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LEADVILLE MINE DRAINAGE TUNNEL ACT OF 1976

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HEARING

BEFORE THE

SUBCOMMITTEE ON

ENERGY RESEARCH AND WATER RESOURCES

OF THE

COMMITTEE ON

INTERIOR AND INSULAR AFFAIRS

UNITED STATES SENATE

NINETY-FOURTH CONGRESS

SECOND SESSION

ON

S. 3394

A BILL TO AUTHORIZE ENGINEERING INVESTIGATION,
STABILIZATION, AND REHABILITATION OF THE LEAD-
VILLE MINE DRAINAGE TUNNEL AND THE CONSTRUCTION
OF FACILITIES FOR THE TREATMENT OF THE DRAINAGE
EFFLUENT

JUNE 7, 1976



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2. 3394

SENATE CONFERENCE

LEADVILLE MINE DRAINAGE TUNNEL ACT OF 1976

MONDAY, JUNE 7, 1976

U.S. SENATE,
SUBCOMMITTEE ON ENERGY RESEARCH AND
WATER RESOURCES OF THE COMMITTEE ON
INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m. in room 3110, Dirksen Office Building, Hon. Floyd K. Haskell presiding.

Present: Senator Haskell.

Also present: Russell R. Brown, professional staff member.

OPENING STATEMENT OF HON. FLOYD K. HASKELL, A U.S. SENATOR FROM THE STATE OF COLORADO

Senator HASKELL. Good morning, gentlemen. The hearing of the subcommittee on Energy Research and Water Resources on S. 3394 will commence.

I will place in the record at this point a copy of the bill and the Department report.

[The material referred to above follows:]

94TH CONGRESS
2D SESSION

S. 3394

IN THE SENATE OF THE UNITED STATES

MAY 6, 1976

Mr. HASKELL introduced the following bill; which was read twice and referred to the Committee on Interior and Insular Affairs

A BILL

To authorize engineering investigation, stabilization, and rehabilitation of the Leadville Mine drainage tunnel and the construction of facilities for the treatment of the drainage effluent.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

SHORT TITLE

4 SECTION 1. This Act may be cited as the "Leadville
5 Mine Drainage Tunnel Act of 1976".

6 SEC. 2. (a) The Congress finds that—

7 (1) the Leadville Mine drainage tunnel was con-
8 structed by the Bureau of Mines with completion of
9 eleven thousand two hundred and ninety-nine feet in
10 1952;

1 (2) subsequently possession of and responsibility for
2 the tunnel was assumed by the Bureau of Reclamation in
3 1959, such possession and responsibility continuing to
4 this date;

5 (3) slides, falls, and erosion within and above the
6 tunnel have resulted in an impoundment of water esti-
7 mated to be in excess of eight million gallons, and have
8 resulted in the development of sink holes in the general
9 area;

10 (4) all of which, slides, falls, water impoundment,
11 and sink holes pose a clear and present danger to lives
12 and property in the area.

13 (b) It is therefore, the purpose of this Act to provide
14 for the stabilization and rehabilitation of the Leadville Mine
15 drainage tunnel, near Leadville, Colorado, for public safety
16 and water quality improvement.

17 SEC. 3. The Secretary of the Interior is hereby author-
18 ized to rehabilitate and maintain, in a safe condition, the
19 existing Leadville Mine drainage tunnel, constructed and
20 owned by the United States, and to construct, operate, and
21 maintain facilities required for the treatment of drainage
22 water discharges therefrom, as necessary to comply with
23 water quality standards established for such effluent, pursuant
24 to the Federal Water Pollution Control Act Amendments of
25 1972 (Public Law 92-500). Such work shall consist of

1 engineering investigations of the existing tunnel conditions,
2 the determination and the implementation of required stabili-
3 zation and rehabilitation measures, and the construction of
4 water treatment facilities to improve the quality of the tun-
5 nel drainage effluent. After completion of the engineering
6 investigations of the existing conditions and the stabili-
7 zation of the tunnel, the tunnel may be plugged in lieu of reha-
8 bilitation and treatment of the drainage effluent.

9 SEC. 4. Such engineering investigations, determinations,
10 and implementation of required stabilization and rehabilita-
11 tion measures as are directed in section 3, shall be carried
12 out in consultation with the Governor of Colorado.

13 SEC. 5. There is also authorized to be appropriated such
14 sums as may be necessary for the rehabilitation, administra-
15 tion, operation, and maintenance of the existing tunnel and
16 of the additional facilities authorized by this Act.

17 SEC. 6. All funds authorized to be appropriated by this
18 Act shall be nonreimbursable.

U.S. DEPARTMENT OF THE INTERIOR,
Washington, D.C., June 7, 1976.

HON. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, United States Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: This responds to your request for the views of this Department with respect to a bill, S. 3394, to authorize engineering investigation, stabilization, and rehabilitation of the Leadville mine drainage tunnel and the construction of facilities for the treatment of the drainage effluent.

We recommend that the Committee defer action on the bill at this time, pending further review by the Department and the Administration of various alternative solutions now under consideration. The regional office of the Bureau of Reclamation has made preliminary studies and recommendations concerning the possible solution to the existing public safety and water quality problems at the Leadville mine drainage tunnel. The Administration has not yet had time to establish its position with respect to the potential options, and further consideration is needed by the Department and among Administration agencies. We estimate that satisfactory review can be completed in about 2 months.

The bill would authorize and require the Secretary of the Interior to undertake investigations and to establish and implement stabilization and rehabilitation measures for the Leadville mine drainage tunnel in Colorado. The bill would also require the construction of water treatment facilities to improve the quality of the tunnel drainage effluent. Plugging the tunnel in lieu of rehabilitation would be an authorized option under the proposal. Consultation with the Governor of Colorado would be required in carrying out the investigations and rehabilitation measures. Funds are authorized in "such sums as may be necessary" for construction and maintenance, and all funds authorized would be nonreimbursable. The principal purposes of the bill are for public safety and water quality.

The Leadville drainage tunnel was constructed by the Bureau of Mines beginning during World War II as a war measure for the primary purpose of providing continuous water drainage of certain mines in the Leadville mining district to make available mineral resources in the district for the war effort. It was believed that without the tunnel, complete exploitation of the mines in the district could not be realized. Work began on the tunnel in December 1943, but was slowed by unexpectedly poor underground conditions. In 1945 the war ended, and after the first 6,600 feet had been driven, appropriations were exhausted and tunneling was abandoned. After the Korean war broke out, further appropriations were authorized and tunneling resumed, continuing until March 1952 when the tunnel was completed to its total length of 11,299 feet. Little production or exploration has occurred in the district since World War II. Until 1959, the Bureau of Mines continued a minimal maintenance program on the tunnel, including the construction of a concrete lining in the first 100 feet.

In 1959 the tunnel was transferred from General Services Administration's surplus property list to the Bureau of Reclamation with the expectation that water from the tunnel could be used for Reclamation project purposes. The transfer agreement contained the proviso, ". . . the Bureau of Reclamation has no present intention of spending any funds for operation and maintenance of the tunnel."

The expectations of the Bureau of Reclamation concerning use of water from the tunnel have not been fulfilled. Measurements of the quantity of water have shown that only about 4 ft³/s are available and the water presently contains metallics. A water right claim filed by the Bureau with the Colorado State Engineer many years ago has not been adjudicated, and it will not be possible to obtain a water right to tunnel flows unless they can be shown to be independent of the Arkansas River.

Because of the lack of maintenance, the condition of the tunnel has deteriorated. The first 630 feet of tunnel are in unconsolidated glacial moraine and terrace gravels. As the timber sets and lagging rotted away, cave-ins developed. Collapsed areas appeared at the surface as sinkholes, some of which were as much as 30 feet deep. One such sinkhole developed less than 15 feet from State Highway 91 which crosses the tunnel approximately 525 feet from the outlet. (Both the tunnel under the highway and the sinkhole were subsequently backfilled under emergency measures.)

Caving of the tunnel has also impeded the natural flow of water from the tunnel, with the result that the water table in the glacial moraine above the tunnel, which has been monitored through observation wells, has shown a marked rise in recent years. It is feared that too much of a rise might create an unstable condition above the tunnel and could endanger a trailer court downstream from the tunnel portal, as well as the highway.

Since 1959, the Bureau of Reclamation has expended nearly \$330,000 for surveillance and to provide temporary measure for public safety. These measures have included acquiring 8.0 acres of land, providing protective fencing, filling sinkholes and about 450 feet of the tunnel, installing observation wells, and installing and operating a pump to lower ground water levels affected by tunnel blockage.

A point source discharge permit (National Pollution Discharge Elimination System) for the Leadville Mine Drainage Tunnel has been issued by the Environmental Protection Agency pursuant to the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500). Because of the heavy metals presently in the drainage outflow from the tunnels, the water may require treatment to comply with the effluent standards as established by the permit. Reclamation has been performing water quantity and quality monitoring of the drainage effluent to assist in developing a solution to the water quality problem.

Several approaches have been considered to solve the safety and water problems. Proposals that have been investigated by Reclamation include rehabilitation of the first 1,000 feet of tunnel with an 8-foot horseshoe-shaped concrete lining, at an estimated cost of \$2.2 million. (Bureau of Reclamation and Bureau of Mines engineering personnel believe there is little public safety threat presented by the tunnel beyond 1,000 feet.) This would remove hazards of sinkholes appearing on the surface above the tunnel and prevent water buildup and thus alleviate dangers caused by the accumulation of water behind blocked areas in the tunnel. It would not necessarily restore access to the entire length (approximately 2 miles) of the tunnel. However, by providing substantially unrestricted access to the first 1,000 feet, this plan would facilitate further work in the tunnel at some future time if desired to accommodate the resumption of mining operations in the area.

A possible variation of this plan, if it were not necessary to maintain unrestricted access to the tunnel, would be to construct either a 6-foot-diameter steel liner plate tunnel (which is feasible) or a small drainage pipe (if found feasible) which could be installed in the first 1,000 feet at less cost. We estimate the 6-foot-diameter steel liner plate tunnel could be installed in the first 1,000 feet for \$1.7 million.

If found feasible to do so, a smaller drainage pipe might be installed for even less cost, in conjunction with packing additional gravel in the tunnel as was done earlier on an emergency basis.

Another possibility which has been considered is to drill an entirely new tunnel adjacent to the existing one, to intersect the existing one at a depth of 1,000 feet. This would provide the same relief as the above plans for the problems of water buildup, and could be easier because it would not be necessary to deal with existing collapses, backfilling, old timbers and rails, and other residues and problems that will be encountered in rehabilitating the old tunnel to a depth of 1,000 feet. This plan may not, however, adequately solve the problem of filling existing sinkholes and preventing future ones over the old tunnel.

The foregoing alternatives appear appropriate for further consideration to carry out the objectives of the bill which are to provide for public safety and water quality improvement.

We also propose further consideration of possibilities for joint and non-Federal participation in plans for rehabilitation and continued maintenance of the tunnel. Inasmuch as there is little Federal interest in continued maintenance of the tunnel, and interests other than the United States will be served by rehabilitating the tunnel, particularly if opportunity for mining use is to be provided, we believe there is opportunity for non-Federal participation. Accordingly, we believe that any legislation should provide for specific authority for the Secretary to transfer all or parts of the existing tunnel and such other associated interests of the United States to a non-Federal entity, such as the State of Colorado, for administration, operation and maintenance.

Another proposal is to plug the first 6,000 feet of the tunnel completely to eliminate the drainage discharge. This is specifically mentioned in the proposed bill and would fully solve any future safety and maintenance problems now associated with the tunnel, but it would be very costly, at an estimated \$13 million at 1976 prices, and would have other detrimental effects as well. It would preclude the possibility of any future use of the tunnel. It might cause reflooding of mines drained or flooding of new areas and the pollution of the Leadville municipal water supply. The Department recommends against adoption of this plan.

Another plan has been suggested by the State of Colorado and others which would call for rehabilitation and maintenance of the entire tunnel. This would anticipate possible future mining in the area and would, of course, go beyond the safety and water quality objectives of the bill. The total cost of this plan has not been estimated and could not be without further work and access to the tunnel, but it would be considerably more costly than limited rehabilitation and might well be even more costly than plugging the tunnel. While future mining operations in the area are entirely possible, we believe that, based on market conditions and projections, any substantial resumption of mining in the area is unlikely for the near future. Consideration of rehabilitation of the entire tunnel should await the development of more specific plans for mining the area. Moreover, any such rehabilitation should be undertaken with the financial participation and support of other interested parties such as the State and the mining developers who would benefit from the tunnel.

Any plan adopted should include provisions covering improvement of water quality. We believe that further studies must be made before a good plan of water treatment acceptable to the Environmental Protection Agency can be developed.

The possibility exists that the water quality problem might substantially improve if the tunnel blockage is removed. The concentration of metal residues in the water may be caused by the fact that the water buildup in the tunnel and adjacent grounds allow for prolonged contact of the water with the metallic substances. If the blockage is removed, the buildup eliminated, and the water is allowed to flow freely, without the prolonged underground contact, the quality of the drainage effluent may improve.

Consequently, we believe that authorizing the construction of water treatment facilities would be premature at this time under any alternative which we might recommend. After the impounded water is drained off, monitoring of the outflow from the tunnel would determine whether a water treatment facility is in fact needed, and if so, what kind of treatment would be required. Without this kind of study, we cannot give a good estimate of the cost of a water treatment facility but a preliminary estimate would be about \$2 million. We estimate the annual cost of such monitoring to be \$40,000.

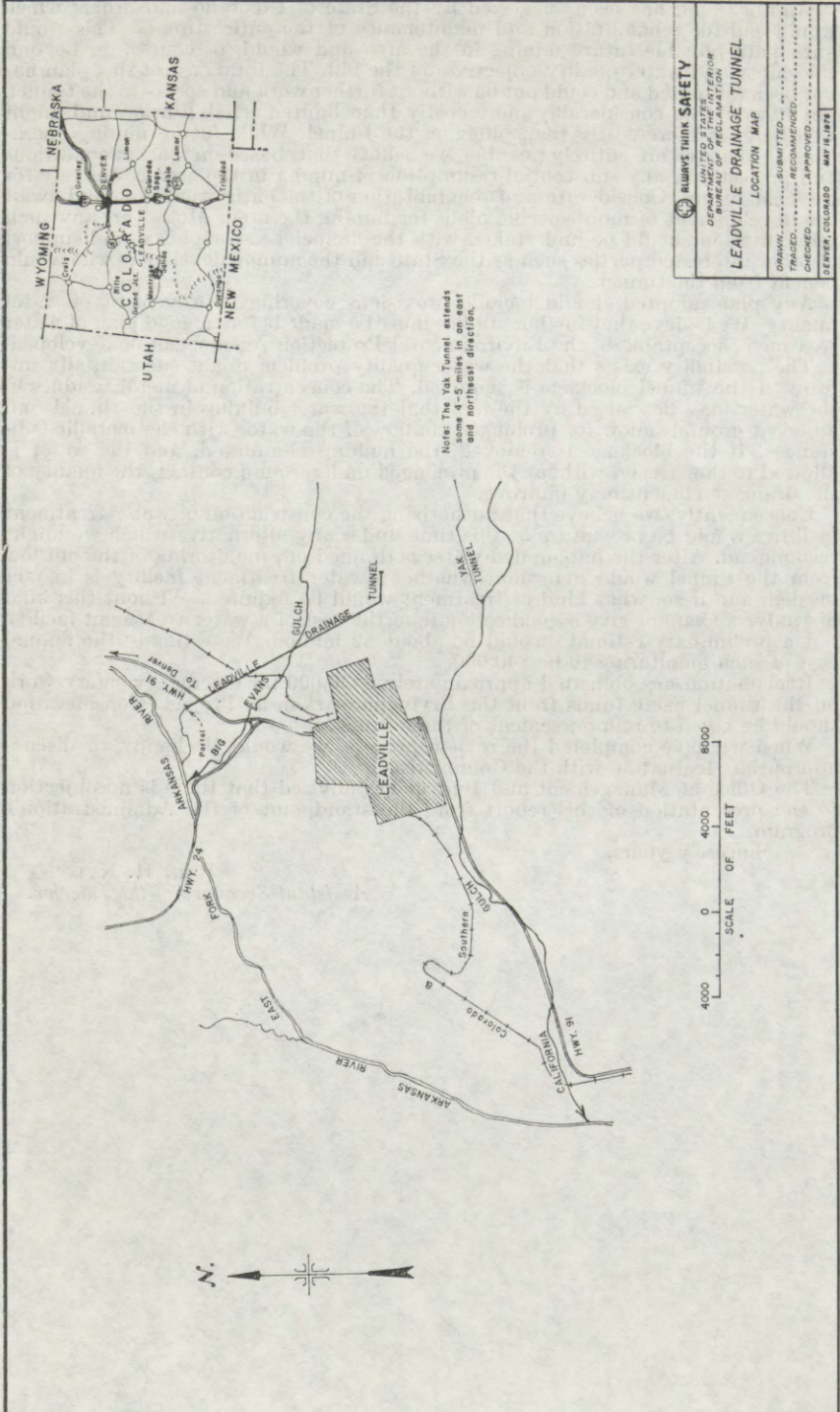
Reclamation has obligated approximately \$330,000 for emergency safety work on the tunnel using funds from the Fryingpan-Arkansas Project. Consideration should be given to reimbursement of these funds.

When we have completed the review process, we would be happy to discuss appropriate legislation with the Committee.

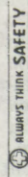
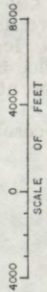
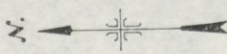
The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely yours,

JOHN H. KYL
Assistant Secretary of the Interior.



Note: The Yak Tunnel extends some 4-5 miles in an east and northeast direction.



ALWAYS THINK SAFETY
 UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
LEADVILLE DRAINAGE TUNNEL
 LOCATION MAP

DRAWN.....SUBMITTED.....
 TRACED.....RECOMMENDED.....
 CHECKED.....APPROVED.....
 DENVER, COLORADO MAY 18, 1924

Senator HASKELL. Our first witness is Mr. Sullivan, Assistant Commissioner of the Bureau, whom we will hear from at this time.

STATEMENT OF EDWIN F. SULLIVAN, ASSISTANT COMMISSIONER, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR; ACCOMPANIED BY SHELDON P. WIMPFEN, CHIEF MINING ENGINEER; AND J. WILLIS ERVIN, REGIONAL SUPERVISOR, WATER AND LAND OPERATIONS, DENVER, COLO.

Mr. SULLIVAN. Senator, glad to be here and present testimony before you on this.

Senator HASKELL. Would you identify the gentlemen accompanying you for the benefit of the reporter.

Mr. SULLIVAN. Yes; I will. I have on my left Mr. Sheldon P. Wimpfen. He is Chief Mining Engineer for the Bureau of Mines.

On my right Willis G. Ervin. He is the Regional Supervisor of Water and Land Operations in our regional office in Denver, Colorado. He will be available to assist in answering questions if that should be of help.

Senator HASKELL. Fine, thank you very much, sir.

Mr. SULLIVAN. Mr. Chairman, we are here today to present the Department's views on S. 3394, a measure to authorize the Secretary of the Interior to carry out certain engineering studies and implementation measures relating to safety and water quality improvement of the Leadville mine drainage tunnel.

As stated in the Department's letter of June 7, 1976, to the committee, the Department recommends that the committee defer action on the bill at this time pending further review by the Department and the administration of various alternative solutions now under consideration. The administration has not yet had time to establish its position with respect to the potential options, and further consideration is needed by the Department and other agencies. It is estimated that a satisfactory review can be completed in about 2 months.

The bill, if enacted, would provide authority to conduct engineering investigations, stabilize and rehabilitate the Leadville mine drainage tunnel for public safety, and improve the quality of the tunnel effluent.

The tunnel is located generally east and north of the city of Leadville, Colo. The tunnel effluent is discharged via a natural drain into the east fork of the Arkansas River. Colorado Highway No. 91, the principal highway connection between Leadville and Denver, crosses the tunnel alinement near its portal. A 12-inch diameter waterline carrying the domestic water to the city of Leadville also crosses the tunnel adjacent to the highway. A trailer court is located below the tunnel portal.

If I might depart for a minute from my prepared statement, we do have these drawings here that I might describe briefly so that we can refer to them if we need to.

The first one is a more detailed plan of the area near the tunnel portal. The tunnel, for the first 1,000 feet is shown as a dashed line, although it actually extends another 10,000 feet into the mountain beyond that.

Colorado Highway No. 91 is shown on there in red, and a waterline is shown adjacent to it. The area colored in yellow is owned by the United States, and the location of the Molly Brown Trailer Court is also indicated on the map.

The manager of the trailer court estimates that about 240 people reside in the 60 trailers in the court.

The natural drainage from the tunnel portal to the east fork of the Arkansas River is also shown. We have another display map showing the first 1,000 feet of the tunnel from the portal in a cross section and generalized geological conditions which exist in that region.

The location of the ground water observation wells and the ground water level as of April 15, 1976, as determined by measurements of the wells, are indicated on the map.

The location of the highway and waterline are also indicated. A 20-inch steel vent line, not shown, remains in the invert of the tunnel and appears to carry the present drainage discharge through the full section, and there is a 24-inch line that goes on out to convey the water down to the river.

The Leadville mine drainage tunnel was constructed by the Bureau of Mines during the period 1943-52 for the primary purpose of providing continuous water drainage of certain mines in the Leadville mine district. The tunnel is 11,299 feet long. The tunnel has not provided the benefits anticipated because a drop in ore prices resulted in closing most of the mines soon after the tunnel was completed. The Bureau of Mines continued a minimal maintenance program on the tunnel until 1959.

During the construction of the tunnel, it appeared that the drainage outflow might become available for use on the proposed Fryingpan-Arkansas project. In 1951, the Bureau of Reclamation filed a water-right claim with the Colorado State Engineer for 20 cubic feet per second of discharge from the tunnel. To date, the filing has not been adjudicated. Outflow over the past several years has been between 3 and 4 cubic feet per second. For the claim to be adjudicated for that use, it would be necessary to demonstrate that such flows are not naturally tributary to the Arkansas River.

In 1959, because of its interest in the water supply potential of drainage outflow, the Bureau of Reclamation assumed custody of the tunnel when it was declared excess real property by the Bureau of Mines. The assignment of the tunnel to the Bureau of Reclamation was with the understanding that Reclamation did not intend to expend any funds for operation and maintenance of the tunnel.

Because of the lack of maintenance, the condition of the tunnel has deteriorated. The first 630 feet of tunnel are in unconsolidated glacial material and terrace gravels. As the timber sets and lagging rotted away, cave-ins developed, and collapsed areas appeared at the surface as sinkholes. The sinkholes were as much as 30 feet deep, and two were adjacent to the highway. The cave-ins are impeding the tunnel outflow. The water table in the glacial material above the tunnel has risen 20 to 30 feet since 1968. Probably the entire tunnel is filled completely with water.

Since 1968, the Bureau of Reclamation has undertaken various emergency measures to provide for public safety, utilizing funds appropriated for the Fryingpan-Arkansas project. To date, \$330,000

have been expended or obligated for these purposes. The principal measures have included:

1. Clearing and rehabilitating the first 200 feet of the tunnel and installing a bulkhead at that point.

2. Backfilling the surface sinkholes and placing gravel in approximately 450 feet of the uncollapsed tunnel from the bulkhead to a location just beyond the highway (shown on the cross section area of the drawing).

3. Installing observation wells to monitor groundwater conditions.

4. Installing a pump in the observation well above the highway to maintain the water table at a safe level until a permanent solution could be determined.

5. Acquiring 8 acres of land overlying the tunnel portal area.

6. Fencing around the hazardous sinkhole area.

The Bureau of Reclamation believes that the water trapped in the tunnel does not pose a threat to Leadville or the trailer court from the standpoint of a blowout. It is not probable, with the existing physical conditions in the tunnel area, that enough hydraulic head could develop to cause a 400-foot-long plug of silt, sand, gravel, cobbles, boulders, and steel sets to be blown from the tunnel. However, the buildup of ground water could cause instability in the hill near the tunnel outlet, and landslides might develop. Should this occur, it could damage State Highway 91, the Leadville water pipeline, and the trailer court.

Senator HASKELL. That might be the understatement of the week, Mr. Sullivan.

Mr. SULLIVAN. You think so? There have been some sinkholes developed as recently as this year, not as serious as they were earlier. But there have been, and maybe Mr. Ervin could point those out on the drawing.

Mr. ERVIN. Just above the highway.

Senator HASKELL. Along the waterline, too.

Mr. SULLIVAN. That is correct. Because no one has been beyond approximately 200 feet into the tunnel since 1959, any statement as to its condition can only be speculative. However, it is believed that the Leadville mine drainage tunnel is presently in a state of disrepair and deterioration.

The Environmental Protection Agency has issued a point source discharge permit for the Leadville mine drainage tunnel in accordance with the Federal Water Pollution Control Act amendments of 1972, Public Law 92-500. The national pollutant discharge elimination system permit establishes effluent standards which become effective on July 1, 1977. At present, the discharge contains concentrations of certain heavy metals in excess of the effluent limitations. When advised that the Bureau of Reclamation lacked authority and funding to provide treatment, EPA indicated that it would be willing to work with Reclamation in developing plans to achieve scheduled compliance.

Additional construction to develop a water supply from the Leadville mine drainage tunnel is not considered to be within the scope of the plan authorized for the Fryingpan-Arkansas project, and the cost of such development cannot be justified for the incremental amount of water gained. Therefore, it is the Department's view that the Leadville mine drainage tunnel is not a part of the Fryingpan-Arkansas

project and that authority is lacking to request or expend funds appropriated to that project for the rehabilitation of the tunnel or for improving the quality of the tunnel effluent.

The Bureau of Reclamation has attempted to dispose of the U.S. interest in the tunnel both to Federal and non-Federal agencies or entities. Interest has been limited because of the apparent rehabilitation costs and water quality problem.

It is unlikely that substantial mining in the Leadville area will be resumed in the near future. Consequently, rehabilitating the complete tunnel for mining purposes should not be undertaken at this time unless there is a demonstrated need and then only with the financial participation of interested parties.

The first 1,000 feet of the tunnel is in unconsolidated materials and needs to be rehabilitated or stabilized for safety purposes. Most of the remainder of the tunnel is in bedrock formations and does not appear to constitute a serious safety hazard.

Alternative measures are available which, it is believed, would provide public safety for the foreseeable future and maintain adequate drainage. One of these alternatives, installing a concrete-lined, structural steel supported, 8-foot-diameter, horseshoe-shaped tunnel section for a distance of 1,000 feet from the portal, would provide reasonable access to the rest of the tunnel for mining purposes.

It is estimated that this work would cost \$2.2 million. Other alternatives would be less costly. For example, a 6-foot-diameter steel liner plate installed in the first 1,000 feet of the tunnel would cost \$1.7 million. A smaller diameter drainage pipe might prove feasible.

Also, it might be possible to drill holes from the surface to the tunnel and to place gravel in the first 1,000 feet of tunnel to prevent the development of additional sinkholes (as was done earlier for some small sections as an emergency measure). However, drainage pipes or wells may also be needed.

If unrestricted drainage is reestablished, it is conceivable there could be a significant change in the need for treatment of the effluent because there would be less impounded water in contact with minerals. A monitoring program to collect and evaluate quantitative and qualitative data and to determine the need for treatment may be advisable. It would be desirable to coordinate any water quality improvement plans for the Leadville mine drainage tunnel effluent with similar plans for handling other mine drainage in the area.

These comments on the problems associated with the Leadville mine drainage tunnel are based on information gathered in the field. The Bureau of Reclamation, because of its current responsibility for the tunnel, has felt obligated to undertake certain emergency measures in the interest of public safety and to seek long-range solutions to the problems posed by the tunnel. The Bureau of Reclamation has no desire to continue its jurisdiction over the tunnel because the tunnel does not appear useful in connection with the reclamation program. If the tunnel is to be retained for possible future use in connection with mining activities, it would appear appropriate for some other agency to assume the responsibility.

Appropriate action needs to be taken with respect to the public safety and water quality problems associated with the tunnel. As already indicated, the administration has not completed its review of

the available data and, therefore, does not yet have a position as to what action should be taken. However, that review should be completed in about 2 months, at which time a further statement as to the position of the Department and the administration can be made available.

Senator HASKELL. Thank you, Mr. Sullivan. I wonder if you and your associates would mind stepping down and staying around. Because of the health and safety problems, I would like to hear from the State of Colorado, and after I hear from them I would like you gentlemen to come back and I will have some questions.

Mr. SULLIVAN. We will be very pleased to do that.

Senator HASKELL. I think that would be the best way to proceed. Mr. Blake of the Colorado Department of Natural Resources.

Mr. Blake, I would like to hear from you first, and then I would like to talk to you gentlemen. I would like you in turn to stick around, too.

Mr. BLAKE. Thank you, sir.

Senator HASKELL. I am very much concerned, the problem could be solved on a long-term basis, were it not for the trailer court and the water supply through Leadville and the highway. I am very much concerned about these three situations.

Mr. BLAKE. I think Mr. Sullivan probably covered a lot of the points I have in here, so I will try to highlight.

Senator HASKELL. We will include your statement in full.

STATEMENT OF NORMAN BLAKE, COLORADO DEPARTMENT OF NATURAL RESOURCES

Mr. BLAKE. I think the first thing you should do, you have recommendations from the Commissioner, Colorado Mining Association, and the water district. I would like to see that these documents, along with this testimony, be put into the record.

Senator HASKELL. They will be out into the record.

[The prepared statement and documents submitted by Mr. Blake follow:]

STATEMENT OF NORMAN BLAKE, COLORADO DEPARTMENT OF NATURAL RESOURCES

A bill to authorize engineering investigation, stabilization, and rehabilitation to the Leadville Mine Drainage Tunnel and the construction of facilities for the treatment of the drainage effluent.

Mr. Chairman, honorable members of the committee on Interior and Insular Affairs, my name is Norman R. Blake. I am the director of the Colorado Division of Mines. I am here on behalf of Governor Richard D. Lamm and the State of Colorado to offer comments on S. 3394, a bill to authorize engineering investigation, stabilization, and rehabilitation to the Leadville Mine Drainage Tunnel and the construction of facilities for the treatment of the drainage effluent. The State of Colorado thoroughly endorses this bill and urges its early adoption.

The Leadville mining district lies on the west slope of the Mosquito Range, in Lake County, Colorado. Since the discovery of placer gold in 1860 Leadville has been a mining community. After a brief boom and a period of relative quiet lead and silver were discovered in 1874 and serious production mining began. The Leadville District has produced about \$2,246,967,772 worth of metals, chiefly molybdenum, lead, zinc, silver, and smaller values in tungsten, tin, manganese, copper and gold. Its production record is the largest of all the mining districts of Colorado and is among the largest in the country.

Mining in the Leadville District has been greatly affected by water and has involved a continuous struggle, at great expense, to maintain drainage by pumping. In periods of high metal prices, pumping was economically possible and production resulted. When metal prices receded, production decreased, and the water was allowed to encroach upon and eventually fill the mines. Labor trouble stopped operations in 1896 and 1919 with resultant flooding. As the mines became deeper, the costs of unwatering in a succeeding "boom" cycle became much greater.

It has long been recognized that complete exploitation of the Leadville District cannot be accomplished without continuous drainage provided by a tunnel. Various tunnels to drain portions or all of the district have been proposed from time to time.

The Leadville Drainage Tunnel was begun in December 1943 as a World War II emergency measure to facilitate recovery of an estimated 3,000,000 tons of zinc-lead ore which would be made available for mining by unwatering the district through the drainage tunnel. The ore that would be thus unwatered was expected to be of a considerable higher grade than what was then being mined throughout the country.

The Tunnel was authorized in 1943 by public law 133 of the 78th Congress, an Act making appropriation for the Department of the Interior for the fiscal year ending June 30, 1944. The \$1,400,000 was appropriated and expended on the project. Funds were exhausted after 6,600 feet of tunnel was completed and operations were recessed in August 1945.

The Tunnel was again funded and reactivated in the early nineteen fifties and was advanced to a total length of 12,000 feet at which time funds were exhausted again. Although the tunnel was never completed, it has been effective in dewatering a large area of the Leadville District. This is evidenced by average outflow of over 1,500 gallon per minute despite blockages that have occurred in the lower 1,000 feet. The blockages have resulted from caving which followed the rotting of timber supports in the lower section of the tunnel. The blockages have reduced the effectiveness of the tunnel as a drainage way and caused a build-up of the water table to a level approximately 65 feet over the tunnel. Auxiliary pumping has been initiated and seems to be reasonably effective in keeping the water level from going much above the 65 foot level but has not yet made any significant reduction in that level.

The situation, as it exists today poses at least three potential hazards. These are:

- (a) Caving and earth movement,
- (b) Reduced water quality in the Arkansas River, and
- (c) Potential flooding.

The Tunnel passes under State Highway 91 which carries a very heavy traffic load due to the large employment at the Climax Colorado Mine and it being the primary route to Interstate 70 and Denver. A cave condition was detected on surface in 1966 at which time the Bureau of Reclamation fenced the hole off. In 1968 another cave was noticed, this became alarming because of the State Highway No. 91 crossing over the top of the Tunnel. Several holes were drilled into the Tunnel from surface along the Tunnel line on both sides of the road, the purpose was for water measurements. A hole was drilled from the center of the road intersecting the Tunnel at 564 feet from the portal. The Tunnel was filled with aggregate through this hole and grouted for the protection of the road. Since April of this year two additional caved areas have developed, one of which was approximately 20 feet in diameter and 30 feet deep and formed immediately adjacent to the highway.

In addition to the cave-in, the high water table in the unconsolidated glacial sediment poses a landslide hazard to the slope below the highway.

The concentration of heavy metals, such as zinc, copper, lead and iron, in the water draining from the Tunnel greatly exceeds the limits established in an applicable NPDES permit issued by the Environmental Protection Agency covering the outflow on a joint source of pollutants under Public Law 92-500. The permit limits, which go into effect on July 1, 1977, were established to meet minimum conditions for aquatic life in the Arkansas River immediately downstream of the Tunnel discharge point. The surface discharge also threatens to seep into the ground and pollute an adjacent water well which serves as the domestic supply to approximately 200 persons living in a mobile home park adjacent to the tunnel portal.

Finally, there is the ever-present danger of the loose blockage material being breached by the water which is pushing against it at a pressure of more than two tons per square foot. This is a serious threat to property and human life,

particularly because of the mobile home park immediately adjacent to the tunnel portal.

Thus, it is clear that prompt action is required to alleviate the very serious situation that has developed around the Leadville Drainage Tunnel. We strongly urge your early and favorable recommendation that corrective action be initiated without delay. We believe that the only realistic solution involves a rehabilitation of the damaged portion of the tunnel and the construction and continuing operation of a water treatment plant at the discharge point.

It has been proposed that a permanent sealing of the tunnel may be an acceptable and less expensive solution. For several reasons we have serious reservations that this approach would be satisfactory.

First, the source of the water is continuous. Ground water in the Leadville District originates from precipitation and melting snows on the high mountain ridges to the east. Soaking into the weathered rock and glacial debris and following the bedrock surface in its natural descent to the Arkansas Valley, it finds its way through faults and fractures into the rock formations and eventually into the mine workings. A permanent plug in the tunnel would cause the static water level to continue to rise well above the current 65 foot level. The effect of the resulting hydrostatic head on the unconsolidated sediments that form the hillside above the highway would probably pose a serious landslide threat. The only way of alleviating this threat would be the installation of drains at various locations in the side slope. It is obvious that this would only compound the problem of water quality control.

Second, about 80% of the Leadville city water supply flows from the Canterbury tunnel which lies in the vicinity of and about 100 feet higher than the drainage tunnel. The Canterbury water is essentially free from concentrations of heavy metals and is an acceptable municipal water supply source. Should the Leadville Drainage Tunnel be effectively blocked it is highly probably that the static water level would rise to intersect the Canterbury tunnel and introduce heavy metal pollutants into the municipal water supply.

Third, we all know that the water which is now flowing from the tunnel must go somewhere. The mountain around the tunnel is severely faulted and fractured. This, added to the fact that the hillside is composed of loose gravels, indicates that the polluted water will appear in the form of a multitude of seeps and controlled point pollutant source to a totally unmanageable non-point source. It is clear that the pollutants, in time, would find their way to the river.

Last, but of fundamental importance, is the basic reason for the tunnel in the first instance. Recall that the Congress authorized its construction as an emergency measure in World War II. The nation's need for minerals was of a crisis proportion at that time. The tunnel was not finished in time to help the nation through that critical period. The lesson is clear.

There has been no extensive mining in the area drained by the tunnel since the construction was first authorized by the Congress. Thus it seems clear that considerable deposits rich in lead, zinc and silver remain to be mined. Actual mining will depend upon the world and national minerals situation and market prices for these metals.

The future mineral potential of the Leadville District which would be enhanced by the Leadville Drainage Tunnel is difficult to quantify, but is considered large by most experts who have studied the area. G. F. Laughlin of the NSGS in Open File Report No. 578, 1934 estimated conservatively that 250,000 tons of sulfide ore containing an average of 3 oz. of silver and .2 oz. of gold per ton and 3.0% lead, 15% zinc and 0.2% copper as a justification for a drainage tunnel. The Bureau of Mines in IC8464 cited an additional 360,000 tons of ore of substantially equal grade in the "Blue" limestone (Leadville Lime, upper units) above.

The true magnitude of mineral potential lies not in these known and estimable reserves but in the undiscovered, or unrecognized to date, resources. These resources which could be substantial will occur in four categories:

1. Shallow oxide, carbonate or combination oxide-sulfide which were not amenable to then current milling and smelting practices and thus, were by-passed.
2. Undiscovered high grade veins at both shallow and great depths which were not discovered by mining or drilling. For example many shafts and drill holes mistook the Gilman sand for the Parting Quartzite and, therefore, never penetrated the often productive Dyer dolomite.
3. Abandoned but not depleted mines. Whenever costs (mining and water pumping) became higher than the current but cyclical price of ore, mining became a financially losing venture and many mines were shut down with considerable

minerals value remaining. The well-known Emmett mine in the area is only one of many possible examples.

4. A lesser but still possible potential for substantial ore reserves in Tertiary intrusives beneath the sedimentary rocks in the Pre-Cambrian. Evidence in some nearby mines and deep drill holes indicate the possibility of multiple Tertiary intrusives such as at Climax.

The fruition of these potentials awaits further exploration and new technology or the application of present technology in milling and smelting not available at the time the area was mined or a substantial increase in mineral prices or the probability that international events will place a premium on domestic minerals which transcends prices and economics. All of the above are likely future events. The Leadville Drainage would increase the likelihood that the District could respond to any of the above cited outside pressures.

For a relatively small investment now, we can protect this valuable tunnel that could be replaced today only at a cost of tens of millions should another mineral crisis arise. Recent developments in the materials supply picture suggest that that time may be rapidly approaching.

The Bureau of Reclamation has worked closely with the Colorado Department of Natural Resources in reviewing this problem in recent weeks. We sincerely appreciate the concern shown and the willingness of the Bureau and Congress for addressing the concerns of the State of Colorado in this matter.

Thank you.

THE COLORADO MINING ASSOCIATION,
June 4, 1976.

Re Leadville Drainage Tunnel—H.R. 13097 and S. 3394—94th Congress.
Hon. RICHARD D. LAMM,
Governor, State of Colorado, State Capitol Building,
Denver, Colo.

DEAR GOVERNOR LAMM: After careful review of the current situation and condition of the Leadville Drainage Tunnel, the Colorado Mining Association and its standing committee on the Leadville Drainage Tunnel recommends that the tunnel be rehabilitated rather than plugged and abandoned.

This recommendation is based on the following factors:

1. Build-up of water behind a cave or plug could create a sufficient pressure head to cause a blowout and subsequent flooding and water pollution.
2. The development of the mineralized area drained by the tunnel would be impaired by requiring an operator to pump an additional 400-foot depth of water.
3. Plugging and abandonment would be contrary to the purpose of the tunnel. Another tunnel would cost in the neighborhood of \$500 million.
4. Plugging the tunnel would relocate the point of discharge of the underground waters. This might occur in a less desirable and more hazardous location.
5. Flowing drainage water through an open tunnel is less likely to be a source of mineral pollutants.

The mineral potential of the Leadville Mining District has been reported on in detail by the U.S. Geological Survey and others. The District has a rich mining history and is currently being actively mined.

The Colorado Mining Association endorses and supports your efforts to have legislation enacted to have the Leadville Drainage Tunnel rehabilitated.

Sincerely yours,

DAVID R. COLE,
Secretary and Manager.

PROCEEDINGS OF THE BOARD OF COUNTY COMMISSIONERS OF THE COUNTY OF
LAKE AND STATE OF COLORADO

RESOLUTION

Whereas by Resolution adopted the 4th day of June, 1976, the Lake County Board of County Commissioners supports H.R. 13097 with one exception; and

Whereas it was determined that a drainage tunnel be constructed to make it possible to dewater a portion of the Leadville mining district in order to make available for mining a number of lead, zinc, and copper mines which are strategic metals in the support of an armed conflict.

Whereas the Leadville Drainage Tunnel was constructed by the Bureau of Mines and completed in 1952 to a distance of ELEVEN THOUSAND TWO HUNDRED NINETY NINE (11,299) FEET.

Whereas the Korean war was over before any minerals could be produced for the benefit of the nation.

And Whereas the tunnel has not been maintained since 1952 and has deteriorated to the point where there are many cave-ins which resulted in sink holes to the surface above the tunnel.

And Whereas these cave-ins have partially blocked the water drainage for which purpose the tunnel was constructed, and that this water behind the cave-ins amounts to EIGHT MILLION (8,000,000) GALLONS.

Whereas the need for the tunnel, although not as acute as it was in the 1940's, still exists today because if the Leadville mines were again called upon to supply the nation with strategic war minerals, the tunnel would have to be operational in order to assist in dewatering the mining district: Therefore be it

Resolved, That the Lake County Board of County Commissioners on behalf of the citizens of Lake County go on record in support of H.R. 1309 which has been introduced by Representative Frank Evans of Colorado in the House of Representatives.

And that we also support S. 3394 that has been introduced by Senator Haskell in the Senate of the United States Congress. This support of these two bills is given with ONE VERY IMPORTANT EXCEPTION which is the provision which states in Section 5, of the House Bill, "or \$12,300,000 (January 1975 price levels) for plugging of the tunnel." Now therefore be it

Resolved, That the Board of County Commissioners of the County of Lake and State of Colorado object to the plugging of the tunnel for the following reasons:

1. If the tunnel were plugged, the water would back up into an area in the mining district contaminating the water that is currently being used to supply the populated areas of the Leadville community.

2. The water that would be held back would escape through other means of outlet throughout the mining district which would make it virtually impossible for this water to be treated to comply with any water quality standards.

Passed and adopted at a special meeting the 4th day of June, 1976.

WILLIAM J. GREGORY,
Chairman.

FRANK A. HREN,
Commissioner.

CHRIS KASTRINOS,
Commissioner.

ATTEST
State of Colorado, ss:

JO NIXON,
*Deputy Court Clerk and Recorder,
Lake County Colorado,
Ex-Officio Clerk of the Board.*

Mr. BLAKE. The Leadville Mining District has about \$2¼ billion, and this area is here has the possibilities of producing a lot more. They went into the fact that money was appropriated and everything, so I won't get into that.

I am just going to health and safety and ad lib most of that because it is written. The fact that the trailer court is situated just at the border of the tunnel, has four tunnels in a direct line with the border of the tunnel, and the fact that the last two sinkholes occurred at station 6 plus 34, one of them was close enough to the highway that they filled the hole with a front-end loader without getting up on the bank.

It also exposed the Leadville waterline going through there, and about 100 yards to the west of where that sinkhole came in, the water line parted about a week after the first sinkhole went in.

I was there the day they were preparing it, but I did not get to stay to see them cut it and see which way it flexed. But the whole side area is saturated with water, and they have a lot of water when they dug down to repair that land.

The one hole was on the highway side of station 6 plus 34, and about 2 weeks later the other sinkhole fell in, on the opposite side, along the tunnel of station 6 plus 34.

Since that pump has been set in that particular hole, there is no way of getting the water measurements back there any more. Prior to the time that the pump was running in there, the water had raised up to a little over 65 feet.

My estimation is that the tunnel has over 8 million gallons of water in it. The temporary buckets, sandfilled, gravel filled put in in 1968, some of this, in U.S. opinions at that time, that it was just a temporary measure. Right now we have no way of knowing what is holding that highway up.

That highway carries nearly 100 percent of the travel to the Climax Mine which employs 400 people at this time.

Senator HASKELL. Which side of the mountain is it? I am trying to figure out where on the highway—I have been over that highway many times myself.

Mr. SULLIVAN. Senator, I believe you have a generalized map which will give that to you a little bit better.

Senator HASKELL. I see the highway coming up—oh, yes; it is on the Leadville side of the mountain.

Mr. BLAKE. Yes.

Senator HASKELL. Thank you.

Mr. BLAKE. That highway is also the main link, Interstate 70 that runs east to Denver. It probably could be one of the worst hazards that we've got, if that highway would happen to drop through and a carload of miners or tourists were going over and got killed. It would be a real bad situation.

Senator HASKELL. Do I hear you say you really don't have any idea what is holding that highway up?

Mr. BLAKE. Nothing in the records that we have, and the Colorado Division of Mines will show anything except they bored some holes down, they put some gravel down into it and supposedly grouted it. It never showed anything in the records that they actually grouted.

About 2 years ago, they found that some of the water was coming up through the old vent line and to the air line that flowed from the back of the tunnel. So they went in and shot that line in two so they could pick up more water.

It did bring the water flow up some, but it has not leveled it significantly in station 6 plus 34.

Senator HASKELL. If that highway falls in, there goes the 12-inch waterline too.

Mr. BLAKE. Yes, it would possibly take the 12-inch water line—is it 12 or 24?

Senator HASKELL. It says 12 on the map, that's why I say 12.

Mr. ERVIN. That is the 12-inch line. This outflow line is 24.

Senator HASKELL. I am talking about this city water supply.

Mr. ERVIN. Yes, that's the 12-inch line.

Mr. BLAKE. The other problem is, if the water would blow out, it would probably damage part of the trailer court. It would also wash the flow channel, the east fork of the Arkansas River.

I have personally tapped large bodies of water. I also personally saw blowouts from tunnels which are only about 5 by 7, and maybe

1,000 feet of workings. And saw the damage the water has done when they blew out.

I think it is a real hazard to people in the trailer court and downstream, plus the fact that if that water does blow up the rock formation, for some 54 feet above the top of the tunnel are saturated with water. If that water would blow out, it would suck that tunnel completely closed in place.

I think that would be a big waste of money, and taking a big chance on using the tunnel for drainage and haulage, as it was designed to do.

Senator HASKELL. Would there be another health hazard? Mr. Sullivan testified and told that the water is badly damaged, let's put it that way. In other words it had a high metallic content, and therefore is injurious for almost any purpose you would use it for.

Would that have an adverse effect if it got into the Arkansas River?

Mr. BLAKE. It would now, but I think I would have to agree with him, if the tunnel flow was maintained so that the water did not stand—

Senator HASKELL. I mean if it blew out.

Mr. BLAKE. If it did blow out it would be a great pollution problem.

Senator HASKELL. There is a lot of water in there, I gather.

Mr. SULLIVAN. I would ask Mr. Blake, if it blew out, it seems to me that would be of very short duration and then it would stabilize into the normal flow, wouldn't you think?

Mr. BLAKE. Depending on how much lime and stuff came with it. It could be pollution problems for a long time.

Mr. SULLIVAN. By a long time what do you mean?

Mr. BLAKE. Six to eight months.

Senator HASKELL. It would probably also go only downstream, I would presume.

Mr. BLAKE. Yes.

The other problem is that the water keeps building up. I would have to look to see what the name of the tunnel is, but the water supply primarily comes from two sources. One is the Canterbury Tunnel which lies within a half mile of the tunnel and about 100-foot difference in elevation.

I never looked on a contour map to see for sure but some say it is only 50 feet and some say 100. But if the tunnel was plugged off and the water raised up to that elevation, the faulting in that area is primarily north and south.

It would contaminate Leadville's water supply which they say in their statement here from Parkville Water District, is about 1 million gallons a day, for 50 percent of the days per year, coming out of the Canterbury Tunnel.

The other water supply that they get comes out of the Evans shaft and into the Evans Reservoir, and this is mostly in the wintertime so that it can raise the water temperature up so that the water mains in town don't freeze.

Both of these supplies are good domestic water right now, but if the water level was raised up and contamination of the metals was pushed over to their water supply, it would probably pollute it enough to where it would not be usable.

Senator HASKELL. To be sure I understand you right on that, Mr. Blake, are those water supplies that you have talked about, are they from high altitude lakes?

Mr. BLAKE. No; they are from mines in the area.

Senator HASKELL. I see, therefore if this contaminated water gets pushed through these faults, it will get into these mines that they get the water from now.

Mr. BLAKE. That's right.

Senator HASKELL. I understand.

Mr. BLAKE. This is another reason why I feel personally that if the water is kept moving in the Leadville drainage, that the mine wall might not be so high that they would have a problem with it.

The water in 1959 was good agricultural water. The record changed at the Bureau of Reclamation filed on the water at that time, and why they never followed through, maybe the State of Colorado would give it to them. I don't know, it was never followed through, but they did file on that water at one time.

It was good water then, and I think if the water—the flow is maintained—that the water would possibly still be good enough to let go.

Senator HASKELL. Now, let's go back to Mr. Sullivan. We have a serious problem here that I don't think can wait. We have a problem where possibly a highway caves in, which is the main access between Leadville and the climax mine, to say nothing of the fact that the wall would go over it, generally some other States.

We have a situation where that highway may cave in. We have a situation where the probabilities are, as I get it, that the 12-inch waterline to the city will be severed.

We have a possibility that the city of Leadville's water supplies will be contaminated.

We have the possibility of pollutants in the Arkansas River, which will be extremely serious and detrimental to agriculture, to say nothing of the health of people downstream. And then we have the trailer court.

So I don't think we can sit around. Now, what are we going to do?

Mr. SULLIVAN. I think basically we agree that there is a problem here that needs to be resolved.

Senator HASKELL. Let me ask you this first, Mr. Sullivan. I wonder how come it took this legislation to bring this to a head. Is this something that you folks have been working on for some time? How do we happen to be here in a kind of crisis situation today?

Mr. SULLIVAN. Perhaps we should have been here sooner. We have, as I indicated in my statement, taken some emergency measures, and I believe that we felt that those might solve the problem. But we are now feeling that it takes something more permanent.

We don't believe the Bureau of Reclamation has the authority to do that, and that is why the legislation is being suggested now, I presume.

Senator HASKELL. But you are asking for another couple of months to decide—in other words, you are resisting the legislation.

Mr. SULLIVAN. Well, when we were clearing our position within the administration, the view was that more time was needed to review the data we had.

Senator HASKELL. That's nonsense. This must have been going on for years. Your own statement says that the tunnel has been blocked up since 1958. This has been going on for years.

We have quite a few people that live in Leadville, quite a few people that drink water. You people are procrastinating. I just don't understand it.

Mr. Blake, let me ask you this. What measures do you, as representing the Colorado Department of Natural Resources, feel should be done on an emergency basis? Just to alleviate the emergency situation.

Then we will address ourselves to the longer range problem later.

Mr. BLAKE. The very first thing that would need to be done would be to get a drill hole in back of station 6 plus 34, and completely remove the water behind that area. We did not allow anyone to work from the borderline to that tunnel and go in and remove that bulkhead and intercept the water now.

The water would have to be drained down to the floor of the tunnel or near the floor of the tunnel. This would entail—in 1972 we felt sinking a 4-by-8 shaft and opening it up that way.

Now, I don't think that is too good an idea because we would probably have to blast, and the concussion of the air blast or dynamite blast or explosive blast might cause a blowout, and I think it would be better to drill a large enough hole and put in a larger pump to blow all the water out of that cave there and alleviate the immediate danger.

At the same time that you are pulling the water down through down through all of that unconsolidated material in the portal area when that water goes down it could also pull the highway in and pull the rest of that tunnel area in. It would have to be watched real close while you are doing it, with the weight of the water in that type of ground is going to make an awful head and it will be hard to hold.

It would have to be watched at the time the water is being lowered.

But I must agree, within the first 1,000 feet of that tunnel is going to have to have something done with it. I want to say, and my statement says, that we appreciate the fact that the Bureau of Reclamation has been working with us for the past couple to 3 months to try to alleviate this problem.

Their cooperation has been real good. I think we're on the right track, and the only thing I can say, I feel somewhat like you do. I think we should have been doing something since 1968, and—because this is a problem that has been known, and probably it is as much my fault as it is theirs in not pushing harder before.

But just a couple of years ago one area was fenced at the location of LT-5, or station 3 plus 40. A man was walking across the ground, working on the ground, and a hole fell in. He tells me it was 35 feet deep, and he says I know because I was there 10 hours.

The highway patrol happened to know that his pick-up sat there all day, and he stopped, and this man's little dog ran up to him and led the patrolman back to where the man was trapped in the hole.

This has been known to be a hazardous area.

Senator HASKELL. What year was this?

Mr. BLAKE. About 3 years ago.

VOICE. 1972.

Mr. BLAKE. They realize it is a hazardous area because now they have cables stretched between trees and the man who goes out and

takes the readings on the holes straps a safety line onto that cable so that if the ground goes out from under him he won't go down to the bottom.

It is that serious, and I think that the first 1,000 feet will have to have something done with it or we are going to have a real serious—well, there could even be fatalities.

Senator HASKELL. Now, Mr. Sullivan, what do you propose to do about this? You don't propose to study it, you have to do something.

Mr. SULLIVAN. I agree, but of course you ought to do it on a sound, planned basis. What we have done here, of course is to try to work on the problem on an emergency basis, when something like this develops. Mr. Blake referred to the sinkhole, and a man getting in there. Incidentally, he was our employee.

We have tried to take stopgap measures in order to correct the situation. Our view now is that we should be looking to a longer range solution so that we don't have to just keep coming in, particularly from the Bureau of Reclamation's standpoint, on the question of our authority to spend money, except perhaps for public safety.

Senator HASKELL. Let me say this. Do you have the authority to spend money to take these emergency steps that will at least take the pressure off?

Mr. SULLIVAN. The question, I think, is what we can do through limited or emergency measures that do not cost a tremendous amount and whether we have the authority, except for doing it on a limited basis, or whether we have the authority to proceed with more.

Senator HASKELL. Do you know how much it would take to alleviate the emergency situation, how much money?

Mr. SULLIVAN. We have spent \$330,000 already on this. Unless we go into a program on the order of \$2 million, which would be more of a permanent solution, we might spend an equal amount of say \$200,000 or \$300,000.

But we don't know for sure whether it would work or not. That is why we are looking for a permanent solution. Let me put it this way. When these first sinkholes occurred, we took action that we thought would be effective, and I think it has helped out some. The first serious sinkholes were right near the highway, and until two more developed recently, it appeared to us that the tunnel had stabilized.

Senator HASKELL. I will tell you this, Mr. Sullivan. I am going to push this legislation as hard as I can. You can be working under an interim plan, but I would like to point out to you that if the sinkhole developed 4 years ago, the man fell in and it was 35 feet, and you are professionals in the business, you must have, if you had been awake at that time, recognized the danger to the highway.

You must have recognized the danger to the city of Leadville. You must have recognized the pollutant possibilities downstream.

I am going to push this legislation as hard as I can, that's all I can do. I can lead the horse to water, but I can't make him drink.

I am pointing out to you that you are playing with the health and welfare of a part of the State of Colorado, and you are possibly playing with the lives of people.

It would behoove you to get with it and not wait 2 months, get with it and have a plan.

It also would behoove you to cooperate to the greatest extent possible getting this legislation through.

As I say, I can lead a horse to water, but I can't make him drink.

And I am very sorry, because this is a very, very serious situation.

Mr. SULLIVAN. I think we are aware of our responsibilities and when these earlier events occurred in 1972 we did take interim or temporary measures that we thought would solve the problem. The fact that some further sinkholes developed would indicate that it was not a complete solution.

Senator HASKELL. Well, gentlemen, I am going to adjourn the hearing.

Do you have anything further, Mr. Blake?

Mr. BLAKE. One other thing I would like to make. We would urge that Congress appropriate the full funding to complete the project as outlined in the bill.

The other thing is that if the tunnel were plugged, we are still not going to eliminate the pollution problem. That water, before a man ever got to that was surfacing some place, and it had minerals in it.

If we plugged the tunnel we will push the pollution problem to the place where it will come out in 14 points of water, rather than one.

I think you should be aware of that, that we will just push the water to another area, and it will take more treatment.

One suggestion has been made that water be picked up and piped to one central point, and pick up the other pollution problems in the Leadville area. If the tunnel were completely rehabilitated, there is a possibility that there could be some aid coming from private industry to drill some more holes to pick up some of the other pollution problems, use the drainage tunnel to transport that water to the surface and have one plan.

I don't think the State of Colorado wants to operate a water treatment plant, and I'm sure the city of Leadville or the county of Lake don't want to operate one. I don't know who would take over the situation unless it was funded by Congress too.

It is one of the problems that could be solved in a bigger area if the tunnel were rehabilitated.

I think the Lake County Commissioners are real firm in what they want, but the first 1,000 feet is something that we've got to have an immediate answer to, to keep from having a bigger problem than we have now.

Mr. SULLIVAN. Senator, may I ask Mr. Blake a question about the statement he just asked.

Senator HASKELL. Sure.

Mr. SULLIVAN. He mentioned that he thought there should be full funding as provided in the bill, and I'm not sure what he had in mind, in terms of a plan of funding.

I don't think the Senate bill has any dollar figures mentioned.

Senator HASKELL. No; it is an open-ended authorization in the bill to get the job done. What Mr. Blake is saying, I think, is what he perhaps would like to get done. I don't want to put words in your mouth, but would that be reasonably accurate?

Mr. BLAKE. Yes, sir.

Senator HASKELL. Thank you, gentlemen.

We will proceed as fast as I can, and I hope you will proceed as fast you can.

Mr. SULLIVAN. We certainly will, Senator.

[Whereupon, at 10:25 a.m., the hearing was adjourned.]

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