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REPORT BY THE
Comptroller General
OF THE UNITED STATES



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Congress Needs Reliable Cost Estimates And Established Priorities For Allocating Funds For Water Resources Projects

Cost estimates presented to the Congress by the Bureau of Reclamation and the Corps of Engineers to authorize construction of water resources projects are based on incomplete and conceptual design data. Better cost estimates are developed later and should be used to authorize construction.

The Bureau and the Corps together had over 400 projects scheduled to be constructed in or after fiscal year 1978. That many projects cannot be constructed efficiently at the authorized funding level. The projects should be placed in order of priority, so that those with the highest priority can be built at the most economic and efficient level.



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PSAD-79-13
JANUARY 29, 1979



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-167941

The Honorable Edmund S. Muskie, Chairman, and
The Honorable Henry Bellmon, Ranking
Minority Member
Committee on the Budget
United States Senate

The Bureau of Reclamation and the Corps of Engineers need to improve cost estimates, establish priorities for allocating funds, and request full funding for their water resources construction projects. Cost estimates are based on incomplete data, are not always based on current prices, and do not include future inflation through project completion. In addition, neither the Corps nor the Bureau sets priorities on its projects for use by the Congress in allocating funds. Delays and backlogs causing cost growth on major programs could be reduced if the Bureau and Corps set priorities and requested full funding of their projects.

Our report is in response to your August 5, 1977, letter, requesting that we study certain aspects of water resources programs and present a series of reports on the results of the study. It addresses two items--estimated costs and efficiency of project construction.

We examined records and spoke with representatives of the Bureau of Reclamation and the Corps of Engineers in Washington, D.C., and in the field. We also examined the files and administration of selected projects. We received oral comments from the Bureau of Reclamation and written comments from the Corps of Engineers and the Office of Management and Budget (OMB). These comments are included in this report where appropriate and in appendixes I and II.

IMPROVEMENT NEEDED IN
COST ESTIMATES

Cost estimates the Bureau and Corps present to the Congress for water resources construction authorization are not based

on reliable information. They are based on preliminary designs established early in the planning cycle and preliminary cost estimates updated by indexing, rather than basing them on current prices. Although the estimates are updated to reflect inflation to the date of the estimate, they do not include future inflation through completion of the project. As a result, the Bureau and Corps projects are generally experiencing large cost growth over the cost estimates presented to the Congress at the time the projects were authorized for construction.

Construction authorization should be based on more reliable cost and design data

Both the Bureau and the Corps provide incomplete, conceptual design data for use by the Congress in authorizing large amounts of funding to construct major water resources projects. For example, after developing a general cost-benefit analysis to solve a particular water resource problem, the Bureau and Corps obtain authorization from the Congress before studying the project further. The Bureau next develops a feasibility study and the Corps, a phase I general design study, both containing preliminary designs and estimated costs. Then the Bureau and Corps request authorization for construction from the Congress. Although the Bureau finally develops a definite plan report and the Corps, a phase II general design study which establishes relatively firm designs, capacities, and locations of various project structures, they are not used by the Congress for construction authorization.

Construction authorization should be based on the firm designs and cost estimates that are available in the Bureau's definite plan report and the Corps' phase II general design memorandum. This will give the Congress better data on which to base construction authorizations. Neither the Corps' phase I nor the Bureau's feasibility report provides a firm basis for a decision to authorize construction of a project. They may be ideal, however, for authorizing advanced engineering and design, with construction being authorized later based on the phase II general design memorandum or definite plan report.

If the Congress believes that additional control over water resources projects is warranted, as we suggested in a previous report, 1/ the authorization committee should adopt

1/CED-78-123, July 11, 1978.

an alternative approach for authorizing Bureau and Corps water resources projects. This would include: (1) an initial authorization for planning and general design, (2) a second authorization before construction, and (3) an authorization ceiling included in the construction authorization. The second authorization before construction should be based on the firmer costs and designs in the Bureau's definite plan report and the Corps' phase II general design memorandum. This alternative may delay construction, however, while the agencies develop firmer designs and the projects go through the authorization-appropriation process.

Agency comments

Although the Corps did not comment on this issue, the Bureau and OMB generally agree, with reservations, that the construction authorization should be based on firmer data. The Bureau does not want to forgo a congressional authorization for advanced engineering and design work based on its feasibility study. It is generally considering three authorizations for each project: (1) authorization to perform a feasibility study based on the appraisal report, (2) authorization to perform advanced engineering and design work based on the feasibility report, and (3) authorization for construction based on the definite plan report.

OMB is concerned with the large commitment of resources that may be necessary to develop the phase II general design memoranda or the definite plan reports on projects that may never go to construction. Consequently, OMB suggests the construction authorization be based on phase I data.

We recognize that basing the construction authorization on phase II data will require more resources prior to the construction authorization. For those projects which are approved, however, there are no additional resources required because this data would still have to be developed if phase I review suggested continued effort. For those projects that are not authorized for construction, this additional preconstruction work could be considered as wasted.

We believe, however, the phase II data, even though it is costly to obtain, is not wasted. It provides the decision makers and the Congress firmer data on which to base their decisions. We expect that some projects will not be authorized for construction because of the firmer data. Also, the elimination of these projects will save many times the funds that were spent on phase II studies for projects that never go to construction.

Cost estimates for appropriations
should be based on current prices

The cost estimates the Corps gives to the Congress at annual appropriation hearings after construction authorization are not based on current prices. Instead the Corps applies an engineering index to the previous cost estimates. In the Corps' July 29, 1977, Engineering Circular 1110-2-179 however, district and division engineers are directed to insure that cost estimates reflect the best and most recent information available and, to the extent practicable, update project estimates on the basis of current applicable unit prices. In addition, the engineers should limit cost indexes in annual updates of estimates to only those cases in which more specific information, such as current unit prices, is not available. We believe the Corps should provide the Congress with a realistic estimate of completed project costs at the time of construction authorization based on current prices.

Agency comments

Although the Bureau reestimates project costs using current prices about every 4 or 5 years, the Corps believes that the sheer work volume and time pressure would negate the small added value of reestimating about 500 active projects each year and that the difference in estimates would be very small over 3 or 4 years. OMB believes that using manpower in continuously reestimating project cost is not a viable solution to provide better cost estimates and suggests that better price indexes should be developed and applied. We believe that until these better price indexes are developed, however, cost estimates should be compared to current prices periodically, especially for construction authorization.

Cost estimates should
provide for future inflation

Cost estimates are not only based on incomplete data and noncurrent prices, but also do not include provision for future inflation. Although the Bureau can increase the authorized ceiling of the projects each year to account for increased costs, including inflation, the Corps does not have the benefit of routinely increasing authorized costs because of inflation. OMB Circular A-11 requires including anticipated future price increases for certain fully funded major procurement of construction projects. However, future price increases are only presented to the Congress for those new projects for which full funding is requested. Accordingly,

the Bureau and the Corps presented anticipated future price increases to the Congress for only 18 new construction starts for fiscal year 1979. They did not present future inflation increases for those active projects authorized for construction previously.

In a previous report 1/ we pointed out that a uniform OMB policy for treating inflation in program estimates either did not exist or was circumvented and that the use of uniform inflation criteria would enable the Congress to make comparisons of program budgets.

To this end, the Bureau and Corps should present a separate cost estimate for all active projects in the construction stage, which includes a provision for inflation through project completion.

Agency comments

Corps and Bureau officials generally agreed with the recommendation that OMB should develop policy and procedures which would apply inflation uniformly and consistently to annual program and budget estimates.

Although OMB does not believe that a cost estimate including projection of inflation will raise the quality of debate at the time of project authorization, it has required, since June 1977, that anticipated future price increases be included in budget requests for certain multiyear, fully funded major procurement or construction programs.

PRIORITIES AND FULL FUNDING NEEDED TO REDUCE BACKLOGS AND DELAYS

Neither the Corps nor the Bureau sets priorities on its projects for use by the Congress in allocating funds, nor do they request full funding for all of their projects. Inadequate funding may not have been the cause of recent delays, but in the past, projects were delayed because they were funded below the optimum level, thereby stretching out the projects and adding to the backlog. Because construction is stretched out over such a long period after a project is authorized, inflation contributes greatly to cost growth. As of September 30, 1978, major Corps projects, with total estimated Federal costs of \$27.5 billion, were experiencing a

1/PSAD-78-8, Mar. 20, 1978.

cost growth of \$15.5 billion; and major Bureau projects, with total costs of \$13.8 billion, were experiencing a cost growth of \$6.7 billion. Projects should be ranked with those of the highest priority fully funded and built at the most efficient rate and those of the lowest priority deferred or not funded.

Delays and backlogs need to be reduced

Delays occur in Bureau and Corps projects for several reasons and can hold up a project indefinitely. Less than optimum or maximum funding available, loss of local support for a project, and lawsuits over environmental impact statements can cause delays. The Corps' Larose project was delayed over 10 years, due primarily to refinement of levee settlement rates and planning delays before the phase II general design memorandum could be completed. Similarly, the Corps' New Malones project has also been delayed by more than 12 years due to insufficient funding, a court injunction stopping construction, and an environmental suit.

Delays in completing projects cause backlogs and adversely affect the efficiency and economy of project construction since inflation greatly contributes to cost growth on construction projects. Both the Corps and Bureau have large backlogs of unfinished construction projects which cannot be constructed efficiently at the authorized funding level. In 1977 the Corps had 326 unfinished construction projects that had received some construction funding, and they estimated \$9.1 billion would be required to complete them. The Bureau had 138 unfinished projects requiring \$16 billion to complete. The problems causing these delays should therefore be resolved before authorizing construction of new projects or reauthorizing old projects.

Full funding needed

The Corps and the Bureau develop their annual budgets at various funding levels, from the minimum needed to complete outstanding contracts or planning for a specific part of the project, to the optimum or maximum level the agency can use to efficiently plan and construct a project. The funding requests are made in accordance with the Zero Base Budget and may be reduced during subsequent reviews by agency headquarters, OMB, or the Congress. Corps officials recommend that projects be funded below the optimum level to insure that most projects receive some funds. According to Bureau officials, however, funding a project at less than the optimum level causes the project to be stretched out longer than necessary to construct it. This causes delays and results in increased costs due to inflation.

As stated in our report to the Chairman of the House Budget Process Task Force, 1/ full funding permits an agency to contract for the full cost of a project knowing that it has full obligational authority available to complete the project and that budget cuts or funding delays will not hold up or stretch out the project. Full funding, however, could reduce the ability of the Congress to exercise shortrun control over expenditures by eliminating the need for annual appropriations.

Agency comments

The Executive Branch supports the full funding concept. According to OMB Circular A-11, requests for major procurement and construction programs will provide for full funding of the entire project costs. In addition, the President, in submitting the 1979 budget to the Congress, provided full funding estimates and future inflation estimates for those Bureau and Corps projects recommended for construction start in fiscal year 1979.

The President did not provide for full funding of those projects previously authorized for construction. Although OMB supports full funding of projects with new construction starts, it believes full funding of ongoing projects would provide little benefit. OMB also points out that in recent years unspent balances of funds have been high and increasing. The Corps adds that in recent years it is rare that funding has been the cause of project delays and attributes this to its authority to transfer funds from other projects.

In the past, water resources projects were often delayed due to funding below the optimum level needed to efficiently plan and construct them. In the Corps' South Pacific Division, the Warm Springs project was funded below the optimum level for 10 of the 14 years since construction funds were first received. This resulted in delays of about 6-1/2 years. On the Corps' New Malones project, 3 of the 12 years of delay were attributed to insufficient funding. The Alamada Creek project was also delayed 3-1/2 years since 1962 because of limited funds.

To reduce delays and backlogs, however, we believe the Corps and Bureau should request full funding on their highest priority active projects not yet completed, but which had received previous construction appropriations.

1/FGMSD-78-18, Feb. 23, 1978.

Priorities are needed

Although both the Bureau and the Corps rank projects in preparing their budget request, they do not present this priority listing to the Congress to assist it in funding the high priority projects at the optimum or maximum level. The Bureau establishes priorities for project development within OMB budget limitations, showing what can be achieved with several levels of funding: (1) minimum level funding to support projects under construction at the optimum construction level, (2) minimum funding plus funds for planning new projects, or (3) maximum funding which also includes funds for new construction starts. The Corps' New Orleans and Galveston Districts, however, use a system that gives priority to projects nearing completion.

Because there are too many projects for the available funding to construct each project at its optimum rate, the Corps and Bureau need to set priorities so that the highest priority projects can be constructed efficiently, while those with lowest priority be deferred or perhaps left unfunded.

In his water policy message of June 6, 1978, the President established criteria for setting priorities among the Bureau's and Corps' water projects eligible for funding or authorization. Generally, projects with higher benefit-cost ratios and fewer adverse environmental consequences will be given priority within the limits of available funds.

Agency comments

OMB also supports setting priorities for project construction. The Corps believes that its screening process insures that only the best projects and those ready for construction are recommended to the Administration for new construction starts.

We recognize, however, that the Congress may have different criteria than the Administration for selecting new starts. We think the Administration is moving in the right direction in setting priorities and requesting full funding on new construction starts. For the active projects not yet completed, but which had received a previous construction appropriation, however, the Bureau and Corps should set priorities and request full funding for those with the highest priority.

Recommendations

The Bureau and Corps need to improve cost estimates, establish priorities, and request full funding for their highest priority water resources projects.

Consequently, the Secretary of the Army should direct the Corps of Engineers to:

- Update each project's cost estimate prior to construction authorization and periodically thereafter, by using current prices until better price indexes are developed.

The Secretary of the Army should direct the Corps of Engineers and the Secretary of the Interior should direct the Bureau of Reclamation to:

- Provide the Congress with a priority listing of projects when requesting appropriations for a large number of projects and request full funding for those approved.

The Director of the Office of Management and Budget should:

- Require the Corps and the Bureau to identify separately for the Congress the effect of inflation on future project costs of all active projects in the construction stage.

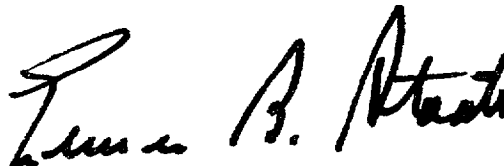
Recommendations to the Congress

The Congress should base the construction authorization for water resources projects on better cost estimates derived from firmer designs. Such cost estimates and designs are developed later in the planning process, but are available before construction begins. They are contained in the Bureau's definite plan reports and the Corps' phase II general design memoranda.

The Congress should also reduce delays to projects caused by lack of funding during the appropriation process, by fully funding construction of high priority projects. Although this could reduce the ability of the Congress to exercise annual control over expenditures, full funding of construction projects would reduce delays during construction.

B-167941

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 14 days from the date on the cover. At that time, we will send copies to the appropriate Senate and House Committees, the Secretary of the Interior, the Secretary of the Army, and the Director of the Office of Management and Budget.

A handwritten signature in black ink, reading "Louis B. Stacks". The signature is written in a cursive style with a large, prominent initial "L".

Comptroller General
of the United States



EXECUTIVE OFFICE OF THE PRESIDENT
 OFFICE OF MANAGEMENT AND BUDGET
 WASHINGTON, D.C. 20503

AUG 31 1978

Mr. Victor L. Lowe
 U.S. General Accounting Office
 441 G Street, N.W.
 Washington, D.C. 20548

Dear Mr. Lowe:

This is in reply to your letter of July 27, 1978, in which you asked for our comments on the draft report entitled "Reliable Cost Estimates and Priorities Needed for Water Resources Projects" which was prepared by your office.

We will confine our comments to the conclusions of the report on pages 25 and 26, as follows:

[See GAO note, p. 3.]

Report

"We believe that construction authorization could be based on the firmer data that is available in the Bureau's Definite Plan Report and the Corps Phase II General Design Memorandum."

Comment

We concur that authorization for construction should be based upon firmer data than that usually contained in survey reports. However, waiting until completion of the Phase II General Design Memorandum or the Definite Plan Report might defer the construction decision too long. Carrying all projects through the entire pre-construction planning process could require a large commitment of resources on many projects that may never go to construction. Authorization based on a Phase I report might be an appropriate compromise.

Report

"The cost estimates presented to Congress for authorization and funding were not based on current prices, instead a construction index was applied to previous cost estimates"

Comment

We concur that good cost estimates should be available for author-

ization and funding decisions. The problem should not be addressed, however, by using manpower unnecessarily in continuously reestimating project costs, since there can be several years between the time a report is prepared and ultimately submitted to the Congress. Instead, good price indices should be developed and applied as necessary. We believe the ENR and other commonly used indices are deficient for these purposes.

Report

"... in addition to a cost estimate based upon current prices which includes inflation to the date of the estimate, a separate cost estimate should be presented ... which includes inflation through project completion."

Comment

With respect to estimates of project costs at time of authorization, we believe that an estimate in current prices is sufficient. This indicates the demand for the real resources that will be needed to build a project. Including projections of inflation at this stage will not raise the quality of the debate surrounding project authorization and will, we believe, create confusion through the introduction of a variable and inconsistent scale of value (dollars of different years) for inter-project comparisons.

For example, two projects that cost the same in real resources authorized at the same time could ultimately cost vastly different amounts in dollars because of scheduling differences, even at optimum rates, or differences in starting dates for construction.

Report

"... there are too many projects for the available funding to construct each project at its optimum rate ... projects should be prioritized and full funding requested...."

Comment


One third to one half of the Corps' projects and almost all BuRec projects slip each year for non-funding reasons. As a result, in recent years unspent balances of funds (obligated and unobligated) have been high and increasing. Since construction agencies have considerable latitude to reprogram funds from projects delayed for non-funding reasons to projects needing funds, funding has been a minor contributory factor in delaying the completion of projects. Fully funding ongoing projects would therefore provide little real benefit in terms of speeding construction.

We, of course, strongly support full funding of new projects with allowances for inflation, but here too we expect little improvement in the rate of construction progress if implemented.

With respect to prioritizing projects, OMB has worked with the agencies for several years attempting to prioritize project construction. Schedules have been planned taking into account project costs, benefits, outputs, and percent of completion. The President's budget proposal for FY 1979 for these agencies reflected such a prioritization.

We hope these comments will be of help to you.

Sincerely,


W. Bowman Cutter *for*
Executive Associate Director
for Budget

GAO note: Page references in this appendix refer to our draft report and may not correspond to the pages of this final report.



DEPARTMENT OF THE ARMY
OFFICE OF THE UNDER SECRETARY
WASHINGTON, D.C. 20310

8 SEP 1978

Mr. Henry Eschwege
Director, Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

This is in reply to your letter to the Secretary of Defense regarding your draft report of 27 July 1978 on "Reliable Cost Estimates and Priorities Needed for Water Resources Projects" (OSD Case #4965) GAO Code 951351.

The assumption that OMB does not permit allowances for future inflation in project cost estimates, which is a basic assumption throughout the report, is no longer accurate. The June 1977 issue of OMB Circular A-11 called for full funding of major construction projects. In implementing this guidance, OMB directed that all new construction projects be fully funded, including an allowance for inflation. On 9 June 1978, President Carter submitted a budget amendment for 17 new construction projects for the U.S. Army Corps of Engineers. The budget report for these projects totaled \$519,965,000 on a fully funded basis, including inflation. Furthermore, guidance from OMB staff is that new Advance Engineering and Design projects will not be fully funded. The rationale for this decision, which we fully support, is that there is no commitment to go to construction. Furthermore, the full funding request should be based on more detailed design than is available at the start of AE&D.

The report recommends prioritization of construction projects in Chapter 3. We believe that the tight screening process we go through each year insures that only the best projects and those ready for construction are recommended to the Administration as new construction starts. However, the criteria that the Corps and the Secretary of the Army have developed for selecting new starts may be different from those of the Congress. Thus, we believe it more prudent to:

- a. Recommend to OMB only those new construction starts which meet our eligibility and selection criteria, leaving the final selection of budgeted new construction starts to the Administration.



b. Provide to the Appropriations Committees our Five Year New Investment Program, which identifies those projects available for construction within a defined five year period.

c. Provide Congressional interests and others, upon request, our capabilities to undertake new projects.

[See GAO note 1, p. 7.]

It is true that when we submit our budget each year, it may include projects budgeted below an amount required to maintain the scheduled completion date. However, in recent years, it is rare that funding has been the cause of project delays. The following are principal reasons for minimizing funding delays:

a. Liberal use of the Corps 15 percent transfer authority.

b. A significant number of committee approvals of transfers over the Chief of Engineers' 15 percent transfer authority.

We would agree that firm, advance knowledge of the availability of the full amount of construction funds would help to insure that construction contracts are adequately funded; however, it would not impact the other major reasons for delays such as lack of local cooperation, design delays, etc.

Additional comments correcting errors in the report are inclosed.

We appreciate the opportunity to review and comment on the draft report.

Sincerely,



Michael Blumenfeld
Deputy Under Secretary

1 Inclosure
As stated

GAO DRAFT REPORT, "RELIABLE
COST ESTIMATES AND PRIORITIES NEEDED
FOR WATER RESOURCES"

[See GAO note 1, p. 7.]

Pages 9 & 10 - Corps Estimates for Appropriations are not
Based on Current Prices [See GAO note 2, p. 7.]

a. Usually the ENR construction cost index is regionalized by our Division offices to reflect price level in the geographical area of the Division. The statement implying that all cost not derived from contracts were updated annually using only the ENR index is not accurate. During any year when specific or feature design memos are written, the detailed estimates in these reports are used in lieu of updating by indices. Usually requests for construction funds are based on these feature design memo estimates.

b. The circular referred to in the last paragraph on page 9 also states that "cost estimates reflect the best and most recent information which is available."

c. The use of current unit prices for updating all cost estimates would be impracticable. With almost 500 active projects to update each year, the sheer volume of work involved and the pressure of time would negate the small added value of re-estimating. The difference in validity of an estimate based on the use of cost indices and one based on current unit prices would be very small over a time period of 3 or 4 years.

[See GAO note 1, p. 7.]

[See GAO note 1, below.]

Page 17 - Backlogs and Optimum Funding, [See GAO note 2, below.]

[See GAO note 1, below.]

Funding requests are made in accordance with the Zero Base Budget process and the "recommended" or "target" level of funding is that level which will provide for no delay in project schedules.

- GAO Notes:
1. A portion of this letter has been deleted because it is no longer relevant to the matters discussed in this report.
 2. Page references in this appendix refer to our draft report and may not correspond to the pages of this final report.

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United States Senate

COMMITTEE ON THE BUDGET

WASHINGTON, D.C. 20510

August 5, 1977

JOHN T. MC EVOY, STAFF DIRECTOR
 ROBERT S. BOYD, MINORITY STAFF DIRECTOR

The Honorable Elmer B. Staats
 Comptroller General
 General Accounting Office
 411 G. Street N.W.
 Washington, D.C. 20548

Dear Elmer:

We are requesting that a study of certain aspects of water resources programs be conducted by your office for the Senate Budget Committee. This study will center on those aspects of water resources programs that affect the authorization of individual projects. Results of the study should be presented to the Committee in a series of separate reports.

Water is a limited resource. Where it is scarce, development of any kind is limited drastically. Careful allocation and wise, conservative use of our remaining water resources are becoming more and more critical as our population expands and our supplies of fresh water are depleted.

Moreover, our water resources programs bear closer scrutiny from an economic standpoint. The Administration recently has raised questions concerning the documentation of need, the accuracy of benefit-cost ratio analyses, and the enormous cost overruns that have occurred in some water projects. Congress and the Administration agree on the need for a water resources program which promotes prudent fiscal policy and careful resource planning.

To enable Congress to set national spending priorities and accordingly to direct and control water resources programs, all pertinent information pertaining to water projects authorizations must be accurately presented to the committees involved. To provide a complete picture, alternatives to projects and their associated costs must be delineated. Also, Congress sorely needs better information on costs at the time of project authorization and during construction for predictive purposes. Committees should be notified as estimated costs change during construction, so that projects can be reevaluated on a regular basis.

We wish to see the GAO study directed to four main areas elaborated upon here:

1. Benefit-cost ratio analysis

(a) A procedure should be outlined whereby the benefits and costs of alternatives to individual projects are identified for authorizing committees. These data would make possible rigorous comparisons with the standard benefit-cost ratio analyses on water projects and provide for well-informed decisions as to the need for particular projects.

(b) The general methodology of benefit-cost ratio analysis as carried out by the Corps of Engineers and the Bureau of Reclamation should be investigated. Particular emphasis should be directed to identification of questionable benefits such as area redevelopment, enhancement of project values, recreation values, and fish and wildlife enhancement. These types of benefits deserve special consideration, for by pushing benefit-cost ratios above unity, they can make projects appear economically sound. As examples, projects in varying stages of completion should be examined to find if the validity of benefits claimed at project authorization can be reaffirmed during and after construction.

(c) The use of probability analysis in the calculation of benefits for water resources projects should be reviewed. For example, for a flood control project, is the probability of the flood occurring during the life of the project used to calculate benefits or is the flood assumed to be a certainty? Similarly, are probabilities assigned to such variables as local population growth projections? Data on the effects of probability analysis on benefit-cost ratios and determination of the most realistic method of calculating the value of benefits should result.

2. Cost projections

(a) The accuracy of the estimated costs in authorization bills for water resources projects should be evaluated. Alternative methods of cost estimation should be suggested that would permit increased accuracy at the time of project authorization. We recognize that GAO has investigated cost indexing during project construction by the Bureau of Reclamation. Similar analyses should be done for the Corps of Engineers. Suggested means of monitoring intra-agency cost estimation and cost indexing should be made.

(b) Alternative procedures for funding projects leading to closer regulation by authorizing committees should be determined. The effectiveness of cost ceilings on Bureau of Reclamation projects should be evaluated, and recommendations concerning similar treatment of Corps of Engineers projects should be made. The impact of requiring re-authorization of Corps projects when the estimated cost is exceeded should be included. Regulation of spendout rates by authorizing projects in steps (as in the Phase I stage of Corps projects) should be studied.

(c) A determination of the total number of authorized projects and the estimated remaining cost of these should be made. The proportion of these for which funds have not been appropriated, current methods of project deauthorization, and new suggestions for deauthorization should be determined.

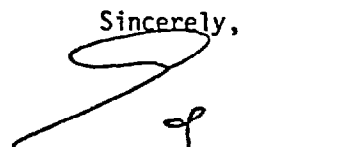
3. Efficiency of project construction. The GAO should investigate the rates at which projects should be constructed such that the resources of a particular agency are best utilized and the real costs are kept at a minimum.

4. Individual project authorization. The study should include an analysis of general options for continuing authorizations of individual water resources projects. It may be that benefits to the nation can be maximized through authorization of general water resources development plans rather than through individual project authorizations. Alternative plans should be identified and their merits reviewed.

All sections of this study should be completed and transmitted to the Budget Committee by October 1, 1978. We have chosen this rather lengthy time frame for two reasons. First, a very detailed, in-depth analysis of the more complicated parts of this study should be possible in this time period. Second, it will allow the GAO to incorporate the recommendations and revisions resulting from President Carter's review of national water resources policy (to be completed November 1) in the study, and to evaluate these formally. We believe, however, that some parts of the study could be completed well before the final deadline. Therefore, we are requesting that your staff meet with Brenda Tremper of the Senate Budget Committee staff to schedule completion of draft and final versions of a series of separate reports on these issues.

With best wishes, we are


Henry Bellmon

Sincerely,

Edmund S. Muskie

OTHER GAO REPORTS IN RESPONSE
TO THIS CONGRESSIONAL REQUEST

A letter report to you dated January 30, 1978 (CED-78-41).

"Improved Formulation and Presentation of Water Resources Project Alternatives Provide a Basis for Better Management Decisions," February 1, 1978 (CED-78-42).

"Better Analysis of Uncertainty Needed for Water Resources Projects," June 2, 1978 (PAD-78-67).

"Improved Project Authorizations and Agency Practices Can Increase Congressional Control of Water Resources Projects," July 11, 1978 (CED-78-123).

"An Overview of Benefit-Cost Analysis for Water Resources Projects--Improvement Still Needed," August 7, 1978 (CED-78-127).

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