPAGE			
OUTLET			
SPILLWAY			

DC185a-85

GUIDELINES FOR DETERMINING CONDITIONS

CONDITIONS OBSERVED - APPLIES TO UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, OUTLET, SPILLWAY

GOOD	ACCEPTABLE	POOR
In general, this part of the structure has a near new appearance, and conditions observed in this area do not appear to threaten the safety of the dam.	Although general cross-section is maintained, surfaces may be irregular, eroded, rutted, spalled, or otherwise not in new condition. Conditions in this area do not currently appear to threaten the safety of the dam.	Conditions observed in this area appear to threaten the safety of the dam.

CONDITIONS OBSERVED - APPLIES TO SEEPAGE

GOOD	ACCEPTABLE	POOR
No evidence of uncontrolled seepage. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions do not appear to threaten the safety of the dam.	Some seepage exists at areas other than the drain outfalls, or other designed drains. No unexplained increase in seepage. All seepage is clear. Seepage conditions observed do not currently appear to threaten the safety of the dam.	Seepage conditions observed appear to threaten the safety of the dam. Examples: 1) Designed drain or seepage flows have increased without increase in reservoir level. 2) Drain or seepage flows contain sediment, i.e., muddy water or particles in jar samples. 3) Widespread seepage, concentrated seepage or ponding appears to threaten the safety of the dam.

CONDITIONS OBSERVED - APPLIES TO MONITORING

GOOD	ACCEPTABLE	POOR
Monitoring includes movement surveys and leakage measurements for all dams, and piezometer readings for Class I dams. Instrumentation is in reliable, working condition. A plan for monitoring the instrumentation and analyzing results by the owner's **engineer** is in effect. Periodic inspections by owner's engineer.	Monitoring includes movement surveys and leakage measurements for Class I & II dams; leakage measurements for Class III dams. Instrumentation is in serviceable condition. A plan for monitoring instrumentation is in effect by **owner**. Periodic inspections by owner or representative. OR, NO MONITORING REQUIRED.	All instrumentation and monitoring described under "ACCEPTABLE" here for each class of dam, are not provided, or required periodic readings are not being made, or unexplained changes in readings are not reacted to by the owner.

CONDITIONS OBSERVED - APPLIES TO MAINTENANCE AND REPAIR

GOOD	ACCEPTABLE	POOR
Dam appears to receive effective on-going maintenance and repair, and only a few minor items may need to be addressed.	Dam appears to receive maintenance, but some maintenance items need to be addressed. No major repairs are required.	Dam does not appear to receive adequate maintenance. One or more items needing maintenance or repair has begun to threaten the safety of the dam.

OVERALL CONDITIONS

SATISFACTORY	CONDITIONALLY SATISFACTORY	UNSATISFACTORY
The safety inspection indicates no conditions that appear to threaten the safety of the dam, and the dam is expected to perform satisfactorily under all design loading conditions. Most of the required monitoring is being performed.	The safety inspection indicates symptoms of *possible* structural distress (seepage, evidence of minor displacements, etc.), which, if conditions worsen, *could* lead to the failure of the dam. Essential monitoring, inspection, and maintenance must be performed as a requirement for continued full or reduced storage in the reservoir.	The safety inspection indicates *definite* signs of structural distress (excessive seepage, cracks, slides, sinkholes, severe deterioration, etc.), which *could* lead to the failure of the dam if the reservoir is used to full capacity. The dam is judged unsafe for full storage of water.

SAFE STORAGE LEVEL

FULL STORAGE	CONDITIONAL FULL STORAGE	RESTRICTION
Dam may be used to full capacity with no conditions attached.	Dam may be used to full storage if certain monitoring, maintenance, or operational conditions are met.	Dam may not be used to full capacity, but must be operated at some reduced level in the interest of public safety.

CLASSIFICATION OF DAMS

CLASS I	CLASS II	CLASS III
Class I - Loss of human life is expected in the event of failure of the dam, while the reservoir is at the high water line.	Class II - Significant damage to improved property is expected in the event of failure of the dam while the reservoir is at the high water line, but no loss of human life is expected.	Class III - Loss of human life is not expected and damage to improved property is expected to be small, in the event of failure of the dam while the reservoir is at high water line.

DAM NAME: _____ DAM I.D.: _____ DATE ___/___/___

MONITORING

EXISTING INSTRUMENTATION FOUND ☐ (110) NONE ☐ (111) GAGE ROD ☐ (112) PIEZOMETERS ☐ (113) SEEPAGE WEIRS/FLUMES

☐ (114) SURVEY MONUMENTS ☐ (115) OTHER _____

MONITORING OF INSTRUMENTATION: ☐ (116) NO ☐ (117) YES PERIODIC INSPECTIONS BY: ☐ (118) OWNER ☐ (119) ENGINEER

Comments: _____

GOOD ☐ ACCEPTABLE ☐ POOR ☐ **MONITORING**

MAINTENANCE AND REPAIR

PROBLEMS NOTED: ☐ (60) NONE ☐ (61) ACCESS ROAD NEEDS MAINTENANCE ☐ (62) CATTLE DAMAGE

☐ (63) BRUSH ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE ☐ (64) TREES ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE

☐ (65) RODENT ACTIVITY ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE ☐ (66) DETERIORATED CONCRETE-FACING, OUTLET, SPILLWAY

☐ (67) GATE AND OPERATING MECHANISM NEED MAINTENANCE ☐ (68) OTHER _____

Comments: _____

GOOD ☐ ACCEPTABLE ☐ POOR ☐ **MAINTENANCE AND REPAIRS**

OVERALL CONDITIONS

REMARKS: _____

Based on this Safety Inspection and recent file review, the overall condition is determined to be:

☐ 71 SATISFACTORY ☐ 72 CONDITIONALLY SATISFACTORY ☐ 73 UNSATISFACTORY

OVERALL CONDITIONS

The State Engineer, by providing this dam safety inspection report, does not assume responsibility for any unsafe condition of the subject dam. The sole responsibility for the safety of this dam rests with the reservoir owner or operator, who should take every step necessary to prevent damages caused by leakage or overflow of waters from the reservoir or floods resulting from a failure of the dam.

ITEMS REQUIRING ACTION BY OWNER TO IMPROVE THE SAFETY OF THE DAM

MAINTENANCE - MINOR REPAIR - MONITORING

☐ (80) PROVIDE ADDITIONAL RIPRAP: _____

☐ (81) LUBRICATE AND OPERATE OUTLET GATES THROUGH FULL CYCLE: _____

☐ (82) CLEAR TREES AND/OR BRUSH FROM: _____

☐ (83) INITIATE RODENT CONTROL PROGRAM AND PROPERLY BACKFILL EXISTING HOLES: _____

☐ (84) GRADE CREST TO A UNIFORM ELEVATION WITH DRAINAGE TO THE UPSTREAM SLOPE: _____

☐ (85) PROVIDE SURFACE DRAINAGE FOR: _____

☐ (86) MONITOR: _____

☐ (87) DEVELOP AND SUBMIT AN EMERGENCY PREPAREDNESS PLAN. _____

☐ (88) OTHER: _____

☐ (89) OTHER: _____

ENGINEERING - EMPLOY AN ENGINEER EXPERIENCED IN DESIGN AND CONSTRUCTION OF DAMS TO: (Plans & Specification must be approved by State Engineer prior to construction.)

☐ (90) PREPARE PLANS AND SPECIFICATIONS FOR THE REHABILITATION OF THE DAM: _____

☐ (91) PREPARE AS-BUILT DRAWINGS OF: _____

☐ (92) PERFORM A GEOTECHNICAL INVESTIGATION TO EVALUATE THE STABILITY OF THE DAM: _____

☐ (93) PERFORM A HYDROLOGIC STUDY TO DETERMINE REQUIRED SPILLWAY SIZE: _____

☐ (94) PREPARE PLANS AND SPECIFICATIONS FOR AN ADEQUATE SPILLWAY: _____

☐ (95) SET UP A MONITORING SYSTEM INCLUDING WORK SHEETS, REDUCED DATA AND GRAPHED RESULTS: _____

☐ (96) PERFORM AN INTERNAL INSPECTION OF THE OUTLET: _____

☐ (97) OTHER: _____

☐ (98) OTHER: _____

☐ (99) OTHER: _____

SAFE STORAGE LEVEL RECOMMENDED AS A RESULT OF THIS INSPECTION

☐ (101) FULL STORAGE

☐ (102) CONDITIONAL FULL STORAGE

☐ (103) RECOMMENDED RESTRICTION → RESTRICTED LEVEL OFFICIAL ORDER TO FOLLOW

- _____ FT. BELOW DAMS CREST
- _____ FT. BELOW SPILLWAY CREST
- _____ FT. GAGE HEIGHT
- _____ NO STORAGE-MAINTAIN OUTLET FULLY OPEN
- _____ _____

REASON FOR RESTRICTION: _____

ACTIONS REQUIRED FOR CONDITIONAL FULL STORAGE OR CONTINUED STORAGE AT THE RESTRICTED LEVEL: _____

Engineer's Signature _____ INSPECTED BY

Owner's Signature _____ OWNER/OWNER'S REPRESENTATIVE DATE: ___/___/___

DC-22-2649a-86

APPENDIX D

DAM SAFETY BRANCH
CURRENT RESTRICTIONS[1]

JUNE 30, 1986

DIVISION ONE

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Adams & Bunker #3	1	6' below crest	5/22/75	Inadequate freeboard, high seepage	L	150
Akers & Tarr	5	7' below crest	2/17/83	Sloughing on downstream slope	M	95
Allis	8	11.5' below crest	5/03/85	Temporary repaired slough	M	80
Angel Lake	3	8' below crest	2/21/78	Poor condition	L	309
Antero	23	No storage	2/04/86	Stab. berm const. & new instrumen. monitoring	H	8,000
Badding/Croke 12 West	7	11' below embankment crest	12/30/83	Lack of maint. & repair; no serv. spwy.; no invest. of seepage situation, no EPP	H	751
Baseline	6	2.' below spwy	4/01/86	Seepage on D/S Slope	H	600
Beaver Brook #2	7	3.0' below crest	8/26/85	Inadequate spwy., maint.	H	2
Beaver Brook #3A	7	15' below crest	9/17/85	Seepage high on embankment	H	48
Beaver Park	5	5' below spillway	11/8/84	Inadequate spillway	H	570

[1]Total Storage Lost 158,981.6

* Restrictions imposed this month.
** Restrictions removed this month (date).
\+ Revised existing restrictions

Division One (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Bergen #1	9	5' below crest	7/11/83	Questionable cond. of east embnkmt.	M	90
Bergen #2	9	10' below crest	4/30/84	Cracks in crest; inadequate spillway	H	209
Bergen #5	9	5' below crest	5/13/86	Generally poor state of repair & maintenance	L	25
Bijou #2	1	G.H. 15 ft.	5/16/83	Erosion on upstream slope	M	470
Bluebird	5	No storage	11/21/74	Poor condition	M	966
Box Elder #3	3	5' below outlet	10/10/84	No emergency spillway	L	150
Brewer	2	No Storage	9/26/85	Generally poor condition	L	36
Bright View #1	2	7' below crest	9/30/85	Inoperable outlet, inadequate frbd.	L	17
Carlin	02	5' below crest	3/21/86	No spillway	L	0
Carmody	9	3' below crest	4/30/84	No spillway	M	0
Chambers	3	No storage above gage 45' more than 30 days	11/22/78	Excessive seepage over gage 45	H	0
Clarks Lake	3	G.H. 5 ft.	4/23/84	Poor condition	M	338
Clennon	5	6' below crest	7/11/85	Eroded and scarped u/s slope and eroded crest.	M	25
Comanche	3	27.0 ft.	1/21/83	Excessive seepage-Sand boils in toe area	H	340

Division One (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Cooke	1	5' below crest	3/20/74	Deteriorated conditions	L	75
Croke #12 East	7	4.0' below emerg. spillway	6/01/84	Leakage from outlet pipe, sinkholes & depressions above outlet pipe	M	44
Crystal	5	5' below crest at outlet	4/17/85	Excessive seep. erosion of U/S slope, no spwy., brush, trees, and slough areas on D/S slope	M	50
Curtis	3	G.H. 10'	7/2/85	Irr. narrow crst, eroded unprotected u/s slope, exten. seep. area below d/s toe.	M	173
D. A. Lord #4	1	7' below crest	2/10/76	Inadequate spillway - seepage	L	450
Davis	80	10' below crest	9/13/84	Non-existent emergency spillway	L	10
Derby	2	14.5' below crest	2/5/85	Inadequate Spillway	M	400
Dixon Canyon	3	6' below crest	4/13/84	Erosion of u/s slope, sliding of d/s slope, lack of maintenance	M	195
Dry Creek	3	6' below crest	3/27/84	Outlet deter., u/s face erosion seep. d/s slope cracking	L	125
Eastlake #2	2	10.0' below crest	3/07/86	Poor condition of outlet	M	150
Eaton Law	3	6' below crest	1/3/77	Questionable condition of outlet	M	200
Elder	3	8.5' below crest	10/20/81	Inadequate spillway	H	264
Empire	1	No storage above G.H. 29.0	7/9/84	Excess seepage and no spillway	H	6,000

Division One (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
*Erie	6	3.0' below crest	06/02/86	Insufficient Freeboard	M	29
Fairport	4	6' below crest	7/16/73	Poor condition	L	0
Fairview #2	8	5' below crest	5/6/86	Inadequate Spillway, inoperable outlet	L	12
Florissant	23	No storage	5/21/73	Spillway failed	L	20
Foothills	5	G.H. 41.0 ft.	5/20/86	Excessive Leakage	H	450
Francis Smart	6	1' below spillway	12/12/84	Incompleted dam construction	L	40
Geist/aka/B-22	3	5' below crest	1/27/84	Erosion, seep., inad. spwy. no acceptable outlet	L	57.5
Gerlits	8	No storage	11/13/84	Dam partially breached due to overtopping	L	10
Gray #3	3	2' below spillway	3/11/83	Severe erosion U/S slope	M	200
Green Lake #1	6	13.5' below crest	10/12/84	Seepage, no spillway	L	30
Green Lake #3	6	3' below crest	10/8/84	Leaks, inadequate spwy. freeboard	L	60
Harris Park Est.#1	80	G.H. 0 ft.	4/13/84	Inadequate spillway	M	207
Haviland	3	5.0 below spwy.	10/17/85	Saturated condition of embnkmnt. 10 feet above toe of dam	M	270
Highland	5	4' below crest	3/7/77	Inadequate freeboard	L	90
Hourglass	3	9.5' below crest	10/27/75	Excessive seepage	H	259

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Hyatt	7	8' below crest	5/8/84	Seepage d/s of toe and continual pressure on outlet pipe	M	360
Idaho Springs	7	9' below crest	7/9/84	Freeboard, leakage, depression spot	M	59
Ide & Starbird #1	5	3' below crest	7/3/85	Poor maintenance, eroded u/s face questionable spillway	M	---
Jasper	6	5' below crest	9/3/85	Leakage next to outlet; inadequate frbd.; deteriorated spillway.	M	200
*John Law	3	3' below crest	6/27/86	Inadequate freeboard & spillway	L	20
Johnson/aka Hohnholtz #3	48	7.0' below crest	5/22/85	Restriction of 10/15/84 lifted for 30 days.	L	
Julesburg	64	G.H. 24.0	3/17/86	Revised until 9/1/86 to allow collection of data	H	
Kalcevic	7	11' below crest	2/10/83	Sloughing on upstream slope	H	69
Knoth	5	Zero storage	12/24/85	Never completed dam.	L	204
Lake George	23	6' below crest	11/07/85	Crack on downstream slope	M	30
Lake Loveland	4	8.0' below crest	6/27/85	Deteriorated outlet, no spillway	H	1,000
Lambert	8	8' below crest	7/10/84	Completely rehabilitate the dam	L	50

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Leyden	7	8' below crest	5/29/74	Inadequate spillway, unstable embankment	M	207
Lilly Lake	4	3.5' below crest	10/9/85	Spillway too small	M	5.0
Little Gem	5	10.0' below crest	10/11/85	Erosion on U/S slope & crest & trees on U/S slope	L	60
Little Hohnholtz (Hohnholtz #2)	48	7' below crest	10/10/84	Questionable outlet, seepage	L	200
Louisville #1	6	5.5' below crest	6/28/85	Excessive seepage This is a seasonal restriction between the months of 10/1 & 4/30	M	---
Loup Lake	3	1' below spillway	7/26/84	Wave erosion on upstream face	M	100
Lower Chinns	7	7' below crest	11/13/84	Excessive seepage in vicinity of outlet	L	14
Lower Cochran	9	4.5' below crest	5/22/86	Poor condition of upstream slope	L	2
Lower Long Lake	7	5.0' below crest	6/21/85	Poor condition of upstream face and crest, no spillway	M	52
Magnusun #1	23	8.0' below crest	12/4/85	Provide adequate freeboard	L	18
Mitchell #1	3	3' below crest	4/25/83	Insufficient freeboard	L	32
Mountain	23	4' below crest	11/06/85	Insufficient freebd., seepage @ toe	L	3
Mountain Supply #8	3	No storage	10/3/78	Poor condition	L	643

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Munger No. 2	2	12' below crest	11/27/85	Poor condition	L	53
No. 4 Dam	9	Zero storage	11/06/85	Structure not accepted for storage	L	12
North Poudre #1	3	7' below crest	5/2/84	Poor u/s slope, decaying tree stumps, deteriorated riprap	M	106
North Poudre #2	3	G.H. 18 ft.	5/15/84	Concentrated seep, questions concerning abandoned outlet	H	985
North Poudre #4	3	G.H. 17 ft.	4/25/84	Poor u/s face, general condition	M	265
North Poudre #5	3	5.5' below spillway	12/12/78	Seepage instability	H	2,375
North Poudre #6	3	G.H. 9 ft.	1/21/83	Inadequate spillway, outlet, riprap	H	4,567
North Poudre #15	3	G.H. 40 ft.	10/3/78	Instability, seepage, poor riprap	H	1,283
North Poudre #17	3	15' below crest after repaired	7/15/83	Poor condition, outlet	M	600
Oberon #1 (Lower) aka/ Hays Lake	7		6/8/85	Inadequate spwy., inoperable & disintegrating outlets.	M	54
Ohio Lake	2	5' below crest	5/14/84	Erosion on u/s slope, rodent activity, lack of maintenance	M	0
Panhandle	3	Level of Morning Glory spillway	3/14/84	Lack of monitoring and maintenance	H	192
Park Creek #2	3	8' below crest	10/3/84	Generally poor condition, seepage	M	10
Patrick Lake	8	4' below crest	12/9/82	Inadequate spillway	H	300

Division One (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Pear	5	No storage	11/21/74	Poor condition	L	420
Pennock Creek/aka/ Twin Lakes	3	Zero storage	1/22/86	Deteriorated outlet, etc.	M	278.0
Peterson	3	12.6' below principal spillway	8/16/82	Excessive uplift at toe	H	246
Polly Deane	9	6.5' below crest	4/30/84	Erosion of upstream slope, poor general condition	M	57
Prospect	1	1.5' below spillway	4/15/80	Post-failure monitor	M	600
Rainbow Falls #5	8	9' below crest	9/11/85	Inadequate spillway	L	25
Richards	2	6' below crest	12/22/83	Erosion, narrow crest, seepage, plugged outlet, etc.	L	140
Rist Canyon	3	3' below crest	4/19/83	Poor condition	L	30
Rist George	4	Gage 10.8	7/18/85	Dilapidated condition, no spwy.	M	200
Riverside	1	G.H. 33.55 ft.	5/9/84	Prevent overfilling of reservoir	H	0
Rockwell Dam	4	8' below crest	6/8/72	Poor riprap, no access to outlet control	L	62
Rosalie #1	80	No storage	11/9/84	Overtopping, slide on d/s slope	L	5
Rush Creek #1	65	7' below crest	5/10/84	Failure of principal spillway and eroded upstream slope	L	20

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Rush Creek #2	65	4.9 below crest	4/07/86	Eroded upstream slope; slough on downstream slope (Temp. rev. til 9/30/86)	L	0.
Ryan Gulch	4	8' below crest	2/15/78	Inadequate spillway and leakage	M	217
Sandbeach	5	No storage	2/7/83	Poor condition	M	297
Section 19 Res.	6	4' below crest	7/24/84	No spillway	M	10
Shaffer/aka Tinker Shaffer	8	No storage	6/4/84	Outlet unsafe, sinkholes above outlet	L	90
Signal #1	2	10' below crest	5/25/84	Concentrated seepage areas and questionable condition of outlet	L	100
Southside	4	8' below crest	7/7/78	Inadequate spillway	M	144
Storm	2	5' below crest	11/7/84	Inadequate cross-section, low areas on crest, service spwy. blocked	L	10
Sun Lake	23	5' below crest	6/20/83	Provide adequate freeboard	L	1
Todd (B-10)	2	10.0' below crest	3/18/86	Poor condition	L	10
Tom Frost Dam	2	Zero storage	4/01/86	Rodent damage	L	75
Tony White	8	10' below crest	5/18/84	Dam breached through spillway	L	112
Tucker Lake	7	6' below crest	6/12/78	Inadequate spillway	H	70
Upper Michigan	23	6.5' below crest	9/13/85	Slope instability, no outlet	L	50

Division One (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Vaile	2	7.0' below crest	9/26/85	No spwy., slope erosion on U/S side	L	25
Wadley #1	2	8.0 below crest	6/13/85	Poor condition of dam	L	50
Wadley #2	2	7.0 below crest	6/17/85	Poor condition of dam	L	140
*Waterpoint	2	No storage	6/19/86	Poor condition of spillway	L	10
Williams Res.	7	4.0' below crest	8/ /85	Unsat. spwy., inoperable outlet	L	4.0
Williams-McCreery	1	Gage height 15.0	8/28/85	Questionable foundation embnkmnt.	H	16,000
Wind	23	5.5' below crest		Saturated downstream slope	L	3.0
Woodland Park	8	20' below crest	4/21/83	Poor condition/inadequate spillway	H	40
Worster	3	5' below spillway	7/26/84	Inadequate emergency spillway	M	531
				Division One Total		57,343.5

DIVISION TWO

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Calahan	10	8' below crest	12/6/84	Saturated downstream slope	L	180
+Cripple Creek #3	12	3' below crest	6/27/83	Inadequate spillway	L	120
+Cucharas #5	16	5' below spillway	6/20/86	Spillway inadequate	H	6,500
Cudahy #1	17	5' below crest	7/15/85	Outlet disrepair	L	900
Dye	17	5' below crest	5/8/85	Poor upstream slope/no spillway	M	300
Evans Gulch	11	3' below crest	9/14/84	Insufficient freeboard	L	2
Evans Gulch #2	11	2' below spillway	9/14/84	Insufficient freeboard	M	39
Holita	16	3' below crest	6/2/77	Inadequate freeboard, slip on D/S slope	L	189
Horse Creek	17	2' below spwy.	4/04/86	Excessive seepage	M	5,225
Horse Creek & Black Draw	17	5' below crest	4/24/86	In disrepair, abandoned	L	112
Lake Chipita	10	5' below crest	3/11/83	Provide adequate freeboard	L	5
Lake Henry	17	6.5' below crest	6/7/85	Seepage at east dike	M	500

Division Two (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Lolita #3	17	5' below crest	8/12/85	Inoperable outlet, uneven crest	L	700
Martin Lake	16	5' below crest	2/18/83	Inadequate spillway, poor condition of outlet	H	412
Mill Lake	16	9' below crest	2/16/83	Inadequate spillway, poor condition	L	40
Modern Woodmen of America #2	10	No storage	8/12/83	Spillway obstructed	L	18
Monument	10	3' below spillway	4/23/85	Unsat. Spillway condition	M	150
Mount Pisgah	12	5.2' below spillway	6/6/85	Inadequate spillway capacity	M	586
Neenoshe	67	5' below crest	1/17/83	No spillway	M	7,392
Orlando #2	16	G.H. 22.5 ft.	7/24/84	Cracks on downstream slope	L	750
Park Center L&W#2	12	No storage	9/26/85	Slide on downstream slope	L	15
Park Center #10	12	6' below crest	1/5/74	Severe cracking	L	12
Queen	67	8.0' below crest	4/07/86	Unsatis. U/S slope riprap	M	1,000
Rainbow Lake	11	5' below crest	9/16/85	Insuff. frbd. & spwy. capacity	L	50
Sharps Orchard	16	7' below crest	5/1/72	Badly eroded upstream slope	L	20

Division Two (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Silver Spruce #7	12	4' below crest	1/18/85	Seepage and slide	L	6
Swink #1	17	5' below crest	4/24/86	In disrepair, abandoned	L	500
Swink #2	17	5' below crest	4/24/86	In disrepair, abandoned	L	600
Swink #5	17	5' below crest	4/24/86	In disrepair, abandoned	L	750
Swink #6 (aka - Powell)	17	5' below crest	4/24/86	In disrepair, abandoned	L	650
Three Elk Dam	11	No storage	8/14/72	Inadequate spillway leakage	L	26
Thurston	67	5' below crest	1/24/83	Inadequate freeboard	L	1,300
Timpas #3	17	10' below crest	4/21/86	In disrepair, abandoned	L	500
Two Buttes	67	35' below crest	1/24/83	Inadequate spillway	H	22,200
Valdez, Antonio	16	5' below crest	11/13/84	Inadequate freeboard,outlet damaged	L	450
Valley #1	10	15' below crest	12/27/84	Poor condition and blocked spillway	L	50
Valley #2	10	40' below crest	12/27/84	Inoperable outlet, poor condition	L	150
Victor #2	12	8' below crest	6/22/84	Extensive cracking along embankment	M	17
Wahatoya	16	5' below crest	5/12/75	Excess seepage, cracks	H	52
Walsenburg Water	16	5' below crest	5/12/75	Excess leakage, erosion	M	0
				Division Two Total		52,468

DIVISION THREE

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Cove Lake	22	No storage	5/8/74	Dam failed	L	6,380
Eastdale #1	24	Gage 18'	4/4/78	Excessive seepage	L	1,008
Eastdale #2	24	10' depth of storage	11/18/85	Poor condition of outlet structure	L	2,000
Flickinger	26	17' below crest	11/12/80	Inadequate spwy., poor construction	L	30
Forbes Park	35	2.5' below spwy.	7/19/85	Inadequate spillway	L	45
Fuchs	20	No Storage	7/9/84	Erosion of emergency spillway	M	60
Hermit Lake #1	20	Level of service spillway	9/14/84	Sinkhole adjacent to outlet	L	182
Mountain Home	35	Gage 87.5'	9/16/82	Inadequate spillway	H	15,000
**Salazar #1	24	7' below crest	7/25/85	Severe erosion of U/S slope and inadequate freeboard	M	34
Terrace	21	7' below spillway	7/18/84	Deteriorated spillway	H	2,000
Willow Creek	24	No storage	8/12/77	Poor condition	M	1,000
				Division Three Total		27,739

DIVISION FOUR

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Alta #1	60	5' below spillway	8/18/76	Inadequate spillway	L	20
Alta #3	60	5.0' below crest	9/16/85	Insufficient freeboard	L	10
Arch Slough	40	Gage 0.0	12/12/85	Poor condition	L	66
Beaver	40	10' below crest	6/26/78	Excessive abutment leakage	H	210
Big Battlement	40	5' below crest	9/27/84	Insufficient freeboard	L	134
Blanch Park	40	No storage	10/10/84	Piping of hole through embankment	L	36
Buckeye #1	61	4' below crest	3/3/83	No spillway	H	140
**Carl Smith	40	5' below crest	3/27/80	Inadequate spillway stability	H	108
Casto	63	12' below crest	4/6/84	Rodent holes, abandoned outlet, thin crest	M	477
Cliff Lake	42	Zero storage	11/20/85	Geologic slide	L	21
Coffey	41	15' below crest	10/22/85	Poor condition & excessive seepage	L	35
Cole #4	40	3' below crest	9/14/84	Lack of freeboard, crest width and muskrat diggings	L	5.6
Columbine	40	5.0' below crest	9/27/85	Lack of frbd., irregular crest elevation	L	22
Craig #1	63	3' below spillway	05/1/86	Seepage ponding at toe and brush obscuring upstream slope	M	95
Cushman Lake	60	6' below crest	7/29/75	Dilapidated condition	L	6

Division Four (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Dogfish	40	7' below crest	9/13/85	Sinkhole	L	55
Duvall #1	73	16' below crest	5/22/85	Poor condition, no outlet	L	15
**Elephant	68	4' below crest	6/22/84	Poor condition	L	30
Fullmoon	68	3' below crest	11/27/85	Maintain minimum freeboard	L	--
G.H.& S. #2	42	6' below crest	3/14/84	Narrow crest, steep slopes	L	29
Granby #11	40	6' below crest	4/2/84	Abutment sink holes	M	72
Granby #12	40	8'/7' below crest	8/30/85	Slides on downstream slope	M	98
Grand Mesa No. 1	42	9' below crest	8/8/84	Extensive seepage, inadequate spillway, unacceptable outlet	L	230
Hale	40	5' below crest	9/17/85	Sinkholes	L	15
Holy Terror	40	5' below crest	3/12/80	Inadequate spillway	L	32
Inter Ocean	40	Zero storage	7/22/85	Unsafe beaver dam	L	5
Knox	40	Gage rod 13'	2/14/68	Slide - excess leakage	L	135
Leon Park	40	2' below spillway	9/14/84	Slip on upstream slope	L	36
Little Giant #1	40	5' below crest	9/30/85	Slip on left toe of dam	L	3.5
Little Giant #2	40	No storage	9/9/85	Leak beside outlet	L	7.0
Lone Cabin	40	3' below spillway	9/11/84	Slide on downstream slope	L	40

Division Four (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Lone Star #1	40	10' below crest	4/12/85	Construction without plans	L	
Lone Star #3	40	4' below crest of spillway	4/12/85	Construction without plans and specs	L	
Meridian Park Lake	59	Outlet fully open	4/16/79	Construction not complete	L	105
Miramonte	60	5' below spillway	7/15/76	Extensive leakage	H	1,845
Mock #1	41	9' below crest	9/20/82	Poor condition	L	20
Monument	40	11' below crest	5/22/86	Inadequate spillway	M	20
Norwood Pond	60	5' below crest	1/5/83	Seepage high up on D/S slope	L	4
Oasis	40	3' below crest	11/9/84	Lack of freeboard, poor outlet	L	21
Overland	40	G.H. 35 feet	8/9/84	Cracking of embankment	H	2,000
Priest Lake	60	3' below crest	9/16/85	Insufficient freeboard	L	25.0
Reeder	42	8' below crest	8/14/85	Insufficient freeboard Seepage, trees,	L	96
Spring Creek	59	5' below spillway	1/14/83	Inadequate spillway	H	400
Squirrell Fish Pd.	62	4.0 'below crest	6/11/85	Steep slopes, narrow crest, no plans or outlet	L	25
St. George	40	7' below crest	10/19/84	Lack of freeboard, muskrats, cattails, and seepage	L	145

Division Four (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Todd	40	10' below crest	10/19/84	6' elevation difference along crest with no spillway	L	112
Vela	40	G.H. 30 feet	9/14/84	Slip on downstream slope	L	32
Waterbug	40	5' below spillway	8/9/72	Poor condition	L	0
Womack #3	40	4' below crest	9/14/84	Inadequate cross-section	L	23
				Division Four Total		7061.1

DIVISION FIVE

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Barton Porter	45	5' below crest	8/2/84	Severe erosion of upstream slope	L	10
*Basin	50	5' below crest	6/19/86	Inadequate Freeboard, Wave erosion, Badger infestation, seepage at toe	L	18
Battlement #2	45	Zero storage	11/5/85	Damaged outlet	L	70
Beaver Lake	38	5.0' below crest	9/12/85	Insufficient frbd., embnkmnt. stability, insuff. crest width.	L	30
Big Beaver	72	7' below crest	8/20/85	Extensive seepage	L	35
Big Creek #3	72	3.0' below spwy.	10/17/85	Inadequate spwy., ext. seepage	M	200
*Binco	50	5' below crest	6/27/86	Insufficient Freeboard, Wave Erosion	H	62
Bobo Strait	36	3' below crest	8/8/85	Inadequate freeboard	L	---
Bull Basin #1	72	9' below crest	10/12/84	Unstable conditions	L	40
Bull Creek #3	72	9.0' below crest	8/20/85	Extensive seepage	L	25
Bull Run	51	4' below spwy.	6/28/85	Inadequate spillway	L	45
Coon Creek #1	72	5' below spillway	11/23/82	Poor condition	M	141
Coon Creek #2	72	3' below spillway	11/23/82	Poor condition	M	121
Coon Creek #3	72	5' below crest	10/15/84	Lack of freeboard	L	30
Coon Creek #4	72	No storage	1/27/84	Corroded outlet pipe	L	9
Cottonwood #2	72	3.0' below spwy.	10/17/85	Inadequate spwy., ext. seepage	M	50.0

Division Five (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Crescent Lake #2	53	5' below crest	10/19/84	Sinkhole, outlet damage, inadequate freeboard	L	35
Currier #2	72	4' below spwy.	8/02/84	Severe erosion in spwy. channel and left side slope	L	70
Dale #2	51	5' below crest	7/5/85	Insufficient freeboard	L	15
Dawson/aka/Lambert	72	3.0' below crest	10/17/85	Inadequate spwy., poor condition	L	70
Divide Creek	39	Reduce dam to 10'	4/18/83	Unapproved	L	10
Fruita Settling Basin #2	72	20' below crest	6/22/84	Poor condition	L	150
G. G. Lower	37	No storage	2/14/86	Inadequate freeboard	L	37
G. G. Upper	37	No storage	2/14/86	Inadequate frbd. & questionable stability of D/S slope	L	30
Harris	39	6.0' below spwy.	11/27/85	Undersized spillway	M	50
Hoagland #1	36	No storage	10/29/76	Excessive leakage, poor condition	L	99
Hopkins	38	8' below crest	8/3/84	Excessive seepage at downstream toe	M	54
Huntington	51	10' below crest	11/27/84	Reconstruction w/o required plans and specifications	L	50
Jones	36	3' below crest	8/8/85	Insufficient freeboard	L	4
Jones	52	5' below p. spwy.	10/23/85	Outlet disrepair, seepage on embmnt.	M	35
Kelly Dam	53	5' below crest	11/21/84	Insufficient freeboard	L	50

Division Five (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Kendall	72	No storage	8/28/85	Dam breached	L	87
Kitson	72	3.0 below crest	10/17/85	Inadequate spwy, seepage, poor condition	L	45
Langholen	51	4.0' below spwy.	6/28/85	Inadequate spillway, deteriorated outlet	L	60
Leon Lake	72	3.0' below spwy.	8/20/85	Inadequate spillway	H	300
Little King Ranch	51	10' below crest	4/16/73	Excessive leakage	L	180
**Mack Mesa	72	1.0' below spwy.	9/17/85	Transverse crack on embankment	L	18.0
McCoy	53	Zero storage	5-26-72	Slide on D/S slope, outlet disrepair	H	200
**McElroy	50	10' below spwy	6-11-86	Incomplete construction	L	96
Mesa Creek No. 4	72	10' below crest	1/18/83	Excessive seepage and instability	M	324
Mesa Lake #2	72	5.0' below spwy.	10/17/85	Rodent holes in embkmnt., eroded toe area	L	150
Morris	53	5.0' below crest	10/18/85	Insufficient freeboard	L	24
*Muddy Gulch	72	No storage	6/2/86	Inad. s/w, seepage, poor condition	L	5
Newton Gulch	53	20' below crest	7/3/75	Abutment piping failure	L	20
Noeker	37	5' below crest	10/10/84	Badger holes down into crest	L	65
Parker Basin #3	72	4.0' below spwy.	10/17/85	Inadequate spwy., seepage, steep slopes	L	125

Division Five (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Parsons	50	Zero storage	11/27/85	Inadequate spwy. sagging crest abutment slides	L	107
Pinney	50	7' below crest	5/10/78	Inadequate outlet and spillway	L	30
Ralston #1	38	3.0' below crest	7/2/85	Inadequate freeboard	L	20
Rapid Creek #1	72	3' below spillway	9/26/84	Extensive downstream seep area and need for embankment rehab.	M	375
Rapid Creek #2	72	5' below crest	3/14/84	Erosion, inadequate freeboard, outlet inoperable	M	147
Rifle Valley	39	5' below crest	2/14/77	No spillway, outlet, inoperable	M	49
Rock Creek	51	15' below crest	1/22/79	Inadequate spillway, poor embnkmnt.	L	125
Ruby Lee	72	No Storage	6/25/85	Inadequate spillway, poor condition	L	367
+Scholl	51	22' below crest	6/30/86	Sinkholes in abutment	L	250
Schorn Fish Pond	72	No storage	9/14/82	Poor condition	L	7
Sterner	53	15' below crest	11/27/85	Slope instability	L	490
Sylvan	51	5' below crest	9/30/85	Insufficient freeboard	M	130
Upper Craven	50	10' below crest	8/2/85	Spillway backcutting	L	15
Upper Highline	72	10' below spwy.	8/22/85	Seepage of dissolved solids	M	1,860
Vincent No. 1	72	No storage	9/22/84	Overall condition very poor	L	174

Division Five (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Vincent No. 2	72	No storage	9/22/84	Overall condition very poor	L	164
Welsh	37	8' below crest	5/17/78	Poor condition	L	36
Y-T Reservoir	72	12' below crest	11/21/84	Slope instability, extensive seepage, inadequate spillway	L	70
				Division Five Total		7,760

DIVISION SIX

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
+Anderson	44	6' below crest	6/06/86	Blocked spillway	L	60
Basin	57	13' below crest	9/17/85	Dam is breached	L	200
*Biskup Dam	44	5' below s/way	6/27/86	Inadequate spillway, slide, poor condition	L	45
Bunker	44	5' below crest	11/15/85	Poor condition, no spillway	L	60
Clayton	47	3' below lowest point in crest	1/18/85	Lack of freeboard - Low crest	L	25
Cogdill Lower	54	10' below crest	9/11/85	Downstream slope failure	L	173
DD & E Wise	44	5' below spwy.	11/27/85	Poor outlet condition	M	200
Ellgen #2	44	No storage	5/30/86	Poor outlet condition	L	60
Elk Lake	54	5' below crest	9/12/85	Spillway obstructed, poor maint.	M	40
Gill	44	10.0 below crest	6/17/85	Seepage high on embankment	L	60
Greasewood Flats	57	zero	5/13/86	Poor Condition	L	50
J.B. Dawson #1	57	9' below crest	9/27/84	Partial breach at spillway	L	49
Lake Emrich	57	12' below crest	5/6/86	Slide on d/s face, with seepage evidence	L	250
*Larson #1	47	Zero	6/27/86	Inadequate Spillway	L	10
Lower Spg. Ck.	58	3' below spillway	9/11/85	Slide on D/S slope, spwy. obstructed	L	5
McGinnis Meadows	43	6' below spillway	9/17/85	Extensive seepage & boggy cond. skimpy cross-section	L	90

Division Six (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Nofstger-Zeigler	57	5.0' below crest	6/18/85	No spillway, poor condition	L	40
Pole Mountain	47	No storage	3/30/83	Slide, upstream slope	M	1,905
Sage Creek	57	No storage	6/14/85	Dam breached at spillway	N	810
Skinny Fish	43	5' below crest	1/23/85	Sinkhole	M	60
Upper Spring Ck.	58	3' below spillway	9/11/85	Spillway obstructed	L	5
Wyman	44	5.0' below crest	6/28/85	Poor condition		40
				Division Six Total		4,237

DIVISION SEVEN

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Bauer #1	34	3' below spwy. for 45 days or 5' below spwy.	8/27/84	Saturation high on embankment	M	144
Belmear	69	7' below crest	7/17/84	Backcutting of spillway, concentrated leakage, questionable outlet	M	168
Big Pine	71	2' below spillway	8/12/85	Steepness of d/s slope around outlet and seepage and sloughing from abutment left of outlet	M	70
Charles Lemon	30	No storage	7/29/74	Poor condition	L	15
Coppinger #1	34	3' below crest	1/27/84	Inadequate freeboard, inoperable outlet, rodent activity	L	12
Coppinger #2	34	3.0' below crest	8/ /85	Inadeuate freeboard	L	5
Durango #1	30	3' below crest	9/22/84	Insufficient freeboard, generally poor condition	L	40
Highland Mary	30	11' below crest	9/12/85	Inoperable outlet, partially breached condition of dam	L	60
J. O. Spencer	34	5' below spillway		Poor condition	L	13
Short	30	5' below crest	11/29/77	Inadequate spwy. erosion on U/S face	L	26

Division Seven (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
+Sullenberger	78	2.0 spillway	6/24/86	Leakage along low level outlet	M	720
Summit	34	1' below spillway except for 3 weeks	7/17/84	Adverse seepage	H	1,100
				Division Seven Total		2,373

An Act

HOUSE BILL NO. 1010.

BY REPRESENTATIVES Carpenter, Shoemaker, Wright, Herzog, Dambman, Younglund, Swenson, Trujillo, Bond, Entz, McInnis, Armstrong, M.L. Bird, Fish, Groff, P. Hernandez, Pankey, Philips, and Reeser;
also SENATORS Bishop, McCormick, Allard, and P. Powers.

CONCERNING THE STORAGE OF WATER, AND RELATING TO FACILITIES CONSTRUCTED THEREFOR.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. 37-87-101 (1), Colorado Revised Statutes, as amended, is REPEALED AND REENACTED, WITH AMENDMENTS, to read:

37-87-101. Storage of water. (1) The right to store water of a natural stream for later application to beneficial use is recognized as a right of appropriation in order of priority under the Colorado constitution. No water storage facility may be operated in such a manner as to cause material injury to the senior appropriative rights of others. Acquisition of those interests in real property reasonably necessary for the construction, maintenance, or operation of any water storage reservoir, together with inlet, outlet, spillway structures, or other facilities necessary to make such reservoir effective to accomplish the beneficial use or uses of water stored or to be stored therein, may be secured under the laws of eminent domain.

SECTION 2. Effective date. This act shall take effect July 1, 1986.

SECTION 3. Safety clause. The general assembly hereby

Capital letters indicate new material added to existing statutes; dashes through words indicate deletions from existing statutes and such material not part of act.

finds, determines, and declares that this act is necessary for the immediate preservation of the public peace, health, and safety.

Carl B. Bledsoe
SPEAKER OF THE HOUSE
OF REPRESENTATIVES

Ted L. Strickland
PRESIDENT OF
THE SENATE

Lee C. Bahrych
CHIEF CLERK OF THE HOUSE
OF REPRESENTATIVES

Marjorie L. Nielson
SECRETARY OF
THE SENATE

APPROVED April 11, 1986 7:25 pm

Richard D. Lamm
GOVERNOR OF THE STATE OF COLORADO

1986

An Act

HOUSE BILL NO. 1185.

BY REPRESENTATIVES Swenson, Shoemaker, Herzog, Dambman, Carpenter, Younglund, Entz, McInnis, Armstrong, Bledsoe, Entz, Erickson, Mutzebaugh, Pankey, Paulson, and Underwood;
also SENATORS Bishop, McCormick, Beatty, Brandon, Durham, P. Powers, R. Powers, Rizzuto, Wattenberg, and Winkler.

CONCERNING THE LIABILITY FOR DAMAGES RESULTING FROM THE FLOW OF ANY WATER FROM A RESERVOIR.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. 37-87-104, Colorado Revised Statutes, as amended, is REPEALED AND REENACTED, WITH AMENDMENTS, to read:

37-87-104. Liability of owners for damage. (1) Any provision of law to the contrary notwithstanding, no entity or person who owns, controls, or operates a water storage reservoir shall be held liable for any personal injury or property damage resulting from water escaping from that reservoir by overflow or as a result of the failure or partial failure of the structure or structures forming that reservoir unless such failure or partial failure has been proximately caused by the negligence of that entity or person. No entity or person shall be required to pay punitive or exemplary damages for such negligence in excess of that provided by law. Any previous rule of law imposing absolute or strict liability on such an entity or person is hereby repealed.

(2) No such entity or person shall be liable for allowing the inflow to such reservoir to pass through it into the natural stream below such reservoir.

(3) (a) No stockholder, officer, or member of a board of directors of an owner of a reservoir shall be liable for any personal injury or property damage resulting from water

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escaping from such reservoir or as a result of the failure or partial failure of the structure or structures forming such reservoir for which the owner shall have been found liable if a valid liability insurance policy, or adequate substitute as provided in paragraph (b) of this subsection (3), has been purchased by the owner of the reservoir and is in effect at the time such damage occurs. Such insurance policy shall insure against such damages and provide coverage in an amount of not less than fifty thousand dollars for each claim and in an aggregate amount of not less than five hundred thousand dollars for all claims which arise out of any one incident. The policy may provide that it does not apply to any act or omission of a stockholder, officer, or member of a board of directors of an owner if such act or omission is dishonest, fraudulent, malicious, or criminal. The policy may also contain other reasonable provisions with respect to policy periods, territory, claims, conditions, and other matters common to such policies of insurance. The limitation of liability pursuant to this paragraph (a) shall not apply to any criminal, fraudulent, or malicious act or omission by a member of the board of directors of the owner, an officer of the owner, or a stockholder of the owner, nor shall it apply to any ultra vires act of the owner or of a member of the board of directors, an officer, or a stockholder of such owner. The provisions of this paragraph (a) shall not be deemed to impose any liability upon a member of the board of directors, an officer, or a stockholder of the owner of a reservoir beyond that provided in section 7-42-118, C.R.S.

(b) An adequate substitute for such insurance may be in the form of:

(I) A good and sufficient bond, in an amount equal to such recovery limitations duly executed by a qualified corporate surety approved by the commissioner of insurance, conditioned upon the payment by the entity or person who owns, controls, or operates a water storage reservoir of any valid and final judgment for damages imposed within the judgment limitations established in this subsection (3);

(II) A good and sufficient escrow of acceptable securities, as defined in section 24-91-102, C.R.S., or an annual irrevocable letter or annual letters of credit issued by any national or state bank or any bank for cooperatives as chartered under Title III of the "Federal Farm Credit Act of 1971", as amended, and deposited with an escrow agent pursuant to an escrow contract or agreement requiring the escrow agent to pay from the escrow account amounts necessary to discharge a valid and final judgment for damages within the limits established in this subsection (3). Such escrow contract or agreement shall provide that it cannot be revoked or amended until after any claims for damage against such entity or

person have been discharged or until applicable statutes of limitation pertaining thereto have expired.

(III) A combination of insurance and any of the substitutes described in this paragraph (b).

SECTION 2. Article 42 of title 7, Colorado Revised Statutes, as amended, is amended BY THE ADDITION OF A NEW SECTION to read:

7-42-118. Liability of stockholders, directors, and officers. Stockholders, directors, and officers of corporations formed under the provisions of this article shall enjoy the same measure of immunity from liability for corporate acts or omissions as stockholders, directors, and officers of corporations formed under the "Colorado Corporation Code", articles 1 to 10 of this title, or the "Colorado Nonprofit Corporation Act", articles 20 to 29 of this title.

SECTION 3. 35-49-104, Colorado Revised Statutes, 1984 Repl. Vol., is amended to read:

35-49-104. Statutes inapplicable. The provisions of sections 37-87-101 to 37-87-108 and ~~37-87-113~~ 37-87-114 to 37-87-115, C.R.S., shall not apply to stock water tanks of the character defined in section 35-49-103.

SECTION 4. Repeal. 37-87-113, Colorado Revised Statutes, as amended, is repealed.

SECTION 5. Safety clause. The general assembly hereby

finds, determines, and declares that this act is necessary for the immediate preservation of the public peace, health, and safety.

Carl B. Bledsoe
SPEAKER OF THE HOUSE
OF REPRESENTATIVES

Ted L. Strickland
PRESIDENT OF
THE SENATE

Lee C. Bahrych
CHIEF CLERK OF THE HOUSE
OF REPRESENTATIVES

Marjorie L. Nielson
SECRETARY OF
THE SENATE

APPROVED May 16, 1986 8:55 p.m.

Richard D. Lamm
GOVERNOR OF THE STATE OF COLORADO

An Act

HOUSE BILL NO. 1186.

BY REPRESENTATIVES Carpenter, Shoemaker, Herzog, Dambman, Younglund, Swenson, McInnis, M.L. Bird, Pankey, Paulson, and Shoemaker;
also SENATORS McCormick, Bishop, Allard, Rizzuto, Strickland, and Wattenberg.

CONCERNING PROBABLE FUTURE WATER FLOWS, AND RELATING TO HAZARDS ASSOCIATED THEREWITH.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. 37-87-102 (2) and (3), Colorado Revised Statutes, as amended, are REPEALED AND REENACTED, WITH AMENDMENTS, to read:

37-87-102. Definitions - natural streams and use thereof by reservoir owners. (2) Whenever the records basic to a determination of probable future water flows, either with respect to this section or by other requirements of law, extend for a period of one hundred or more years, the calculation based upon those results shall be deemed conclusive. If such records do not extend for a period of one hundred or more years the determination shall be made by interpolation and correlation to a full one hundred years of records by relating them to known records of water basins as similar as reasonably possible to the basin under consideration or by other acceptable methods.

(3) (a) In any case in which a determination of probable future surface water flows at any place in the state is required, the calculation shall be based upon past surface water runoff at the place in question supplemented as provided in this section. Such probable flows shall be determined by reference to the records of reliable stream gauging stations. A stream gauging station record shall be deemed reliable if

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made by the state of Colorado or the United States as part of a regular program of either of those entities, except as to any part of such records which the state engineer shall have designated as being unreliable, on the basis of facts so showing. Whenever a designation of probable future runoff is required at a place other than the location of a reliable stream gauging station, the determination of probable runoff at such other place shall be made by relating the probable future runoff at that place to the recorded runoff at a comparable gauging station or gauging stations by the interpolation of reasonable hydrologic, geologic, and natural vegetative factors supplemented as provided in this section. Unless clearly unrelated, the factors of the comparison shall include, but not be limited to, the following elements or characteristics:

(I) The water basin contributing to the probable future flow at the place where probable future runoff is to be determined, considering:

(A) The size;

(B) The altitude or altitudes;

(C) The various soil permeabilities;

(D) The various vegetative covers;

(II) The known runoff as determined by reliable stream gauging stations using interpolations when necessary from comparable gauging stations and relating interpolations to the characteristics of the basin measured by the comparable gauging stations as related to the basin of runnoff being determined;

(III) The slope or slopes of the terrain whose surface runoff contributes to the surface water flows at the place at which a determination of probable future surface water flows is required.

(b) The state engineer shall promulgate rules pursuant to section 24-4-103, C.R.S., which include other factors for consideration in any area or situation in which calculations based on the criteria in paragraph (a) of this subsection (3) will probably be made more accurate by use of other or additional criteria. Whenever conditions are such that records of past precipitation are an appropriate factor, he may designate any portion of official precipitation records of agencies of the United States or of the state of Colorado which are appropriate in evaluating probable future water flows. He may approve use of factors referred to in this paragraph (b) with respect to particular areas or design of

specific structures when requested to do so.

(c) No dam safety requirement shall be imposed to meet a potential hazard of a flood whose magnitude is such that the hazard would probably exist whether or not the dam failed.

SECTION 2. 37-87-102, Colorado Revised Statutes, as amended, is amended BY THE ADDITION OF THE FOLLOWING NEW SUBSECTIONS to read:

37-87-102. Definitions - natural streams and use thereof by reservoir owners. (3.5) Whenever a determination of probable future surface water flows, or the probability of frequency of their recurrence, at any place in Colorado is required by relation to a longer period of flow than that for which there is a reliable record of flow as defined in subsection (3) of this section, the determination shall be made by interpolation and correlation of known records to the longer period by relating known records of water basins as similar as reasonably possible to the place of determination or basin under consideration, or by use of geologic determinations, or by use of other methods reasonably calculated to formulate an accurate estimate of probable future flows or the probability of frequency of their recurrence at the place of determination of such flows.

(3.7) Calculations of probable flows or frequency of recurrence based upon application of the principles set forth in subsections (3) and (3.5) of this section shall relieve anyone acting in accordance with such principles of any liability respecting an occurrence different than that predicted. This exemption from liability shall apply to the state and its public officials or employees when acting in performance of their public duties.

SECTION 3. Safety clause. The general assembly hereby

finds, determines, and declares that this act is necessary for the immediate preservation of the public peace, health, and safety.

Carl B. Bledsoe
SPEAKER OF THE HOUSE
OF REPRESENTATIVES

Ted L. Strickland
PRESIDENT OF
THE SENATE

Lee C. Bahrych
CHIEF CLERK OF THE HOUSE
OF REPRESENTATIVES

Marjorie L. Nielson
SECRETARY OF
THE SENATE

APPROVED April 4, 1986 8:45 pm

Richard D. Lamm
GOVERNOR OF THE STATE OF COLORADO

An Act

HOUSE BILL NO. 1187.

BY REPRESENTATIVES Younglund, Shoemaker, Wright, Carpenter, Trujillo, Bond, McInnis, Berry, Bledsoe, Brown, Dambman, Entz, Mutzebaugh, Paulson, and D. Williams;
also SENATORS McCormick, Allard, Glass, Bishop, and Brandon.

CONCERNING LIABILITY OF THE STATE OF COLORADO, AND ITS OFFICERS AND EMPLOYEES FOR ACTS OR OMISSIONS REGARDING RESERVOIRS.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. 37-87-115, Colorado Revised Statutes, is amended to read:

37-87-115. Damages. THE PROVISIONS OF THIS ARTICLE ARE UNDERTAKEN BY THE STATE OF COLORADO IN THE DISCRETIONARY EXERCISE OF ITS GOVERNMENTAL AUTHORITY. THEREFORE, neither the STATE OF COLORADO, THE state engineer nor any member of his staff or any person appointed by him shall be liable in damages for any act done by him OR FOR HIS FAILURE TO ACT in pursuance of the provisions of this article. IN ADDITION, THE STATE ENGINEER AND ANY MEMBER OF HIS STAFF AND ANY PERSON APPOINTED BY HIM SHALL HAVE THE SAME IMMUNITY FROM LIABILITY AS OTHER PUBLIC EMPLOYEES PURSUANT TO THE PROVISIONS OF ARTICLE 10 OF TITLE 24, C.R.S.

SECTION 2. Safety clause. The general assembly hereby

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finds, determines, and declares that this act is necessary for the immediate preservation of the public peace, health, and safety.

Carl B. Bledsoe
SPEAKER OF THE HOUSE
OF REPRESENTATIVES

Ted L. Strickland
PRESIDENT OF
THE SENATE

Lee C. Bahrych
CHIEF CLERK OF THE HOUSE
OF REPRESENTATIVES

Marjorie L. Nielson
SECRETARY OF
THE SENATE

APPROVED May 3, 1996 6:30 pm

Richard D. Lamm
GOVERNOR OF THE STATE OF COLORADO