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A.O. 208-10)

UNITED STATES GOVERNMENT

Memorandum

U.S. DEPARTMENT OF COMMERCE
OFFICE OF THE SECRETARY

TO : Cecil Mackey

DATE: March 28, 1966

In reply refer to:

FROM : Byron Nupp

SUBJECT: Status of "Revised Corps of Engineers Standards for Transportation Projects"

This is a short summary of the situation with respect to the Corps of Engineers' current standards for transportation projects:

1. The Corps of Engineers in 1960 revised its regulations concerning the computation of benefit cost ratios. These regulations, among other things, provided that cost comparisons be used in place of rate comparisons in comparing water and land transportation.

2. In November of 1964, the Chief of Engineers sent a circular letter to the field offices dealing with the methods of estimating potential water traffic to take into account the impact of unit train rates by railroads. This letter had the effect of lowering the volume of potential water traffic and thereby reducing the likelihood of a favorable cost benefit ratio.

3. This letter was protested by waterway interests. They inaugurated an elaborate campaign to have the letter rescinded. A number of members of Congress assisted in this campaign. As evidenced by the letter from the Chief, dated May 14, 1965, which is appended, the Chief resisted this pressure.

4. The culmination of this campaign was a letter to the President signed by 16 senators and representatives. Apparently, this letter sought to have the President directly counteract the effect of the Chief's letter.

5. A reply to this letter was recently signed by the Director of the Bureau of the Budget on behalf of the President. The reply is said to have been a polite but firm refusal to interfere with the Chief's policy. The Bureau of the Budget and the Corps of Engineers collaborated in drafting this reply.

6. The exchange of correspondence between the 16 members of Congress and the Director of the Bureau of the Budget is not available. The Corps of Engineers would not release the letter without first consulting the Bureau of the Budget. Gordon Murray advised that the White House and the Bureau regard this correspondence as "very sensitive". He said that high level representations would have to be made in order to get copies of the letters. He suggested that this matter be brought up in the Task Force meeting.

Attachments

I Letter of 20 November 1964
From Chief of Engineers to Divisions and Districts
(Calling for use of projected rail rates in
estimating waterway traffic)

II Letter of 29 March 1965 (with "memorandum" attached)
From six waterway organizations to Chief of Engineers
(Calling for rescinding of 20 November 1964 instructions)

III Letter of 14 May 1965
From Chief of Engineers to W. J. Hull
(Reply to letter of 29 March 1965)

IV Excerpts from Engineering Manual 1120-2-101
(Instructions for the evaluation of waterway projects
issued in 1960 but not fully implemented because
acceptable values of economic costs for rail
transportation not available)

I

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20315

IN REPLY REFER TO

ENGCW-PE

20 November 1964

SUBJECT: Waterway Improvement Studies - Navigation Benefits

TO: Division Engineers, U. S. Army Engineer Divisions, except Mediterranean
District Engineers, U. S. Army Engineer Districts, except Gulf, Far East, and Okinawa
Resident Member, Board of Engineers for Rivers and Harbors

1. This letter revises and rescinds letter, ENGCW-PE, 28 October 1964, above subject. These instructions will be incorporated in an early revision of EM 1120-2-101.

2. The Chief of Engineers has decided that, pending the availability of acceptable data for consistent application of the cost basis in the evaluation of waterway transportation benefits, the procedures set forth herein will be applied immediately at all levels in evaluating the navigation benefits from the movement of traffic that would move by alternative means in the absence of the waterway improvement.

3. The traffic that would move over a considered waterway improvement will depend on the competitive rates by barge and by alternative means that would likely be in effect with the waterway improvement. Therefore, estimates of waterway traffic will be prepared on the basis of projected "water-compelled" rates with consideration of all data and factors that are likely to modify current rates to take account of the competitive situation anticipated with the waterway in being, and foreseeable technological developments applicable to the several transport media.

4. The benefits for the traffic (estimated as in 3 above) that would move over an improved waterway will be computed as the difference in the projected competitive rates or charges for the movement by the alternative means that would be used in the absence of the waterway and the projected rates and charges utilizing the waterway. In developing the projected rates or charges, consideration will be given to all pertinent data and factors including the competitive situation in the absence of the waterway, current rates, and foreseeable technological developments applicable to the several transport media. The benefits determined in this manner will be used in project justification and in the benefit-cost ratio.

5. In addition, reports will include an estimate of benefits obtained by applying unit savings based on the rates prevailing at the time of the study to the waterway traffic also estimated on the basis of rates prevailing at the time of the study.

6. Application of the procedure herein is subject to the general principle that the precision and refinement of estimates should not exceed the degree required in reaching a sound judgement as to project justification. Thus, if a considered navigation improvement is clearly not justified on the basis of current rates and a preliminary analysis of readily available data indicates that the gap between barge rates and the rates of competing carriers would likely decrease if the waterway were improved, this phase of the study should be terminated without further expenditure of time and funds in refining the rate data.

FOR THE CHIEF OF ENGINEERS:

JACKSON GRAHAM
Major General, USA
Director of Civil Works

II

March 29, 1965

Lt. Gen. Walter K. Wilson, Jr.
Chief of Engineers
Department of the Army
Washington, D. C. 20315

Dear General Wilson:

We, as officials of water resource development associations, representing community and regional interests broadly distributed throughout the country, wish to express our deep concern as to the import of the letter announcing new waterway improvement justification standards issued by your office under date of 20 November 1964.

We are convinced that the standards expressed constitute unsuitable measures of the public benefits normally to be expected from waterway improvement and that the application of these standards would distort the structure of transportation by water and other modes and would thus obstruct optimum industrial and community development.

We submit herewith a memorandum in which we analyze the new standards in some detail and seek to explain what we believe to be their defects. This memorandum does not, of course, imply any criticism of the long-established principle of conservatism for which benefit estimates of the Corps of Engineers are justly noted. Rather, our concern is with the danger of faulty construction and misapplication of these projections and with the outlook for a resulting misallocation of economic resources devoted to transportation development.

The salient points of the accompanying memorandum are as follows:

1. Paragraph 4 of the letter of 20 November 1964, may be construed to call for the use of prospective water-depressed charges of modes alternative to water in the determination of the unit benefit of a waterway improvement, a practice which would be invalid in principle and which would seriously understate the actual benefit.

2. The projection of waterborne traffic, as called for by Paragraph 3, on the basis of prospective water-depressed rates of modes alternative to water, would involve a series of conjectures of great uncertainty, providing measures too vague to be useful and tending to discredit the justification process.

3. The use of prospective water-depressed rates of alternative modes in making waterborne traffic projections would be valid in principle only if, in addition to the waterborne traffic, the freight continuing to move by the alternative mode under the depressed rates were to be included in the total traffic benefiting from waterway improvement.

4. We concur in the position taken by the subject letter that changes in technology by all competing modes should be anticipated to the extent practical. It is evident, of course, that the extended economic life of waterway projects makes balanced and reasonable prediction of such developmtnes extremely difficult. We recognize also that in many instances such technological improvements may occur whether or not the waterway is improved. We think it equally clear, however, that such technological improvements in modes alternative to water, as are directly consequent upon the waterway improvement, should be considered among the project benefits.

5. Prospective technological improvements in waterway transportation, which will foreseeably be associated with use of a waterway improvement, should clearly be taken into account in determination of the benefits of the improvement.

6. Water-depressed rates of alternative modes which fall below out-of-pocket costs induce an excessive allocation of the nation's resources to moving traffic under the depressed rates. To use this circumstance as a basis for delimiting the estimated benefits of a waterway improvement would compound the damage by inducing a deficient allocation of resources to waterborne transportation.

7. The delimitation of the affected traffic projections as provided by Paragraph 3 would have the incongruous effect of yielding a benefit-cost ratio more favorable to an improvement if it promised a benefit only through transportation by water and a less favorable ratio if it promised benefits both by water and by alternative modes.

8. The standards of Paragraph 3 and, by reasonable inference, of Paragraph 4 would subject the public interest objectives of the justification process to the control of private agencies, in that the private transportation firms of alternative modes, by their control of water-competitive rates, could largely determine the feasibility findings with respect to a proposed improvement.

These points are developed in more detail in the accompanying memorandum. Based upon these considerations, we respectfully request that the standards spelled out in the letter of 20 November 1964, be rescinded and that, pending

further study of this question, those standards and procedures in force prior to the issue of the letter be reinstated and continued. In view of the complexity and seriousness of these issues in relation to the overall development of the nation's water resources, we would welcome an opportunity to present this matter in more detail at a conference with you or members of your staff to be held at such time and place as you may designate.

Communication with respect to this matter should be addressed to William J. Hull, 1000 Connecticut Avenue #615, Washington, D. C. 20006.

Respectfully,

Francis J. Wilson

Col. Francis J. Wilson, USA (Ret)
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xc: Maj. Gen. Jackson Graham
Maj. Gen. William F. Cassidy

M E M O R A N D U M

SUBJECT: Waterway Improvement Studies -- Navigation Benefits, Letter of 20 November 1964, of the Office of the Chief of Engineers.

March 23, 1965

The subject letter of the Office of the Chief of Engineers, dated 20 November 1964, specifies new standards for estimation of benefits in navigation improvement justification studies. The letter is concerned particularly with estimates of traffic volume to which benefits would apply and with estimated benefits per unit of traffic. The two paragraphs of the letter which incorporate the points most at issue read as follows:

"3. The traffic that would move over a considered waterway improvement will depend on the competitive rates by barge and by alternative means that would likely be in effect with the waterway improvement. Therefore, estimates of waterway traffic will be prepared on the basis of projected 'water-compelled' rates with consideration of all data and factors that are likely to modify current rates to take account of the competitive situation anticipated with the waterway in being, and foreseeable technological developments applicable to the several transport media.

"4. The benefits for the traffic (estimated as in 3 above) that would move over an improved waterway will be computed as the difference in the projected competitive rates or charges for the movement by the alternative means that would be used in the absence of the waterway and the projected rates and charges utilizing the waterway. In developing the projected rates or charges, consideration will be given to all pertinent data and factors including the competitive situation in the absence of the waterway, current rates, and foreseeable technological developments applicable to the several transport media. The benefits determined in this manner will be used in project justification and in the benefit-cost ratio."

A copy of the subject letter is attached. This memorandum is a critical analysis of the standards specified.

The public benefits attributable to a navigation improvement may conceivably include elements other than, and in addition to, savings in transportation cost. However, inasmuch as the letter in question confined itself to transportation savings, this memorandum will concern itself only with these.

1.

The essence of the transportation benefit of a navigation improvement is the excess of transportation costs as they would be without the improvement over what they would be with the improvement. The correct measure of transportation costs without the improvement is found in the prospective rates of alternative modes as they will be if the improvement is not constructed.

Paragraph 4 of the subject letter may be construed to call for a determination of unit benefits which would violate this principle. It seems to direct the use, as a measure of costs without the improvement, of water-depressed rates consequent upon the improvement. In comparing such rates with those of waterborne carriage via the improvement, the analyst would be comparing two rate levels, both of which are results of the improvement. Such a comparison would be totally without meaning as a measure of the transportation cost reduction which the improvement would yield. No valid measure of cost without the improvement would have been introduced into the calculation. As a practical matter, the analyst would predictably, and sometimes seriously, understate the unit benefit.

2.

The limitation of waterborne traffic projections to allow for rate reductions of alternative modes, usually by rail, as called for by Paragraph 3 of

the subject letter, involves a series of conjectures which would yield highly unreliable results and tend to discredit the entire justification process. To prepare a projection of traffic tonnages, a District or Division Engineer will have to develop the following data:

a. As in the past, he will have to prepare a forecast of traffic tonnages via the projected improvement on the basis of existing rail rates.

b. He will then have to forecast, with respect to each commodity movement, by how much the railroads may be expected to reduce rates in response to the traffic volumes he has forecast.

c. He will then have to forecast which of his forecasted rail rate reductions will be disallowed by the ICC. This will require some expertise in regulatory law and precedent.

d. He will then have the most difficult forecast of all. At this point he will have to forecast by what tonnages, with respect to each commodity movement, the various shippers will redirect their shipments from water to rail in response to the hypothetical rail rate reductions. Only by this process can he develop a waterborne tonnage forecast adjusted for future water-depressed rates of alternative modes. It involves modifying conjectures with conjectures and promises to yield highly unreliable results.

Lest it be supposed that past performance of railroads in establishing rates to meet water competition would prove a useful yardstick, we append a table showing the wide variation in ton-mile revenues produced by various water-competitive rates. In this sampling, which we believe to be representative, no pattern or regularity of practice can be discerned as a basis for predicting

future rate cuts from past performance. Moreover, the structure of these rates changes over time. A forecast of water competitive rates for fifty years must stem from a relatively long empirical base if the forecast is to have statistical validity. Undue emphasis on the short-run structure of water compelled overland rates renders the rate projections unduly sensitive to temporary economic fluctuation and the vagaries of management pricing and costing policies. Yet an attempt to collect and weigh rate and cost data over a base period of statistically acceptable duration adds still another serious complication to the analysis.

Since there is no pattern to existing water-compelled railroad rates, and even less regularity over time, such predictions of rates would be subject to wide margins of uncertainty and would afford no reliable basis for determining project benefits.

3.

Apart from the dubious and conjectural character of the estimates required, the limitation of Paragraph 3 could be accepted as sound in principle only if the traffic moving by rail under the water-depressed rates were to be included, along with the waterborne traffic, as a segment of the benefited traffic. Water-competitive railroad rate reductions, when attributable to a waterway improvement are, in several circumstances, a clear public benefit of the improvement, and this benefit is applicable to the traffic moving by rail.

These relevant circumstances include the following:

a. The railroad rate reduction may induce an expansion in the volume of railroad traffic over and above the traffic so moved before the waterway improvement. This is a very usual situation. Even if railroad

profits are impaired by this development, the benefit to shippers demonstrably exceeds the profit impairment, leaving a clear net public benefit. The following hypothetical figures illustrate this principle:

PUBLIC BENEFITS OF A WATER-INDUCED RAILROAD RATE REDUCTION

(Assumption: The rate reduction induces an increase in rail-borne freight.)

	Before	After	Change
Rail Rate (Mills/Ton-Mile)	25	20	-5
Ton-Miles of Freight Moved	10,000,000	12,000,000	+2,000,000
Gross Rail Operating Revenue	$ 250,000	$ 240,000	-$ 10,000
Costs:			
Fixed	$ 90,000	$ 90,000	----
Out-of-Pocket	100,000	120,000	+$ 20,000
Total Costs	$ 190,000	$ 210,000	+$ 20,000
Net Operating Income	$ 60,000	$ 30,000	-$ 30,000

Savings to Shippers:

A. On 10,000,000 ton-miles which had been moving under the old rate at 25 mills, and which now move at 20 mills:

10,000,000 ton-miles at $ .005: $ 50,000

B. On 2,000,000 ton-miles increment to traffic: To be estimated from on-site production savings.

In the above illustration it is clear that savings to the shipping public exceed $50,000, whereas the impairment of railway net income is only $30,000.

b. While, in the above illustration, a public benefit is produced in spite of a reduction in railroad profits, in still additional instances a water-compelled rate reduction, by inducing an expansion in railborne

traffic, will actually increase railroad profits. This bestows a benefit, not only on shippers, but on the railroad ownership as well. When attributable to a waterway improvement, this should, in principle, clearly be included as one of the benefits.

c. The railroad rate reduction may also reflect an improvement in railroad technology. This increases the overall efficiency of the nation's transportation system and, if clearly induced by the waterway improvement, should be credited as a project benefit. Both railroads and shippers benefit.

The delimitation of waterborne traffic projections, as provided by Paragraph 3, would thus be valid when, and only when, the traffic carried by the alternative modes under water-induced rate cuts is included in the compass of the benefit estimates.

Indeed, the introduction of speculation as to the adverse effects of water-compelled rates on waterway traffic volumes, while continuing to exclude projections of new traffic generated by reduced transport costs both by water and overland modes resulting from the improvement, would gravely and unfairly prejudice the whole benefit-cost analysis against waterway improvements.

It is evident that the introduction of water-compelled rates by alternative modes requires a further exercise in highly dubious conjecture, involving the prediction of the extent of rate reductions by the alternative modes and the impact of such reductions on the traffic and earnings of such modes as well as on the waterborne traffic. Tested procedures utilizing known traffic volumes moving at rates in effect at the time of the study, which experience over the

years has proven to be trustworthy -- if not overly conservative -- avoid such speculative exercises and provide a far more practical and reliable technique of evaluation.

4.

In those instances in which water-competitive railroad rates are below the level of railroad costs, particularly of out-of-pocket costs, such rates cause an excessive allocation of labor and resources to rail transportation. That is, the value of the service to society, as measured by the rail rate, is less than the cost of the labor and resources providing it. If below-cost rail rates are accepted as a datum for limitation of traffic moving competitively by water, leading at times to the rejection of waterway improvements, the result would be an under-allocation of labor and resources to water transportation. Service which might have been provided by water carriage at a value to society greater than the cost of the labor and resources used in producing it would be denied to society on the basis of a grave distortion of economic values.

The uneconomic character of below-cost railroad rates was brought out in a paper delivered by Professor Robert A. Nelson of the University of Washington at the Annual Meeting of the American Economic Association in Chicago on December 29, 1964. Professor Nelson writes as follows:

> "It appears that a good deal of the business done by the New England roads produces revenues falling far short of costs, even costs calculated for as short a period as a year. Crude calculations reveal that some traffic on the Boston and Main railroad may be carried for as low as eight cents a car mile. On this traffic the railroad is without much doubt losing money in substantial quantities per unit, and the more business done the greater the loss.

> "The New England roads have an acute case of the malaise which afflicts a good deal of the railroad mileage of the United States....It may be speculated that in the U.S. no Class I railroad is free of substantial amounts of unprofitable traffic. Indeed, it is entirely possible that profitable roads have more unprofitable business than do the unprofitable roads, but can manage because they have a better balance.
>
> "It is probable that the railroads carry much traffic for revenues below out-of-pocket cost, and are permitted to recoup on other traffic. The effect of the railroads carrying much traffic for revenues below out-of-pocket cost and recouping on other traffic is to make it impossible for the railroads to engage in the marginalizing process by which private firms presumably allocate their resources."

The "marginalizing process" to which Professor Nelson refers is simply the procedure of comparing the additional revenue which the railroad might obtain from a stated addition to its traffic with the added cost which the carriage of this traffic would incur. If the added revenue is less than the added cost, obviously acceptance of the business leaves the railroad and through it the country poorer because the freight service adds less to the national total of economic values than it uses up.

Professor Nelson's statement has been incorporated here to show that this misallocation of resources in the railroad rate structure is sufficiently prevalent that the compounding of its wastes in waterway improvement justification by the Corps of Engineers would induce a significant under-development of water transport resources to the detriment of the national economy.

Thus, the standard of Paragraph 3 would accept an uneconomic use of labor and resources in rail transportation as a reason for neglecting their economic use in water carriage.

5.

The delimitation of the affected traffic projections as provided by Paragraph 3 would have the incongruous effect of yielding a benefit-cost ratio more favorable to an improvement if it promised only one category of transportation benefit, and a less favorable ratio if it promised two categories. If a project under study were unaccompanied by any outlook for water-induced rate reductions by competitive modes, its benefits would be confined to the waterborne traffic, but, these being higher, the project would be more favorably evaluated. But, if the improvement offered benefits both via the waterborne traffic and via that moving at reduced rates by alternative modes, then, under the dictum of Paragraph 3, it would be less favorably evaluated. A formula which would yield an outcome so perverse is presumptively defective.

6.

The allowance for foreseeable improvements in water transport technology provided for in the subject letter appears entirely sound. We think it worthy of emphasis, however, that improved waterway technologies should be included as benefits of a waterway project when they will foreseeably occur in association with or in consequence of that improvement.

We recognize also that improved technologies in alternative modes should be taken into account. Where such technological improvements are clearly induced by a waterway project, then, it is essential that these improvements be included as project benefits.

7.

Only public interest considerations should play a part in authoritative waterway improvement evaluation. Yet, the standards expressed would constitute an open invitation to railroads, in pursuance of their private interests, whenever a navigation improvement project came under consideration, to establish a clear expectation that its construction would lead to competitive railroad rate reductions, thereby impairing the outlook for approval. Such rail action might consist, for example, of public announcement of a determination so to reduce rates. With the improvement project thereby defeated, the railroads would never actually have to institute the rates announced. They would be liberated from any necessity for limiting threatened reductions to those which they would actually put into effect, and the waterborne traffic projection would be subject to the whim of irresponsible rate-cutting threats for which the competitive mode would never be held accountable.

Thus, the private interest considerations of the railroads would assume a significant degree of control over waterway improvement justification, and a control of a particularly irresponsible character.

Conclusion. The standards expressed in the letter of 20 November 1964, for waterway improvement justification are invalid in principle. They would involve the justification process in an elaboration of unsupportable conjectures and would subordinate the public interest objectives of justification to the influence of private interests hostile toward water resource development. These standards should be rescinded, pending further study, and those standards and procedures in force prior to the issuance of the subject letter should be reinstated and continued.

TABLE OF REPRESENTATIVE WATER COMPELLED RAIL FREIGHT RATES

Origin	Destination	Commodity	Distance	Rate in Mills Per Ton-Mile
St. Louis, Mo.	New Orleans, La.	Wheat for Export	685	9 mills
Connell, Wash.	Portland, Ore.	Grain for Export	325	11 mills
St. Louis, Mo.	Gainsville, Ga.	Corn	654	6 mills
Tampa, Fla.	Norfolk, Va.	Phosphate Rock	802	5 mills
Houston, Tex.	Minneapolis, Minn.	Oyster Shells	1198	8 mills
West Kentucky	Tampa, Fla.	Coal	770	5 mills
East Tennessee	Tampa, Fla.	Coal	802	4 mills
Pittsburgh, Pa.	St. Louis, Mo.	Structural Steel	604	16 mills
Pittsburgh, Pa.	Baton Rouge, La.	Steel Plates	1133	8 mills
Chicago, Ill.	Corpus Christi, Tex.	Iron & Steel Plates & Sheets	1281	13 mills
Calhoun, Tenn.	Houston, Tex.	News Print	854	13 mills
Oregon City, Ore.	Los Angeles, Calif.	News Print	1135	10 mills
New Orleans, La.	Cincinnati, O.	Sugar	834	12 mills
San Francisco	Chicago, Ill.	Sugar	2263	8 mills

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20315

IN REPLY REFER TO
ENGCW-PE

14 May 1965

Mr. William J. Hull
1000 Connecticut Avenue
#615
Washington, D. C.

Dear Mr. Hull:

This is in reply to the joint letter of 29 March 1965 concerning the justification standards of the Corps of Engineers in waterway improvement studies addressed to me by Brig. Gen. John L. Person, Col. Francis J. Wilson, and Messrs. Kenneth M. Lloyd, Herbert G. West, Everett F. Winter, and Glover Wilkins. As requested my reply is addressed to you.

The procedures of the Corps of Engineers in the evaluation of navigation improvements have as their bases the National transportation policies and objectives set forth in the Transportation Act of 1958, and the standards and criteria for the evaluation of water resource developments approved by the President in May 1962 and published in Senate Document No. 97, 87th Congress, 2d Session. From these official pronouncements I believe it clear that the justification of Federal waterway improvements should be based upon their ability to provide needed transportation service more efficiently than would be possible by alternative modes. The depression of rates cannot be considered a purpose of such developments.

The 20 November 1964 letter, issued under my direction, does not change the basic standards for the evaluation of waterway improvements. These have always required estimates of traffic that would move over improved waterways. In making such estimates the goal we must continue to strive for should be to predict as closely as possible the traffic that will actually be carried by the waterway when it is built. Lacking dependable cost data, it is my view that the evaluation should be based upon the best possible estimate of the rates most likely to be charged by all competing modes of transportation during the life of the project.

It is well established that competition in the transportation industry has been increasing particularly since the enactment of the Transportation Act of 1958. Regulatory decisions and Administration pronouncements have favored this trend. The large-scale adaptation of technological improvements by segments of the industry has made possible significant reductions in

operating costs and has enhanced their competitive situation. There is firm evidence of further gains along these lines. Our waterway evaluation techniques must continue to be adjusted periodically to take into account these changes in the transportation industry in order to provide realistic estimates of the traffic that would actually move over improved waterways in the future. Accordingly, the 20 November 1964 letter reaffirms the basic principles of evaluation and requires that, to the best of our ability, we take these changing conditions into account in estimating waterway traffic and benefits. I believe that a review of history will indicate that by continuous adjustments in our evaluation procedures, in recognition of changing economic and social conditions, our recommendations to the Congress and their decisions have resulted in waterways which, almost without exception, have proven their worth. If we permit our procedures to become outmoded, the whole future of inland waterway development will be in jeopardy.

The joint letter summarizes eight salient points from the accompanying memorandum. The following comments bear on these points.

Point 1. Paragraph 4 of the 20 November 1964 letter does provide that in computing unit savings, use will be made of charges that would be in effect in the absence of the waterway.

Point 2. I agree with your view that there are major difficulties in projecting future rates. But this problem is not unique with respect to rates. Also required in estimating waterway traffic are long-term projections of the growth of the economy, the accompanying growth in transportation needs in areas under study, and the future allocation of traffic among different transportation systems. Our current studies of navigation projects are not limited to transportation savings. Other benefits such as recreation, water supply, low flow regulation and pollution abatement are also considered. Economic projections for such variables as population, employment, production, and income are essential elements in the formulation of plans to meet future needs for all aspects of water resources development. We cannot avoid projections if we are to use the best tools that are available in planning to meet demands during the economic lives of projects and if we are to provide the Congress with the most perceptive analysis for its consideration in the legislative process.

Point 3. As I have previously indicated, the standards approved by the President and the National Transportation policy adopted by the Congress do not include, as a purpose of Federal waterway improvement, the depression of rates of competing carriers.

ENGCW-PE
Mr. William J. Hull

14 May 1965

Point 4. As you recognize, changes in technology by all competing modes should be anticipated to the extent practical. The need to take account of such changes in our evaluations is covered in our comment on Point 2. I can not concur in the view, however, that we should credit as a project benefit the technological improvements in modes alternative to water that are directly consequent upon the waterway improvement even if they could be distinguished. It would be equally invalid to credit the benefits from technological improvements in waterway transportation to the railroads, trucks, and pipelines upon whose competition such waterway improvements are directly consequent. The benefits resulting from adoption of technological improvements, regardless of the motivation, are attributable to the transportation medium in which the improvement takes place and are not creditable as a benefit to another mode of transportation. One of the great benefits of our free enterprise system is that technological improvements are being made continously in response to the interplay of many forces. I am confident this will continue to be true.

Point 5. We do give full consideration to prospective technological improvements in waterway transportation as well as the several modes that are alternative one to the other.

Point 6. Your point is valid. There is no intention to use rates that are below long-run out-of-pocket costs, since such rates would not be viable over the long-run.

Point 7. This has been answered under Point 3.

Point 8. I agree that this can happen but our improved method of evaluation reduces this effect by placing less dependence on published rates. All traffic estimates are government forecasts of private action taken by shippers, consumers, and operators of transportation facilities. This is not a matter under the control of the competing carriers but for the considered judgment of all echelons of the government in the authorization process.

I greatly regret that the letter of 20 November 1964 has been interpreted as establishing "new standards" for the evaluation of Federal waterway projects. It was intended to help our Division and District Offices apply long established standards in the solution of problems that now appear in new and more difficult aspects, simply because revolutionary changes are taking place in certain sections of the transportation field. There is certainly nothing "new" in the basic principles upon which our evaluations are based. What has changed is not those principles, but the environment in which they must now be applied.

ENGCW-PE
Mr. William J. Hull

14 May 1965

Finally, to place this matter in proper perspective, I must point out that the use of projected rates for competing modes of transportation is not the only modification that has been made in our procedures. We also use projected barge rates and costs in which we take into account foreseeable technological improvements in waterway transportation. But beyond this, we now base our estimates of future traffic upon projected economic development in the region served. This procedure we feel provides the most valid estimate of probable future commerce. In addition, the regulation of the rivers necessary to make navigation feasible is being treated - and quite properly so - as serving a multiplicity of purposes, including water quality control, water supply, increasing the capacity of the stream for power generation, and the enhancement of recreational and fish and wildlife potentials. I urge that you take all these factors into account in judging the efforts we are making in continuing to improve our method of evaluating proposed waterway projects. I believe our efforts are in accord with established principles and policies and will assure sound navigation improvements as integrated, fully justified elements of the National Transportation System and in the broader sense will assure sound public investments in the multipurpose development of our great natural resource, water.

I shall, of course, be pleased to arrange a conference at a mutually convenient time, if you desire.

Sincerely yours,

W. K. WILSON, JR.
Lieutenant General, USA
Chief of Engineers

1-04. SCOPE OF EM 1120-2-101

This manual incorporates the basic instructions for the planning, conduct and processing of survey reports through authorization of projects * by Congress. Several sections discuss the general and specific concepts of investigation planning, organization and coordination of most concern to the engineers conducting and reviewing the investigations and reports. Others give the clerical and administrative handling of the report and the papers and records concerned up to the time of submission of the report to Congress, printing of the report as a Senate or House document, and preparation for testifying before the Public Works Committees of Congress on authorization of recommended projects. It is intended that, insofar as practicable, the standards and bases for action in investigations will be * applied consistently at District, Division, River and Harbor Board, and * Office, Chief of Engineers levels.

1-05. FEDERAL, STATE AND LOCAL AGENCIES CONCERNED WITH INVESTIGATIONS

It is the responsibility of the Corps of Engineers, when making investigations of water resources at Congressional request, to study as completely as necessary for sound conclusions all aspects of local and general needs, and the fullest practicable use of water resources and project sites. In this respect, the Corps of Engineers is an engineering consultant to Congress and the people, and must assure that the fullest practicable degree of participation by the people and their governmental officials in the development of water resources takes place. Within the law, maximum cooperation and coordination with other Federal, State and local agencies is essential from the beginning of investigation. A report should, therefore, show that a proposed project will meet the needs of the people concerned, has their support, and produces the optimum use of the natural resources required for its realization. Proper coordination involves cooperation with local, State and regional representatives of other Federal agencies, and with representatives of State and local * agencies. During the study, assistance is available from the Board of * Engineers for Rivers and Harbors, the Coastal Engineering Research Center, * the Waterways Experiment Station, and the Office, Chief of Engineers. Later the report of the Chief of Engineers is referred to the Governors of the affected States, other Federal Departments (Agriculture, Commerce, Health, Education and Welfare, Interior and Labor), and the Federal Power Commission, as required by law or by interagency agreement. Finally, the Bureau of the Budget

IV

SURVEY INVESTIGATIONS AND REPORTS

GENERAL PROCEDURES

SECTION I - INTRODUCTION

1-01. PURPOSE OF SURVEY INVESTIGATIONS AND REPORTS

Survey investigations and reports are the origin and foundation of the authorized civil works program of the Corps of Engineers. They are made by the Corps of Engineers pursuant to specific Congressional authorization to determine the engineering and economic feasibility of adopting Federal projects or modifying existing projects for navigation, flood control, beach erosion control, and related water resource developments. Such studies determine the proper scale and scope of developments, the degree of economic justification, and the equitable sharing of costs and responsibilities by Federal and non-Federal interests.

1-02. PURPOSE OF EM 1120-2-100 SERIES

This series of manuals provides basic information and guidance on the origin, conduct, and principles and procedures of engineering and economic * investigations for civil works projects, both in pre-authorization surveys * and in post-authorization studies of project justification. The task of investigation requires careful coordination and cooperation among all Federal and non-Federal interests concerned, basic research into natural forces and conditions, gathering and analysis of economic data, deriving and comparing the relative merits of all practicable solutions for related and conflicting demands for water uses and site development, assuring optimum use of resources and sites and securing the maximum net benefits, determining the most equitable sharing of costs under the law among Federal and local interests, and presenting a satisfactory and adequate report on the matter for the information of all concerned and for a basis of action by Congress.

1-03. SCOPE OF EM 1120-2-100 SERIES

The principles and procedures in these manuals are to be applied, in accordance with the specific controls indicated, by all District and Division Engineers, Boards, and Office, Chief of Engineers in the conduct of survey investigations * and reports. The principles of project formulation and evaluation herein shall also be applied at all other stages of consideration of projects, large or small, throughout planning and construction stages.

- S. ...ded by later changes

EM 1120-2-101
Change 11
17 Oct 60

TRANSMITTAL SHEET

Manuals - Corps of Engineers
U. S. Army

SURVEY INVESTIGATIONS AND REPORTS

General Procedures

1. Attached are revised pages 23, 24, 24a, 24b, 36, 36a, 39, 40, 40a, 40b, 41, 42, 48a, 43, 45, 66, 67, 81, 82, 88b, 104, 119, 120, 120a, and page 5 of Appendix E, for EM 1120-2-101.

2. Par. 1-19e clarifies instructions on the weight of paper permitted in reproducing survey reports.

3. Par. 1-20b has been revised to specify procedures on the increased use of color on survey report plates, as approved by the Chairman of the Joint Committee on Printing.

4. Revised pars. 1-46d, 1-53a and 1-53e clarify considerations involved in the inclusion of spoil disposal areas required of local interests in navigation projects, and wording of the conditions of local cooperation in recommendations. The primary intent of these changes is to insure flexibility in report recommendations and subsequent project authorizations to require or not require spoil disposal areas when conditions on this could not be fully defined in the survey. In addition, wording is included to provide understanding that local interests should provide either any needed retaining works at spoil disposal areas or the costs thereof.

5. Par. 1-51c states the basic concepts underlying the determination of transportation savings from navigation improvements by comparison of costs of such improvements with the costs of the most economical alternative means of transportation. Permissible use of rates charged by alternatives is stated.

6. Par. 1-53a(4) has been added and par. 1-55 revised to require an explicit statement in the requirements of local cooperation in general navigation reports that local interests will dredge the berthing areas landward of Federal project limits. Par. 1-53c(4) adds the explicit statement in recreational harbor reports that local interests will relocate or alter utilities as necessary. These requirements have generally been customary in, and should be applied in all cases.

7. Par. 1-84j has been revised to discuss and clarify the basis for Federal participation in provision of pumping plants in local flood protection projects.

8. Par. 1-116f specifies that favorable cooperative beach erosion control reports require local interests to provide appurtenant facilities required for the realization of recreational benefits.

9. Par. 1-121b(4) revises item 9 of the quarterly status report on surveys to provide fiscal information in the form now found desirable.

10. Par. 1-137 incorporates considerations on public relations affecting Members of Congress and Governors of States, and on participation in locally organized meetings, which have been discussed in multiple letter ENGCW-P, 8 August 1960, subject: "Coordination of Public Relations Activities in the Survey Program with Members of Congress."

11. Par. 1-139 specifies increased use of public hearings and requires a public hearing be held near the end of investigations to insure public understanding of considered or proposed plans, to develop public reaction.

12. Other revisions are self-explanatory.

13. Asterisks indicate revised paragraphs or lines of text.

FOR THE CHIEF OF ENGINEERS:

W. P. DEER
Colonel, Corps of Engineers
Executive

b. Benefits to be evaluated. Navigation benefits and detriments, and all other economic effects of considered navigation improvements, will be evaluated in accordance with the principles and procedures in this series. *Benefits will be determined and discussed relative to the value of transpor-*tation service, increased safety, reduction of hazards to vessels and damage to wharves, commercial fishing, recreational boating, land enhancement due to deposition of dredged material, and benefits such as flood control, bank stabilization, shore protection, and others which may result from considered projects. The evaluation will be made with an accuracy and precision consistent with the basic data and proper to each stage of project investigation and formulation. The final objective is to determine the scope and economic justification of the most suitable plan. At no stage will studies be continued past the point of productive return when an unfavorable conclusion becomes evident. Benefits claimed by proponents will be stated and discussed insofar as proper and relevant (see par. 1-41), but will not be blindly accepted. The evaluation for the report will be an independent analysis based on accepted departmental policies and principles. See par. 1-123c, below, for guidance on transportation studies by the Board of Engineers for Rivers and Harbors.

* c. Transportation benefits. The principal transportation benefits of navigation improvements are the savings in the cost of moving commodities ·t h in the absence of the improvement would move by other means from the same or other sources. These are the savings in costs to whomsoever they may accrue, made possible by the improvement. In computing these savings it will be assumed that, in the absence of the waterway improvement, use would be made of the alternative means that could move the traffic at least cost. In selecting the least costly alternative means, consideration will be given to all transportation media or combinations thereof, existing and reasonably potential, that are suitable for the purpose. *

* (1) Basis for Estimating Savings in Transportation Costs. The costs to be compared in the analysis are all of the incremental (added) costs in the waterway improvement and in the least costly alternative means that would be required in moving the estimated traffic by the two media. For both the waterway and the alternative means, the base from which costs are measured is the current condition. No cost should be included in the analysis for existing facilities, that is, "sunk" costs. For example, if the contemplated improvement is the deepening of an existing waterway none of the original cost of constructing the waterway should be included since this cost cannot be affected by the decision whether or not to make the improvement. Likewise, if the increased traffic could move by existing rail facilities without requiring additional right-of-way, roadbed, general plant, etc., no cost for these items should be included in the cost comparison. If, however, replacement of or additions to any such items or increased operation and maintenance will be required over the period of the economic life of the project to accommodate the estimated increase in traffic in the waterway or the alternative means, such costs should be included. This will necessitate an estimate of the growth in traffic over the evaluation *

period and a comparison with the capacity of existing facilities to accommodate this growth.

(2) Relationship of Costs to Rates: The costs of movement of commodities by alternative means may not be as readily available as are the rates published by carriers for such movements. Such rates may or may not reflect actual costs involved. Thus, analyses of transportation savings based upon such rates may not give a true measure of the value of a waterway improvement. Where it is not possible to obtain actual cost figures for movement by alternative means, published rates may be used when, in the opinion of reporting officers, they fairly represent costs. Where there is strong possibility that the rates for movements under consideration do not approximate costs, the best estimates of overland carrier costs will be used in the analysis. Thus, in any case where rates are used as a basis for computing the cost of movement by alternative means, the relationship of rates to costs must be established. In making a decision in such cases whether to use available rates or attempt to secure costs, the principle should be followed that precision and refinement of estimates should not exceed the degree required to reach a sound judgment as to project justification. For example:

(a) If the analysis shows that waterway costs are higher than rail rates which in turn are clearly higher than rail costs, it follows that waterway costs will be higher than rail costs. Further precise study of rail costs would not be warranted under the circumstances.

(b) On the other hand, existing rail rates on a commodity suitable for water movement may have been depressed below cost for various reasons. If these rates are still greater than estimated costs of movement on the proposed waterway, and the benefits computed on this basis are sufficient to justify the waterway improvement, further detailed study of rail costs would not be necessary.

(3) Consideration of Rate Levels: While comparative costs determine the economic justification of a waterway improvement, rates may have an important effect on the economic analysis because the actual level of rates will determine whether traffic will move on the waterway. A drastic reduction in overland rates might be sufficient to prevent movements of commodities by water, even though such action would not be justified from the broad public viewpoint. Studies of potential waterway traffic should, therefore, recognize the possible impact of varying rate levels and include an analysis of the effect upon projected use of the waterway of significant deviations in rates from cost levels.

(4) Quality of Service: The economic analysis on the basis of costs should consider any difference in quality of service provided by the transportation media being compared. Such matters as time required in

* transit, degradation of product, stockpiling costs, and special handling charges would reflect this difference in quality of service. *

* (5) Traffic that would not move without the waterway improvement. In some instances a waterway improvement, by tapping sources of supply new to or unused in the area served may result in an increase in the quantities of certain commodities that would be marketed and utilized with the improvement over the quantities that would be utilized in the absence of the improvement. Although the possibility of benefits from this source is recognized in principle, they should be treated in qualitative terms unless they are considered critical in the justification of the improvement and reasonable quantitative measurement is feasible. *

* d. Removal of hazards to shipping. Whenever practicable on a sound basis, elimination of damages or hazards will be given a monetary value. However, when this is impracticable, and recurrence of past average annual *damages is not considered indicative of the future, no arbitrary monetary value will be placed thereon, and the matter will be discussed on the basis of sound judgment as to whether the work is worth the cost. Other intangibles may be treated in a similar manner.

* e. Commercial fishing. Benefits to commercial fishing activities result from elimination of delays in entering and leaving a harbor, reduction in spoilage of fish, and reduction in loss of or damage to vessels and gear. Fish catch may be increased by elimination of delays and increased fishing time made possible on the fishing grounds. Estimates of the probable average annual catch must consider the capability of the fishing grounds to sustain the expected yield and the availability of a market for the increased catch. Commercial fishing benefits should be measured in terms of the net value of the increased fish catch at the dock or "buy boat", and by the damages prevent- * able by the project.

* f. Recreational boating and sport fishing. Special procedures have been developed for evaluation of benefits from provision of facilities for *recreational craft and sport fishing. (See EM 1120-2-113).

* g. Land enhancement in navigation projects. Increased land values that may result when a navigation project is provided are considered to be only the market's estimate of the capitalized transportation savings, or the effect of land-side developments, to the extent that some residual valu[illegible]emains in the land. Such increased values are therefore either a duplication of navigation benefits or of development effects. The only real additional enhancement benefit produced by a navigation improvement is the value of new or filled land created by deposition of spoil dredged from the project areas. The net benefit from such land attributable to the project shall be measured in terms of the net increased market value or net income,

or the cost of equivalent fill, whichever is less, exclusive of development costs and any additional costs of depositing the spoil. Market or capital values of land will be converted to equivalent annual values by application of the long-term interest rate for mortgage financing in the locality or region (4 to 6 percent). The principles underlying the relation between land values and income are the same as discussed for flood control in EM 1120-2-111.

* h. Adverse effects on overland transportation. Navigation projects may result in higher costs of overland transportation, other than from bridge, highway, and railroad relocation at the time of project construction, because of the costs of providing greater clearances for bridges to be constructed in the future, increased operation and maintenance costs of bridges, increased cost of future highway construction, and increased cost of future vehicle operation, including delays for bridge openings. Water resource development studies and reports will include an evaluation of all such effects to the extent that reasonable and sound estimates can be made. These features are economic costs and they will be deducted from the benefits to obtain the net benefit for the considered improvement, except for those cases where payment or remedy adds to the first costs of the project. The reports cited in par. 1-149a(3) discuss these problems, which are under further study. Any special problems encountered by reporting officers will be referred to the Chief of Engineers. The effects of considered projects on overland transportation will be determined by consultation with appropriate division and district offices of the Bureau of Public Roads, State Highway Departments, railroads and others.

* i. Summary of economic evaluation. The results of economic studies for the various plans of improvement presented in the report will be stated concisely, so that a clear distinction will be evident among the various types of benefits, and the incidence of benefits to the general public and to local interests will be apparent, for use not only in project justification but also in determination of cost sharing and local cooperation requirements. The analysis in the report will be presented so that adjustments can readily be made at the time of consideration of the project by Congress for authorization and subsequently for appropriation of funds. At this point also in the report, intangible and incidental benefits which may have a bearing on the conclusions to be drawn from the evaluation of tangible factors will be discussed.

1-52. COMPARISON OF BENEFITS AND COSTS

The estimated annual benefits, the estimated annual charges, and the ratio of benefits to charges for the various plans of improvement under consideration will be given, including, where pertinent, separate data for each integral, useful component of an over-all or comprehensive plan. Any factors not reflected in the evaluated benefits and costs will be described. Any pertinent considerations of project formulation or economic justification that have exercised any major influence on the methods of analysis or the conclusions reached will be discussed. (See par. 1-83 for general principles.)