

1033

Y4  
Ap 6/2:  
T 25/3

9614  
Ap 6/2  
T 25/3  
9

# Senate Hearings

*Before the Committee on Appropriations*

GOVERNMENT  
Storage

## Tennessee-Tombigbee Waterway

*Fiscal Year 1981*

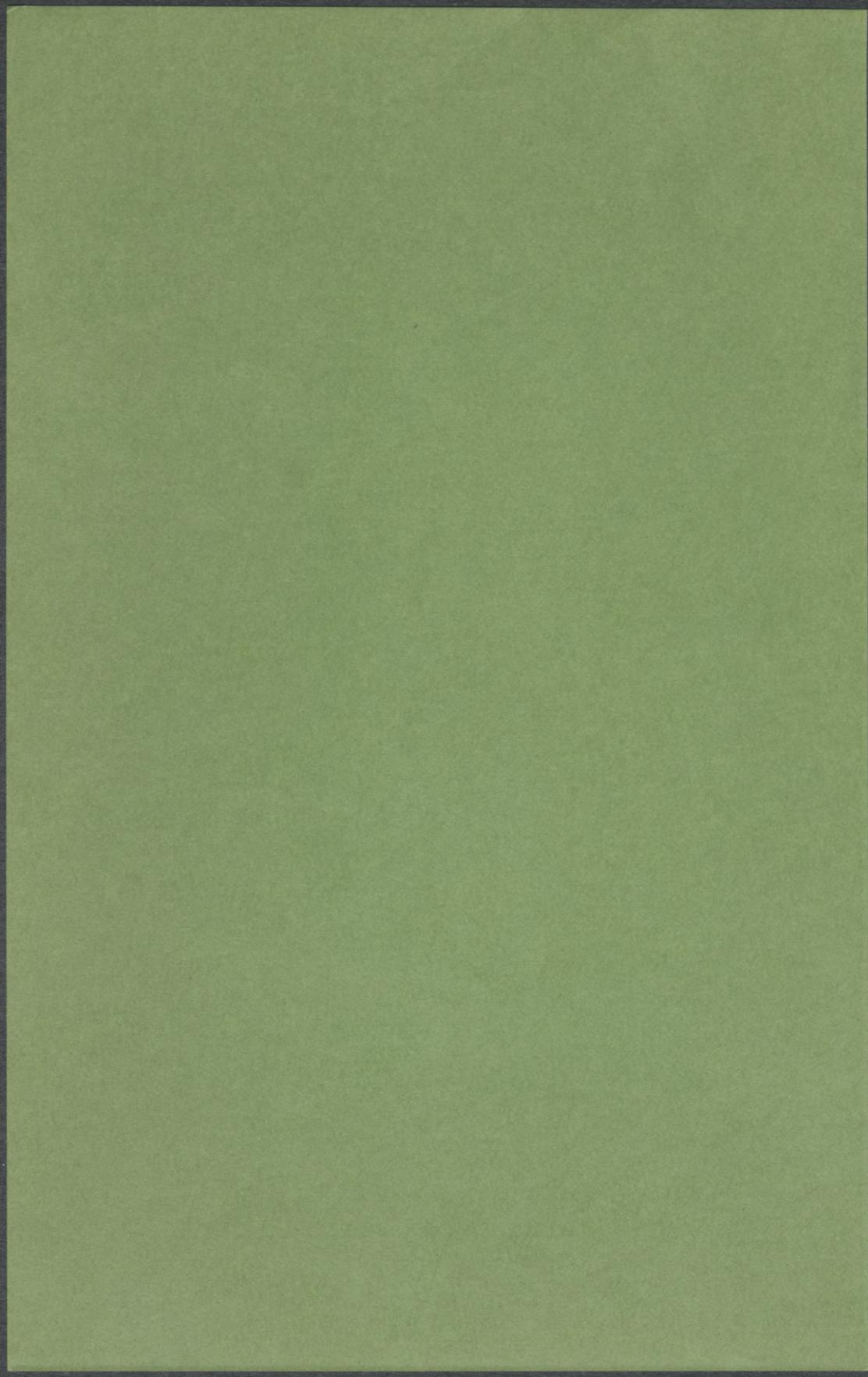
KSU LIBRARIES



A11900 220844

96<sup>th</sup> CONGRESS, SECOND SESSION

SPECIAL HEARING  
DEPARTMENT OF THE ARMY  
Corps of Engineers



# TENNESSEE-TOMBIGBEE WATERWAY

---

---

HEARING  
BEFORE A  
SUBCOMMITTEE OF THE  
COMMITTEE ON APPROPRIATIONS  
UNITED STATES SENATE  
NINETY-SIXTH CONGRESS  
SECOND SESSION

---

SPECIAL HEARING  
DEPARTMENT OF THE ARMY  
Corps of Engineers

---

Printed for the use of the Committee on Appropriations



U.S. GOVERNMENT PRINTING OFFICE

66-929 O

WASHINGTON : 1980

---

For sale by the Superintendent of Documents, U.S. Government Printing Office  
Washington, D.C. 20402

COMMITTEE ON APPROPRIATIONS

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT

J. BENNETT JOHNSTON, Louisiana, *Chairman*

JOHN C. STENNIS, Mississippi  
WARREN G. MAGNUSON, Washington  
ROBERT C. BYRD, West Virginia  
ERNEST F. HOLLINGS, South Carolina  
WALTER D. HUDDLESTON, Kentucky  
QUENTIN N. BURDICK, North Dakota  
JAMES R. SASSER, Tennessee  
DENNIS DeCONCINI, Arizona

MARK O. HATFIELD, Oregon  
MILTON R. YOUNG, North Dakota  
RICHARD S. SCHWEIKER, Pennsylvania  
HENRY BELLMON, Oklahoma  
JAMES A. McCLURE, Idaho  
JAKE GARN, Utah  
HARRISON SCHMITT, New Mexico

---

*Professional Staff*

W. PROCTOR JONES  
W. DAVID GWALTNEY  
J. KEITH KENNEDY

# TENNESSEE-TOMBIGBEE WATERWAY

---

THURSDAY, AUGUST 21, 1980

U.S. SENATE,  
SUBCOMMITTEE ON ENERGY AND WATER  
DEVELOPMENT OF THE COMMITTEE ON APPROPRIATIONS,  
*Washington, D.C.*

The subcommittee met at 10:15 a.m. in room S-128, the Capitol, Hon. J. Bennett Johnston, Jr. (chairman) presiding.  
Present: Senators Johnston, Stennis, Young, and Hatfield.  
Also present: Senator Heflin.

## DEPARTMENT OF THE ARMY

### CORPS OF ENGINEERS

STATEMENT OF LT. GEN. JOHN W. MORRIS, CHIEF OF ENGINEERS

ACCOMPANIED BY:

MAJ. GEN. ELVIN R. HEIBERG III, DIRECTOR OF CIVIL WORKS  
J. LANKHORST, DEPUTY CHIEF COUNSEL

### OPENING REMARKS

Senator JOHNSTON. The hearing will come to order.

We are having further recall hearings today to review the issues and allegations which have been raised concerning the Tennessee-Tombigbee Waterway project.

The well-organized opponents of the project, principally the environmental and railroad interests, have been fighting this project in the courts and Congress for almost a decade. Now, the opponents are conducting a national campaign to stop the Tennessee-Tombigbee by bombarding the Congress and the news media with many of the same allegations raised in the lawsuits.

Most of these allegations and issues raised again this year during the debate on the supplemental appropriations bill have been aired before this committee during our annual appropriations hearings for several years now.

For many years this committee has conducted hearings at which proponents and opponents have testified on this project. The allegations and issues raised during those hearings in the past have been examined by the committee, and the Corps of Engineers has responded to questions and issues raised by the committee as a result of the proponents' and opponents' testimony.

The printed hearing records over the last decade will show that many of these same allegations have been examined by the committee over that period of time. Nevertheless, because of the current controversy, it is the responsibility and duty of this committee in making our appropriation recommendations to the Senate for this or any other authorized project to insure that the record is made clear and that the issues and questions are carefully examined.

I want to say that I am disappointed to see several respected newspapers and columnists disseminating some of these allegations and misinformation with respect to this project.

I want to say that I have no interest in the Tennessee-Tombigbee project as a political matter, other than such derivative interest as I have for my friends from some of our neighboring States. As a matter of fact, if it were purely a parochial interest with me representing the State that has the Port of New Orleans, I would be against Tenn-Tom because it is obviously in competition.

I am for Tenn-Tom because it seems to me clear beyond any question—I mean, I do not understand how a fair-minded person can, in 1980, look at a project in which almost a billion dollars has been invested and say, "Stop that project." I do not understand how a fair-minded person can do that.

I understand how reasonable minds could differ if we were going back to square 1 and saying that we should or should not build a project of this size and magnitude. But we are virtually a billion dollars into this project and there is no way to recoup that billion dollars.

#### TRIBUTE TO GENERAL MORRIS

Today, we have General Morris and General Heiberg with us. I am very sorry to say that this will be General Morris' swan song before this committee. Over the protests of myself and others, he is retiring from the Corps of Engineers. We have written to the Secretary of the Army and to the President to urge that he be drafted to stay on for another term. Their agenda was different from ours, unfortunately.

I think General Morris has been one of the outstanding leaders of the Corps of Engineers, certainly in the 8 years I have been here, and I venture a guess to say in the history of the Corps. The competition for that honor is very keen, because the Corps has produced some very outstanding people.

So it really is with deep regret that we see General Morris leave the Corps. We have great respect for him as an engineer. We have great respect for his integrity. One reason I wanted him to testify today is because I think he makes eminent sense.

We didn't ask General Morris to make a written, prepared statement, because he is one of those witnesses who can testify very well off the cuff. We want to go into these issues and allegations once again.

I think General Morris knows most of these questions and issues that we are interested in. General, after Senator Stennis says a word or two, I wish you would just give us your view of the Tenn-Tom project. We particularly want to know how much is in it for sunk costs. That calls into question such matters as, how much can you sell the land the Corps has acquired for the project.

You know, there has been this issue where they say you can get out of it and sell this property for huge amounts and recoup most of your sunk costs. We want to deal with that.

We want to deal, of course, with the cost-benefit ratio—and the remaining costs to the remaining benefits. And also the question of whether or not you must go into what I will call phase 2—the work from Demopolis to Mobile. That is the widening and straightening of the already-existing navigable channel below Demopolis which, of course, is not authorized. I keep hearing, and Mr. Kilpatrick stated the other day in his comments, stated it as a fact—and the National Journal stated it as a fact, and I believe the Post stated it as a fact—that this is a \$3 billion project.

It is not a \$3 billion project. In my view, it is not going to be a \$3 billion project. The only way it could be a \$3 billion project is to have the authorized project or phase 1, if that is the proper word that some call it, so successful that a recalcitrant Congress—recalcitrant on water projects—comes in and says, “Look, we have had such phenomenal success on the first part of this that we have got to go in there and improve the existing part.” That is the only way it would be done. And I don’t expect that to be done under the present recalcitrance.

In any event, we came here to hear General Morris and not myself. So, Senator Stennis, if you will give us a few of your words on this matter, and then we will hear from General Morris.

Senator STENNIS. Mr. Chairman, I do want to say something, but I think now is not the best time for this. We have come here to hear General Morris. His testimony is the key testimony in this entire matter.

I want to say that I heartily concur in the fine things you said about this highly professional man who has a career that not only the engineering profession can be proud of, but the Army and the entire military. We are in a room here where I heard Senator Hayden a few years ago give his valedictory remarks in response to a few remarks made by the late Senator Russell. Senator Young was here at that time.

That incomparable man, Senator Russell, couldn’t compliment General Morris any more. What you said about him reminded me of the tribute we paid to Senator Hayden at the time he was retiring as chairman of this committee.

I do appreciate his services, and I want to say more about it later. I am here to be of such service as I can.

I want to say this: I have never been prouder to have been a member of this subcommittee than right here this morning so as to be of some service now, if I can, and later on the floor of the Senate, in making this decision. I am proud of the whole mission of the subcommittee. I am glad to have been a small part of it all of these years. I am proud to be in this spot this morning with you and Senator Young and Senator Heflin.

Senator JOHNSTON. Thank you, Mr. Chairman. You know, our problem is to get out the truth.

Senator STENNIS. Yes; that is it.

Senator JOHNSTON. I feel like, you know, sometimes—and understand,

the press and I are great friends. I don't have a single enemy in the press. I love every member of the press and every word that comes out of their pens—at least most of the time.

But in this respect, the press has been sold a bill of goods. I wish we could sort of make this a big press conference and—we have some other friends down here at this end of the table—make this a big press conference so we could—you know, if there is a fact or a question, we want to get it exposed today.

Senator Young?

Senator YOUNG. I would just like to say that I am sorry this will be General Morris' last appearance here and that he will soon be retiring.

He reminds me so much of General Pick who so many years ago was a strong voice for water projects, a strong voice, not only in the military, but throughout the Nation. He wasn't afraid to speak up. Neither is General Morris.

I personally came to know and become acquainted with General Morris, I think, in the early 1950's when he was involved in the haylift in North Dakota during one of our worst winters. We don't even have much hay out there now. We will all miss you a lot and wish you many good years.

Senator JOHNSTON. I didn't mean to recognize my valued friend, Senator Milton Young, before our distinguished ranking minority member, Senator Hatfield, except that this may be the last hearing that Senator Young will sit on this committee. We gave him some accolades at the last hearing. We will have him for our markup session. But I think he has special status and seniority on this committee, I say to my ranking minority member.

Senator Hatfield. You, Mr. Chairman, were very correct in your protocol.

Senator YOUNG. Thank you.

Senator HATFIELD. I, too, wish to add my commendation to the distinguished record of General Morris. I have had a special relationship with him over this period of time on the hopper dredge question. [Laughter.]

I think we have succeeded pretty well in achieving certain objectives and goals because of the great leadership of General Morris and his staff.

I am sure the ports of this country will be eternally grateful for the support you gave in developing the principle of a minimum dredge fleet for the maintenance of these ports. We dredge the ports. If we don't have those bars open at the entrance, the ports are of little value. [Laughter.]

So, we had a lot of adversaries, a lot of problems, a lot of battles. We used to have a saying, at least in the Navy, that there are those you might choose to go to the officers club with and bend the elbow and in battle there might be others you would choose. I would enjoy being with you either in the officers club or in battle.

Senator JOHNSTON. Keep the bars open. [Laughter.]

Senator HATFIELD. Yes; keep the bars open.

Senator JOHNSTON. We are happy to have Senator Heflin, who is not

a member of this committee, but is a valued Member of the Senate, with us. Would you like to say anything, Senator?

Senator HEFLIN. I am interested in listening to General Morris.

Senator JOHNSTON. At long last, General Morris, we are happy to hear from you.

General MORRIS. Thank you, Mr. Chairman. I would like to respond briefly to the compliments. If I had to say one thing about this term, it is that I have thoroughly enjoyed it. I have been a very happy Chief of Engineers. I liked the job and what we had to do. I liked the stress sometimes.

But, Senator Young, I have to tell you that was not Operation Haylift; it was Operation Snowbound. You got it all right, except we hurt more cows by dropping hay out of airplanes than we helped. [Laughter.]

It was the soldiers on the ground that opened up the roads. Anyhow, I had to get that straight for the record. That was in February 1949.

Senator Hatfield, we are going to christen the hopper dredge *Yaquina*, the first of our modern fleet, this Saturday.

Senator HATFIELD. I am sorry I can't be there.

General MORRIS. As soon as that is done and the new ship is in shipshape condition, it goes up to the Northwest to open up some of those bars. I guess if we ever had to have proof of the worth of the Federal fleet, Mount St. Helen just about did it. Thank you all very much for your confidence.

Senator Johnston, do you want me to just go through the background on these points you raised?

Senator JOHNSTON. Sure. You might start with the question of the authorization of the project, whether or not the Corps hoodwinked the Congress and all of that.

General MORRIS. I came to be Director of Civil Works in April 1972. In the intervening 8 years, by virtue of the positions I had, I have been associated with every decision made on the Tennessee-Tombigbee; that is, most of them that affect our present circumstances.

#### TENNESSEE-TOMBIGBEE DECISIONS 1974-75

The key period of time in the scenario that we are talking about was about August 1974 to August 1975. That is when most of the events occurred about which there are challenges or questions in the court.

To understand some of the decisions that were made and some of the actions that were taken, we need to reconstruct somewhat the national circumstance at that particular time.

You may recall that we had just gotten out of the oil embargo in January 1974. At that time the construction industry and the cost of doing business was in a more turbulent situation than it is now. At least it seemed to me that it was. We found that the cost of construction products—steel, for example—rose at a much more rapid rate than normal projections.

I had the major construction companies in the United States come to me and say they would not do any more work for the Corps if the construction time exceeded a year or two because they couldn't project their costs.

The cost of petroleum was skyrocketing. So it was a pretty unsettled set of circumstances.

#### JUDGE RICHEY'S DECISION (1974)

In August 1974 something else important happened. Judge Richey, here in Washington, made a decision on locks and dam 26 which punched a big hole in our interpretation of the authority of the Chief of Engineers to repair and modify navigation works.

Prior to his decision, our position was under the 1909 law that the Chief of Engineers had the authority to modernize and repair navigation structures to current transportation needs. The word "current" is the key word. Our interpretation for "current" meant for the continued life of the projects, the 50 years for which we do the repairs. His decision was that that was wrong, that current meant as of the date the decision was made, thus we could not project.

Therefore, our program to expand locks and dam 26 came without authority. That decision affected the portion of the waterway from Demopolis to Mobile. I will come back to this. That was an important decision.

#### FISCAL YEAR 1975 BUDGET FORMULATION

Another thing that happened concerned our sending our fiscal year 1975 budget over to OMB in September. I appeared before them. Then our budget was put together in final form, practically in final form, in early December 1974, to be submitted to the Congress by the President in January 1975.

On the 13th of December, which was just 12 days before Christmas and less than a month before the budget was to go in, we opened bids on one of the Tennessee-Tombigbee locks, Aliceville. The bids on that project were one-third higher than we had estimated.

The question then became very serious to us. How important was the Aliceville experience to remaining work on the Tennessee-Tombigbee? Do we have to increase everything by a third because of that one bid? Now what do we do?

We only had a few days to decide because the budget was practically being typed in final form.

The other important point was that the project had been authorized many years and the economic analysis was out of date. It needed to be modernized. So that was the circumstance that existed in the fall of 1974.

#### AUTHORITY QUESTION

The question now about authority. Did we have the authority? And another question: Did we withhold budget information? Those are two of the major challenges.

On the matter of authority, I asked our Chief Counsel to thoroughly review all of the authorities for this project and report back to me. The answer came back that the authority on the Tennessee-Tombigbee from the Tennessee River down to Demopolis was clean. The authorized project was properly covered under legislation.

However, because of the decision by Judge Richey on locks and dam 26, we did not have the authority to modernize the section from Demopolis to Mobile, and we would have to come back to Congress to get that.

We wrote a letter to both Public Works Committees explaining the impact of Judge Richey's decision and asked we be given a directive to make a study on the section from Demopolis to Mobile. We did that. We have that study fairly well underway now.

So from the standpoint of authority, it has been totally reviewed. It has been tried in court. The court, by its actions, has affirmed our position.

So far as the section of the waterway from the Tennessee River to Demopolis is concerned, it is authorized properly under the laws of this Congress.

#### BENEFIT-COST RATIO

Senator JOHNSTON. Now, General, with respect to the cost-benefit ratio, first of all, what is the cost-benefit ratio for the remaining cost relative to the benefits?

General MORRIS. If I could, sir, I would like to stay 1 minute longer with the circumstances of 1974, because it is important.

Senator JOHNSTON. Sure.

General MORRIS. When we found out that the section of the waterway from Demopolis to Mobile was not authorized, we had a problem in the benefit-cost situation because we had included in the benefit-cost analysis the cost and the benefits for that section of the waterway, under the presumption that the Corps had the authority to fix it. So we had to take those out. And during the hearings for 1975, Major General LeTellier, our South Atlantic Division Engineer, indicated that we were going to redo the benefit-cost ratio. This was also reflected on our justification sheets.

Senator Stennis questioned that at the hearings and wanted to know why. The answer was pretty simple. This is a major project, costs a lot of money, we have old data, and we have to find out if our information is right.

So, we went through a very difficult and intensive review of the benefit-cost analysis on the project so we could have proper data in the next year's budget.

When that was all done, the benefit-cost ratio for the portion of the waterway which was authorized, from the Tennessee River to Demopolis, was 1.08. Marginal, but yet certainly satisfactory.

#### CURRENT OBLIGATIONS AND EXPENDITURES

Now at this point in time, 1980, some 5 years later, we have actually spent on this project \$805 million. We have obligated \$867 million through July 31, 1980. The benefit-cost ratio for the remaining work is presently 2.5 at the 3¼-percent interest rate, which is the one the system requires us to use. If we use the current survey report interest rate of 7⅛ percent, the remaining benefit-cost ratio is 1.3.

## EFFECT OF INFLATION ON BCR

Now, interestingly enough, if you project the benefits and apply inflation at 5 percent to them as well as to the cost, we find that the projected remaining benefit-cost ratio goes up to 7.8 to 1 at 3¼ percent, and 4.0 to 1 at 7 percent. This results because the benefits continue to rise while the costs are fixed when spent.

Senator JOHNSTON. Now, this is something that is not generally understood about cost-benefit ratios. You do not apply inflation to the benefits; isn't that correct?

General MORRIS. Yes; that is correct; we do not project inflation in any of our benefit-cost analyses. This year we were told by OMB to put in inflated costs so we could show the ultimate cost of the project.

That is one of the reasons why the total cost increased. We put in 100 million dollars' worth of inflation.

## TERMINATION COSTS

Senator JOHNSTON. You say you have \$867 million obligated.

General MORRIS. Yes.

Senator JOHNSTON. There are other costs than this if the project were terminated—termination costs.

General MORRIS. We figure termination of the project would cost about \$130 million. This estimate included administrative costs and claims and stopping the contractors presently working and all the things you have to do to stop work.

Senator JOHNSTON. What could you sell off?

General MORRIS. We figure we could sell about 30 million dollars' worth of land. That is about all.

Senator JOHNSTON. Well, there are those that claim—

General MORRIS. That would get half the cost of the land investment back. But it is not going to work. I think the total land investment was only about \$45 million.

Senator JOHNSTON. Why could you get back only \$30 million?

General MORRIS. We have messed up some of it. We took some of it out and put it someplace else. I don't know; we might get \$45 million back. But we just figure that, under the circumstances under which we can sell it, we probably wouldn't get back as much as we paid for it.

Senator JOHNSTON. You got the timber, too, didn't you?

General MORRIS. Yes. We did some clearing. I have a feeling if you tried to sell that now the way it looks, it would be pretty hard to get a good price for it.

Senator JOHNSTON. You don't exactly go out and—

General MORRIS. I don't know what a man would want to do with that divide cut.

Senator JOHNSTON. So if you have \$130 million in termination costs, is that on top of the \$867 million?

General MORRIS. Yes; you would have to add the \$867 million and the \$130 million.

Senator JOHNSTON. That gives you \$997 million.

General MORRIS. And subtract the other one, the land sales.

Senator JOHNSTON. And you subtract \$30 million. So you have well, \$967 million. The Budget Committee would round that off to \$1 billion.

Now, the States have also contributed about \$130 million on bridges and highway locations.

General MORRIS. Yes; they have contributed \$130 million.

Senator JOHNSTON. That is also a sunk costs. So if you took \$1 billion, which is your testimony, that the billion, or \$950 million to \$1 billion, in sunk costs that you cannot get away from; is that correct?

General MORRIS. That is correct. I would agree with that.

Senator JOHNSTON. In that neighborhood.

#### REMAINING NAVIGATION BENEFITS

General MORRIS. The next issue, of course, is: What is usable today?

Senator JOHNSTON. What part would be usable?

General MORRIS. You could use the lower part, up to around Columbus. I don't have the figure of what that is worth, but it is a very small part of the benefits.

Senator JOHNSTON. About how many miles would that be?

General MORRIS. About 80 miles.

Senator JOHNSTON. What percentage of the benefits, just roughly, would that be?

General MORRIS. Virtually nil. I doubt that we could justify maintenance, and the \$130 million closeout includes closing up that portion.

Senator JOHNSTON. So you have about \$995 million to \$1 billion in sunk costs and little is yet economically usable.

#### STEAM COAL EXPORTS

Now if you were to do a cost-benefit ratio on the remaining cost, the remaining cost being the difference between the \$995 million and \$1 billion and what it takes to finish, and the benefits being reestimated with inflated benefits and cost as well as an estimate of putting in a factor for steam coal—and you did not basically consider steam coal in your first cost-benefit ratio, did you?

General HEIBERG. The 1975 study did not have, as a major factor, export steam coal, but we think it would if we were going to do it today.

Senator JOHNSTON. It mainly was coking coal?

General HEIBERG. Right.

#### REMAINING BENEFIT-COST RATIO

Senator JOHNSTON. Can you give me an estimate, General, of what kind of cost-benefit ratio you would have under that scenario? That is, having \$995 million to \$1 billion in cost—

General MORRIS. Sunk, at least.

Senator JOHNSTON [continuing]. And reestimating, on today's cost, your benefits.

General MORRIS. As of today, remaining Federal costs are \$867 million. Remaining benefits are \$117 million annually without inflation. The remaining BCR is 7.8 at 3¼ percent; 4.0 at 7⅛ percent. These

ratios have not factored in an offset to remaining costs for the \$130 million. Accounting for such an offset, the remaining BCR, I'd guess is about 9.0 at 3¼ percent and 4.5 at 7⅛ percent. I don't know how much steam coal exports to factor at this time. The BCR would be higher, so I'd say 4.0 to 5.0 is a good estimate at 7⅛ percent, or about 9.0 or so for 3¼ percent.

#### REMAINING PROJECT COST

Senator JOHNSTON. Now, General, you say that there is about \$700 million to go. You are, therefore, fixing the cost, the total cost, at \$1.7 billion for this project.

General MORRIS. \$1,760,000,000; yes.

Senator JOHNSTON. You say \$1.7 billion to \$1.760 billion.

Senator STENNIS. What was the answer?

General MORRIS. The cost is \$1.760 billion.

Senator JOHNSTON. That is \$1.760 billion, including the National Park Service and Coast Guard cost; is that correct?

General MORRIS. That is correct.

Senator JOHNSTON. And \$100 million of that is for future inflation?

General MORRIS. That is correct; \$100 million is inflation.

Senator JOHNSTON. Of course, there are additional State costs, but those are separate.

General MORRIS. Non-Federal costs are \$165 million, of which \$11 million is future inflation.

Senator JOHNSTON. Now, is it necessary to spend another \$1.3 billion to improve from Demopolis to Mobile in order to have a viable project, in order to realize those benefits, either on the 4 to 5 to 1, which you just described under that scenario, or under the 1.08 to 1 under the original scenario?

General MORRIS. No. Without the lower river being fixed with duplicate locks and channel modifications, we would realize the benefits we have discussed.

Senator JOHNSTON. This is very key, General, because we keep hearing that it is a \$3 billion project. Now tell us what you get with a \$1.7 billion or \$1.76 billion project.

General MORRIS. You get the entire authorized project. You get transportation efficiency benefits of \$105 million annually, and total efficiency benefits of \$121 million annually.

Senator JOHNSTON. You get navigation on the existing navigation channel from Demopolis to Mobile.

General MORRIS. We have that already.

#### TOW CONFIGURATION

Senator JOHNSTON. You can accommodate how many barges on that in one cluster?

General MORRIS. We have six-berge tows on there.

Senator JOHNSTON. You can accommodate six-berge tows today.

General MORRIS. Yes; it will accommodate six.

Incidentally, there is no question about the authority to make minor

channel improvements. It is just maintenance. We could do that as an improvement also. But the benefit-cost analysis, when we came up with 1.08 in 1976, completely excluded the cost and benefits related to the improvements below Demopolis.

#### INCORRECT \$3 BILLION COST FIGURE

So what we are saying here this morning is that the waterway from the Tennessee River to Demopolis, all by itself, that is going to cost an estimated \$1.76 billion in Federal costs, not \$3 billion.

Senator HATFIELD. Where did the \$3 billion come from?

General MORRIS. What that \$3 billion includes is non-Federal costs, future recreation, and, most important, \$960 million, approximately, in modifications to the waterway from Demopolis to Mobile.

Senator HATFIELD. But do you have to do it to make it operative?

#### FUTURE IMPROVEMENTS BELOW DEMOPOLIS

General MORRIS. No, sir; we do not. The whole thing would be more efficient, more modern, but you don't have to do it to justify the construction of the section that is authorized from the Tennessee River to Demopolis.

Senator JOHNSTON. What does that give you that you don't have now? Instead of six-barge tows you would then be able to do what?

General MORRIS. It is not only the change from six-barge tows to eight-barge tows, but a tow could move all the way from Mobile to Cincinnati, Ohio, without having to reflect. It could go right straight through the system. You would save quite a bit of time and travel and, therefore, costs. So, future improvements below Demopolis would add costs to the Tenn-Tom, but would, on preliminary analysis, add more incremental benefits.

Senator JOHNSTON. To repeat, it is not necessary to do that in order to have a viable waterway, a usable system, or to achieve the benefits under either of these scenarios: your 1.08 as originally done, your 1.3 or your 2.6 or your 4 to 5 to 1, which is the difference in the cost-benefit ratios you have described today. It is not necessary to have any improvements below Demopolis in order to achieve those cost-benefit ratios.

General MORRIS. That is correct. This is a very important point. Six-barge tows are common on the lower Tombigbee and 14 million tons moved last year. So the lower Tombigbee is a perfectly servicable waterway as it is.

#### ENVIRONMENTAL ASPECTS OF PROJECT

Senator JOHNSTON. General, we hear the statement that this will be an environmental disaster. Would you speak to the question of the environment and what effect this waterway will have on the environment?

General MORRIS. Yes, sir; we worked very hard not to have it be an environmental disaster. We did all the things the law requires. We have been to court. Our environmental impact statement on the Tennessee-Tombigbee was the first aspect of that project to be challenged in the court. It passed the court as being satisfactory under the National Environmental Policy Act.

But it is more than that. Since then we have evaluated practically every change that we have made in depth from the environmental viewpoint. The channel, the chain of lakes, a section of some 45 miles, has been conceived primarily to leave the river alone and to provide an opportunity for environmental impact enhancement in that particular section.

In the divide cut we really added quite a bit of cost to the project in order to dispose of the millions of yards of material excavated in an environmentally acceptable way. I just don't believe that a project could be built with any more environmental consideration than we put into this one.

Senator JOHNSTON. If it is an environmental insult, has that insult for the most part already taken place?

General MORRIS. I wouldn't want to answer to that sort of implied conclusion that I don't agree with. I don't think it is an environmental insult.

Senator JOHNSTON. I don't either.

General MORRIS. Most of the damage that will be done has already occurred. In fact, now is probably the worst circumstance. When I was down there the last time, I could tell you this: It is evident the construction is at a stage where most of the superficial damage has occurred. The restoration part of the construction has not been completed. So you have some areas down there that need to be restored to an acceptable level. And they will be restored.

Senator JOHNSTON. When you were talking about your \$130 million termination cost, would that include restoration.

#### ENVIRONMENTAL ASPECTS OF TERMINATION COSTS

General MORRIS. It does include restoration. I think if we were told to stop, we would have to go through some study to see just where do we do what and so forth. But the \$130 million is really an estimate based on our experience of having contracts terminated. We would certainly restore the areas to acceptable conditions.

Senator JOHNSTON. Tell us, by the way, how this \$130 million is made up. Where does that estimate come from?

General MORRIS. It is generally an estimate based upon the value of the contracts in force and our experience in termination. We came to the figure of \$130 million.

General HEIBERG. I would suggest you might want us to furnish the details.

Senator JOHNSTON. All right.

[The information follows:]

*Tennessee-Tombigbee Waterway—Estimated termination costs as of September 30, 1980*

[In millions of dollars]

Item	Section of project			Total project
	River	Canal	Divide cut	
Contract termination costs and claims.....	17.1	25.4	31.0	73.5
Protection of completed works.....	14.2	5.2	30.0	49.4
Real estate settlements and deficiency judgments.....	3.4	4.45		7.85
<b>Total.....</b>	<b>34.7</b>	<b>35.05</b>	<b>61.0</b>	<b>130.75</b>

NOTE.—Estimated total termination costs: \$130,750,000

Senator JOHNSTON. But the point is, the figure of \$130 million is a figure arrived at after some study by the Corps.

General MORRIS. Yes; but not in depth. The question you are asking would be difficult to answer just at any particular point in time because every day things change. Tomorrow the circumstances would be different than today.

Senator JOHNSTON. I understand that.

General MORRIS. If we were told to terminate, we would stop work and begin to settle claims of the contractors. At the same time, we would make an analysis of the physical situation and decide what to do. The question is, Does the \$130 million include some of that? Yes; it provides for the completed work and material. The environmental adjustment includes \$49 million.

Senator JOHNSTON. So you would have \$49 million to move the dirt back to where you dug it from and where possible—

General MORRIS. Plant some trees.

Senator JOHNSTON [continuing]. Plant some trees and grass. You would have, in effect, liquidated damages by the contractors who have a contract.

General MORRIS. That is \$73.5 million.

Senator JOHNSTON. That is a fairly firm figure, I would guess, as of the time you looked at that. All right.

Would you speak briefly to the question of whether the Corps has violated statutes in planning and the construction of the project, including questions on the Corps own regulations?

Senator HATFIELD. Would the Senator yield?

Senator JOHNSTON. Sure.

## PROJECTING NAVIGATION BENEFITS

Senator HATFIELD. Before we leave this cost-benefit question, could I ask one question?

General, one of the issues in this cost-benefit ratio that has been raised has been the estimate of the future traffic, as to whether or not the Corps has estimated that usage correctly. Would you care to comment on that, as to how your track record is on other water projects in terms of estimating future traffic? Because, as I recall, you were low on the Columbia/Snake River system in your future traffic estimates. I would like to just have you comment on that.

General MORRIS. So far as the Tennessee-Tombigbee is concerned, I can only say I don't think there was ever a project built that has had as much thought and study go into the economic analysis as this one. We have had some of the finest firms back up our analysis. We have had audits of it and everything else.

Our transportation savings, we think, are conservative. Time will probably prove that to be the case. I will come back to that in just a moment.

#### BENEFITS: FUTURE DEMAND

But to really put the Tenn-Tom benefit analysis in perspective, we have to get back to basics. Essentially, barges provide low-cost transportation for bulk commodities. They move coal, grains, ores, steel, chemicals, and like commodities very cheaply. This is illustrated by the fact that in a recent year, 1976, barges moved 16.9 percent of total ton-miles of intercity freight in the United States for only 2.3 percent of the total freight costs; railroads moved 37 percent of the tonnage for 37 percent of the costs.

Therefore, the first question is: What is the projection of tonnage flows for bulk commodities into or out of the Tenn-Tom service area? I think it is clear that the future for coal is bright. We have the WOCOL study; we have our own national waterway study projecting major coal increases; we have the President's ICE—international coal export—task group; we have the report of the President's Commission on Coal. In short, a lot of coal is going to move in the tributary area. After all, coal already moves on the BWT system; with the coal areas of the Tennessee and Ohio Basins linked to the gulf, it is more than reasonable—indeed it is self-evident—that coal will move to the Southeast for domestic and export uses.

What about other commodities? Agriculture is of growing importance, not well foreseen in 1975. And it seems clear that other bulk commodities also have a future. The commodities are there now, and I can't see the area drying up. None of the projections we are supposed to go by show that. For example, OBERS. Population growth for BEA economic areas—Mobile, 137; Chattanooga, 48; and Meridian, 136—is expected to increase by 43 percent from 1969 to 2000. Total income levels will increase by 290 percent to \$13.3 billion annually. The area is rich in coal reserves. Other bulks should share in the projected growth.

I am not too concerned over specific shippers and whether a specific shipper stays in business. The whole area isn't going out of business. So, as I say, the overall future demand looks pretty bright.

#### BENEFITS: COST SAVINGS

The next question is: Why would the bulk commodities use the Tenn-Tom rather than the Mississippi? "Why turn left?" is the question. The answer is straight-forward. You turn left when it is cheaper than going in a circuitous route. You turn left because it is cheaper.

Why is it cheaper? Because it is shorter. It is shorter by an average of 550 miles for the tonnage in the 1986 Kearney base. That represents a 40-percent distance savings on average.

Kearney realized that the Mississippi below Cairo could accommodate larger tows than the Tenn-Tom and that they would move at a faster speed, without locking and lock delay. All of that was factored into Kearney's analysis. It was all accounted for. That is Kearney's business; that is what the company does for a living.

Further, the majority of the Tenn-Tom traffic by far is domestic and originates or terminates on the GIWW, Mobile, or the Tombigbee Basin. The route through New Orleans is particularly difficult because of tow size constraints on the GIWW and delays at the inner harbor lock canal. Kearney accounted for all of this also. So, for much of the traffic you have to turn left eventually. Once you have the demand potential and establish a savings, you know there is something solid. The interviews are just a way of honing in on an amount.

#### USE OF INTERVIEWS

I think where we have problems is that we use interviews to establish demand for bulk movements. This has been our practice. There are a great number of interviews. You talk to anybody you can to get their views but that is just an indication of the market situation at a point in time. The fact that specific shippers change their mind or go out of business is irrelevant. I cannot imagine that coal demand in the Ohio River Basin is not there in the face of all current studies. The Tennessee Basin is not likely to go bankrupt.

For example, in its testimony before the Moynihan hearings just last month, the L. & N. Railroad said that they would lose 30 to 50 million tons to the Tenn-Tom. That was determined by L. & N. from its marketing offices. It turned up a large amount of traffic potential which Kearney missed.

The Moynihan hearings last month turned up several shippers not in our traffic base. In 1977 a public hearing was held in Columbus as part of the President's review of water resources projects. From that hearing and letters related thereto, several shippers not in our traffic base said they would ship via the Tenn-Tom. Shippers come and go; demand is stable.

I think people lose sight of the fact that the cost savings are independently computed by an outside expert. So the savings are there; it is not established by interview. And this savings is a gain in efficiency for the Nation as a whole. The interview establishes the potential tonnage; the cost savings, which are easily verified and fully open to scrutiny, step by step, establish the actual tonnage and the efficiency benefit.

I might add that the interview technique is conservative in the sense that you can only interview shippers who are physically there; independent demand/supply studies of mineral resources and plant location studies would likely account for new firms and/or industries. I think this explains why we tend to underestimate tonnage.

#### PROJECTIONS ON OTHER WATERWAYS

On the point on other waterways. A waterway is a very expensive investment and the transportation that moves across it is a function of

industry, as it actually ships, which is not necessarily how we predict it, based on interviews. But in total, as this table indicates, we have been very conservative.

The Arkansas River project is a good example of that. The Arkansas was opened on the last day of December 1970. It has been in operation now 10 years. In the anticipated tonnage, we anticipated 9 million tons a year. In the most recent year for which we have complete figures, 1978, we did 10 million, but it was a different mix of bulk commodities than we had predicted.

Senator JOHNSTON. That is on the average you are talking about?

General MORRIS. Nine million is what we estimated we would be moving by this time.

Senator JOHNSTON. By 1980.

General MORRIS. The tonnage on which the Arkansas River project was authorized was 9 million tons by the end of project life.

Senator HATFIELD. But you were conservative in those estimates and you are arriving at those benefits sooner than you had estimated.

General MORRIS. Yes, sir; we are at 10 million tons today. Let's look at the Black Warrior. It was opened in 1954. The anticipated tonnage was 1.333 million tons. Last year it was 14.6 million tons. The Ohio—you have to watch this one, because we have made some improvement in it—had anticipated maximum tons of 59 million. It needed an average of 13 million tons to pay its way. Last year it carried 218 million tons. So we missed that one. It is an embarrassment almost. The Gulf Intercoastal Waterway, in 1944 the number was 9.7. In 1978 it was 102 million tons. I have a table of examples I'd like to insert for the record.

[The information follows:]

# COMPARISON OF ANTICIPATED TRAFFIC AT TIME OF PROJECT AUTHORIZATION WITH 1978 TONNAGE FOR SELECTED WATERWAYS

Project	Project Completion or Opening Date	Anticipated Tonnage* (Thousands)	1978 Tonnage (Thousands)
Alabama-Coosa	1972	1,906	1,967
Arkansas	1970	9,015	9,852
Black Warrior-Tombigbee	1954	1,304	14,601
Ohio Basin (Combined)	1925	59,389	217,715
Gulf Intracoastal WW	1944	9,668	84,364

\*Annual expected tonnage as estimated at time of project authorization.

**COMPARISON OF ANTICIPATED TRAFFIC AT  
TIME OF PROJECT AUTHORIZATION WITH 1978  
TONNAGE FOR SELECTED WATERWAYS  
(Continued)**

<b>Project</b>	<b>Project Completion or Opening Date</b>	<b>Anticipated Tonnage* (Thousands)</b>	<b>1978 Tonnage (Thousands)</b>
Illinois	1939	7,500	37,251
Tennessee	1948	15,300	31,634
Middle Miss. (Mo. R. to Ohio R.)	1953	10,000	79,328
Upper Miss. (Minn. to Mo. R.)	1940	9,000	68,976

\*Annual expected tonnage as estimated at time of project authorization.

## HISTORICAL BENEFIT-COST ANALYSIS

Senator JOHNSTON. That's fine, General. Actually on your cost-benefit ratios, across the board, you have been very conservative, have you not?

General MORRIS. Yes, sir; we have. I think we ought to go back and review how we do it, if we don't come any closer than that. Every waterway we have looked at, with a few exceptions, have greater tonnages than projected. There are some waterways that have not grown as rapidly as others. We have actually closed some old ones down, but not very many. But throughout the country, the navigation tonnages are multiples higher than we had predicted.

Senator JOHNSTON. They average about two and a half times your benefits have averaged—two and a half times what you have projected?

General MORRIS. I would say that is a ballpark figure and it is probably at least that.

Senator JOHNSTON. How about navigation alone?

General MORRIS. That is what I am talking about, just navigation alone.

On the Arkansas it has had a lot more benefits other than just navigation. There is also flood control hydropower and recreation.

Senator STENNIS. Could we get the answer now, Mr. Chairman? Your answer is, it is two and a half times on the average?

General MORRIS. Senator Johnston, I think it is at least that, approximately. That is not tonnage. That is the benefit generation factor.

But the evidence is very clear that we have justified and authorized navigation on estimated tonnages which have far and away been exceeded in practice years later.

Senator HATFIELD. Thank you.

Thank you, Mr. Chairman.

## ALLEGED VIOLATION OF STATUTES

Senator JOHNSTON. What I wanted to get at is this question of whether you have violated the statutes in planning and constructing this project, including the question of whether you violated the Corps' own regulations on Tenn-Tom.

General MORRIS. Sir, we have not violated the statutes, and as far as our own regulations are concerned, I am not aware we have violated any of those.

Senator JOHNSTON. Now, you have been to court six times on this.

General MORRIS. I was going to say I personally spent 9 hours as a witness on this very subject in the winter of 1979. The decision by the courts in that case was we had not. It has been appealed, and the first decision was upheld by the court.

There has been a lot of discussion on whether or not the Secretary of the Army's discretionary authority allowed him to approve the increased channel width. I will be glad to go into it if you wish. There was no question, at least in my judgment, that the authority existed.

The key point here, and one that very seldom rises to the surface, is analysis of the language which the Congress of the United States put in the authorizing document for the Tennessee-Tombigbee Waterway.

Before the court issue, I reviewed all of the authorizing documents I could find for waterway projects. I found none in which the language was as liberal or as generalized as it was in the Tennessee-Tombigbee. In fact, there are only two waterway projects in the United States which have language that says minimum or not less than minimum width or not less than depth. Tennessee-Tombigbee is one of those two.

Congress, when it wrote the language for this project, was very generous in the authority and the description of the project. So, I just have no doubt in my mind that the present project dimensions are within the authority which was given to us by the Congress or to the Secretary of the Army.

#### WIDTH OF PROJECT

Senator JOHNSTON. It has been a matter of record before the Congress since 1967; that is, the justification for the 300-foot width; is that correct?

General MORRIS. The Secretary wrote a letter to Members of Congress in 1967 describing the change and transmitting a report which the Congress had asked for on the reevaluation. This whole thing on 300 feet was very clearly covered in there. In fact, the letter that came over was a very conservative letter in the sense that it outlined many of the problems of the project. It wasn't a letter which was enthusiastically asking for permission to proceed by any sense of the word.

#### STEAM COAL EXPORTS

Senator JOHNSTON. General, can you speak to this question of coal exports? As you know, at the recent summit, the free world countries there determined to double the amount of coal consumption in the world by 1990. That, of course, would require massive exports from this country. Have you looked into that question and what effect, if any, that might have on the Tennessee-Tombigbee Waterway?

General MORRIS. We have reviewed the commodities to be moved. We have not reacted to that summit that you refer to. We have no steam coal exports in our traffic base.

Senator JOHNSTON. Let me ask you this: This system, the Tennessee River, et cetera, involves coal from what States? In other words, the Tennessee-Tombigbee would be the artery of choice for coal fields located where, if they were going to export through Mobile?

General MORRIS. I really don't know, and I would hate to hazard a guess in the absence of a definitive study comparing, at least, Mobile to New Orleans for different sources.

Senator JOHNSTON. What rivers are connected into this?

General MORRIS. Well, of course the Tennessee River, which connects to the Ohio River and its other tributaries.

Senator JOHNSTON. The Monongahela is connected to it.

General MORRIS. Yes. I realize there is a lot of coal in the basin. In the absence of a direct study, I don't know how much of that steam export coal we would derive as a commodity on this waterway. Surely it would be competitive, but a transportation analysis that goes into this would be relatively complex. The increase would be a net addition.

Senator JOHNSTON. The area around Norfolk, through which most eastern coal now moves, is up to capacity right now in coal handling, isn't it?

General MORRIS. Yes, sir. The President has tasked the Department of Energy to analyze the problems and potentials inherent in significant increases in coal use. One of the major problems is the transportation delivery system, certainly. We are going to need all modes. But it is premature for me to speculate now on the amount of steam coal exports. Surely the Tenn-Tom will offer a cost savings for some steam coal for export.

#### EFFECT OF INCREASED EXPORTS ON PROJECT

Senator JOHNSTON. Is it your judgment—I guess this would have to be an educated guess because you would have to really do an analysis—but is it your guess that Tenn-Tom will ever be suitable for coal exports?

General MORRIS. Sure. There is no reason in the world why it won't be. It will be suitable for that. Remember that Kearney found a solid savings for coking coal exports, so I would think there is a savings for steam coal also. I don't know how much.

Senator JOHNSTON. What would be your professional guess as to whether coal exports, steam coal, will be important to Tenn-Tom? I am not trying to get you to be precise.

General MORRIS. Sir, I prefer not to preempt the Department of Energy's study. I think we should stay with the Kearney study, even though it doesn't contain steam coal exports. After all, if I gave you an answer to that, it would be in addition to the benefits which we are now counting for the project. I just don't feel I should estimate an amount without a study.

Senator JOHNSTON. Very well.

Senator Stennis?

Senator STENNIS. Mr. Chairman, I don't know how long the chairman plans to make this sitting last. I don't know what your situation is about rollcall votes.

Senator JOHNSTON. I might say, Senator Stennis, we have a Budget Committee markup which is meeting right now. We have a lot of cuts, including some cuts in water projects. I have to attend that meeting.

#### ADDITIONAL QUESTIONS SUBMITTED BY SENATOR STENNIS

Senator STENNIS. I want to make this point, then, Mr. Chairman. I do have some questions here that I want to go in the record for the witness, if I can get unanimous consent to submit those questions.

Senator JOHNSTON. Without objection.

Senator STENNIS. I will ask the witness to file the answers fairly soon. I think that will largely serve my purpose, and I will do that in the spirit of trying to cooperate. I make that unanimous consent request now, Mr. Chairman—

Senator JOHNSTON. Without objection.

Senator STENNIS [continuing]. That I be permitted to submit ques-

tions. It will be spelled out in writing for the record, to be brought to your attention.

Senator JOHNSTON. Without objection. And we will also have some more questions of our own to further elucidate these questions and issues.

Senator STENNIS. I don't have them spelled out now fully because I was expecting to ask them orally.

[The questions and answers follow:]

#### JUSTIFICATION FOR FISCAL YEAR 1981 BUDGET REQUEST

*Question.* What is the justification for the President's fiscal year 1981 appropriation request of \$208 million?

*Answer.* The \$208,070,000 requested for fiscal year 1981 is required to continue construction toward meeting the September 1986 completion date. Ongoing work will continue and new contracts will be initiated as scheduled. If the funds are not provided, we would be faced with contract terminations and resultant costs.

*Question.* What will the President's request accomplish?

*Answer.* In fiscal year 1981, we will continue ongoing work, including land acquisition activities, relocations, cultural resources, construction of lock B and spillway, lock C and spillway, Bay Springs lock and dam, and excavation in the canal and divide cut sections. We will complete contracts for Aliceville phases I and phase II dredging, Aberdeen lock and dam contract 1, and lock A and spillway. We will initiate construction of lock D and spillway, lock E and spillway, Bay Springs reservoir clearing, 10 relocations contracts, and 6 recreation and operational facility contracts. The latter six contracts are proposed for award under section 8A to Small Business Administration minority contractors.

*Question.* If the fiscal year 1981 requested funds are appropriated, what will remain to be accomplished?

*Answer.* If we add the \$208,070,000 budget request to the allocations through fiscal year 1980, the remaining funding requirement would be \$662,534,000. All contract work underway at the end of fiscal year 1981 would have to be completed. In addition, there are 57 contracts remaining to be awarded after fiscal year 1981 which would have to be initiated and completed. The value of that work is approximately \$256 million, including 38 contracts with an estimated value exceeding \$1 million each.

#### IMPACT OF NOT PROVIDING CONTINUING APPROPRIATIONS

*Question.* What would be the impact of not appropriating \$208 million?

*Answer.* If the fiscal year 1981 request is denied, no new project work would be initiated and all ongoing contracts would be terminated. Costs associated with project termination are estimated at \$130 million.

## COMPARISON OF TENNESSEE-TOMBIGBEE WITH OTHER WATERWAY INVESTMENTS

*Question.* As a capital investment, how does this waterway investment compare with other waterway investments?

*Answer.* This waterway connects inner America with the Gulf of Mexico and the rapidly growing southeastern region of the country. As such, it brings a much-needed low-cost means of moving bulk commodities for domestic use and for export. Charts 1 and 2 show how efficient water transportation is.

Basically the new waterway provides a shorter route from inner America to the gulf. This can be shown from map No. 1 and table No. 1. In fact, we estimate that in 1986, the total distance saved will be 3.3 billion ton-miles for the 25.9 million tons projected to use the Tenn-Tom (table No. 2).

This distance savings translates to a time savings, of course. We estimate that the total time saved in 1986 will be 1,122.4 million ton-hours, or an average of 2 days for every ton moved.

The distance saved also translates into an energy savings. Comparing the existing allwater route to the Tenn-Tom water route, energy saved is estimated at 7.7 million gallons of diesel fuel in 1986 or 2.0 million barrels of oil annually.

Naturally, the savings in distance, time, and energy translate into savings in shipping costs. We expect \$58.5 million annually national productivity gains by 1986, based on Kearney's report.

Therefore, we conclude that this waterway measures up nicely to our other waterways and will prove out, in the long run, to be a very important part of our much-needed first-class waterway.

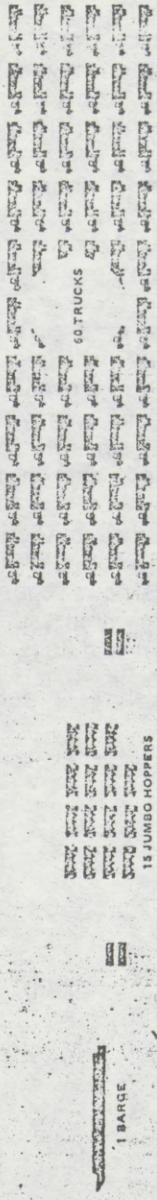
CHART #1

COMPARE

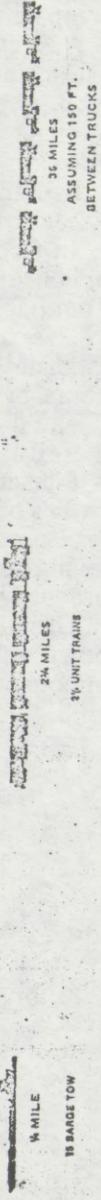
CARGO CAPACITY



EQUIVALENT UNITS



EQUIVALENT LENGTHS



**IN 1976 . . .**

- **Water Transportation Accounted for 16.9% of Total Ton-Miles in the U.S.**
- **It Comprised 2.3% of the Total Freight Bill**

Source: *Waterborne Commerce Statistics, Transport Economics, ICC*

MAP #1



Figure 1-1. U.S. Inland Waterway System

TABLE 1.—*Typical mileage savings*

From	To	Via TTW	Present route	Savings
St. Louis, MO.....	Mobile, AL.....	890	1,200	310
Kansas City, MO.....	Pensacola, FL.....	1,352	1,604	252
Chattanooga, TN.....	Mobile, AL.....	699	1,531	832
Uniontown, KY.....	Panama City, FL.....	942	1,286	344
Pittsburgh, PA.....	Mobile, AL.....	1,599	2,001	402
Decatur, AL.....	Pascagoula, MS.....	606	1,322	716
Guntersville, AL.....	Pensacola, FL.....	674	1,448	774

TABLE #2  
Benefits: T-T Waterway 1/  
1986

Alt Mode (O-D)	Volume 1986-Tons (mil)	Ave. Rate Savings/ton	Total Rate Savings \$/mil	Distance Saved		Time Saved		Energy Saved		Barrels Crude Oil
				Per ton	Total Bil-Ton-Miles	Per ton Hour	Total Ton-hou (MI)	Per ton Gallons	Total Gallons	
<u>COAL</u>										
Upper Miss.	0.2	1.14	0.2	335	0.2	5	1.00	.11932	23,147	5,087
Ohio	7.1	2.20	15.5	375	2.6	25	177.50	.31470	2,221,251	488,187
Tenn.	6.5	2.02	13.2	695	4.5	125	812.50	.97550	6,365,160	1,398,934
<u>RAIL</u>										
Upper Miss.	0	0	0	0	0	0	0			
Ohio	0	0	0	0	0	0	0			N.C.
Tenn.	4.9	1.61	7.9	-219	-1.0	-12.13	-59.43			
<u>Total Coal</u>	18.7	1.97	36.80		6.30		931.56	.62	8,609,498	1,892,208
<u>OTHER</u>										
Upper Miss.	1.1	1.30	1.4	84	1.0	5	5.5	-.58864	-638,084	-140,238
Ohio	1.1	1.50	1.7	409	0.5	25	27.50	.05695	62,819	13,806
Tenn.	1.6	1.93	3.1	587	0.9	125	200.00	.80026	1,289,781	283,468
<u>RAIL</u>										
Upper Miss.	.5	4.46	2.3	-225	-0.1	-12.43	-6.22			
Ohio	.2	3.80	.6	-660	-0.1	-36.46	-7.29			N.C.
Tenn.	2.7	4.67	12.6	-192	-5.2	-10.62	-28.69			
<u>Total Other</u>	7.2	3.01	21.70		-3.00		190.84	.19	714,516	157,036
<u>Total All</u>	25.90	2.26	58.50		3.30		1122.40	.53	9,324,014	2,049,244

## PROJECT BENEFITS

*Question.* What are the benefits of constructing this waterway?

*Answer.* The primary benefit is transportation savings. However, this is by no means a single purpose project.

For example, this is an area which has not kept pace with the rest of the Nation from the point of view of economic growth. Lower navigation charges create the potential for inducing new firms, industry, and business into the area. The Appalachian Regional Commission has estimated new jobs at 20,000 to 135,000. What the real impact will be depends upon State and local leadership and initiatives, although we are helping with information through our corridor study.

The very construction of the project offers benefits from the use of otherwise unemployed labor. We have done our best to insure that social goals of minority hiring are emphasized during the construction period, through the President's TTAAC program.

Furthermore, the project will produce significant recreation benefits. Our navigation lakes have been very popular with recreationists; for example, on the McClellan Kerr Waterway. Even more, our studies show that lake recreation brings a significant number of new jobs and income into rural areas. Indeed, we are very proud that the President has chosen Tenn-Tom as one of the sites for demonstrating his rural initiatives program.

In addition, the Tenn-Tom will support energy conservation and energy independence objectives and will help us narrow our balance-of-payments deficits.

Further, the Tenn-Tom, like other front-end investments provides a hedge against unforeseen inflation. Simply stated, we will construct the Tenn-Tom using today's dollars and will obtain benefits in inflated dollars for many years.

Returning to the transportation savings, table No. 1 is a list of the 1986 traffic and savings from the Kearney report. It gives a fairly good idea of the mix of commodities projected to move on the Tenn-Tom.

I would like to point out that over 80 percent of the productivity gains for the Tenn-Tom depend on domestic movements; in other words 80 percent of the transportation gains depend on shipments to or from the Tombigbee Basin of the Gulf of Mexico east of New Orleans. Only about 20 percent depends on exports and in those cases, the productivity gain was based on a comparison of New Orleans via the Mississippi and Mobile versus the Tenn-Tom.

TABLE 1.—*Accepted prospective commerce and savings by commodity class*

(1986 commerce and savings)

[In thousands of dollars]

	Annual traffic	Annual savings
Farm products.....	635	1,417
Forest products.....	56	152
Marine products.....	27	13
Metallic ores.....	1,996	4,644
Coal.....	18,400	30,186

TABLE 1.—Accepted prospective commerce and savings by commodity class—Continued  
(1986 commerce and savings)

[In thousands of dollars]		
	Annual traffic	Annual savings
Petroleum.....	225	568
Nonmetallic minerals.....	528	677
Food and food products.....	110	198
Pulp, paper, and allied products.....	792	2,065
Chemical and allied products.....	1,859	8,138
Clay, concrete, and stone.....	97	89
Primary metals.....	374	997
Fabricated metals.....	178	495
Miscellaneous, including undisclosed traffic.....	2,794	5,884
Total.....	28,701	55,523

NOTE.—Savings are expressed in current dollars as of June 1975.

#### ECONOMIC VALUE OF BENEFITS

*Question.* What is the estimated economic value of these benefits?

Answer. The current benefits in the benefit-cost ratio are transportation savings, unemployed resources used on the project, and recreation benefits; annual benefits are:

[In thousands of dollars]	
Navigation.....	105,058
Recreation.....	4,951
Fish and wildlife.....	197
Area redevelopment.....	11,696
Total.....	121,902

The above numbers are computed at 3¼ percent interest at October 1979 price levels.

#### BENEFIT-COST RATIO CALCULATION

*Question.* Were all the benefits attributable to the waterway taken into account in the calculation of the benefit-to-cost ratio?

Answer. No; the benefits attributable to regional growth, induced regional traffic, new jobs, energy conservation, energy independence, support of foreign policy (steam coal exports) balance of payments, minority hiring and training, rural initiatives, environmental enhancement, and inflationary hedge are not taken into account in the calculation of the benefit-to-cost ratio.

Further benefits do not include the recent emphasis on steam coal exports, exemplified by the President's International Coal Export Task Group headed by the Department of Energy. In fact, the benefits do not include any steam coal exports. Steam coal exports have not been included because this is a recent development which was not foreseen in 1975 when our economic study was done. The Corps does not revise its benefit-cost estimates for every change in the economic outlook for the Nation. In order to satisfy ourselves as to the proper level of steam coal exports, we would have to do a rate and cost study. This seems unnecessary; benefits could only increase as a result, since there are no steam coal exports in the current traffic.

*Question.* What were the benefits used to calculate the so-called benefit-to-cost ratio?

*Answer.* The basic benefits were computed by the Kearney Corp. in 1975. Kearney is an internationally recognized transportation consulting firm.

They reevaluated the benefits at the request of the Corps to determine whether the BCR was above unity. Normally, the Corps does not reevaluate benefits of projects under construction. However, in the case of the Tenn-Tom, its size and, the 1975 cost increase warranted such reevaluation. Table 1 summarizes the Kearney analysis.

Since 1975, the Corps has updated the BCR for the Tenn-Tom (and every project) each year to make sure that inflation is not making inroads on the BCR. The BCR in 1975 was 1.08. Since that time, inflation on the benefit side outstripped cost inflation; the BCR for fiscal year 1980 was 1.3 (table 2). The BCR's for the entire authorized project as reported to Congress since the Kearney report are listed in table 3.

For fiscal year 1980, the Corps started to report a remaining benefit-cost ratio or RBCR for projects in construction status. Economists agree that this is the correct BCR. The RBCR is 2.5 at 3.25 percent and 1.3 at 7.125 percent.

Finally, there have been a number of questions concerning inflation in the BCR. We do not project inflation for either benefits or costs. If we did, the BCR for the Tenn-Tom at 7.125 percent is 2.1; the RBCR is 4.0 at 3.25 percent; and 7.8 at 7.125 percent, using a 5-percent inflation rate. All of these BCR's are summarized in table 2.

TABLE 1.—*Summary of annual benefits (1975 data)*

[In thousands of dollars]	
Transportation savings .....	66,389
Supplemental benefits.....	
Recreation .....	6,890
Fish and wildlife .....	15,420
Total.....	88,896
<i>Economic justification—Authorized work only</i>	
Annual charges .....	\$82,339,000
Annual benefits.....	\$88,896,000
Benefit-cost ratio.....	1.08

TABLE 2

1975, BCR .....	1.08
1980:	
BCR, at 3.25 percent.....	1.3
RBCR, at 3.25 percent.....	2.5
RBCR, at 3.25 percent; inflation at 5 percent .....	7.8
RBCR, at 7.125 percent.....	1.3
RBCR, at 7.125 percent; inflation at 5 percent .....	4.0

TABLE 3.—*BCR's of Tenn-Tom*

Fiscal year:	
1976 (Kearney) .....	1.08
1977.....	1.1
1978.....	1.15
1979.....	1.19
1980.....	1.2
1981 (1.3).....	1 2.5

<sup>1</sup> Remaining benefit-to-cost ratio.

*Question.* What is the purpose of the so-called benefit-to-cost ratio?

*Answer.* It provides us with a prospective measure of the national efficiency benefits of the project that we can pretty confidently put into dollar terms. Generally, the efficiency benefits must exceed costs in order to make a positive recommendation; that is, the BCR must exceed unity.

Speaking just to the national efficiency benefits, we have found that we normally underestimate likely future tonnage, as shown by the attached table.

We fully recognize that other benefits are created, other potentials are opened. However, we only include those benefits calculated according to a pretty tough set of rules promulgated by the Congress, by the Water Resources Council, and by ourselves.

The water resources program is the only Federal program which requires a positive benefit-cost ratio. This requirement evolved slowly and was given impetus by the 1936 Flood Control Act which said benefits to whomsoever they accrue must exceed costs. Overtime, benefits for the BCR have come to mean those which can be readily put in dollar terms. It is generally conceded that Congress and President will and should make decisions based on policies, goals, and objectives which go beyond the BCR.

The economically correct BCR for the Tenn-Tom, using applicable laws and rules, is 2.5

ERIC  
Ohio BBSI  
Black Msi

# COMPARISON OF ANTICIPATED TRAFFIC AT TIME OF PROJECT AUTHORIZATION WITH 1978 TONNAGE FOR SELECTED WATERWAYS

Project	Project Completion or Opening Date	Anticipated Tonnage* (Thousands)	1978 Tonnage (Thousands)
Alabama-Coosa	1972	1,906	1,967
Arkansas	1970	9,015	9,852
Black Warrior-Tombigbee	1954	1,304	14,601
Ohio Basin (Combined)	1925	59,389	217,715
Gulf Intracoastal WW	1944	9,668	84,364

\*Annual expected tonnage as estimated at time of project authorization.

**COMPARISON OF ANTICIPATED TRAFFIC AT  
TIME OF PROJECT AUTHORIZATION WITH 1978  
TONNAGE FOR SELECTED WATERWAYS  
(Continued)**

Project	Project Completion or Opening Date	Anticipated Tonnage* (Thousands)	1978 Tonnage (Thousands)
Illinois	1939	7,500	37,251
Tennessee	1948	15,300	31,634
Middle Miss. (Mo. R. to Ohio R.)	1953	10,000	79,328
Upper Miss. (Minn. to Mo. R.)	1940	9,000	68,976

\*Annual expected tonnage as estimated at time of project authorization.

*Question.* Would you please review the calculation of the benefit-to-cost ratio?

*Answer.* The single most important factor in calculating the benefit-cost ratio is the discount rate. Construction costs are incurred early but benefits accrue for the entire life of the project. The higher the discount rate, the lower the BCR; the lower the discount rate, the higher the BCR.

All economists agree that the discount, or interest rate should be inflation free if benefits and costs also exclude inflation. Conversely, if the discount rate includes inflation, so should benefits and costs. Dr. Charles Howe, a water resources economist from the University of Colorado, has proven mathematically that the exact same BCR is obtained as long as either: (1) benefits, costs, and discount rate are all inflation free; or (2) benefits, costs, and discount rate are all inflated.

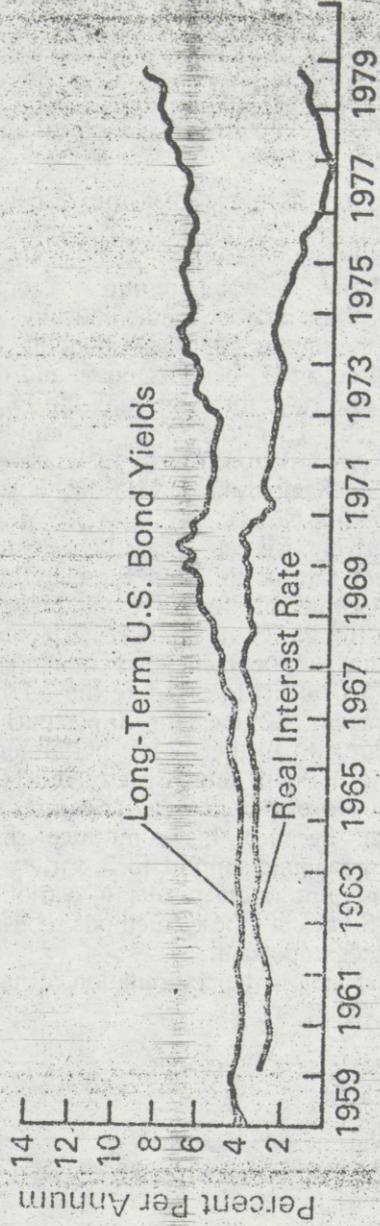
One of the rules for computing the BCR is that benefits and costs are not inflated. Therefore, the discount rate should also be free of inflation. An inflation-free or real rate of interest, has been computed by Dr. Paul Samuelson of MIT in his standard text on economics (see attached graph No. 1).

Alternatively, we can inflate benefits and costs. For example, assume a 5-percent rate of inflation for benefits and costs; further, apply the current discount rate for survey studies, 7.125. Making no other change, the BCR for the entire authorized Tenn-Tom project is 2.1 to 1. The BCR using 3.25 percent and no inflation is, 2.125 percent (7.125 percent - 5 percent) to compute the 2.1 BCR, while we used a real rate of 3.25 percent (3.25 percent - 0 percent) to compute the 1.3 BCR.

There are two further points pertaining to the discount rate. First, of course, the discount rate is prescribed by law, S. 80 of the 1974 Water Resources Development Act. It requires the use of 3.25 percent for the Tenn-Tom. Second, this committee should be aware that there is respected economic support for a variety of methods of determining the proper discount rates; results of various studies range from 1 to 10 percent. Some of these methods consider neither market nor real interest rates important.

The next area is the computation of navigation benefits.

# COMPARISON OF REAL INTEREST RATE AND LONG-TERM YIELDS DURING INFLATIONARY PERIODS



Source: *Economics*, Paul Samuelson, McGraw-Hill Inc., 1980, p. 308.

## NAVIGATION BENEFITS

The Corps computes navigation benefits as follows:

- (1) Establish the projected demand and the sources for the products;
- (2) Subtract the cost of the route and mode to transport the products  
(a) with and (b) without the waterway; and
- (3) Discount at applicable rate.

Now, the actual calculation is pretty complex but perhaps it can be simplified; see attached summary of Kearney report. The following paragraphs review the reasonableness of (1) and (2) above.

The 1975 Kearney study established demand based on interviews and standard demograph projections; supplies for coal were independently established by the 3R Corporation. Since 1975 the Nation has turned to a heavier reliance on coal as a domestic fuel source, and coal export for steam (as well as metallurgical uses) has been prominently mentioned. Hence, the overall demand picture is bright.

The next step is to establish the mode and route. The question has been asked: Why turn left to use the Tenn-Tom? The answer is that for domestic movements, which account for 80 percent of the transportation benefits, shippers must turn left eventually; that is, they will have to turn left at New Orleans, if they don't at Pickwick, Paducah, or Cairo.

Put another way, the Tenn-Tom creates a shorter water route to the gulf than the Mississippi route. On the other hand, as opponents have argued, the Mississippi River accommodates larger tow sizes. The larger tow size is reflected in ICC published rates; the Mississippi River rate is 20 percent less than for the existing BWT. This fact means that the new Tenn-Tom will likely be competitive anytime it saves 20 percent or more in mileage. Naturally, whether a movement actually will use the Tenn-Tom or not depends upon a host of facts, such as size of shipment, type of equipment, tow speed, delays, fleeting needs, time in shipment, service factors, demurrage, and the like. Kearney looked into these. We reviewed the water diversions. Average distance saved amounted to 40 percent, far greater than the 20 percent mentioned earlier. See table 1.

We used the current ICC data, supplemented by ICC rail rate data, and applied this to the distances for the movements reported by Kearney. The result was \$107,100,000 in annual transportation savings, as computed in table No. 2. This highly simplified analysis compares to \$105,100,000 using the detailed commodity origin—destination and discounting analysis conducted by Kearney, updated to 1979 price levels.

It is concluded that the Kearney analysis is reasonable.

TABLE 1.—Distances

Route	Tenn-Tom (miles)	Miss. River (miles)	Percent saved
Pickwick to Mobile, dominates domestic moves to and from Tennessee Basin.....	449	1,278	65
Paducah to Mobile, dominates domestic moves to and from Ohio Basin.....	664	1,063	38
Cairo to Mobile, dominates domestic moves to and from Upper Mississippi.....	710	1,017	30
Pickwick to New Orleans, dominates export moves to and from Tennessee Basin.....	NA	1,116	60
Paducah to New Orleans, dominates export moves to and from Ohio Basin.....	NA	901	26
Cairo to New Orleans, dominates export moves to and from Upper Mississippi.....	NA	855	17

TABLE 2  
COAL-RAIL <sup>1</sup>

Origin	Million tons	Savings/ton	Savings total
Upper Mississippi.....			
Ohio River.....			
Tennessee.....	4.92	6.71	\$33,000,000
			\$33,000,000
OTHER RAIL <sup>1</sup>			
Upper Mississippi.....	.52	7.93	4,100,000
Ohio River.....	.16	10.16	1,600,000
Tennessee.....	2.70	8.48	22,900,000
			\$28,600,000
COAL-WATER <sup>2</sup>			
Upper Mississippi.....	.19	.83	200,000
Ohio River.....	7.06	1.47	10,400,000
Tennessee.....	6.53	4.33	28,300,000
			\$38,900,000
OTHER WATER <sup>2</sup>			
Upper Mississippi.....	1.08	0.01	NEG.
Ohio River.....	1.10	.74	800,000
Tennessee.....	1.61	3.60	5,800,000
			\$6,600,000
Total.....			107,000,000

<sup>1</sup> Average rail costs of 26.5 mills per ton-mile (MTM) compared to 7.1 MTM for water. The former is from 1978 Carload Waybill Statistics, southern territory to southern territory for coal (19.5 MTM) updated to June 1980 by BLS Price Index for R.R. freight. The latter is from "Transport Economics," Bureau of Economics ICC 1978 (1977 waterway data of 5.5 MTM X 1.28=7.1). The 1977 data has been updated based on Waterway Freight Bureau Index.

<sup>2</sup> 9.3 MTM for Tenn-Tom is 7.5 MTM for Mississippi River. They are from Waterway Freight Bureau ICC WFB, 108F, Supp. 47, sec. 4, effective Aug. 7, 1980.

## SUMMARY OF KEARNEY REPORT

Kearney is an internationally recognized transportation consulting firm. In 1975 they undertook a study of the transportation benefits

attributable to the authorized Tenn-Tom project. It was a 1-year study. This paper provides discussion of the steps used by Kearney in their study.

The first step established the likely traffic which potentially might use the Tenn-Tom by the first year of operation, 1986, and for the project life. This potential traffic was established by interviewing 1,000 firms in the Tenn-Tom service area (see map). These firms were asked a number of questions concerning current and future commercial tonnage, rates, and preferences (see questionnaire).

Second, the interviews were screened and a number of firms eliminated as potential Tenn-Tom users because of factors such as: size of shipment, shipper preferences, nature of product, location of destination, and the like. This resulted in paring the 1,000 firms down to 250 movements. A "movement" is the transport of a given commodity from an origin to a destination; the tonnage of a movement is the annual tonnage.

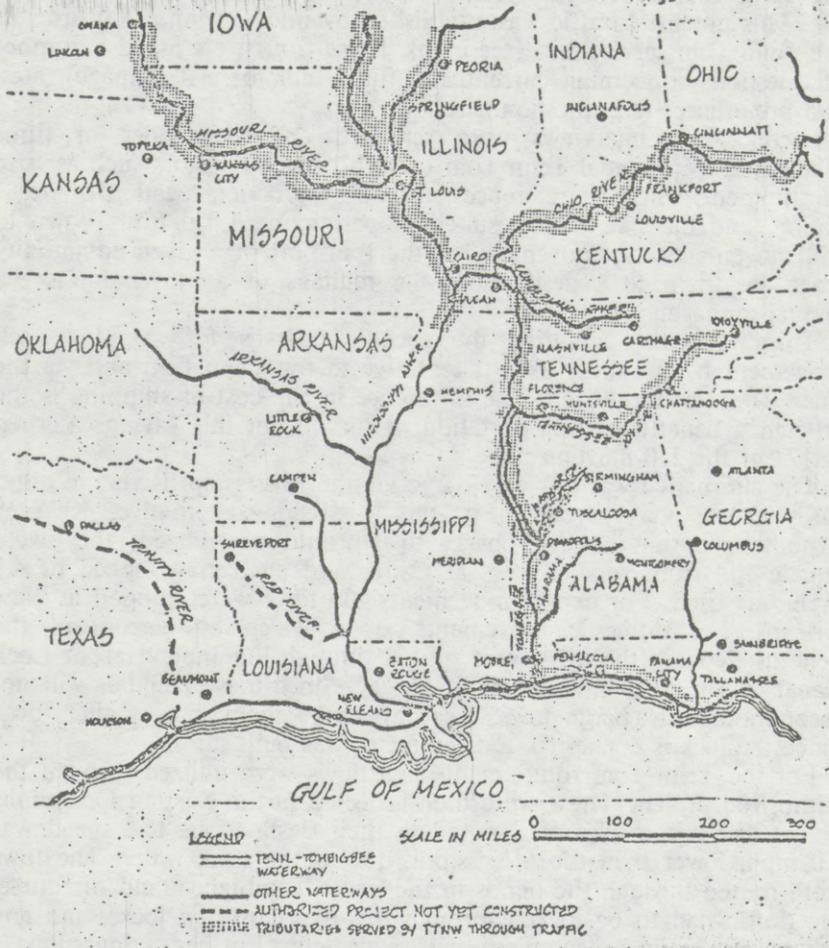
Third, Kearney analyzed the specific charges for shipping each movement by the most likely alternative to the Tenn-Tom and via the Tenn-Tom, as authorized. The difference in the cost of shipping is the efficiency benefit for transportation. It turned out that savings accrued to 121 of the 250 movements.

The alternative was often by barge via the Mississippi River; in other cases it was via railroads. For the Mississippi alternative, Kearney hypothesized that large 25 barge tows would be utilized; they were "made-up" from smaller tows at Cairo, and an average speed of 4.7 mph was used. For export movements the tows were stopped at New Orleans. For domestic movements, upon which 80 percent of the benefits depend, the tows were routed through the Inner Harbor Lock Canal to the Gulf Intracoastal Waterway. Since these facilities will not accommodate 25 barge tows, Kearney broke them into smaller tows. Since the lock is congested, a delay factor was built in.

For the Tenn-Tom route, eight-barge tows were utilized through the authorized project. These were then reflected in the existing Demopolis pool to six-barge tows and routed to their destination. The speed was 4.0 mph, lower than the Mississippi, due to the slack water. The tows were routed through the bends in the lower Tombigbee, and of course, the traffic had to be locked through the 10 Tenn-Tom locks, and any others necessary to complete the movement. Further, congestion is expected as tonnage grows. A total of 1 day was counted for congestion delay. It is clear that many of the factors just mentioned favor the Mississippi route. The major factor favoring the Tenn-Tom is quite simple; reduced distance, and hence energy, time, and cost. The average distance saved via the Tenn-Tom was 40 percent.

Figure 2

Tributary Areas Served by the Tennessee-Tombigbee Waterway







For railroad alternatives, the cost of shipping is based upon actual rates in effect that are currently moving traffic. Such rates are published by the Interstate Commerce Commission. Use of such rates are required by section 7A of the Department of Transportation Act of 1966.

Fourth, the 121 movements were aggregated by type of commodity. The tonnages were projected into the future based on specific rates of increase of standard indicators (see list). In this manner the transportation benefits for each year from 1986 through 2036, the project life, were computed. The benefits were not projected by inflation into the future.

Fifth, the tonnages are increased at the projected rate until the capacity of the existing Lower Tombigbee locks at Demopolis and Coffeerville, or the other locks on the Black Warrior-Tenn-Tom system, are reached. The Mississippi River route and railroads are assumed to have infinite capacity.

Sixth, the discounting process is accomplished. This is completely mechanical, and, while rather technical, is not the subject of debate. The amount of the discount rate is the subject of debate. Kearney used the legally prescribed rate. The output of the discounting is annual navigation benefits. A comparable analysis of other types efficiency benefits (and of costs), which are readily converted to dollar benefits was accomplished. As reported in 1976, the BCR was 1.08:

Benefits	Thousands
Transportation savings .....	\$66,389
Recreation .....	\$6,890
Fish and wildlife .....	\$197
Area redevelopment .....	\$15,420
Total, annual benefits .....	\$88,896
Total, annual charges .....	\$82,339
Benefit-cost ratio .....	1.08

Table VI-10

Tennessee-Tombigbee Waterway -  
TTWW Commodity Forecast

<u>Commodity</u>	<u>Average Annual Growth Rate</u>	<u>Forecast Used</u>	
	(Percent)		
Chemicals	1.0 - 3.9		
Clay, Concrete and Stone	2.4		
Coal (Domestic)	2.5 - 3.5	OBERS Series E for total earn- ings in the applicable in- dustry(s) and region(s) in- volved in each particular movement.	
Fabricated Metals	1.2 - 2.9		
Food Products	2.5 - 2.7		
Marine Products	2.2 - 2.3		
Metallic Ores	1.4 - 3.1		
Miscellaneous	1.4 - 2.2		
Nonmetallic Minerals (Domestic)	-1.9 - 2.9		
Petroleum	1.3 - 2.4		
Primary Metals (Domestic)	1.4 - 3.2		
Pulp, Paper and Allied Products (Domestic)	2.0 - 2.8		
Forest Products	2.7		
Coal (Export)	2.9		Department of the Interior, Bureau of Mines projections for coal exports and projected growth in the foreign steel industry.
Farm Products (Export)	1.0 - 4.1		OBERS Series E for total earn- ings in the applicable supply industry and region for each particular movement.
Nonmetallic Minerals (Export)	0.7		
Primary Metals (Export)	1.6 - 1.8		
Pulp, Paper and Allied Products (Export)	2.4 - 2.6		

Source: Exhibits VI-6 and VI-7.

## COMPLIANCE WITH ENVIRONMENTAL LAWS

*Question.* Please explain the means by which the waterway complies with environmental laws.

*Answer.* The TTW is one of the first large civil works water resource projects to be developed under the auspices of NEPA. The EIS for the waterway which was filed with CEQ in 1971 was debated in Congress and its adequacy was upheld by two Federal courts. The environmental studies on this project have been extensive and continuous. Supplemental environmental reports, updating the EIS, were issued in 1975 and 1978.

Following the court challenge in 1971, a continuing environmental study process was established by the Corps to place more emphasis on environmental considerations in the design and construction of the waterway. An environmental advisory board of consultants was established to review these activities and to recommend opportunities for minimizing environmental losses and to maximize environmental protection and enhancement. This process led to innumerable changes and refinements in the construction of the waterway.

The Congress has mandated that special efforts be taken to insure that environmental resources are protected. The Corps has made every effort to fulfill these mandates. For example all of the disposal sites for the excavated material have been selected in accordance with guidelines promulgated by EPA as directed by the Federal Water Pollution Control Act (Public Law 92-500). The U.S. Fish and Wildlife Service has participated in the selection of the disposal sites under the auspices of the Fish and Wildlife Coordination Act. In addition, State water quality certifications have been obtained for all waterway related activities under the Clean Water Act provisions.

There are no federally listed endangered species which would be adversely affected by the waterway.

Extensive measures have been taken to insure compliance with the Archeological and Historic Preservation Act and the National Historic Preservation Act. Where possible important sites have been protected and where sites had to be disturbed appropriate mitigation measures were undertaken in consultation with the Advisory Council on Historic Preservation and the State historic preservation office.

Requirements are included in all contracts that the contractor will comply with all applicable State and Federal regulations. Thus the Corps has taken every effort to comply both with the spirit and intent of all applicable laws.

## PURPOSE OF BENEFIT-COST RATIO

Senator STENNIS. I do want to mention one thing in particular now. Can you take a few minutes?

Senator JOHNSTON. Sure.

Senator STENNIS. I want to know, first of all, what is the purpose of this cost-benefit ratio? What is the reason for it? Why is it written into the law? Why is it written there like it is? I know that the term doesn't carry its full meaning on its face. I had to be a member of this committee for a few years before I knew what it meant fully.

General MORRIS. Sir, one of the tests which the public works projects must pass, the fundamental question, is that the investment of the public's money in a project must be a sound business proposition. The test is that over the life of the project the taxpayer ought to get back more than he puts in.

To do that, we have arrived at a system of computing costs and computing benefits. Historically, we have taken the position, at least in my office, that we do not recommend a project if the economic factors are not favorable, at least one dollar back for every dollar spent.

As far as the public is concerned, the benefit-cost ratio is very much misunderstood because it is a very complicated process. It is difficult to explain. It is also a target for attack because the best minds in the world can only estimate what is going to happen in the future. They don't know for sure. Any other individual has a right to his own conclusions.

explain. It is also a target for attack because the best minds in the world can only estimate what is going to happen in the future. They don't know for sure. Any other individual has a right to his own conclusions.

So, in our analysis we say the costs are going to be this much down the road and the benefits are going to be this much in 50 years, and those are always items that can generate controversy. So over the years the benefit-cost ratio has always turned out to be the subject for debate in the analysis of projects.

#### CONCEPT BEHIND BENEFITS

Senator JOHNSTON. Could you tell us what goes into it, what you count as a benefit, what you don't count as a benefit?

General MORRIS. Each project is different, of course. But the overall idea is that we try to estimate the national efficiency benefits which can be readily put into dollar amounts. Of course, there are many benefits which cannot be readily put into dollars. Anyway, for navigation, the efficiency benefits are the differences in the cost of transporting products one way versus an alternate means of transportation. That difference, if it is favorable to water transportation, becomes a national efficiency benefit, a gain in productivity. So that one is not too hard to perceive.

Flood control benefits are damages prevented. If you have historical damage to a geographical area without a structure, you put one in and have that benefit, and so forth, through those items we quantify in dollar terms.

#### MECHANISMS OF DISCOUNTING BENEFITS

Senator JOHNSTON. Tell us about the mathematics. I don't mean to interrupt, Mr. Chairman.

Senator STENNIS. That is all right, Mr. Chairman.

Senator JOHNSTON. But let's say you have a savings, you calculate a savings of \$100,000 a year. Now go through the mathematics of how you add that up, what the interest factor is, what inflation factors you apply to that, as well as your costs.

General MORRIS. The discounting part is very mechanical. We have a benefit each year for the life of the project, but we incur most of our costs during construction. Therefore, we bring the benefits to present worth for comparison to costs. The benefit of \$100,000 in the 10th year is only worth \$73,000 today; in the 20th year only \$53,000 today, at 3 1/4 percent.

Now you do that for each year and you ultimately bring it down to present worth. Then you amortize both the present worth of benefits and the construction costs to get an annual cost and an annual benefit. The interest rate is very critical in the present worthing and in amortizing and, therefore, to the BCR. It was fixed by Water Resources Council regulations, which were confirmed generically by section 80 of the Water Resources Development Act of 1974.

Senator JOHNSTON. How do you discount it?

General MORRIS. You discount it by applying the interest rate backward, so to speak, and bring it back.

Senator JOHNSTON. What interest rate?

General MORRIS. Usually the interest rate prescribed by the Congress or in the document or what is prevalent at the time the project was authorized.

Senator JOHNSTON. That is on the benefit side.

General MORRIS. Yes; on the benefits and the costs. You have to apply interest rates to cost. You put the money in the project, but you could be drawing interest on it in the bank. That has to go in, too. If you put it in the project, it is invested. If it is in the bank, you draw interest on it.

Senator JOHNSTON. What I am talking about is that future benefits are discounted to present-day values—

General MORRIS. That is right.

Senator JOHNSTON [continuing]. Using the same consistent interest rate.

General MORRIS. The same interest rate applies to each year of the benefits.

#### NO INFLATION IN BENEFITS

Senator JOHNSTON. General, if we take the project that has the \$100,000 1980 savings, you have a project that will last 10 years so you go down the road 10 years. You then discount back 10 years and the 9 years and the 7 years, et cetera, back to present-day value.

Now my question is, Do you still use that \$100,000 benefit that you had the first year or do you inflate that figure in the 10th year and then discount the inflated figure back to the present year? Did I make myself clear on that?

General MORRIS. There is no inflation in it at all. Under rules promulgated by the Water Resources Council, rules of long standing, there is no projection of inflation in our benefits.

Senator JOHNSTON. That is what I mean. In other words, in taking your benefits 10 years from now, all you are doing is taking today's benefits as if there is not going to be any inflation; isn't that right?

General MORRIS. That is quite right. We get a lot of concern over the failure to include inflation; it seems unrealistic. In theory, we should use an inflation-free or real discount rate to offset the effect of not projecting inflation. To simplify this point—and I admit it has been a tough one for me to grasp—it would be better to take the inflation out of the interest rate and just have the real interest.

I guess the best way to put it is, 4 percent interest in 1940 was probably better off for you than 8 percent in 1980, because we have a lot more inflation now. But if you did that, you would find that the real interest is much, much lower than either 4 or 8 percent, because the real rate excludes inflation.

Senator JOHNSTON. I understand that. I don't know that I made myself clear.

General MORRIS. We are not appreciating benefits upon what we think the money is going to be 10 years from now. We are doing it on the basis of present price levels.

Senator JOHNSTON. Just to make sure the point is clear, let's say you have a project where you have a ring levee that protects one house and

that is all. That house is worth \$100,000. That is all that you figure is going to be built. So when you figure that 10 years from now it is going to protect this \$100,000 house, do you still consider the value of the house to be \$100,000 10 years from now?

General MORRIS. Yes; that is it precisely.

Senator JOHNSTON. So, there is no inflation in that figure, even though everyone knows there will be inflation in the cost and benefits.

General MORRIS. Yes, sir; that is correct. But when you do the benefit-cost analysis, the guidance we compute benefits under says we have to use present price levels.

#### BENEFIT-COST RATIO: UNREALISTIC

Senator JOHNSTON. What I am trying to do here is illustrate the cost-benefit ratio is not realistic. It is conservative. It assumes, with respect to benefits, there will be no inflation in benefits. On the other hand, when you get to cost, you put the interest rate to those costs, whether it is  $7\frac{1}{8}$  or  $3\frac{1}{4}$ . I know the arguments about using those small interest rates on cost. But nevertheless, you are using some interest rate with cost, and on benefits you are not assuming that they are going to inflate at all. You are not assuming that house or city is going to rise in value, and everyone knows it is. Am I correct on that?

General MORRIS. That is correct. Your point is correct.

Senator STENNIS. Mr. Chairman, if I may follow up on that.

Senator JOHNSTON. I am sorry, Mr. Chairman.

Senator STENNIS. No. You brought it out very clearly, the two of you did.

#### BENEFIT-COST RATIO MUST BE GREATER THAN ONE

So after all, the cost-benefit ratio is a measurement that you apply the best you can as professional men, and you have to find in the affirmative that the estimate is favorable, that is, favorable as an investment you might say, wherein the benefit-cost ratio of the benefits equal or exceed the costs. That is true, isn't it? And you don't recommend them unless they do.

General MORRIS. That is correct.

Senator STENNIS. They meet that requirement; is that correct?

General MORRIS. Sir, there is an exception to that. It is an exception that has never been implemented in my judgment. But we would recommend a project to the Congress if the environmental features were sufficiently favorable, if the environmental advantages were sufficiently favorable, to offset a cost-benefit factor which is less than one.

Senator STENNIS. For the record, it would be best, wouldn't it, to state the general rule and then state the exception.

General MORRIS. That is why I say there is an exception.

Senator STENNIS. The general rule is, you do not recommend them unless they meet this benefit-cost requirement; isn't that correct?

General MORRIS. That is correct. I have never recommended a project with a BCR less than unity. That includes Tenn-Tom. That's why I called for the 1975 economy study.

Senator STENNIS. Now, generally, you found that your calculations

and estimates stood up, and these projects, in the practical world, as they were built, they more than justified the figures you had given them in this cost-benefit ratio; isn't that correct?

General MORRIS. That is correct.

Senator STENNIS. You have made even recent examinations, you said a few minutes ago, of a great number of these projects.

General MORRIS. Yes, sir.

Senator STENNIS. Did you list those you made this recent examination of?

General MORRIS. I read some of them off. I just read the navigation ones.

Senator STENNIS. I asked that because I have a lot of faith in what you say about your estimates, your calculations, and your checkup on the situation and what you found. That is why I wanted an answer.

#### ACTUAL BENEFITS HAVE EXCEEDED PROJECTIONS

Now, Mr. Chairman, I want an answer to this: Of all of these projects throughout the Nation generally—I am not saying every single one—but from the Pacific Coast through to the East, or from the East to the West, these projects that have been built—flood control, generating plants, or whatever, transportation—they have justified themselves under your cost-benefit ratio. That is true; isn't it?

General MORRIS. Yes, sir; they have produced better results than we had anticipated by far.

Senator STENNIS. On the plus side.

General MORRIS. By far. I think the Corps' water resources record is one of conservatism. It's not intentional; I guess we are cautious.

Senator STENNIS. And you illustrated the most recent one is the Arkansas/Oklahoma project. I can remember during the course of that construction doubts were—well, questions were asked that were doubtful and created reexaminations. Predictions were made that it was going to fall through, it wasn't worth the money. Somebody had to sit at this table and have faith in it and vote aye. That money was not withdrawn and they finished this project. Now I believe in this short 10 years, it has reached the total level of prospective tonnage. Is that right?

General MORRIS. Yes sir; and that is just for navigation. On the other features, like hydropower and recreation, it is also doing better than expected.

Senator STENNIS. Going back, though, to my broad question, throughout this Nation, these projects generally have held up to your calculation. When I say "your," I mean the Corps of Engineers.

General MORRIS. No question about that, sir.

Senator STENNIS. Pardon me?

General MORRIS. Absolutely no question about that.

Senator STENNIS. And the record shows that.

General MORRIS. Yes. I can give you a good example. In the Depression we built projects as make-work projects. There are several in Oklahoma I am familiar with that under any economic analysis would not be built, but President Roosevelt, to put people back to work, just actually built. Even those projects have paid for themselves.

Senator STENNIS. That is a better illustration than I knew we had.

## UNWISE TO ABANDON THE PROJECT

Now on top of this, Mr. Chairman, we have lived to see this energy crisis come in. We have struggled with legislation and have found out how difficult it is to find a remedy. But we know that transportation is one of those big problems and big costs.

For us to halfway build a project and then turn around and just abandon it, make it a junk heap, rather than spend the rest of the 50 cents on the dollar, half the cost, is just unthinkable to me in this critical time in our economic history because of this energy problem and what we are going to do about it. We have to stay on the constructive side for one thing. This proposal to stop this project, I submit, is totally destructive and puts us deeper in the well than we are now.

I ask unanimous consent for my remarks to go in the record.

Senator JOHNSTON. Without objection, it will be made part of the record.

[The statement follows:]

## STATEMENT OF SENATOR JOHN C. STENNIS

Mr. Chairman:

As you are well aware, the last decade was marked by dramatic economic changes. The very structure of our society was shook to its foundation. The economic tremors have been felt most keenly in the Congress as we have been forced to turn our attention to the wrenching problems induced by rising prices and shortages of petroleum supply.

The nature of our nation's excessive dependence on imported oil is very clear to us all. We are all now aware that we must turn to the development of energy resources within our own borders. Certainly, Mr. Chairman, your leadership in the energy field has been monumental. I am confident that the work of this Congress will make a positive difference in this nation's future growth and prosperity.

This country has been especially blessed with great deposits of coal and oil shale which will provide hundreds of years of energy. This great abundance of energy in the ground can be mined today. However, a most important problem which must be solved before we can use this resource is to provide adequate transportation to haul it to where it is needed.

I believe that our national transportation system will have to greatly expand to achieve the production and transportation levels required to replace the petroleum energy source. Our existing facilities will be greatly stressed by the needs of this increased commerce brought about by more bulky coal and oil shale shipments.

Already the precursors of serious transportation bottlenecks have been highlighted by rail car shortages and long lines of ships off our shores which are waiting to load.

As the Chairman knows, I am deeply concerned that the Senate has not approved a water projects bill in over four years. The lack of such legislation since 1976 has resulted in a large backlog of navigation, waterway,

and port development projects which are urgently needed for a smooth transition to coal, oil shale, and synthetic fuels.

The ability to transport bulk cargo from the agricultural, industrial and energy resource centers is essential for our future economic sustenance and growth.

It is extremely urgent that we continue the development of our national transport system. For more than 30 years, I have served on Senate committees having jurisdiction of water resources, first as a member of the Authorizing Committee and more recently as a member and for several years as Chairman of the Appropriations Subcommittee on Energy and Water Resources. During this period I had the opportunity to gain firsthand knowledge of the tremendous potential and importance of our water resources and have tried to help in the growth and development of our water resources assets throughout the nation. I am proud that I could share in the responsibility for many of the great national water projects that made possible the nation's continued economic progress. These projects have extended navigation to areas which were economically stagnant but are now contributing to the betterment of our entire economy.

I am especially proud to have been part of the Tennessee-Tombigbee Waterway project, which now stands out as a timely and urgently needed link to our nation's energy and economic future.

This waterway, which connects the heart of the huge eastern coal basin and great agricultural lands of the middle Atlantic to the Gulf of Mexico will shorten the transport distance for coal, grain, and other bulk cargo to the Gulf of Mexico. It has made available the inherent advantages of highly efficient water barges over a shorter route to the ocean. The great economic benefit is evident. The savings in energy and transportation costs, and induced economic growth will repay this investment many times over. These great savings will result in lower transportation costs which ultimately will be passed

along to the consumer of the products being shipped. Shippers, on the other hand, will find their products more competitive.

The farsighted decision by Congress and the Executive Branch to build this waterway was made over 13 years ago. We are now 9 years into actual construction. With the completion date very near, coal and other commodities can soon be moved over this route at a cost less than ever before.

The urgency of achieving national energy independence confirms the foresight of many planners which include four Presidents and many Congresses who recognized the strategic and economic importance of this shorter route.

I urge the completion of this waterway as a top priority national project. I am hopeful that this hearing today will confirm the great value of this project to the nation and prove out the worth of the investment.

#### JUDICIAL DECISION ON THE 1909 AUTHORITY

Senator JOHNSTON. Senator Young?

Senator YOUNG. Just one question.

You said in one case Judge Richey ruled against you. Did that ruling take away some of your authority?

General MORRIS. Well, sir, I have to presume we didn't have it in the first place. We had interpreted the law that we had authority to compute the tonnage differently than the judge thought. That difference allowed us to make the project somewhat larger.

Senator YOUNG. Has Congress restored the authority?

General MORRIS. No. What we did, as soon as that decision came down, we reviewed every project we were working on, and on those projects where we had assumed authority to make them larger than current traffic would support, we went back to the Congress for authority on specific projects. The Congress has never changed the basic law.

That is what happened in the Demopolis to Mobile part of this particular situation. We had to come back to Congress and say our interpretation was wrong. We need additional authority to do these things.

Senator YOUNG. Were there any additional costs of the project as a result of that delay?

General MORRIS. Yes, sir; there would be. Locks and dam 26 is the best example. That project has doubled what it would have cost had we gone ahead when we first got approval.

Senator YOUNG. The reason why I mentioned that, we have a project involving Judge Richey in court. I took note on the record I find he

handled environmental cases. He only ruled against it once. Environmental cases are not good.

General MORRIS. This one is behind us, sir.

#### OHIO RIVER BANK EROSION

Senator JOHNSTON. By the way, one of my friends in the media handed me this—in the past few days the media has reported that the Government, I guess the Corps, has admitted during litigation on the Ohio River system that modernization was a mistake, that a mistake was made in raising the dams and that damages, including erosion of the riverbanks and the systems, were thereby caused by the modernization work.

What can you tell the committee about this?

General MORRIS. It is another one of these things where people just are not reading what happened accurately. The Department of Justice lawyer admitted that he made a mistake in presenting his position on an issue. This thing about the dams, the Corps admitting a mistake, was never a factor.

The fact of the matter is, the man from the Department of Justice called me on the phone and said, "I apologize for the article in the New York Times. All I merely did was admit in presenting evidence the other day I got this backward."

It has nothing to do with the case or the facts of it. Yet, if you read the article, you get the idea that everybody admitted the damage.

Senator JOHNSTON. The mistake was an administrative mistake and not a mistake of the project.

General MORRIS. I will let Mr. Lankhorst answer that.

Mr. LANKHORST. It was primarily a typographical error. It was they "admitted" instead of "denied." Yesterday an amended complaint was filed where it was typed in "denied." It was as simple and basic as that. That was reflected in the article. How they proceed with these other conclusions is utterly incomprehensible to me because it was described as a typographical error.

General MORRIS. The article was OK, but the headline was pretty damaging.

#### FURTHER QUESTIONS

Senator JOHNSTON. Senator Stennis, do you want to come back after the vote?

Senator STENNIS. That is all right. Mr. Chairman, you have permission here to ask questions in writing, and I have given you my statement. I do think the General has developed a lot of these matters clearly that you were interested in, these charges of deception and so forth. He has answered all of that so completely, totally, that I am satisfied with all of that. So I would pass up on that.

Senator JOHNSTON. To me, honestly, it is so clear. Again I think reasonable minds could differ, if we went back to the start—although, considering the record of the Corps, I think it is going to be a good investment even considering it from the start. But we are a billion dollars into this project with only \$700 million left to go, with benefits not

decreasing, but benefits increasing, because of the need to export this coal.

I cannot understand honestly how a fair-minded person could come to any other conclusion. I invite any questions to our committee or to the Corps, and we will have a more expanded record which I will invite people to look at. But please, I hope we lay to rest some of these statements which are just not true, like this is a \$3 billion project and that the Corps hoodwinked the country. It is just not true.

Right now we had better go vote or we will miss it. Please respond as soon as possible to the questions submitted, and you may provide such other information as a part of your testimony and in response to these allegations and questions as you wish.

Thank you very much, General Morris.

#### CORPS INITIATED NECESSARY STUDIES IN 1975

General MORRIS. I wanted to make a point. I guess I haven't got time to do that.

Senator STENNIS. May he finish a point?

General MORRIS. I just wanted to say we have been charged with holding back cost data from the Congress. That is absolutely incorrect. I can prove it by the calendar. We have been charged with misusing authority and we have been charged on the benefit-cost ratio.

The point I want to make is, I personally asked for each of those three issues—the benefit-cost, the authority, and the procedures—to be investigated. I called for those investigations of ourselves to be sure that we had a project which could stand the test that the public would place on it.

The thing that is a little bit difficult to handle is the fact that out of those very investigations which we called for to insure we were doing this thing right have come the bases for the charges that we did things wrong. You could almost say it doesn't pay to be good. Why ask for all of this if it is going to get you in trouble.

I just want to let you know we should have asked for it, we did, and we would again, and we would go through all of this if we had to. But those investigations which have caused you and all of us so many questions and problems, we asked for them.

#### CONCLUSION OF HEARING

Senator JOHNSTON. Thank you very much.

[Whereupon, at 11:37 a.m. Thursday, August 21, the hearing was concluded and the subcommittee was recessed to reconvene at the call of the Chair.]

10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

