STATE ENGINEER'S FOURTH ANNUAL REPORT TO THE GENERAL ASSEMBLY ON DAM SAFETY FOR F. Y. 86-87

NOVEMBER 1, 1987

OFFICE OF THE STATE ENGINEER
DIVISION OF WATER RESOURCES

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The Honorable Roy Romer
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 1986-1987.

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. This awareness has been gained by informing the owner through public meetings and seminars on dam safety issues.

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.

I have also initiated steps to decentralize the dam inspection program by moving a field engineer from Denver to Montrose. I anticipate moving other field engineers to Glenwood Springs and Durango this fiscal year. This will permit more inspections at less cost and will enhance the program.

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

Sincerely,

Jeris A. Danielson
State Engineer

JAD/AEP:jad/0227I

cc: Senate Majority Leader Jeffrey M. Wells
Senate Minority Leader Ray E. Peterson
House Majority Leader Chris Paulson
House Minority Leader Ruth Wright
Senator Tilman Bishop, Chairman
Senate Agriculture Committee
Representative Scott McInnis, Chairman
House Agriculture Committee
Senator James Beatty, Chairman
Joint Budget Committee
Senator Cliff Dodge, Joint Budget Committee
Senator James Rizzuto, Joint Budget Committee
Representative Elwood Gillis, Vice-Chairman
Joint Budget Committee
Representative Vickie Armstrong, Joint Budget Committee
Representative Richard R. Bond, Joint Budget Committee

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STATE ENGINEER'S FOURTH ANNUAL REPORT TO THE GENERAL ASSEMBLY ON DAM SAFETY FOR FY 86-87

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)(1986 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. (1986 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)(1986 Supp.).

Organization

Implementation of the dam safety program is accomplished 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)(1986 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)(1986 Supp.)
[2]Per Section 37-87-105(4), C.R.S. (1973)(1986 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)(1986 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 nonfederal dam and reservoir on an annual basis, and the safety inspection of each low hazard nonfederal 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)(1986 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 with these 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 GOVT.	PRIVATE	TOTAL
HIGH (Class I)	37	12	77	128	254
MODERATE (Class II)	12	22	74	216	324
LOW (Class III)	52	34	140	1,009	1,235
TOTAL	101	68	291	1,353	1,813

[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.

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 reserovir is at high-water line.

Table 2

DISTRIBUTION OF DAMS BY IRRIGATION DIVISION/HAZARD

DIVISION	NONFEDERAL			FEDERAL			TOTAL		
	H	M	L	H	M	L	H	M	L
1	113	135	459	13	7	15	126	142	474
2	32	49	213	5	3	9	37	52	222
3	9	13	42	1	0	5	10	13	47
4	21	39	173	8	0	7	29	39	180
5	22	41	126	7	1	9	29	42	135
6	10	17	122	0	1	6	10	18	128
7	10	18	48	3	0	1	13	18	49
	217	312	1,183	37	12	52	254	324	1,235
TOTALS			1,712			101			1,813

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 reserovir is at high water line.

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APPROVAL OF PLANS AND SPECIFICATIONS FOR CONSTRUCTION OF DAMS AND RESERVOIRS

During FY 86-87, the State Engineer received plans for seven new dams, and 47 plans for alteration, modification, repair, or enlargement. Nine change orders to previously approved plans were also reviewed and all were approved within the time frame. Eight 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 $15,404,661. Two thousand eight hundred and five dollars ($2,805.00) 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 86-87. Twelve of them were for high hazard dams, thirteen for moderate hazard, and eight for low hazard dams. (See Appendix B for lists of dams which were approved by Water Division/District, and use.)

Four 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. (1986 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 water rights administration 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. (1986 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 hazard dams. 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 900 safety inspections on an "inspection year" basis, which is equivalent to a fiscal year in the amount planned. Due to budget contraints, follow-up inspections were curtailed until the following fiscal year.

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 includes 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 is 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 86-87, a total of 802 safety inspections were conducted (and 85 construction inspections) for a total of 885. This included 233 safety inspections of high hazard dams, 287 safety inspections of moderate hazard dams, and 282 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" 1986 and is expected for 1987.

Results of Safety Inspections

The 802 safety inspections resulted in the issuance of 35 restriction orders due to unsafe conditions during FY 86-87. Fifty-two former restrictions were removed, and 32 revised.

As of June 30, 1987, there were a total of 283 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[3]
HIGH	12 (-33)[2]	5 (+25)	10 (-9)	5 (-50)	32 (-26)
MODERATE	23 (-8)	31 (-14)	15 (+67)	11 (-15)	80 (-4)
LOW	64 (-15)	64 (-25)	25 (+39)	18 (-18)	171 (-15)
TOTAL	99 (-16)	100 (-20)	50 (+49)	34 (-24)	283 (-13)

TABLE 4

CAUSE FOR RESTRICTIONS BY CATEGORY/IRRIGATION DIVISION[1]

DIVISION	CATEGORY* A	B	C	D	TOTAL	NO. OF NONFEDERAL DAMS
1	40	51	18	10	119	707
2	14	13	3	8	38	294
3	2	2	2	0	6	64
4	16	10	12	10	48	233
5	19	16	8	2	45	189
6	5	5	4	3	17	149
7	3	3	3	1	10	76
TOTAL	99	100	50	34	283[3]	1,712

*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, 1987
[2]Percentage change from FY 85-86
[3]All nonfederal dams

The approximate amount of storage lost due to restrictions was 131,309 acre-feet. Both the number of restrictions and the storage lost has reduced slightly, reflecting the repairs the owners are making to their dams, or breaching. 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 leakage and piping problems increased markedly, especially for moderate hazard dams.

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" 1987, 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 new 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 lowering 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.

USE OF APPROPRIATED FUNDS

The Legislature, for FY 86-87, budgeted by separate line item $823,155 for dam safety personal services. The Division of Water Resources allocated $26,000 for operating costs, and $17,700 for travel and subsistence to the Dam Safety Branch.

Dam Safety personal services expenditures for the fiscal year were $821,132. Total operating expenditures were $19,381, and $17,816 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; less newspaper advertising costs for recruitment of staff; low field equipment costs; and curtailment of driving and operating costs due to budget cuts.

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 $51,017.52 for safety inspections and construction observation, and $2,805.48 for filing plans and specifications. Invoices totaling $66,197.91 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. Due to the concern about the hydrologic requirements for spillways, resulting from criticisms of the National Weather Service's Hydrometeorological Report No. 55, which was the basis for the criteria, they were delayed. An Attorney General's opinion on the proposed criteria was also needed before they could be completed. 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 March 1988 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 three enforcement proceedings under Section 37-87-114 , C.R.S. (1973)(1986 Supp.). Following is a brief description of each case.

1. Flickinger Reservoir Dam, Saguache County

Flickinger Dam is located on Ford Creek in the southwest quarter of Section 2, Township 45N, Range 6E, New Mexico P.M., in the vicinity of Saguache, Colorado. It is a 20-foot high, 15.5 acre-foot, low hazard dam.

While inspecting other dams in the area during 1980, it was discovered that this dam was constructed without having been approved by the State Engineer. On November 12, 1980, the State Engineer issued a restriction order to the owner, providing for a safe storage level 17 feet below the crest of the dam. The owner was ordered to retain the services of an engineer to conduct a hydrologic analysis of the drainage area and design a spillway for the dam which would handle a 100-year flood; to investigate the geotechnical properties of the embankment and analyze the stability of the dam; and to ascertain the integrity of the outlet works; and other administrative data such as capacity tables. The restriction remained in effect until 1986, when the outlet became plugged (under suspicious circumstances) and the reservoir filled to the spillway. No engineering analysis had been done as requested. In September of 1986, the State Engineer issued another order to the owner to either: breach the dam; rehabilitate the dam in accordance with the previous order; or reduce the height of the dam to nonjurisdictional size.

In March of 1987, the State Engineer learned that the owner was being foreclosed, and had filed for bankruptcy. A mortgage company intended to take control of the property. On May 1, 1987, the State Engineer issued another order to breach the dam at the spillway to a nonjurisdictional height and to unplug the outlet, with a due date of May 22, 1987, and to notify him when the work would be done. After the due date passed without any response from the owner, the State Engineer requested the assistance of the Attorney General on June 8, 1987, to file an action in the District Court of Saguache County, pursuant to Section 37-87-114, C.R.S. (1973)(1986 Supp.), to have the court enforce the order. The complaint was filed on June 29, 1987, Case No. 87 CV 78, and the court action is pending.

2. Brewer Reservoir Dam, Adams County

Brewer Dam is located in the vicinity of Colorado Boulevard and East 104th Avenue, within the city limits of Thornton. It is a 20-foot high, 36 acre-foot, low hazard dam.

On September 26, 1985, the State Engineer issued a zero storage restriction order due to the unsafe conditions at the dam, and the increased hazard conditions resulting from development downstream. The owner was directed to prepare plans for the rehabilitation of the dam, or have it breached. During July of 1986, large rainstorms in the area filled the reservoir to the point where Thornton city officials became concerned about the safety and an emergency response plan to patrol the dam by Thornton police was implemented. The owner subsequently began work to pump the reservoir down to the restricted level, but apparently due to poor communications with the contractor, many delays occurred. On August 27, 1986, the State Engineer issued an order to have the spillway enlarged by September 30, 1986, in order to protect the public safety during large rainstorms. Because the owner failed to comply

with the order by the due date, the State Engineer requested the Attorney General on November 12, 1986, to initiate legal proceedings to have the order enforced. The Attorney General filed a complaint for Preliminary and Permanent Injunction in District Court of Adams County on November 25, 1986, Case No. 86 CV 2742. The owner's attorney subsequently prepared a plan for breach of the dam, and upon approval by the State Engineer, proceeded to breach the dam, after a small delay, on July 15, 1987. A motion for dismissal of the case is pending.

3. Douglas (Charles) Frost Dam, Park County

The Charles Frost dams are located in the Roland Valley Subdivision, adjacent to U.S. 285, about five miles east of Bailey in Park County.

The Frost dams are three of several "nonjurisdictional" dams less than 10 feet high which the Board of County Commissioners of Park County requested assistance to require spillways for in 1983 due to drainage problems caused by the dams. Upon complaint filed by the Attorney General for the State Engineer in the Division One Water Court, the judge ordered the owner on August 2, 1985, to construct spillways and other provisions in accordance with plans approved by the State Engineer by August 30, 1985. In 1986, when the State Engineer was able to check the structures, it was determined that the dams were not in conformance with the court order. A contempt hearing was requested and scheduled for January 22, 1987, in the Water Court of Water Division No. 1, where an order was issued for the water referee to determine whether the owner's dams were in reasonable compliance with the original order of August 2, 1985. The referee conducted an inspection of the dams on June 15, 1987, and issued his findings on September 3, 1987. The referee found that the dams are not in compliance. Findings on the case are still pending.

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, 1987, a total of 114 plans for high hazard dams have been filed with the State Engineer, out of the 251 federal and nonfederal high hazard dams on file. Of the 114, twenty-seven are for federal dams, primarily of the Bureau of Reclamation. In addition, plans have been submitted for thirty moderate hazard dams (three federal), and twenty-two low hazard dams (one federal).

During FY 87-88, the State Engineer plans to return comments on submitted 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 86-87, 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.

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 of jurisdictional dams 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

One bill was enacted during the fiscal year amending the reservoir statutes. It was Senate Bill No. 7 concerning the repeal of statutory sections inconsistent with the property tax provisions of the constitution. A copy of the bill is in Appendix E .

RECOMMENDED LEGISLATION

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.

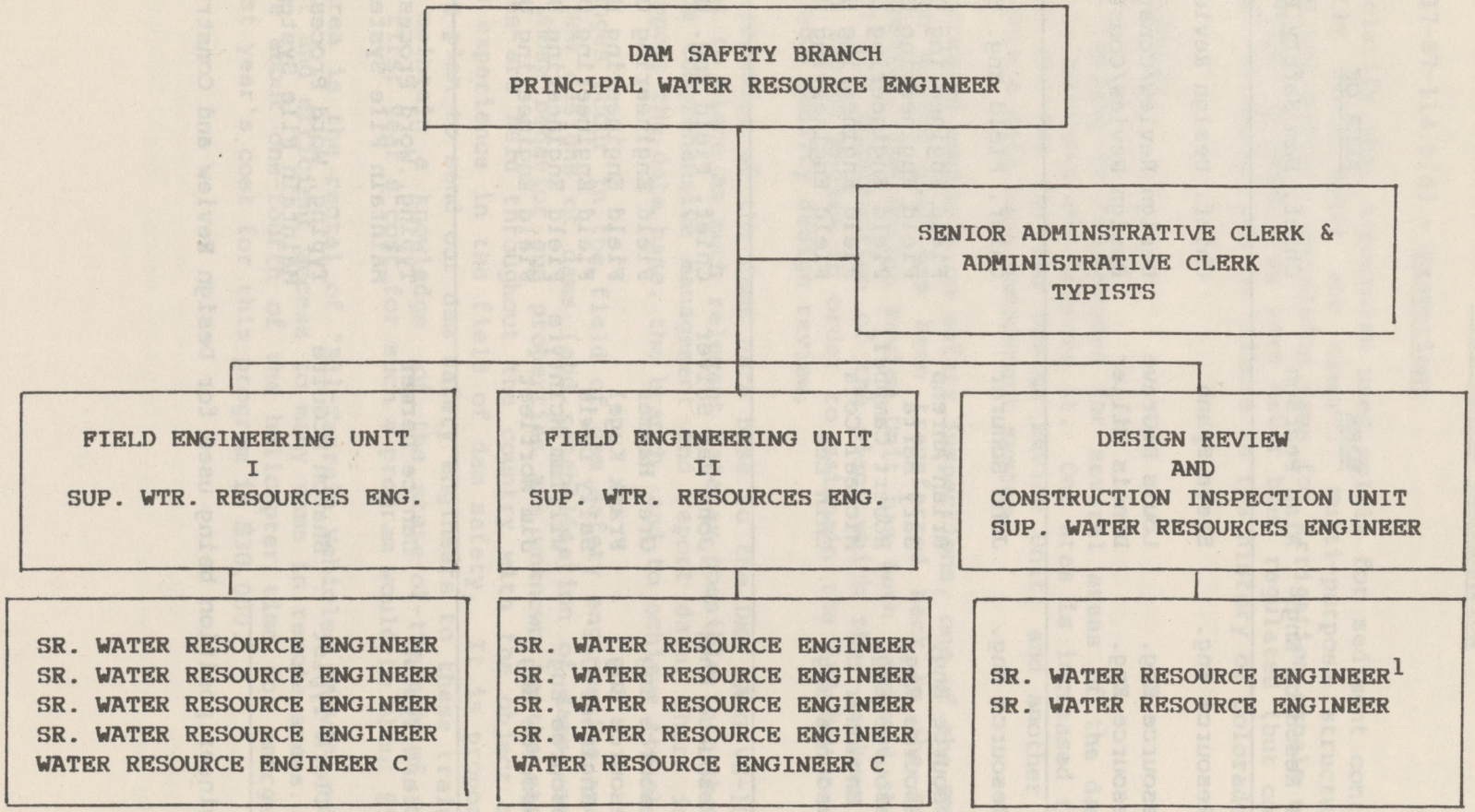
Rapid changes occur in the field of dam safety engineering and related disciplines. New designs of dams (and rehabilitation of dams) are utilizing new material whose behavior and properties are unknown to the staff, and several conferences are held throughout the country with the object of sharing knowledge 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.

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.	Dennis Miller	Design Review/Const. Insp.[1]
Superv. Water Resource Eng.	John Schurer	Chief, Field Eng. Unit - 1
Senior Water Resource Eng.	Brian Ahrens	Field Engineering Unit - 1
Senior Water Resource Eng.	Gary Barta	Field Engineering Unit - 1
Senior Water Resource Eng.	Robert Campbell	Field Engineering Unit - 1
Water Resource Engineer C	Michael Cola	Field Engineering Unit - 1
Senior Water Resource Eng.	Chin Lee	Field Engineering Unit - 1
Superv. Water Resource Eng.	John Van Sciver	Chief, Field Eng. Unit - 2
Senior Water Resource Eng.	Greg Hammer	Field Engineering Unit - 2
Senior Water Resource Eng.	Frank Kugel	Field Engineering Unit - 2
Water Resource Engineer C	Sally Lewis	Field Engineering Unit - 2
Senior Water Resource Eng.	William McIntyre	Field Engineering Unit - 2
Senior Water Resource Eng.	Jim Norfleet	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.



[1]Field Engineer position being used for Design Review & 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
Dam & Res. #4	1/9	C-1651	Irrigation	08/15/86
Clayton Res. Dam	6/47	C-1652	Irr. Stk. Rec.	08/18/86
Bobo Strait	5/36	C-1653	Recreation	08/28/86
Hoagland Res. #1	5/36	C-1654	N. (Breached)	09/09/86
Stagecoach	6/58	C-1655	Irr. Mun. Rec. Hyd.	09/17/86
SS-8	1/64	C-1656	Detention	11/25/86
Mitchell Creek	1/8	C-1657	Det. Irr.	11/25/86
Bull Run	5/51	C-1658	Irrigation	01/09/87
Vail Reservoir	1/2	C-1659	Irrigation	01/16/87
Senac	1/2	C-1660	Municipal	01/30/87
Upper Tule	1/8	C-1662	Rec. Irr.	03/03/87
Black Lake No. 1	5/37	C-1663	Rec. Aug.	06/24/87
Cole Reservoir	5/51	C-1664	Rec. Irr.	06/29/87
Box Elder #3	1/3	C-1665	Irrigation	06/30/87

[1]Filing system for approved plans (C-1651). Assigned to new dams, and existing dams without previously approved plans which are being altered, enlarged, or repaired.

APPENDIX B (cont.)

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

NAME	DIV./ DIST.	"C" NO.[2]	USE	DATE
Harris Park #1	1/80	C-1008A	Municipal	07/09/86
Coon Creek #1	5/72	C-911A	Irrigation	08/18/86
Lake John	6/47	C-828A	Rec. Fsh	08/18/86
Horseshoe Lake #2	1/4	C-807D	Irr. Rec.	08/22/86
South Gray Reservoir	1/3	C-631D	Irrigation	09/17/86
Rist Benson	1/4	C-252B	Irr. Rec.	11/10/86
Rio Grande	3/20	C-899E	Irr. Mun.	01/07/87
Juniata Reservoir	4/42	C-661B	Mun. Fsh, Rec. Irr.	01/23/87
Horse Creek	2/17	C-1327A	Irrigation	02/09/87
Ketner	1/2	C-978B	Mun. Rec. Det.	02/17/87
Bergen #1	1/9	C-536A	Stk. Irr.	02/06/87
Prewitt	1/64	C-60A	Irrigation	02/25/87
Garnet Mesa	4/41	C-647B	Rec. Fsh. Wld.	03/03/87
Julesburg #2	1/64	C-43B	Irrigation	03/12/87
Karval	2/17	C-931C	Rec. Fsh. Wld.	03/13/87
Foothills	1/5	C-66A	Irrigation	03/30/87
Beaver Park	3/20	C-612F	Rec. Fsh.	04/03/87
Gurley	1/60	C-460B	Irrigation	05/14/87
Crystal	2/10	C-280A	Mun. Hyd.	05/28/87

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[2]Filing system for approved plans (C-1008A). Letters denote revisions to previously approved plans.

NOTE: Includes AS-BUILT plans which were prepared after sketch plans or emergency actions were completed.

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, 1987

DIVISION ONE

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
A-20	2	5' below crest	11/27/85	Poor overall condition	M	30
Adams & Bunker #3	1	6' below crest	5/22/75	Inadequate freeboard, high seepage	L	150
Adrian Pond	4	8' below crest	12/3/86	No spillway	L	18
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 repair of slough	M	80
Angel Lake	3	8' below crest	2/21/78	Poor condition	L	309
Antero	23	G.H. 18.0	2/04/86	Stab. berm const. & new instrumen. monitoring	H	5,100
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
Beaver Brook #2	7	3' below crest	8/26/85	Inadequate spwy., maint.	H	2
*Beaver Brook #3	7	4' below spillway	6/11/87	Low area in crest, inadequate spwy.	M	
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
**Bergen #1	9	5' below crest	6/22/87	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
*Camp Shoshoni	6	3' below crest	6/12/87	Inadequate freeboard	L	4
Carlin	2	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

[1]Total Storage Lost: 131,308.6

*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
Clennon	5	6' below crest	7/11/85	Eroded and scarped u/s slope and eroded crest.	M	25
Comanche	3	27 ft.	1/21/83	Excessive seepage-sand boils in toe area	H	340
Cooke	1	5' below crest	3/20/74	Deteriorated conditions	L	75
Croke #12 East	7	4' 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 1, 2, 3	80	10' below crest	9/13/84	Inadequate emergency spillways	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
Duck	65	4' below spillway	3/23/87	Narrow crest, steep slopes	L	15
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
Erie	6	3.0' below crest	06/02/86	Insufficient freeboard	M	29
+Fairport	4	6' below spillway	6/22/87	Poor condition	L	30
Florissant	23	No storage	5/21/73	Spillway failed; dam breached	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
Havana Street	2	No storage	1/2/87	No spillway	L	75
Haystack #1	9	No storage	5/8/87	Spillway undermined	L	3
Henry	2	No storage	1/2/87	Piping into outlet, no spillway	L	100

Division One (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Highland	5	4' below crest	3/7/77	Inadequate freeboard	L	90
*Hoder	8	4' below spillway	6/16/87	Inadequate spillway with backcutting, seepage	L	20
Hourglass	3	9.5' below crest	10/27/75	Excessive seepage	H	259
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	5' below crest	7/24/86	Erosion on u/s face, lack of proper freeboard, seepage along d/s toe.	L	88
Julesburg	64	G.H. 23.0	3/23/87	Seepage high on d/s face, not to exceed 30 days above GH 21.0	H	
Kalcevic	7	11' below crest	2/10/83	Sloughing on upstream slope	H	69
Kelly	7	3' below crest	12/5/86	No spwy, inad. outlet construction	L	30
Knoth	5	Zero storage	12/24/85	Never completed dam.	L	204
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
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
Little Gem	5	10' below crest	10/11/85	Erosion on u/s slope & crest & trees on u/s slope	L	60
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	6/22/87	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' below crest	6/21/85	Poor condition of upstream face and crest, no spillway	M	52
Magnusun #1	23	8' below crest	12/4/85	Provide adequate freeboard	L	18
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
North Poudre #1	3	7' below crest	5/2/84	Poor u/s slope, decaying tree stumps, deteriorated riprap	M	106

Division One (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
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 #17	3	15' below crest after repaired	7/15/83	Poor condition, outlet	M	600
Oberon #1 (Lower) aka/ Hays Lake	7	No storage	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
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
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	G.H. 35.5 ft.	4/15/80	Post-failure monitor; cracking on d/s slope	M	720
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
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	N	10
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

Division One (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Swede	5	5' below crest	11/14/86	Embankment seepage & inadequate freeboard	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
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
Williams-McCreery	1	G.H. 15.0	8/28/85	Questionable foundation embnkmnt.	H	16,000
Wind	23	5.5' below crest		Saturated downstream slope	L	3
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		51,472.5

DAM SAFETY BRANCH
CURRENT RESTRICTIONS

JUNE 30, 1987

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	6' below crest	6/27/83	Inadequate spillway	L	112
Cudahy #1	17	5' below crest	7/15/85	Outlet disrepair	L	900
DeWeese	13	5' below crest	8/28/86	Questionable stability	M	700
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	1' below spwy.	12/11/86	Excessive seepage	M	2,750
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	6/2/87	Slide on downstream of east dike	M	2108
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
Nee-Noshe	67	Gage 22.5 with special requirements to allow storage to 23.5	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	7' below crest	2/20/87	U/S slope erosion; inadq. riprap	M	500
Rainbow Lake	11	5' below crest	9/16/85	Insuff. frbd. & spwy. capacity	L	50
Seven Lakes	19	7' below crest	5/6/87	Dilapidated cond. of dam	L	1,200
Sharps Orchard	16	7' below crest	5/1/72	Badly eroded upstream slope	L	20
Silver Spruce #7	12	4' below crest	1/18/85	Seepage and slide	L	6

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

Division Two (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
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
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
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		45,717

DAM SAFETY BRANCH
CURRENT RESTRICTIONS

JUNE 30, 1987

DIVISION THREE

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Bristol Head #2 (Upper)	20	6.0 feet below lowest point of dam crest	4/20/87	Erosion damage, etc.	L	
Eastdale #1	24	G.H. 18'	4/4/78	Excessive seepage	L	1,008
Flickinger	26	17' below crest	11/12/80	Inadequate spwy., poor construction	L	30
Hermit Lake #1	20	Level of service spillway	9/14/84	Sinkhole adjacent to outlet	L	182
Mountain Home	35	G.H. 87.5'	9/16/82	Inadequate spillway	H	15,000
Terrace	21	7' below spillway	7/18/84	Deteriorated spillway	H	2,000
				Division Three Total		18,220

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

DAM SAFETY BRANCH
CURRENT RESTRICTIONS

JUNE 30, 1987

DIVISION FOUR

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Alta #1	60	5' below crest	8/18/76	Inadequate spillway	L	20
Alta #3	60	5' below crest	9/16/85	Provide sufficient freeboard	L	10
Arch Slough	40	G.H. 0.0	12/12/85	Poor condition, reservoir abandoned	L	66
Beaver	40	10' below crest	6/26/78	Excessive abutment leakage	H	210
Blanch Park	40	No storage	10/10/84	Breached; piped hole through embankment	L	36
Brockman #2	40	5' below spwy	7/11/86	Saturation/instability	L	20
Buckhorn #1	41	7' below crest	8/6/86	Seepage, Insufficent freeboard	L	55
Casto	63	12' below crest	4/6/84	Rodent holes, abandoned outlet, thin crest	M	477
Citizens	41	2' below spwy	9/29/86	Inadequate freeboard and general poor maintenance	L	30
Cliff Lake	42	Zero storage	11/20/85	Geologic slide	L	21
Coffey	41	Zero storage	10/22/85	Poor condition & excessive seepage	L	35
Cole #4	40	2' below spillway	9/14/84	Inadequate freeboard, narrow crest and rodent borrows u/s slope	L	5.6
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	Provide sufficient freeboard	L	6
Dogfish	40	5' below crest	11/10/86	Sinkholes on left abutment, low areas in crest, obstructed spwy.	L	5
Doughty	40	5' below spillway	11/10/86	Seepage adjacent to outlet	L	21
Duvall #1	73	16' below crest	5/22/85	Poor condition, no outlet	L	15
Fish Creek #1	62	No storage	8/6/86	Spillway obstructed, insufficient freeboard, lack of maintenance	L	85
Fish Creek #2	62	7' below crest	8/6/86	Questionable embankment, inadequate spillway	M	185
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
Gobbo #3	42	16' below crest	11/7/86	Slide on d/s slope	M	100
Granby #11	40	6' below crest	4/2/84	Abutment sink holes	M	72
Granby #12	40	8'/7' below crest	8/30/85	Slide on downstream slope	M	98
Grand Mesa No. 1	42	9' below crest	8/8/84	Extensive seepage, inadequate spillway, unacceptable outlet	L	230

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

Division Four (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Hale	40	5' below crest	9/17/85	Sinkholes	L	15
Holy Terror	40	6' below crest	11/10/86	Inadequate spwy., spwy. erosion & debris, seepage, narrow crest	L	67
Knox	40	Gage rod 13'	4/2/87	Seepage on embankment. Temporary revision until 8/15/87.	L	135
Lake Brennand	40	Outlet open	9/24/86	Poor Outlet, upstream slope, and spillway conditions.	L	506
Little Giant #1	40	5' below crest	10/29/86	Slip on left toe of dam	L	3.5
Lone Cabin	40	3' below spillway	9/11/84	Slide on downstream slope	L	40
Lone Star #1	40	10' below crest	4/12/85	Constructed without approved plans and specifications	L	
Lone Star #3	40	4' below crest of spillway	4/12/85	Constructed without approved plans and specifications	L	
*Meridian Lake Park #1	59	2' below spillway	6/4/87	Severe erosion of the spillway	L	10
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
Patterson #1	40	3' below crest	11/10/86	Inadequate freeboard & narrow crest, beaver dam in spillway	L	18
Paxton	60	5' below spwy	8/6/86	Seepage	L	400
Priest Lake	60	3' below crest	9/16/85	Insufficient freeboard	L	25
Reeder	42	8' below crest	8/14/85	Insufficient freeboard Seepage, trees,	L	96
St. George	40	7' below crest	10/19/84	Lack of freeboard; muskrats, cattails, and seepage	L	145
Todd	40	10' below crest	10/19/84	6' elevation difference along crest with no spillway	L	112
Waterbug	40	6' below spillway	11/10/86	Poor condition, slip on u/s slope, d/s outlet valve	L	65
West No. 1	40	3' below crest	11/6/86	Inadequate freeboard	M	0
Womack #3	40	4' below crest	9/14/84	Inadequate cross-section	L	23
				Division Four Total		5,652.1

DAM SAFETY BRANCH
CURRENT RESTRICTIONS

JUNE 30, 1987

DIVISION FIVE

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Battlement #2	45	Zero storage	11/5/85	Damaged outlet	L	70
Big Beaver	72	7' below crest	8/20/85	Extensive seepage	L	35
Bull Basin #1	72	9' below crest	10/12/84	Unstable conditions	L	40
Bull Creek #3	72	9' below crest	8/20/85	Extensive seepage	L	25
Carpenter	72	G.H. zero	11/7/86	Sinkhole, seepage	L	34
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	9/16/86	Poor condition of outlet, blocked spwy	L	138
Coon Creek #4	72	No storage	9/16/86	Poor Condition	L	9
Cottonwood #2	72	3' below spwy.	10/17/85	Inadequate spwy., ext. seepage	M	50
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' below crest	10/17/85	Inadequate spwy., poor condition	L	70
Divide Creek	45	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' below spwy.	11/27/85	Undersized spillway	M	50
Hopkins	38	10' below crest	9/5/86	Excessive seepage, inoperable outlet, narrow crest, poor maint.	M	80
John's Pond	53	5' below crest	10-14-86	Inadequate Freeboard, outlet control disrepair	L	0
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

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

Division Five (cont.)

NAME	DIST.	AMOUNT	DATE	REASON	HAZARD	APPROX. STG. LOST ACRE-FEET
Kelly Pond	38	8' below crest	1/14/87	Inadequate spillway & inoperable & questionable condition of outlet	L	100
Kendall	72	10' below crest	11/21/86	Dam breached, poor condition, inadequate spillway	L	150
Langholen	51	4' below spwy.	6/28/85	Inadequate spillway	L	60
Leon Lake	72	3' below spwy.	8/20/85	Inadequate spillway	H	300
Little King Ranch	51	10' below crest	4/16/73	Excessive leakage	M	180
Morris	53	5' 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	400
Noeker	37	5' below crest	10/10/84	Badger holes down into crest	L	65
Oaks	50	8' below crest	10/20/86	Rebuilt without plans & specifi-cations	L	30
Parsons	50	Zero strg.(3' below spwy., temp. after spring run-off)	11/28/86	Inadequate spwy. sagging crest abutment slides, slides at spwy.	L	27
Pheney	51	5' below crest	7/18/86	No spillway, extensive seepage	L	100
Rapid Creek #1	72	6' below crest	9/12/86	Poor condition & seepage	M	400
Rapid Creek #2	72	6' below crest	9/11/86	Poor condition & inoperable outlet	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	1
Sylvan	51	5' below crest	9/30/85	Insufficient freeboard	M	130
Upper Highline	72	10' below spwy.	8/22/85	Seepage of dissolved solids	M	1,860
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		6,142

DAM SAFETY BRANCH
CURRENT RESTRICTIONS

JUNE 30, 1987

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 spwy	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	5' below spwy	7/23/86	Seepage on d/s face	L	60
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
Gardner Park	58	6' below crest	7/3/86	U/S slope erosion, inadequate freeboard	M	130
Gill	44	10 below crest	10/20/86	Seepage high on embankment	L	60
Lake Emrich	57	15' below crest	5/6/87	Slide on d/s face	L	250
Larson #1	47	Zero	6/27/86	Inadequate Spillway	L	10
McGinnis Meadows	43	6' below spillway	9/17/85	Extensive seepage & boggy cond. skimpy cross-section	L	90
Nofstger-Zeigler	57	5' 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
Skinny Fish	43	5' below crest	1/23/85	Sinkhole	M	60
Simon #1	58	G.H. 19	8/6/86	Sloughing of d/s slope	L	300
				Division Six Total		3,570

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

DAM SAFETY BRANCH
CURRENT RESTRICTIONS

JUNE 30, 1987

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
Caballo Lake	31	2' below spillway	7/29/86	Leakage along outlet; inadequate spillway	L	8
Charles Lemon	30	G.H. 8.5	3/7/86	Poor condition - restriction is to top of principle spwy pipe	L	15
Coppinger #1	34	3' below crest	1/27/84	Inadequate freeboard, inoperable outlet, rodent activity	L	12
Coppinger #2	34	3' below crest	8/ /85	Inadequate freeboard	L	5
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	No storage. Outlet full open.	11/13/86	Inadequate spwy. erosion on u/s face; current rest. results in about 3 AF of dead storage below invert of outlet	L	40
				Division Seven Total		535

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

1987

An Act

SENATE BILL NO. 7.

BY SENATOR Fowler;
also REPRESENTATIVES T. Hernandez, Neale, Mutzebaugh, and Thiebaut.

CONCERNING THE REPEAL OF STATUTORY SECTIONS INCONSISTENT WITH THE PROPERTY TAX PROVISIONS OF SECTION 3 OF ARTICLE X OF THE CONSTITUTION OF THE STATE OF COLORADO.

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

SECTION 1. Repeal. 37-87-116, 37-87-117, 37-87-118, 37-87-119, 37-87-120, and 37-87-121, Colorado Revised Statutes, as amended, and 39-1-102 (7.5), (12.3), and (12.4), 39-1-103 (7), 39-1-104 (6), (13), and (14), 39-5-105 (2) and (3), Colorado Revised Statutes, 1982 Repl. Vol., as amended, are repealed.

SECTION 2. 37-87-122 (1), Colorado Revised Statutes, is amended to read:

37-87-122. Erosion control dams. (1) The provisions of sections 37-87-101 to 37-87-108 ~~and--37-87-116--to--37-87-121~~ shall not apply to erosion control dams of the character defined in this section, unless such dams also come within the specification requirements of said sections.

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.

Ted L. Strickland
PRESIDENT OF
THE SENATE

Carl B. Bledsoe
SPEAKER OF THE HOUSE
OF REPRESENTATIVES

Marjorie L. Nielson
SECRETARY OF
THE SENATE

Lee C. Banrych
CHIEF CLERK OF THE HOUSE
OF REPRESENTATIVES

APPROVED May 22, 1987 at 9:05 am

Roy Romer
GOVERNOR OF THE STATE OF COLORADO