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REPORT BY THE

Comptroller General

OF THE UNITED STATES

9/16/84

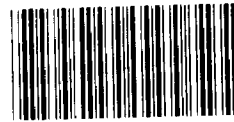
Problems In The Northeast Corridor Railway Improvement Project

The Railroad Revitalization and Regulatory Reform Act of 1976 directs the Secretary of Transportation to undertake a 5-year, \$1.75-billion project to improve rail passenger service and travel times on the Northeast Corridor between Boston, New York, and Washington by February 1981.

The project will not be completed until the end of 1983 (1984 in the Boston area) and the shorter travel times will not be achieved within the \$1.75 billion authorized. The Congress should decide what improvements are desirable and what additional money, if any, should be provided.

Because budgeted costs are being exceeded, the project's scope was reduced, leading to increased future maintenance costs, less passenger comfort, less on-time reliability, and reduced safety.

This report discusses aspects of the project's management and planning which have contributed to these problems.



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MARCH 29, 1979



COMPTROLLER GENERAL OF THE UNITED STATES

WASHINGTON, D.C. 20548

B-164497(5)

The Honorable Charles McC. Mathias, Jr.
and the Honorable Lowell P. Weicker, Jr.
United States Senate

Pursuant to your April 7, 1978, joint request, we are reporting on the Northeast Corridor Improvement Project. As requested, we concentrated our work on (1) changes from the quality of facilities originally envisioned, (2) whether the project will be completed within the specified funding and time frame, and (3) the effectiveness of the project's management.

This report contains recommendations to the Secretary of Transportation and the President of Amtrak which are designed to improve project management. It also contains a recommendation that the Congress determine the improvements and funding level needed to meet the legislative objectives.

We obtained comments from the Department of Transportation, Amtrak, the project's architect/engineer, and other concerned contractors. The comments of each organization have been considered in this report and copies of the Department's and Amtrak's comments have been included as appendixes.

Your offices requested that we make no further distribution of the report before the subcommittee hearings at which the report will be used. These hearings are now scheduled to be held on April 12, 1979.

A handwritten signature in black ink, appearing to read "Thomas B. Stearns".

Comptroller General
of the United States

D I G E S T

The \$1.75-billion Northeast Corridor project to improve rail passenger service between Boston, New York, and Washington, D.C., will not be completed within the established time and funding limits. There have been many problems in the project's administration.

The act authorizing the project--the Railroad Revitalization and Regulatory Reform Act of 1976--requires that regularly scheduled, dependable service operate on schedules of 2 hours 40 minutes between Washington and New York and 3 hours 40 minutes between Boston and New York by February 1981. (See p. 6.)

COMPLETION DATES AND COST

In January 1979, the Secretary of Transportation announced the results of a project redirection study, which said that an additional \$654 million would be required and that construction could not be completed until the end of 1983. (See p. 10.) Construction in the Boston area will not be completed until 1984 because of other work in that area. (See p. 12.)

This is 3 years later than the authorized date and may not be met if construction work does not improve. (See p. 12.) The estimated cost for the planned work is \$2.4 billion, but if additional proposed improvements are added, the estimated cost to achieve the goals the Congress wanted could be about \$3.7 billion or more. (See p. 13.)

The act also sets forth other improved service and trip times. Capital costs for these improvements could increase total project costs to more than \$5.2 billion. However, new railcar technology could considerably reduce costs required to further

shorten trip times. Amtrak is scheduled to receive these cars in 1979 for use outside the corridor. (See p. 20.)

Two issues need to be resolved. Federal Railroad Administration regulations limit operating speeds on railroads to 110 miles per hour, whereas the project, as planned, will require operating speeds of 120 miles per hour. The ability of Amtrak's new locomotives to achieve 120 miles per hour will not be known with certainty until a locomotive is built and tested. The first of these is scheduled for delivery by the end of 1979. (See p. 24.)

Because of the high potential costs involved, the Congress should decide what improvements are desirable and what additional funding, if any, should be provided. (See p. 29.) Alternatives range from terminating the project to providing over \$5 billion to make capital improvements to achieve the legislation's objectives. (See p. 32.)

PLANNED IMPROVEMENTS HAVE BEEN CURTAILED

Because budgeted costs were being exceeded, the project's scope was reduced, resulting in

- increased future maintenance costs,
- reduced passenger comfort,
- reduced on-time reliability, and
- reduced safety. (See p. 34.)

For example, reductions have been made in the fencing work on bridges which pass over the railroad. As a result, many bridges will have fencing not meeting the minimum 8-foot high project standard. The standard had been developed to help prevent objects being thrown onto passing trains, which could result in damage and injuries. (See p. 48.)

The Department of Transportation disagreed with GAO's use of the August 1977 implementation master plan as the benchmark for measuring changes in the project's scope. To GAO this plan was valid for several reasons. The Department also said that the plan recommended in its January 1979 redirection study report will not have the impacts GAO said it would. GAO disagrees with the Department. (See p. 52.)

PROJECT MANAGEMENT NEEDS TO BE IMPROVED

A three-party management structure is responsible for managing the project.

--The Federal Railroad Administration (in the Department of Transportation) has overall responsibility for carrying out the work.

--Amtrak, which owns most of the Northeast Corridor and operates the intercity passenger service, has a dual role of participating in program development and construction supervision, testing, and acceptance; and acting as construction manager for much of the work.

--An architect/engineering contractor is responsible for management support, system engineering, design, work package definition, cost estimates, and construction supervision and inspection. (See p. 8.)

Basic planning, however, is not complete. The roles and responsibilities of the three management organizations are not completely defined, key issues are still unresolved, and there has been waste and inefficiency. (See p. 54.)

For example, total required equipment and material resources cannot be determined because overall plans have not been developed. Accordingly, requirements have been developed piecemeal and Amtrak may have spent almost \$3 million more for ties, rail, and other material than the estimated requirements. Amtrak also

purchased almost \$2 million of railroad cars which may not be needed. (See p. 72.)

Because the three-party management structure is not effective and has contributed to the project's problems, the management has to be simplified and more direct lines of authority, responsibility, coordination, and communication have to be established.

The overall project manager having final authority and responsibility--the Federal Railroad Administration--has not made important overall decisions and has not defined the project or what the roles of the major participants are. GAO sees no overriding reasons for keeping the Federal Railroad Administration directly involved in the project.

Amtrak should have a more responsible role because it owns most of the corridor and operates intercity passenger service in the corridor. (See p. 81.)

Alternatives available for improving the project's management structure include:

- Transferring responsibility for the project from the Department of Transportation and the Federal Railroad Administration to Amtrak, which would require the Congress to amend the legislation.
- Requiring the Federal Railroad Administration to confine itself to a top level funding and monitoring role to avoid its involvement in day-to-day detailed work. This could be directed by the Secretary of Transportation. (See p. 86.)

The Department of Transportation does not agree that GAO's report demonstrates that project management has been ineffective and said that GAO did not sufficiently recognize the project's complexities. It also disagreed that problems existed with the project's management structure and said that the Federal Railroad Administration should continue to play a major

role in the project. Amtrak said that institutional arrangements were the basic problem of the project. The Department also said that the redirection study had resolved most of the project's major problems.

GAO has considered these comments and finds no basis for revising its conclusions. GAO also holds that the Department's redirection study report does not resolve the problems because it does not address the management problems and does not contain enough specific information to determine if it presents a firm and realistic program. (See p. 83.)

AMTRAK'S PERFORMANCE NEEDS TO BE IMPROVED

To date, Amtrak's performance on project construction work has not been very productive. Its work consistently has run behind construction schedules and exceeded cost estimates. (See p. 88.)

Amtrak's project organization has not been effective because Amtrak has not assigned overall responsibility for project performance, the organization has undergone numerous changes, and its role has not been defined. (See p. 93.)

For example, during 1977 three Amtrak organizational units were involved in leasing equipment and vehicles, but their responsibilities were not clear to the people involved. Consequently, some leased equipment costing as much as \$2 million was not used or was used very little, equipment was accepted without proper inspections, some equipment leases were extended without authorization, and other leases were continued after the need for the equipment had expired. (See p. 95.)

GAO recommends that the President of Amtrak assign overall responsibility for project performance and establish a stable project organization with a clearly defined role to help assure that Amtrak's

future construction work is completed on time and within cost estimates. (See p. 104.)

Amtrak agreed that there was waste and inefficiency at the start of the project and that this was partly attributable to Amtrak. Amtrak said that improvements have been made. The Department of Transportation said that Amtrak's problems were due to start-up difficulties that were inevitable and it has noted improvement in Amtrak's performance. (See p. 104.)

Specific comments from the Department of Transportation and Amtrak are included as appendixes II and III.

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DLG-00249

ABBREVIATIONS

ABC 00753

Amtrak National Railroad Passenger Corporation

B&P
tunnel Baltimore and Potomac tunnel in Baltimore,
Maryland

Conrail Consolidated Rail Corporation CNR-00180

DCP DeLeuw, Cather/Parsons and Associates DLG-00249

FHWA Federal Highway Administration ABC 00063

4R Act Railroad Revitalization and Regulatory
Reform Act of 1976

FRA Federal Railroad Administration ABC 00213

GAO General Accounting Office

LRC Light, Rapid, Comfortable train being
developed in Canada

mph miles per hour

NEC Northeast Corridor organization in Amtrak

~~NECIP~~ Northeast Corridor Improvement Project ID



CHAPTER 1

INTRODUCTION

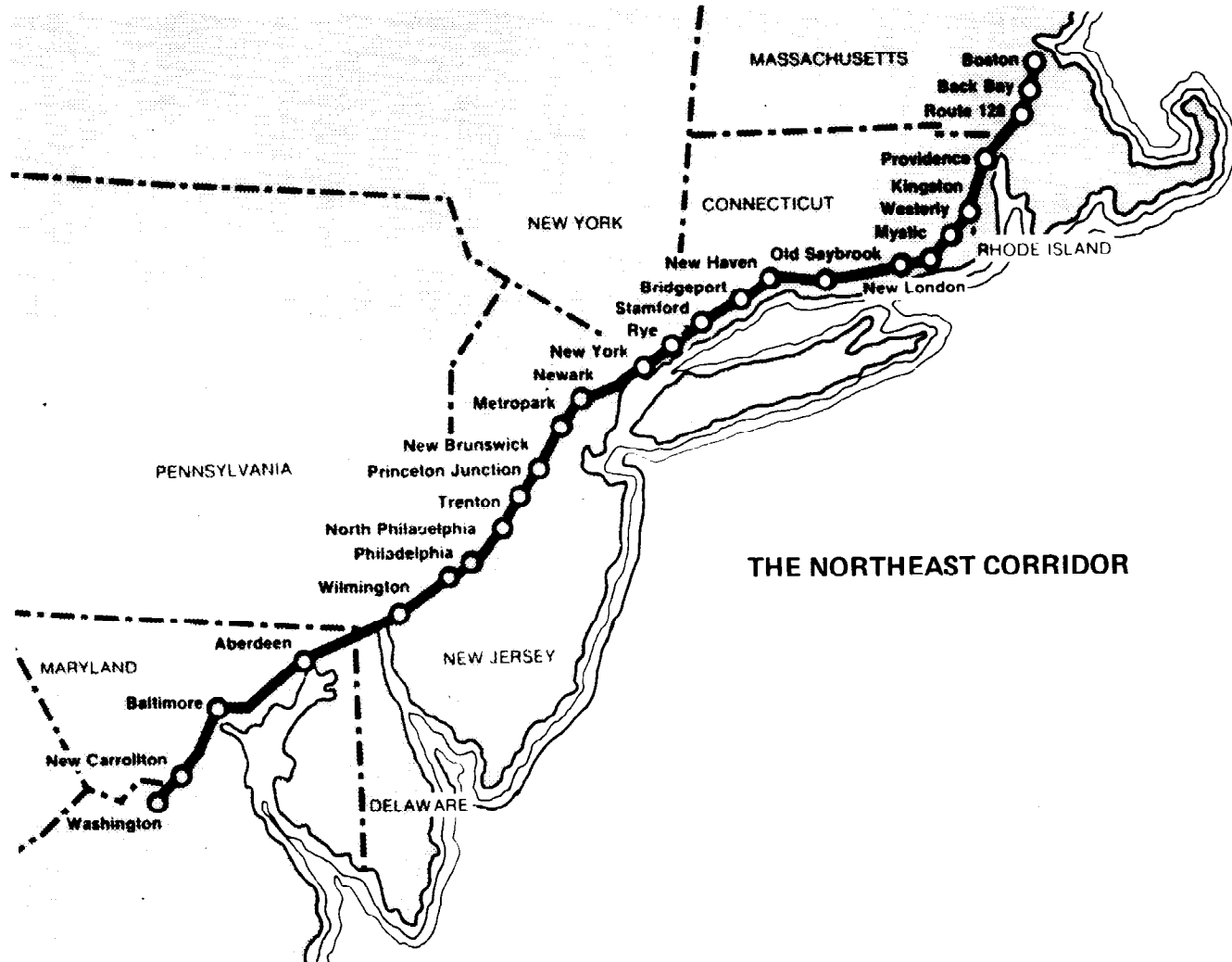
On April 7, 1978, the former Ranking Minority Member, Clifford P. Case, and Senators Charles McC. Mathias, Jr. and Lowell P. Weicker, Jr., members of the Subcommittee on Transportation, Senate Committee on Appropriations, asked us to review the Northeast Corridor Improvement Project (NECIP) to evaluate how effectively it was being managed. (See app. I.) They were particularly interested in determining whether present plans will provide the same quality physical facilities as originally contemplated and whether the project will be completed within the funding level and time frame specified by the Railroad Revitalization and Regulatory Reform Act of 1976 (45 U.S.C. 801) (4R Act). In a subsequent meeting, it was agreed that the August 1977 NECIP draft implementation master plan would be used to determine the originally contemplated quality of facilities.

THE NORTHEAST CORRIDOR

The Northeast Corridor is the 456-mile spine railroad system between Boston, Massachusetts; New York, N.Y.; and Washington, D.C. (See map on p. 2.) The system is electrified between Washington, D.C., and New Haven, Connecticut. In recent years, the New York-Washington segment has accounted for over 80 percent of the corridor's intercity passenger rail traffic.

The corridor right-of-way is owned by the National Railroad Passenger Corporation (Amtrak), except for the following segments:

- The approaches (about 1 mile) to Union Station in Washington, D.C., are owned by the Washington Terminal Company, a joint Amtrak/Chessie System arrangement.
- New Rochelle, New York, (northeast of New York City) to the Connecticut/New York border (about 7 miles) is owned by the New York Metropolitan Transportation Authority.
- Connecticut/New York border to New Haven, Connecticut, (about 47 miles) is owned by the Penn Central Trustees and is leased to the State of Connecticut.



SOURCE: FEDERAL RAILROAD ADMINISTRATION

--Rhode Island/Massachusetts border to Boston South Station (about 38 miles) is owned by the Massachusetts Bay Transportation Authority.

--Yard tracks at Boston South Station are owned by the Boston Redevelopment Authority.

Amtrak operates intercity passenger trains on the entire corridor, and freight and commuter trains also operate over most of the corridor. Through freight trains extensively use the corridor between Washington and Newark, New Jersey, but there is only a small amount of such service north of Newark. Local freight service is provided on almost all of the corridor. Commuter trains operate between Baltimore, Maryland, and Washington, D.C.; Wilmington, Delaware, and New Haven, Connecticut; and Providence, Rhode Island, and Boston, Massachusetts. Commuter trains account for most of the corridor traffic in the areas around New York City.

EARLIER NORTHEAST CORRIDOR STUDIES

Studies to improve the Northeast Corridor date back to 1963, when a Northeast Corridor project was established in the Department of Commerce. The High-Speed Ground Transportation Act of 1965 (49 U.S.C. 1631) authorized the Secretary of Commerce to sponsor demonstration projects to determine the contributions that high-speed ground transportation modes could make to more efficient and economical intercity transportation systems. The responsibility for the high-speed demonstration projects was transferred to the Federal Railroad Administration (FRA), Department of Transportation, when it was established on April 1, 1967.

Two corridor demonstration projects--Washington-New York and Boston-New York--were conducted under the 1965 act. Under the Washington-New York project, new self-propelled electric passenger cars (Metroliners) were designed and purchased, facilities were improved, and highspeed Metroliner service was provided. Facility improvements included upgrading the roadbed with heavy maintenance and installing 190 miles of continuous welded rail, installing heavier conductor wire in the catenary,^{1/} and some station improvements. The Boston-New York project involved experimental service using new gas turbine powered trains (Turbotrains).

^{1/}The catenary is the system of overhead wires which provides electric power for the trains. (See photo. on p. 4.)



4

VIEW OF NORTHEAST CORRIDOR RIGHT-OF-WAY AND CATENARY SYSTEM BETWEEN BALTIMORE AND WASHINGTON—CONRAIL FREIGHT TRAIN ON LEFT TRACK AND WORK EQUIPMENT ON RIGHT TRACK

Total Federal funds allocated to the demonstration projects amounted to \$51.8 million.

The running time for the Metroliners between New York and Washington was 3 hours, with intermediate stops. Non-stop service with a running time of 2-1/2 hours was provided in 1969 but was discontinued after 6 months. The running time for the Turbotrains between Boston and New York was 3 hours and 44 minutes, with intermediate stops.

In September 1971, the Secretary of Transportation issued a report entitled "Recommendations for Northeast Corridor Transportation." The report's recommendations for the "interim period" (1970s) included implementing improved high-speed rail service with nonstop running times of about 2 hours between New York and Washington and 2-3/4 hours between New York and Boston. Total estimated cost, including vehicles, was \$460 million.

In January 1973, the Department of Transportation issued another report proposing improvements to achieve the same running times as recommended in the 1971 report. The estimated cost this time was \$700 million (plus or minus 10 percent), including new vehicles.

The Regional Rail Reorganization Act of 1973 (45 U.S.C. 701), approved January 2, 1974, was enacted to restructure the bankrupt railroads in the Northeast and Midwest sections of the country into an economically viable rail system. The act established the United States Railway Association to develop a reorganization plan to effectuate a number of goals, including high-speed rail passenger service in accord with the Secretary of Transportation's September 1971 recommendations for Northeast Corridor transportation. The act directed the Secretary of Transportation to begin the necessary engineering studies and improvements for the improved service.

The United States Railway Association's July 1975 final system plan for reorganizing the bankrupt railroads into the Consolidated Rail Corporation (Conrail), which was approved by the Congress on November 9, 1975, stated that the Association "lends its support to the development of * * * high-speed passenger services between Boston and Washington consonant with the recommendations of the Secretary of Transportation in his report of September 1971."

On September 17, 1975, the Department of Transportation issued a report on its recommendations based on the planning effort under the 1973 act. The report discussed six options which ranged from doing nothing to providing service with

trip times of 2-1/2 hours between New York and Washington and 3 hours between New York and Boston, with five stops in each segment (referred to as "CorridorRail"). The Department recommended an option (referred to as "Metroliner II Plus") which would provide trip times of 2-3/4 hours between New York and Washington and 3-1/2 hours between New York and Boston, with five stops in each segment. The Department estimated that Metroliner II Plus would take 7 years to complete and would cost \$1.8 billion in constant 1974 dollars, or \$2.5 billion in inflated dollars, excluding new rolling stock. The recommended option could be upgraded later in two phases to provide the running times under the CorridorRail option at an additional cost of \$665 million in 1974 dollars.

As shown below, the goals for the authorized improvement project are not the same as those recommended by the earlier studies.

PROJECT AUTHORIZATION

The 4R Act directs the Secretary of Transportation to implement NECIP. The act, as amended by the Amtrak Improvement Act of 1978 (Public Law 95-421, October 5, 1978), requires that, within 5 years after the date of enactment (February 5, 1976), regularly scheduled and dependable intercity rail passenger service be established operating on schedules of at most 2 hours and 40 minutes between Washington and New York and at most 3 hours and 40 minutes between Boston and New York, including appropriate intermediate stops. Other requirements include:

- Improving facilities on routes to Harrisburg, Pennsylvania, and Albany, New York, from the Northeast Corridor main line; and from Springfield, Massachusetts, to Boston, Massachusetts, and New Haven, Connecticut, to facilitate compatibility with improved high-speed service on the corridor main line.
- Improving nonoperational portions of stations and related facilities and fencing. Fifty percent of these improvement costs is to be borne by the States (or local or regional transportation authorities) or other responsible parties, but the Secretary of Transportation may fund entirely any safety-related improvement.
- Assuring that improvements are compatible with future improvements in service levels.

- Facilitating improvements in and usage of rail commuter services, rapid rail transit, and local public transportation to the extent compatible with the goals for intercity rail passenger service.
- Maintaining and improving rail freight service to the extent compatible with the goals for intercity rail passenger service and rail commuter services, rapid rail transit, and local public transportation.

The amendments added by the Amtrak Improvement Act of 1978 require the Secretary of Transportation to submit a report to the Congress, within 1 year after enactment, on the conflict between commuter service needs and intercity passenger service needs, and on the allocation of access rights to corridor terminals. The amendments also direct the Secretary to develop, in consultation with Amtrak, economical and reliable rolling stock and related equipment designed to be compatible with the characteristics of the corridor after NECIP completion, including the capability to reliably meet future improvements in service levels (2-1/2 hours between New York and Washington and 3 hours between New York and Boston, both with appropriate intermediate stops).

The 4R Act, as amended, authorizes \$1.6 billion to reach the goals for intercity rail passenger service and, after these goals have been reached, the goals for the routes to Harrisburg, Albany, and Springfield. Of this amount, not less than \$27 million is to be available to finance the cost of equipment modification and replacement which States (or transportation authorities) will be required to bear as result of NECIP's electrical conversion system. An additional \$150 million is authorized for improving nonoperational portions of stations and related facilities and fencing, for a total authorization of \$1.75 billion.

The act also authorizes Amtrak to:

- Acquire any real or personal property or interest therein which is necessary or useful in establishing and maintaining improved high-speed rail services.
- Provide for the continuous operation and maintenance of rail freight, intercity rail passenger, and commuter rail passenger service over the properties acquired.
- Improve railroad rights-of-way between Boston and Washington, including, at Amtrak's option, the route through Springfield, Massachusetts, and the routes to

Harrisburg and Albany, to enable improved high-speed rail passenger service between Boston and Washington in accordance with the goals for such service.

--Acquire, construct, improve, and install passenger stations, communications, electric power, public and private highway and pedestrian crossings, other safety facilities or equipment; and any other facilities or equipment necessary for the improved high-speed rail passenger service.

To resolve differing opinions concerning operations among the various users of the Northeast Corridor, the act establishes an operations review panel composed of five members, one each selected by Amtrak, the commuter rail authorities, and Conrail, and two neutral members selected by the Chairman of the National Mediation Board. Decisions of the panel are to be final and binding.

Basis for the authorized trip time goals

The trip time goals specified in the 4R Act differ from those recommended in the earlier Northeast Corridor studies and were not based on a formal engineering/economic analysis.

According to a March 1978 report on a study "The Great Railway Crisis" by a National Academy of Public Administration panel, the goals were a compromise arrived at during meetings between executive branch representatives and the Congress to work out legislation acceptable to both sides. According to the panel's report, the Senate representatives wanted the Department of Transportation to meet the goals in the earlier Department reports of 2-1/2 hours between Washington and New York and 3 hours between Boston and New York. The report stated that since the agreed funding of \$1.75 billion was half of the \$3.5 billion believed to be needed for the faster goals, 10 minutes was added to the Washington-New York goal and 40 minutes to the Boston-New York goal.

MANAGEMENT ARRANGEMENTS

There are three entities which have primary responsibility for NECIP--FRA, Amtrak, and DeLeuw, Cather/Parsons and Associates (DCP), FRA's principal architect and engineering contractor.

Responsibility for implementing NECIP was assigned to the Secretary of Transportation, who delegated the responsibility to FRA. FRA established the Northeast Corridor Project Office to handle the project.

On August 29, 1976, FRA signed a contract with Amtrak under which Amtrak has a dual role. As owner of most of the Northeast Corridor and operator of the intercity passenger service on the corridor, Amtrak is supposed to participate in program and project development and in construction supervision, testing, and acceptance. Amtrak was also designated as construction manager for much of the construction work under NECIP.

DCP is responsible for management support, system engineering, design, work package definition, cost estimates, and construction supervision and inspection. DCP is a joint venture, the principal firms of which are DeLeuw, Cather and Company and the Ralph M. Parsons Company.

PROJECT STATUS

To date, the Congress has appropriated \$1.055 billion for NECIP, as follows:

	<u>Amount</u>
	(millions)
1976	\$ 25
Transition quarter	25
1977	150
1978	400
1979	<u>455</u>
Total	<u>\$1,055</u>

As of January 27, 1979, FRA had expended \$358 million as follows:

<u>Type of work</u>	<u>Amount</u>
	(millions)
Project management and systems engineering:	
Amtrak	\$ 21.0
DCP	87.7
FRA	<u>12.0</u>
Subtotal	<u>120.7</u>
Design:	
DCP	<u>22.3</u>

<u>Type of work</u>	<u>Amount</u>
	(millions)
Construction:	
Amtrak	214.6
FRA	<u>0.4</u>
Subtotal	<u>215.0</u>
Total	<u>\$358.0</u>

On January 4, 1978, the Secretary of Transportation announced a "change in the concept" of NECIP to one which would provide the best possible on-time service for long distance passengers, commuters, and freight customers instead of just meeting the trip time goals established by the Congress. A redirection study was initiated to place greater emphasis on serving users of the Northeast Corridor and overcoming potential conflicts among intercity passenger, commuter, and freight operations.

The FRA Administrator stated that the redirection study was mainly to examine rail operations alternatives, not to make basic changes in the planned construction program. He pointed out that \$1.2 billion of the \$1.75 billion authorization was for eliminating deferred maintenance. The Administrator said, however, that the study would also provide a more realistic and current assessment of project costs and schedules and the best uses of the \$1.75 billion.

On January 15, 1979, the Secretary of Transportation announced the results of the redirection study. The study report stated that an additional \$654 million in Federal funding would be required for NECIP and that NECIP construction would not be completed until the end of 1983.

In June 1978, the Subcommittee on Government Activities and Transportation, House Committee on Government Operations, held hearings on NECIP's implementation. The subcommittee found numerous problems with the way NECIP was being implemented.

SCOPE OF REVIEW

Our review was directed primarily at (1) determining NECIP's current estimated completion dates and costs, (2) determining the changes in work planned under NECIP and the impacts of the changes, and (3) identifying problems in project management and their effects. We used the 4R Act goals and objectives as a standard for evaluating the

project in accordance with the Senators' April 7, 1978, letter.

We reviewed records and held discussions with personnel of the Department of Transportation, FRA, Amtrak, DCP, and consultants hired by FRA. We reviewed Federal Highway Administration (FHWA) audit reports which were prepared pursuant to an agreement with FRA. We also had discussions with FHWA audit personnel. We rode trains over part of the Northeast Corridor; visited corridor facilities in the Baltimore, Maryland, area; and observed some of the improvement work in progress.

Our review was mostly performed at:

- FRA's offices in Washington, D.C., and Philadelphia, Pennsylvania.
- Amtrak's offices in Washington, D.C., and Philadelphia, Pennsylvania.
- DCP's offices in Washington, D.C.; Hyattsville, Maryland; and Philadelphia, Pennsylvania.
- FHWA audit offices in Philadelphia, Pennsylvania.
- FRA consultants' offices in the Washington, D.C., area.

We also obtained information on new Canadian high-speed passenger equipment from MLW Industries Division of Bombardier-MLW Ltd., Montreal, Canada, which is the manufacturer and project manager for developing the equipment; the Canadian Ministry of Industry, Trade and Commerce, Ottawa, Canada, which sponsored the equipment's development; Canadian National Railways and CP Rail, Montreal, Canada, which tested the equipment; and VIA Rail Canada, Inc., Montreal, Canada, a Canadian Crown Corporation set up to operate Canada's passenger trains.

We obtained comments on the matters contained in this report from the Department of Transportation and Amtrak and their comments are included as appendixes II and III, respectively. We also obtained comments from DCP and other concerned contractors.

CHAPTER 2

PROJECT COST, SCHEDULE, AND ANTICIPATED RESULTS

The 4R Act specifies that regularly scheduled and dependable service meeting the mandated trip time goals is to be established by February 1981 and authorizes \$1.75 billion to implement NECIP. NECIP will not be completed until the end of 1983, except for the Boston area which will be completed in 1984 or later, and the goals cannot be met within the authorized \$1.75 billion. Because cost estimates substantially exceed the amount currently authorized and could vary considerably depending on what improvements are to be accomplished, the Congress will have to decide what type of project is desirable and what additional funding, if any, will be authorized.

Questions exist as to whether the trip time goals can be met because of safety-related speed limitations on the track and the availability of vehicles which can operate at the required speeds. Also, the trend of passenger traffic during the construction period indicates that the future traffic projections for the corridor may be overstated. NECIP estimates further show that passenger service on the corridor could require Federal operating subsidies, regardless of passenger demand.

ESTIMATED COMPLETION DATES

The Department of Transportation's estimated completion date for NECIP is the end of 1983, almost 3 years later than the completion date specified in the 4R Act. Work in the Boston area will not be completed until 1984 or later because the Massachusetts Bay Transportation Authority is modernizing and expanding the corridor route in that area. NECIP electrification cannot be completed until the Authority's work is completed and corridor traffic is being detoured to another line because of this work. The work in the Boston area is scheduled to be completed in 1984 but Amtrak told us that the Authority's work is running well behind schedule.

FRA's work schedule shows the following completion dates for the NECIP work elements:

<u>Work element</u>	<u>Estimated completion date</u>
Track structures	Late 1982
Bridges	Late 1983
Route realignments	Late 1981
Signaling	End of 1983
Electrification	End of 1983
Stations	Middle 1983
Communications	Late 1982
Tunnels	Early 1982
Maintenance and service facilities	Middle 1982
Fencing	Late 1982
Grade crossings	Late 1982

As discussed on page 88, most work has experienced a continuous slippage on completion dates. Based on performance to date, it appears possible that the scheduled 1983 completion dates will not be met.

ESTIMATED COST

According to the Department of Transportation's January 1979 redirection study report, the trip time goals of the 4R Act cannot be achieved with the \$1.75 billion authorized for NECIP. The Department's estimated Federal cost for its recommended work is \$2.4 billion. The estimated Federal cost could be \$3.65 billion or more if additional improvements are made to achieve more reliable and comfortable service and have a system with good maintenance characteristics.

As discussed in chapters 3, 4, and 5, the original cost estimates ^{1/} for NECIP were understated, management of NECIP has not been good and has resulted in wasted funds and inefficiency, and Amtrak's performance has been well below expectations. These factors have contributed to the required goals not being achieved within the funding authorized and also indicate that the latest cost estimates may be understated.

The project cost estimates do not include costs for indemnification of DCP against third-party liability (see p. 61), grade crossing elimination, some work on Union

^{1/}The August 1977 implementation plan cost estimates included provisions for an inflation rate of 7 percent a year.

Station in Washington, and acquisition of new vehicles by Amtrak. These costs are anticipated to be funded from sources other than the NECIP authorization.

Estimated cost of planned work

The estimated Federal cost of NECIP as shown in the January 1979 redirection study report is \$2.404 billion. The report noted that "no illusion of high precision should be inferred" concerning the estimate and that projects of the scale of NECIP "always have surprises, usually unpleasant." Other indications that the latest cost estimate may be subject to future changes include

- the Department's report, which states that some work items have not been finally resolved, such as the costs for converting commuter cars to the new electric system;
- the scopes of some work elements were changed after the Department prepared the report; and
- much of the material in the Department's report still indicates a 1981 completion date for NECIP.

The President of Amtrak told us that he believes the Department's cost estimate is too low.

As discussed in chapter 3, the planned work as of January 1979 has been reduced considerably from the work originally contemplated in the August 1977 draft implementation plan. FRA and DCP officials told us that they did not have an updated estimate of the cost to accomplish all the work in the original August 1977 plan. We also were unable to find a detailed list showing the estimated costs for the deleted work items. We compared the total dollar amounts for each work element in the August 1977 plan with those in the February 1978 plan and noted an overall reduction of \$199 million. This total most likely understates the work reductions since it only reflects the net reduction and does not account for any reduction which was offset by increases in cost estimates for the remaining work. The February 1978 and January 1979 work scopes are basically the same.

Estimated costs for other NECIP improvements

On October 3, 1977, DCP listed potential further improvements--estimated to cost \$1.048 billion--needed to provide reliable, comfortable service for the specified running times at the passenger demand levels estimated for the year 1990. DCP stated that the August 1977 draft implementation

plan did not satisfy the on-time reliability goal and these additional improvements were needed to improve trip time reliability and passenger comfort and to lower future operating and maintenance costs. The estimates were based on the assumption that all work in the August 1977 plan would be completed; the total estimated cost of NECIP if these improvements were made would be at least \$3.651 billion:

	<u>Estimated cost</u>
	(millions)
Work now planned	\$2,404
Work deleted from August 1977 plan	199
Additional improvements	<u>1,048</u>
Total	<u><u>\$3,651</u></u>

DCP categorized the potential improvements as follows:

	<u>Schedule</u> <u>reliability</u>	<u>Comfort</u>	<u>Maintainability</u>	<u>Total</u>
	- - - - - (millions) - - - - -			
Route re-alignments:				
Curves	\$ -	\$156	\$ -	\$ 156
Flyovers (note a)	71	-	-	71
Additional Tracks	147	-	-	147
Track structures:				
Track	-	-	55	55
Interlockings (note b)	19	-	5	24
Bridges: re-habilitation/ repair	-	-	44	44
Electrification:				
Catenary Equipment conversion	24	-	-	24
58	58	-	-	58
Signal/traffic control:				
Signal system	85	-	-	85
Equipment con- version	25	-	-	25
Fencing	47	-	-	47
Stations	-	44	-	44
Service facilities	-	-	43	43
Tunnels	<u>225</u>	<u>-</u>	<u>-</u>	<u>225</u>
 Total	 <u>\$701</u>	 <u>\$200</u>	 <u>\$147</u>	 <u>\$1,048</u>

a/A flyover is a grade-separated junction between rail lines where one line passes over the other.

b/An interlocking is an arrangement of signal appliances and special trackwork which allows trains to move from one track to another.

FRA and DCP officials told us that, based on later information, the 1990 demand projections which DCP had used appeared to be overstated; therefore, the congestion problems identified would be overstated and, consequently, some of the proposed improvements might not be needed. Any overstatement of the congestion problems for intercity passenger trains may be small because one assumption on which the DCP report was based was that priority was always given to

intercity trains over commuter and freight trains. It does not seem likely that commuter trains, with their many thousands of daily passengers, will always be delayed just to minimize delays to intercity trains.

The three types of improvements DCP proposed are discussed below.

Improving schedule reliability

According to a November 1977 FRA document on further improvements for the corridor, computer simulations of performance after completion of the corridor work in the August 1977 plan showed that on-time performance would be 75 to 80 percent in the corridor's southern end and somewhat higher in the northern end. Congestion was identified as the most frequent cause of delays. DCP proposed work amounting to \$701 million to improve schedule reliability.

FRA and DCP identified the Baltimore and Potomac tunnel (B&P tunnel) in Baltimore as the corridor's single largest bottleneck. During June 1978 hearings on NECIP, held by the Subcommittee on Government Activities and Transportation, House Committee on Government Operations, DCP's project director for NECIP and the former President of Amtrak both testified that a new tunnel was needed.

The 7,400-foot, double-track B&P tunnel was completed in 1873 and consists of three tunnel sections separated by two short open sections. Because of tight horizontal and vertical tunnel clearances at one curve, freight trains with oversize cars have to use a 928-foot long gauntlet track (a set of rails offset to the center of the tunnel--see photo on p. 18). The tunnel's second track cannot be used while the gauntlet track is being used. Computer simulations of projected 1990 traffic showed that about 76 percent of all freight trains would be delayed at the B&P tunnel, 6 percent would be delayed more than 5 hours and some for up to almost 8 hours. DCP proposed that two new single-track tunnels be built at an estimated cost of \$225 million.

Constructing additional tracks at various locations (\$147 million estimated cost) and flyovers at two interlocking locations (\$55 million) are additional examples of improvements DCP recommended. DCP stated that analyses of current capacity and modeling of proposed 1990 operations clearly indicated the need for additional tracks. According to DCP, lack of additional tracks would result in delays to intercity passenger trains and lower on-time percentages; freight and commuter trains would also be delayed to enable intercity passenger trains to lose as little time as



VIEW OF THE B&P TUNNEL IN BALTIMORE SHOWING THE GAUNTLET TRACK

possible. The two proposed flyovers would eliminate the interface between corridor trains and commuter trains, thus eliminating congestion delays.

Improving passenger comfort

Most DCP-proposed comfort improvements related to curves. DCP proposed a \$156 million program for spiral l/improvements. According to DCP, work in this country and overseas has investigated ride comfort in the spiral transition and has developed standards for the minimum comfort criteria passengers would find acceptable. NECIP's minimum spiral length was based on this limit of acceptable comfort.

DCP stated that in most cases existing spiral lengths on the corridor were less than the acceptable minimum. If the comfort standards were to be enforced, allowable speeds on the curves would have to be reduced which would increase trip times and affect the ability of trains to reliably meet the trip time goals. DCP also said that "it is our contention that the uncomfortable ride generated by the curves with inadequate spirals would inhibit the growth of ridership projected for 1990."

Improving future maintenance

The three main elements of DCP's proposal to reduce future maintenance and operating costs were track, bridges, and service facilities.

DCP stated that an additional 200 miles of concrete ties, estimated to cost \$30 million, should be installed to operate the corridor efficiently and at least cost. DCP also recommended a \$25 million program to upgrade the dedicated passenger tracks between New Rochelle and New Haven, a portion of the corridor not owned by Amtrak. DCP stated that eliminating deferred maintenance on this part of the corridor was required to meet 1990 operating requirements and reduce maintenance levels.

DCP proposed a \$44 million program for rehabilitating and repairing bridges. DCP stated that bridges not included in the NECIP bridge program would require frequent detailed inspections and follow-up maintenance to insure that their

l/A spiral is the transition curve between straight track and the curve itself. The outer rail is gradually raised above the inner rail to achieve the required banking or superelevation in the curve.

structural integrity is maintained. DCP assumed that after a bridge has been restored to a rated load capacity and painted, maintenance requirements would be minimal for the next 25 years. DCP's proposals also assumed that the bridge rehabilitation program originally included in the August 1977 implementation plan would be carried out, but the scope of the authorized bridge program has subsequently been considerably reduced.

DCP proposed an increase of \$43 million to increase service facility capabilities to the level required to maintain plant and vehicles for 1990 demand. The proposed work included increasing the size of buildings and yards at maintenance-of-way facilities and upgrading and improving repair facilities. Again, DCP's proposals assumed that the August 1977 draft plan would be implemented, but the scope of the planned service facility program was subsequently reduced.

ADDITIONAL WORK AFTER NECIP COMPLETION

In addition to the trip time goals, the 4R Act requires (1) improvements to routes to Harrisburg, Pennsylvania; Albany, New York; and Springfield, Massachusetts, and (2) corridor improvements to be compatible with future improvements in service levels.

Feeder routes

The act specifies that funds authorized for NECIP are to be used to improve the feeder routes after the running time goals for the corridor are reached. The total authorization of \$1.75 billion will be used for corridor work, leaving no funds for improving the feeder routes. FRA stated that the feeder routes are operating at reduced service levels due to many years of neglect and deferred essential maintenance. FRA estimated that it would cost \$415 million just to restore the lines to allow previous service levels, as follows:

	Estimated <u>cost</u>
	(millions)
Harrisburg - Philadelphia	\$165
Albany - New York City	100
New Haven - Springfield - Boston	<u>150</u>
Total	<u>\$415</u>

The above estimates do not include improvements such as electrifying nonelectrified line and major station improvements. Amtrak believes these estimates are too low.

Future service improvements

Regarding improvements in service levels on the corridor, the 4R Act directs the Secretary of Transportation to submit a report to the Congress within 2 years after the date of enactment on, among other things, the practicability of establishing regularly scheduled and dependable passenger service between Boston and New York operating on a 3-hour schedule and between Washington and New York on a 2-1/2-hour schedule, both including appropriate intermediate stops. The Department of Transportation's report, dated February 1978, stated that a financial analysis of alternatives to achieve further trip time improvements suggested that a fixed-plant intensive approach would be costly and that tilt-body vehicles, if proven to be technically feasible, would achieve the goals and thus should be considered a possible alternative. The tilt-body vehicles are vehicles with an active suspension system which provides additional banking on curves to protect passengers from excessive centrifugal force. Such vehicles would allow trains to go around curves at higher speeds than conventional equipment while maintaining the same degree of passenger comfort.

Fixed-plant capital improvements for faster service

Transportation's February 1978 report estimated that the cost of post-NECIP capital improvements to increase speeds from 120 to 150 miles per hour (mph) to achieve the shorter schedules would be \$890 million, broken down as follows:

<u>Type of work</u>	<u>Cost</u> (millions)
Curve realignments	\$663
Increasing space between track centers for passenger and freight tracks below New York	42
Incremental improvements in the New Rochelle-New Haven segment (which is not owned by Amtrak)	89
Converting Metropolitan Transit Authority/Connecticut Department of Transportation commuter equipment to allow the change to higher voltage electric power	32
Changing signaling and traffic control systems	<u>64</u>
Total	<u>\$890</u>

DCP submitted a report to FRA dated August 1978 on the work required to reduce trip times to 2-1/2 hours between Washington and New York and 3 hours between Boston and New York and to achieve required 1990 system capacity. DCP's estimated cost for this was \$1.099 billion. DCP assumed that all the work originally included in the August 1977 draft implementation master plan and the additional improvements recommended on October 3, 1977, would be implemented. Therefore, DCP's cost estimate would be over and above the costs for the August and October 1977 work.

DCP's cost estimate was broken down as follows:

	<u>Trip time</u>	<u>Schedule reliability</u>	<u>Maintenance</u>	<u>Total</u>
	- - - - - (millions) - - - - -			
Curve realignments	<u>a/\$600</u>	\$ -	\$ -	\$ 600
Additional tracks	-	415	-	415
Signaling and traffic control system	-	69	-	69
Service facilities	-	-	<u>15</u>	<u>15</u>
Total	<u>\$600</u>	<u>\$484</u>	<u>\$ 15</u>	<u>\$1,099</u>

a/Includes estimated cost for increasing space between track centers.

Use of tilt-body vehicles

High-speed vehicles with powered tilting mechanisms are being developed in several European countries and Canada. Both FRA and DCP reports on further improvements in running times stated that tilt-body vehicles had the potential to meet the future reduced running time objectives and that fixed-plant capital costs could be significantly reduced by using such vehicles. FRA estimated that fixed-plant capital costs would only be \$89 million if tilt-body vehicles were used instead of the \$890 million FRA estimated if non-tilt-body vehicles were used. FRA and DCP estimated that the acquisition cost of tilt-body vehicles would be \$71,000 to \$75,000 more than for conventional equipment, but, relative to the cost of the conventional vehicle, this is negligible.

Computer simulations have been made of trip times using various types of equipment and based on the completed improvement work. An August 1978 FRA report on long-range train considerations contains the results of simulations based on tilt-body vehicles and the 120-mph maximum speed which NECIP is to achieve. The simulations indicated that the tilt-bodies could meet the 3-hour goal between New York and Boston but would be 3 minutes over the 2-1/2-hour goal between New York and Washington.

One example of tilt-body equipment is the Canadian Light, Rapid, Comfortable (LRC) train. This train consists of a diesel-powered locomotive(s), which does not have a tilt mechanism but is designed for higher speeds on curves, and passenger coaches which have hydraulically powered tilting or banking suspension mechanisms. The current LRC equipment is diesel powered and has a maximum operating speed of 125 mph. One prototype locomotive and coach exist which have been tested for about 150,000 miles, according to officials of MLW Industries. The tests included runs on the Northeast Corridor and at the FRA test center in Pueblo, Colorado.

Production LRC equipment has been ordered by Amtrak, which will lease two trainsets for use in the Pacific Northwest, and by VIA Rail for use in various parts of Canada. Delivery of the equipment is scheduled to start in mid- or late 1979.

Based on a review of various reports on LRC tests and discussions with MLW Industries officials; the Canadian Ministry of Industry, Trade and Commerce; Canadian National Railways; and VIA Rail, it appears that LRC equipment has the capability to negotiate curves at higher speeds than conventional equipment, resulting in reduced running times

without having to make additional improvements to the right-of-way. MLW Industries officials estimated that using LRC equipment on a route with average curves with average superelevation (banking of railroad track on a curve) could improve running times by an average of about 15 percent. They also believed that the equipment could reduce running times between Boston and New York by about 20 minutes, but did not believe there would be very much improvement in times between Washington and New York because of few curves on that part of the corridor.

According to MLW Industries officials, an LRC coach would cost about the same as a conventional coach and the LRC banking mechanism would add little additional maintenance cost. An official of CP Rail, which tested the prototype LRC equipment for a 4-week period, informed us that the equipment was quite reliable and required minimum maintenance. On the other hand, officials of Canadian National Railways, which tested the prototype LRC equipment for 9 months, told us that the prototype equipment's availability for service percentage was poor because of its complexity and poor accessibility of components and because the equipment required extensive maintenance. An official of VIA Rail told us that VIA Rail's decision to buy 22 LRC locomotives and 50 LRC coaches was made after competitive bids for new passenger equipment were obtained and evaluated for such things as estimated costs over the equipment's 20-year life, operating capabilities, maintenance, reliability, product support, and potential for generating revenue.

Amtrak told us that the stress on the rail from the wheel and the additional heavy maintenance costs required would also have to be considered.

QUESTIONS ABOUT ABILITY TO ACHIEVE REQUIRED OPERATING SPEEDS AND DEMAND LEVELS

To achieve the trip time goals mandated by the 4R Act, NECIP's plans call for a maximum operating speed of 120 mph on the Northeast Corridor. However, questions about safety-related speed limits and operating capabilities of new equipment must be resolved before 120-mph speeds can be achieved.

Safety-related speed limits for track

FRA safety regulations (49 C.F.R. 213.9) state that the highest category of track is class 6 track, which has a maximum allowable speed of 110 mph. The regulations provide that operating speeds may not exceed 110 mph without prior

approval of the Federal Railroad Administrator and that petitions for approval must provide sufficient information concerning such things as performance characteristics, trespasser control, equipment, and maintenance and inspection practices to establish that the proposed speed can be sustained in safety.

An official of FRA's Office of Safety told us that in November 1977 Amtrak sent a letter to the Office of Safety about raising the speed limit on the corridor, and Amtrak was told that extensive information would be required to justify a waiver. The official said that Amtrak had not provided the requested information as of February 1979. He said that based on present track inspection records, FRA would be hesitant to grant a waiver because Amtrak has not adequately maintained its track. He also said that to permit safe operations at 120 mph, the track would have to be almost perfect.

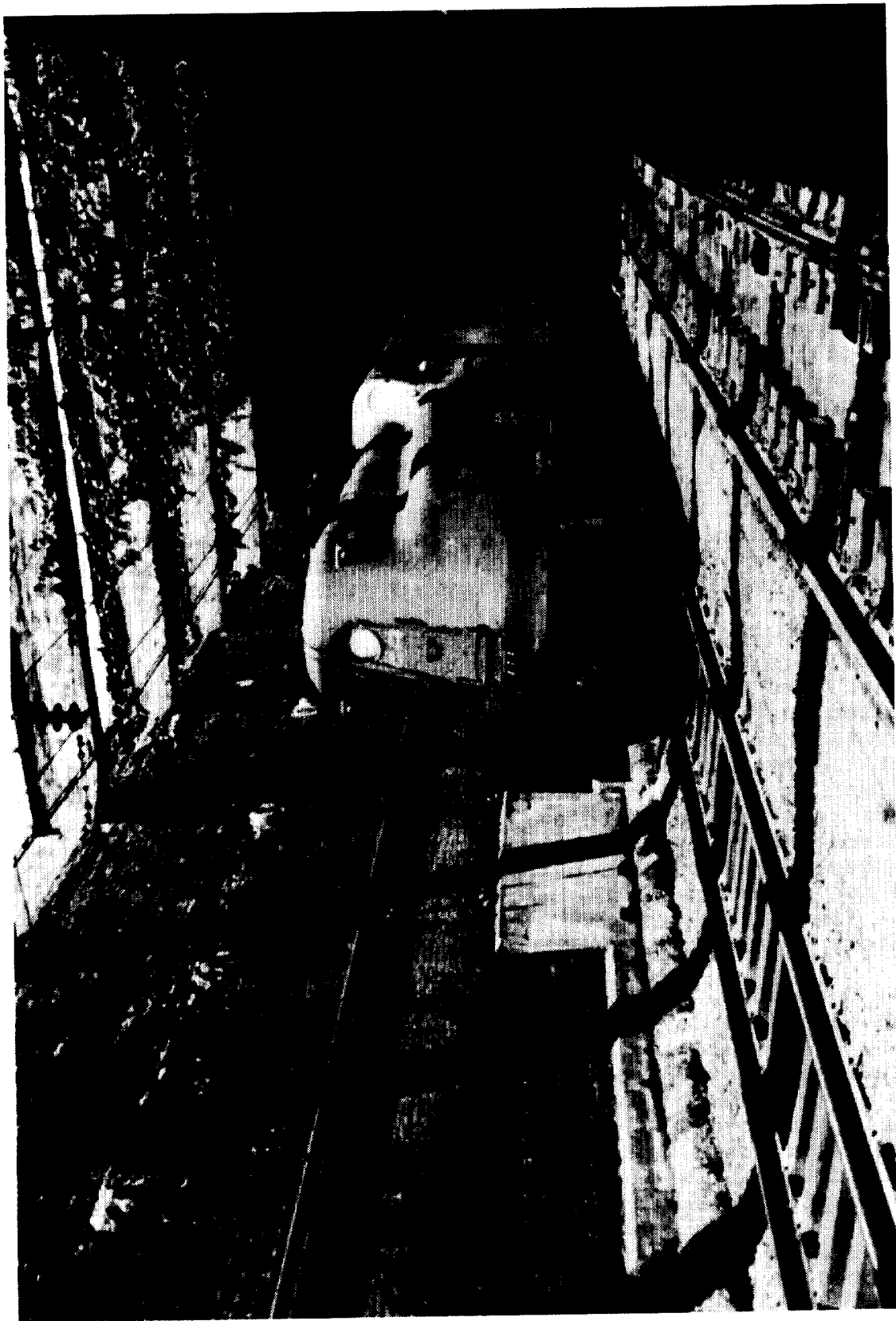
The issue of safety-related speed limits could raise some questions about FRA's role in NECIP; FRA will be asked to grant a waiver for a project for which it is responsible, which may impair its objectivity.

The Department of Transportation told us that no aspect of NECIP is given greater attention than safe rail operations. The Department said that the Office of Safety indicated that it anticipated no problem in permitting 120-mph operation on class 6 track. The Department also pointed out that the Penn Central had operated corridor trains at over 110 mph as recently as a few years ago and that foreign railroads regularly operate at speeds as high as 132 mph. The Department's comments, however, do not specifically address the question raised about Amtrak's maintenance of the track, and the fact remains that a waiver has not yet been granted.

Vehicle capability

Currently, Amtrak's electric locomotive power on the Northeast Corridor consists of 61 self-propelled Metroliner cars, 26 E-60 locomotives, and 42 GG-1 locomotives. The Metroliner cars are capable of 120-mph speeds but the E-60s are restricted to less than 90 mph. The GG-1s (see photo on p. 26) have over 100-mph capability but are old, the earliest ones having been built in the mid-1930s. According to FRA, none of the GG-1s can be economically converted for operation on the improved corridor.

The 4R Act does not provide funding for vehicles to be operated on the improved corridor, and before the redirection study little detailed planning was done concerning specific



GG-1 ELECTRIC LOCOMOTIVE AT B&P TUNNEL IN BALTIMORE

equipment needs. Although Amtrak had done some preliminary work concerning equipment requirements, FRA assumed responsibility for such planning in conjunction with its redirection study. The January 1979 redirection study report calls for a mix of 34 upgraded Metroliners and new light-weight electric locomotives (AEM-7s).

The AEM-7 design is based on the Swedish ASEA Rc4A locomotive (designed for 100-mph speeds) which was tested in corridor operations in 1976. It will be heavier to accommodate certain U.S. safety requirements and the gearing will be modified to allow 120-mph speeds. The first AEM-7 is scheduled for delivery by the end of 1979. The AEM-7's capabilities will not be known with certainty until the first engine is built and successfully tested. The E-60 locomotives were also designed for 120-mph high-speed service but have been restricted to less than 90-mph operations because of their excessive weight, which contributes to accelerated track deterioration, and safety reasons.

Demand projections are questionable
and operating losses are possible

The August 1977 draft programmatic environmental impact statement for NECIP projected an increase in ridership to 26.4 million in 1990 resulting from improvements afforded by NECIP. It also projected a 14.8 million ridership by 1982. Subsequently, FRA developed new projections for 1982 and 1990. FRA selected the projections it considered the "most likely" to be achieved--21.8 million riders in 1990 and 14.7 million riders in 1982. The primary factors causing this decreased ridership in 1990 are availability of more current population and income projections which are less optimistic than those used for the earlier analyses, revised fare structures which call for higher fares than previously projected, and longer trip times on the corridor. (The earlier analyses had assumed that trip times faster than the 2 hour-40 minute and 3 hour-40 minute goals would be achieved in the late 1980s, resulting in an increased ridership.) Amtrak told us that it had questioned the 1990 passenger forecasts at the beginning of NECIP but FRA had assured Amtrak that five different studies had confirmed FRA's numbers.

The projected ridership of 14.7 million in 1982 was based on completing the corridor in 1981 and instituting the improved trip times. FRA believes that a major increase in ridership might be realized immediately after the improved service begins, followed by a period of continued growth at a slower rate. FRA and Amtrak reports tend to show overall increases in ridership between fiscal years 1978 and 1982, despite construction work. Actual fiscal year 1978

ridership of 9.7 million passengers, however, was less than the 11.1 million passengers shown in the projections, and traffic in recent years has not been increasing.

<u>Year</u>	<u>Number of passengers</u> (millions)
1972	8.1
1973	8.7
1974	10.0
1975	9.6
1976	9.7
1977	9.8
1978	9.7

Also, as the construction program stretches out, resulting in delays and longer trip times, ridership may decline further. The director of the FRA NECIP agreed with us that ridership will probably decline until the major construction work is completed. He maintains, however, that when the work is completed, ridership will markedly improve, possibly beyond current projections. We believe that such assumptions may be overly optimistic because, as the construction activity continues (resulting in delays and increased travel times), passengers probably will seek alternative means of transportation. It may be extremely difficult to "win back" these riders considering their firsthand experience with the earlier deteriorated service. In addition, to the extent that station improvements and other nonoperational improvements (such as parking facilities) are deleted from the program, ridership may further decline.

The Department of Transportation told us that Amtrak and FRA agree that ridership will remain at about 11 million annually during the construction period and that ridership should improve as a result of the Metroliner rebuilding program underway. As shown above, however, annual ridership has never reached 11 million in recent years and was as high as 10 million only in 1974, when the Arab oil embargo occurred.

Regardless of the number of riders who will ride on the improved corridor, the service may not produce a profit. FRA data as of June 1978 indicated that the fiscal year 1990 deficit per revenue passenger mile will be in the range of 1.5 cents to 5.4 cents, or a total of \$37 million to \$137 million. Although this is an improvement over the 9.2 cents per mile deficit experienced in fiscal year 1976 and the 8.2 cents per mile deficit of fiscal year 1977, it is still far from profitability. Since the Federal Government provides

the funds to cover Amtrak's losses, future corridor operations could require continuing Federal subsidies.

The Department of Transportation told us that its February 1978 "2-Year Report" identified combinations of service levels, fares, demand-growth assumptions, and costs that show breakeven or profitable operations in the future. The Department said that Amtrak and FRA are pursuing these options and that NECIP will provide a system that should be more than able to cover operating costs with prudent Amtrak management and aggressive marketing innovations. While the "2-Year Report" shows some conditions under which future corridor service would not incur a deficit, none of the options correspond exactly to the recommended service contained in the Department's redirection study report. The deficit figures we showed above were contained in a later FRA report, the June 1978 final programmatic environmental impact statement. In any case, the available information shows that corridor service may operate at a deficit after NECIP is completed.

Under the Rail Passenger Service Act of 1970, Amtrak's need for Federal assistance is channeled through the Department of Transportation and becomes part of the Department's budget request that is ultimately submitted to the Congress. Federal funds appropriated by the Congress for Amtrak also flow through the Department.

CONCLUSIONS

NECIP will not be completed within the time frame and cost authorization specified by the 4R Act. The act specifies that the improved service was to be established by February 1981. The latest estimated completion date for NECIP is the end of 1983 (1984 in the Boston area) and that date may not be met if construction progress does not improve.

The Department of Transportation's estimated cost to complete the work as presently planned is \$2.404 billion but there are indications that this estimate may have to be changed in the future. Also, as discussed in chapter 3, the work scope has been reduced from what was originally intended. The cost of the deleted work is at least \$199 million, which would make the estimated cost of the originally intended work at least \$2.603 billion. Moreover, DCP proposed that another \$1.048 billion in work should be done to provide reliable, comfortable service for the running times specified in the act at projected 1990 demand levels. If these additional improvements were added, the total cost of the 4R Act goals would be at least \$3.651 billion.

Additional 4R Act objectives relate to future improvements to certain feeder routes and further improved running times. FRA estimated that it would cost \$415 million just to restore the feeder lines to former service levels, thus the cost of further improvements would undoubtedly be much higher. DCP's estimated cost for capital improvements to provide for further improvements in running times was \$1.099 billion. Thus the costs for the 4R Act goals and the rehabilitation work on the feeder lines could total more than \$4.066 billion. Capital improvements to achieve further improvements in running time could bring the total up to more than \$5.165 billion.

Tilt-body vehicles appear to have the potential to greatly reduce the cost of achieving further running time improvements, and using such vehicles should be carefully considered if such improvements are to be made. Amtrak's forthcoming use of Canadian LRC vehicles should afford an opportunity for evaluating the practicality of tilt-body vehicles.

Questions about the safety-related speed limitations on track and the capabilities of the new locomotives need to be resolved before reliable service meeting the 4R Act goals is realized. Further, projected passenger demand figures for the period after NECIP completion may be overstated and improved corridor service could require continuing Federal operating subsidies.

Because of the extremely high potential costs involved--more than an estimated \$5 billion--we believe that the Congress should decide what improvements are desirable and what additional funding, if any, should be authorized.

AGENCY COMMENTS AND OUR EVALUATION

NECIP completion date and estimated cost

The Department of Transportation agreed that the Congress should assess its expectations from NECIP and adopt a realistic program scope, schedule, and budget for the project. The Department also agreed that the trip time goals could not be met by 1981 or within the \$1.75 billion authorized. The Department stated that its redirection study had conclusively demonstrated that the 4R Act's major goals were never achievable within the specified target date and funding and cited four key factors contributing to its conclusion:

- The unusual size and complexity of NECIP in conjunction with the need to rapidly assemble a team of engineers and designers.

- Amtrak did not own or operate the corridor when NECIP was authorized and had no construction experience.
- The need to maintain acceptable levels of service during construction.
- The number and variety of institutions with which FRA must work.

While we recognize that the factors cited by the Department make NECIP implementation a far from simple task, they do not in themselves prove that NECIP could never have been completed within the authorized time and funding. The Department's redirection study report also does not prove that the goals could never have been met within the authorized time and funding; it presents a case for saying that NECIP now cannot be completed within the authorization. The scope of our work did not include the highly technical evaluation necessary to reach an opinion on the reasonableness of the 4R Act's goals and authorization. Therefore, we cannot say whether the goals could ever have been achieved within the authorized time and funding. It seems, however that the factors cited by the Department should have been evident before NECIP was initiated and that 3 years is a long time for the Department to decide, and inform the Congress, that these factors always precluded the implementation of the goals within the authorized time and funds.

Feeder routes

The Department of Transportation stated that the record demonstrates that improvements to the feeder routes could not be made within the \$1.75 billion authorized for NECIP and this was known when the 4R Act was enacted, and that the Department never considered that the improvements could be achieved under the current NECIP authorization. The 4R Act did include improvements to the feeder lines as one of its requirements, but provided that funds were to be used for feeder lines after the corridor goals were met. We agree that, at least from the time of the August 1977 draft implementation master plan, the Department has not considered the feeder line improvements to be achievable under the current authorization.

Estimated costs for additional improvements

The Department of Transportation disagreed with our inclusion of a discussion on other NECIP improvements, because FRA was studying these improvements in relation to the feasibility of achieving further improvements in running time and the 4R Act only called for feasibility studies on

these improvements. The Department stated that the scope of NECIP, as far as planned improvements by 1984 are concerned, should not exceed the \$2.404 billion recommended in the redirection study report and that the Department's February 1978 "2-Year Report" contained a comprehensive description of potential enhancements to the corridor. The Department suggested that our conclusions be revised to reflect the redirection study's recommended program and that we avoid speculating on how much might be invested in the corridor in the post-NECIP environment. The Department said that readers would be better served by a reference to the Department's "2-Year Report" and the 4R Act requirement for an updating of the report by February 1982.

We have recognized the Department's redirection study report and its recommended program as appropriate in our report. As noted previously, the Department's \$2.404 billion estimated cost may be subject to future change. Our discussion of cost estimates for work in addition to the Department's recommended program included more than just the post-NECIP improvements cited by the Department. The estimates include costs for improvements eliminated after the August 1977 plan; further improvements recommended by DCP to improve trip time reliability, passenger comfort, and future operating and maintenance costs under the 4R Act goals; feeder line improvements; and further improvements in feeder running times. The Department's February 1978 "2-Year Report" did not address all these categories and did not comprehensively discuss the costs for the various options. We realize that the cost estimates we present are by no means firm and would vary depending on what additional work, if any, is authorized. However, the Congress will have to consider the Department's request for additional funding and we believe it is important for the Congress to be informed of the possible options and their cost implications now, rather than waiting until the Department's 1982 report.

RECOMMENDATIONS TO THE CONGRESS

We recommend that the Congress decide what improvements are desirable and what additional funding, if any, should be provided to (1) meet the 4R Act's trip time goals, (2) make any improvements to feeder lines, and (3) further improve trip time goals for the Northeast Corridor, particularly considering the potential use of tilt-body vehicles to achieve such improvements. The Congress could:

- Terminate the project now and make no additional improvements.

- Restrict the work to what can be accomplished with the \$1.75 billion already authorized, which would allow a considerable amount of improvements to the corridor but would not achieve trip time goals.
- Provide for completing the work in current NECIP plans, which is intended to achieve trip time goals but would be less than originally anticipated. This work would require estimated funding of about \$2.4 billion.
- Complete the work originally anticipated in the August 1977 implementation plan which would require estimated funding of at least \$2.6 billion.
- Include all the work recommended by DCP to provide reliable, comfortable service meeting the trip time goals at projected 1990 demand levels. Total estimated funding for this would be at least \$3.7 billion.
- Restore feeder routes to former service levels, which would cost an estimated \$415 million or make further improvements to those routes, the cost of which has not been estimated but would be much more than \$415 million. Restoring the feeder routes and making all recommended improvements to the corridor would require estimated funding of at least \$4.1 billion.
- Provide for the further trip time improvements contemplated by the 4R Act. The cost to achieve this goal and restore service on the feeder routes would be more than \$5.2 billion if capital improvements were made to meet the goals with conventional vehicles. Using tilt-body vehicles could reduce the funding required under this alternative.

CHAPTER 3

PLANNED PROJECT IMPROVEMENTS HAVE BEEN CURTAILED

The scope of work planned for NECIP has been considerably reduced from the August 1977 planned work resulting in

- increased future maintenance costs for Amtrak,
- reduced passenger comfort,
- reduced on-time reliability, and
- reduced safety.

According to FRA's then Acting Project Director, the reason for the February 1978 major changes in project budgets and scopes was a realization that budgeted costs were being exceeded, which triggered the need for reassessing project priorities. Because we were not able to find documentation on all the changes, we had to rely in some cases on comments by various officials regarding the reasons for changes and the impact of such changes.

FRA, DCP, and Amtrak have not quantified the impact of the changes in the project's work scope. In most instances an impact is easily demonstrated, but quantification is difficult. For example, changing the bridge criteria eliminated many bridges which needed work. FRA, Amtrak, and DCP officials, however, could not estimate when the effect of deferring this work in terms of increased maintenance would be felt. Another example is the impact on passenger and crew safety from not improving the fencing on many overhead bridges with fencing that does not meet NECIP's standards.

OVERALL CHANGES IN WORK SCOPE AND THEIR IMPACT

The August 1977 draft implementation master plan was the first document that organized the improvements for all project elements into individual projects--some corridor-wide and some by segment of track--with scheduled milestones and costs to meet the completion date and funding authorization specified by the 4R Act. It also was the basis for the draft environmental impact statement on NECIP issued in August 1977.

In analyzing the changes made and the impact of such changes on the project goals, we found that there were

problems with the implementation plan, including

- inconsistencies within the implementation plan between the overall summary of work for the 11 major project elements and the detailed backup schedules,
- inconsistencies between the implementation plan and other documents prepared at the same time by project managers, and
- the fact that the plan had not been updated even though project element budgets and work scopes have been substantially revised.

In addition, according to many officials, the cost estimates, quantity estimates, and completion dates for many project elements were, at best, rough approximations. For example, the improvement costs for many bridges will not be known until a complete field investigation is finished. The Department of Transportation told us that the estimated cost of bridge work, as well as all other work elements, will improve as more and better information is available. It said that initial estimates were based on preliminary data which is being updated as more thorough inspections and design work are performed.

As a result of problems with the implementation plan, many FRA managers did not know the work scope of the project elements for which they had management responsibility. We also noted during our review that managers in FRA, DCP, and Amtrak seemed confused by the then on-going redirection study and by the revised funding levels and work scopes shown in a February 16, 1978, document, which had never been officially approved. According to FRA and DCP officials, the February 1978 document was used for planning purposes until the redirection study was completed.

We compared the work scopes in the August 1977 draft implementation master plan, as best we could determine them, with the work shown in the February 1978 tentative plan. Even though the redirection study report was not issued until January 1979--after we had completed our field work--we compared the February 1978 and January 1979 work scopes and found them to be basically the same. Accordingly, our comments apply to the changes from August 1977 to January 1979.

The following table shows the budget levels, which include the non-Federal share of the costs, and changes for NECIP's 11 project elements and system engineering and program management.

<u>Project element</u>	<u>August 1977 plan</u>	<u>February 1978 plan</u>	<u>January 1979 recommended program</u>
	(millions)		
Route realignment	\$ 151.2	\$ 38.0	\$ 84.6
Track structures	448.2	532.7	722.0
Bridges	242.5	188.0	239.6
Electrification	234.8	267.0	349.9
Signaling and traffic control	163.3	177.0	259.7
Communications	24.7	24.0	33.6
Fencing	48.5	42.0	49.4
Grade crossings	4.0	4.0	16.0
Stations	222.2	212.8	214.7
Service facilities	103.8	89.0	159.9
Tunnels	18.4	19.5	29.7
Systems engineering and program management	<u>158.4</u>	<u>231.0</u>	<u>297.9</u>
Total	<u>\$1,820.0</u>	<u>\$1,825.0</u>	<u>\$2,457.0</u>

In addition to the trip time goals specified in the 4R Act, FRA has specified a number of goals against which we have measured the impact of project element reductions. These goals are:

- The service performance goals shall decrease the lateness allowance and improve on-time dependability.
- The design consideration for all elements of the system shall emphasize safety.
- The passenger ride comfort levels shall be consistent with acceptable state-of-the-art levels for vibration and noise.
- The stations shall meet contemporary standards for passenger comfort and conveniences.
- The security characteristics shall be designed to minimize vulnerability of the Northeast Corridor to intrusions, vandalism, and other illegal activities.

Many performance goals have been compromised by the revised work scopes. The project element changes that would adversely affect project quality are in route realignments, track structures, bridges, fencing, stations, and service facilities. The following table shows the impact or impacts that we identified.

Performance goals

<u>Project element</u>	<u>Service reliability</u>	<u>Passenger comfort</u>	<u>Safety</u>	<u>Maintainability</u>
Route realignments		X		X
Track structures	X			X
Bridges	X			X
Fencing	X		X	X
Stations		X		
Service facilities	X			

Although the January 1979 recommended program was just completed, the work scopes of some project elements continue to change. For example, the bridge element has since been revised because, according to an FRA official, some bridges that had been scheduled for replacement in the January 1979 program are now to be rehabilitated instead. He said this change resulted from more detailed engineering studies. Further, according to the Department of Transportation, the fencing budget will continue to change as more detailed design information becomes available and safety concerns become more apparent.

FRA has revised its goal for on-time reliability. The original goal was to have 95 percent of the trains arrive within 5 minutes of the scheduled time, but this was reduced to 80 percent on-time within 5 minutes. At hearings in June 1978 before the Subcommittee on Government Activities and Transportation, House Committee on Government Operations, FRA's NECIP Project Director testified that the original goal was found to be unrealistic. He pointed out that the reliability goals in many foreign countries were lower than NECIP's original goal, ranging from 80 percent on time in the United Kingdom to 90 percent within 5 minutes in France and 90 percent on time in Germany. Amtrak's current goal for its passenger operations is 85 percent on time within 10 minutes.

ROUTE REALIGNMENTS

Route realignments involve various types of work, such as realigning curves, which contribute to safe high-speed operations and achieving trip time goals. Under the January 1979 plan, the route realignment budget is \$84.6 million, which is a reduction of \$66.6 million from the August 1977 plan and an increase of \$46.6 million from the February 1978 plan. The net changes to the route realignment work since August 1977 are the elimination of realignment work on 161 curves that were in the August 1977 plan and the addition of time saving improvements on the New York to Washington segment. These improvements were needed to meet the trip time and reliability goals and include reconfiguration of several interlockings and improvements to two groups of curves to increase the operating speed to 120 mph. Other than these two groups of curves, the only curves remaining in the program are those to accommodate improvements to stations, bridges, and interlockings, and the worst passenger comfort curves. The reductions in the route realignment project element will decrease passenger comfort and increase track maintenance.

FRA and DCP officials said the curve realignment project element was changed because they realized there were more cost effective ways to reduce trip times.

Passenger comfort

Curves affect passenger comfort in two areas: (1) the spiral transition between straight track and the curve proper and (2) the curve itself.

The January 1979 plan will not provide as high a level of comfort as the August 1977 plan and in some cases will produce a jerk rate 1/ in excess of the level recommended by the American Railway Engineering Association. 2/ According to the Association, a suitable transition from no curvature--straight track--to a given constant curvature--curve--is a

1/Jerk rate, a criterion for passenger comfort, is the rate of change of unbalanced acceleration acting on a passenger.

2/A professional association of railroad officers, engineers, and supervisors whose purpose is to advance knowledge on maintaining and operating railroads. The American Railway Engineering Association has published a Manual for Railway Engineering with recommended standards for various aspects of railroad operation.

requirement for a smooth, comfortable ride. Based on DCP records, the jerk rate on at least 33 curves dropped from the project is in excess of the Association-recommended limit. According to a DCP memorandum to FRA discussing the 28 curves with the highest jerk rates which were dropped from the project, reconstructing these curves would measurably enhance the railroad's quality.

The Department of Transportation told us that empirical data gathered by FRA led to the conclusion that the initial NECIP standards were unnecessarily rigid and required relaxation. It also commented that passenger comfort under the recommended program will be enhanced over present-day levels and will fall within American Railway Engineering Association recommended limits. We do not disagree with the Department concerning the improved level of passenger comfort compared to the present-day level; however, its own analysis stated that the jerk rate on some curves will be "marginally greater" than the recommended level.

Another area of passenger comfort that may be compromised involves changing the allowable lateral imbalance in the curve proper, which requires a waiver of FRA safety regulations. Amtrak contended that the FRA standard, which limited lateral imbalance to 3 inches, is based on overly restrictive passenger comfort criteria rather than safety criteria. Amtrak obtained a waiver of FRA's track safety standards to permit trains to be tested with a lateral imbalance of up to 6 inches on the Northeast Corridor.

According to an FRA official, the tests were conducted in November 1978 and showed that the 3-inch lateral imbalance standard could be exceeded in some instances with no decrease in passenger comfort. Further testing is planned for later in 1979 with emphasis on the safety aspects of increased lateral imbalance. The official said that there are no plans to apply for a waiver of FRA safety regulations under the January 1979 recommended program, but if the planned tests are successful, such a waiver may be requested as part of FRA's efforts to identify additional trip time improvements in the post-NECIP period.

Maintenance

In addition to reducing passenger comfort, changes involving the jerk rate and lateral imbalance will also increase track maintenance. According to an FRA study, maintenance experience has clearly proven that proper length spirals are easier to maintain at high-speed passenger service standards. Regarding lateral imbalance, a DCP study

stated that the additional dynamic loading to the track structure might increase the rate of track deterioration. Neither FRA nor DCP were able to quantify the extent to which maintenance would be increased as a result of the foregoing changes.

TRACK STRUCTURES

Track structures with a budget of \$722 million, an increase of \$274 million from August 1977, is the largest and, according to top level FRA, DCP, and Amtrak officials, the most important project element.

In addition to the basic track work estimated to cost \$377 million (including interlocking rehabilitation), the track structures budget includes \$62 million for work in connection with the Massachusetts Bay Transportation Authority improvement project in the Boston area, \$130 million for equipment procurement, \$57 million for interlocking reconfigurations, \$49 million for tunnel and service facilities trackwork, and \$47 million for such things as access roads and right-of-way cleanup. The only decrease since August 1977 has been in interlockings. Track work, the largest component of this element, and interlockings are discussed below.

Track work

According to the track work plan, improvements will be made to the rails, ties, ballast, 1/ and subgrade. 2/ The major improvements are

- replacing jointed rail with continuous welded rail on 520 track miles,
- replacing unfit ties on 1,075 track miles, including complete renewal with concrete ties on 400 miles of track,
- track undercutting 3/ and ballast cleaning on about 500 miles of track, and

1/Ballast is the crushed gravel or rock laid to form a bed for the railroad.

2/Subgrade is the foundation which supports the ballast and track structure.

3/Undercutting is the removal of ballast from below the tracks while the rails and ties remain in place.

--improving shoulders and drainage on 85 miles of track.

A photograph showing some of the track work in progress is on page 42.

Amtrak, FRA, and DCP officials told us that the February 1978 track work plan was basically unchanged from the track work plan on which the August 1977 implementation plan was based. To verify this we compared the plan on which the August 1977 implementation plan was based with the February 1978 plan for selected track segments and found that they were basically the same.

According to DCP and FRA officials, the primary reasons for increasing the track work budget were that

--Amtrak's production was initially overestimated and

--the track is in worse condition than indicated by earlier surveys.

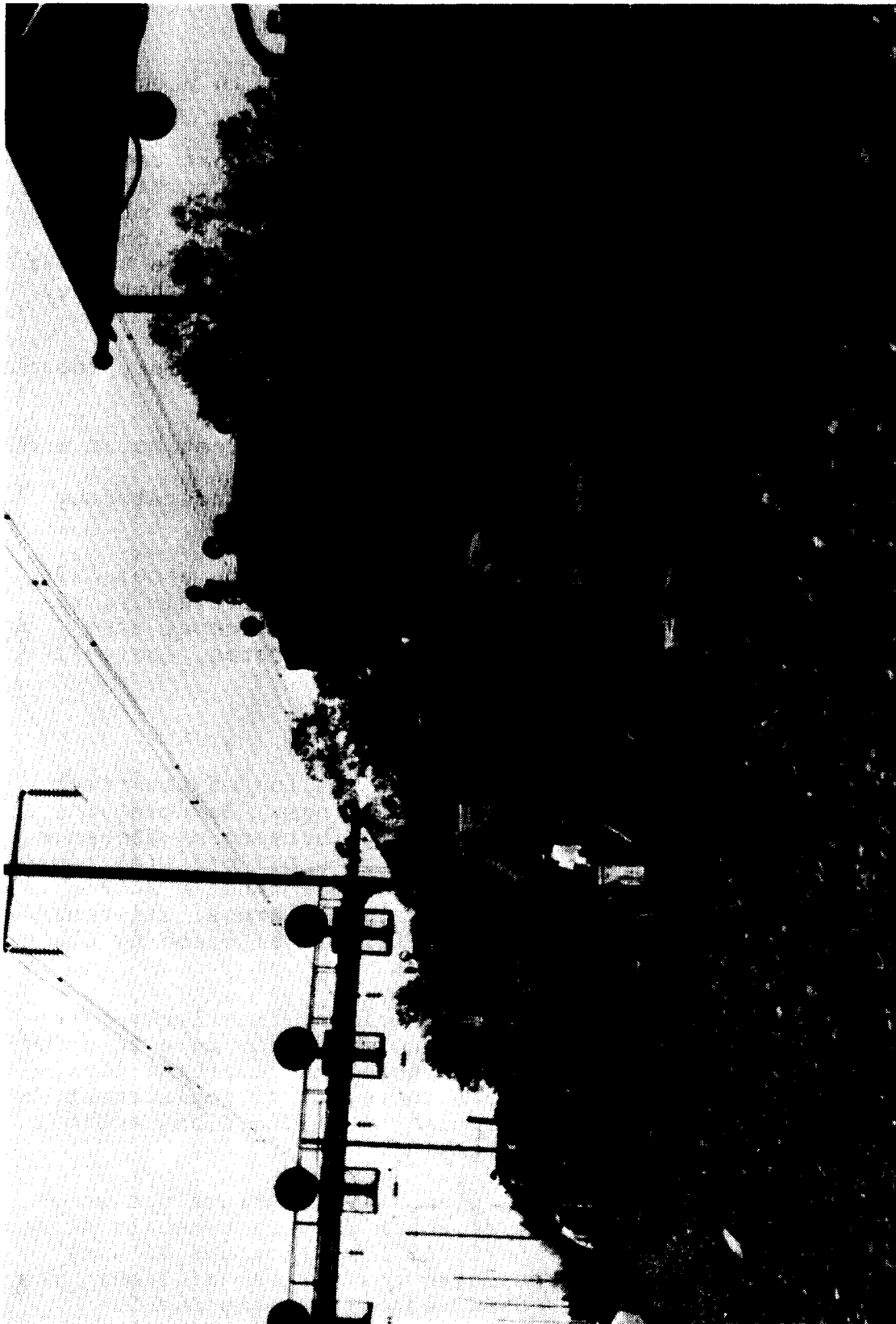
The cost of track work has increased from about \$230 million to \$377 million. According to DCP officials, the change is due to net increases in the work scope, more accurate definition of Amtrak production rates, and refined estimates of material costs.

Interlocking work

As of January 1979, about \$122 million of the track structure budget related to interlockings. Reducing the interlocking program would generally increase maintenance and/or reduce operating flexibility. A DCP official could not estimate the extent of increased maintenance and/or reduced flexibility because, as in other areas, maintenance experience is lacking and flexibility is affected by changes made to other nearby interlockings.

According to DCP and FRA officials, interlocking rehabilitations and reconfigurations are being done to eliminate slow orders, reduce maintenance, and increase flexibility. Rehabilitation refers to repair or replacement in kind, whereas reconfiguration is the elimination, addition, or modification of an interlocking.

Under the January 1979 plan, 110 interlockings were scheduled for improvement, of which 60 were rehabilitations at an estimated cost of about \$65.2 million and 50 were reconfigurations at an estimated cost of \$57 million. The August 1977 plan contained 68 rehabilitations and 51



TRACK WORK ON NORTHEAST CORRIDOR IN MARYLAND

reconfigurations. Reconfigurations include five interlockings to be eliminated because they were no longer needed due to changing traffic needs or were replaced by a new relocated interlocking.

According to DCP and FRA officials, interlocking improvements will eliminate all slow orders at interlockings. FRA and DCP could not comment on the impact of specific interlockings dropped from the project but they stated that, generally, deleting an interlocking from the program will increase future maintenance. For example, the Landover, Maryland, interlocking was scheduled for reconfiguration in the August 1977 plan. Under the current plan, it will be rehabilitated at the same location which, according to a DCP official, will result in increased maintenance to keep it properly aligned.

The Department of Transportation commented that the increased maintenance costs resulting from interlocking reconfigurations are insignificant and would be more than offset by the benefits derived from increased operating flexibility, line capacity, and schedule improvements. The Department, however, did not comment on our point concerning the effects of reductions in planned work. The Department's comments related to the justification for doing interlocking work, which our report does not question.

BRIDGES

The bridge work element was cut back by eliminating work on those bridges that are in relatively better condition than those included in the project. As a result, future maintenance will be increased and reliability has been compromised. The budget for this work, however, was reduced only slightly from \$242.5 million in August 1977 to \$239.6 million in January 1979.

According to the final NECIP programmatic environmental impact statement, there are 1,300 bridges on the corridor, of which 772 are undergrade--carrying the railroad over streets, streams, other rail lines, etc.--and 528 are overhead--carrying streets, other rail lines, etc. over the railroad. Only undergrade bridges are scheduled for improvements which will increase safety and reliability or reduce future maintenance requirements. Overhead bridges will be improved only to provide proper clearance for electrification or to accommodate a curve realignment.

Under the February 1978 plan, 248 bridges were to be improved, of which 28 were to be replaced. This represented a reduction of 151 bridges from the August 1977 program.

The impact of these reductions is that future maintenance and schedule reliability will be compromised, but passenger safety, trip times, and future speed improvements will not be compromised. The scope of the bridge work in the January 1979 redirection study report is basically the same as the February 1978 plan except for the addition of bridge timber replacement on 80 open deck bridges.

FRA and DCP officials stated that all speed restrictions due to deteriorated bridge conditions would be removed by the bridge improvements. Our analysis, however, showed that 13 of the 14 bridges that contained speed restrictions as of August 21, 1978, per Amtrak records, were scheduled for repair work which, according to DCP officials, will correct the cause of the speed restriction. Amtrak and FRA officials did not know the reason for the speed restriction on the other bridge, but stated that their review of the records showed that it had existed for a long time. As of February 16, 1979, FRA had no plans for removing the speed restriction on this bridge.

FRA decreased the bridge work by eliminating 14 large bridge projects, changing several projects from replacements to repairs, and lowering the criteria for a bridge to remain in the improvement program.

According to FRA records, the August 1977 plan included all bridges in the corridor with critical ratings. These were bridges with a rating of less than E-72. ^{1/} FRA revised the project criteria to exclude bridges rated E-55 and above, which means that bridges which will require future improvements were deleted. In effect, FRA has moved these bridge improvements out of NECIP to a later time when they will be Amtrak's problem. Also, the unimproved bridges will require much more inspection and maintenance than if they had been included in the NECIP work. FRA, DCP, and Amtrak officials, however, could not estimate how much maintenance will be increased or when the need for the increased maintenance will occur. They also stated that the increased maintenance and inspection varied depending on the condition of the individual bridge, which makes an estimate of the increase in such activities impossible without studying each bridge.

^{1/}The bridge analysis on which the bridge program was based used the "Cooper" loading as the standard loading for rating corridor bridge capacity. The bridges were then rated in accordance with the procedures of the American Railway Engineering Association.

On-time service reliability will also be compromised both in the immediate period after completing the project and at some subsequent period because of maintenance required on those bridges dropped from NECIP. Amtrak and DCP officials could not quantify the extent of reduced reliability, however, because records on the reasons for train delays were not sufficient. For example, a DCP analysis of Amtrak's data on train delays for the period February 1, 1977, to June 30, 1977, showed that about 2 percent of all delays were due to problems with bridges. The data did not identify the specific bridges that caused the problems. According to DCP and Amtrak officials, the only comment that can be made about the impact of bridge program reductions on reliability is that reliability will be decreased.

Amtrak officials noted that future reliability is affected by bridge project reductions. They said that work on the bridges cut from the project must still be performed and, consequently, traffic will be delayed. Again, they could not estimate when the delays will occur or how substantial they will be.

The bridge element's work scope continues to change. Project officials stated that as detailed design work on individual bridges progresses, earlier plans based on less in-depth work must be revised. For example, the January 1979 redirection study report showed 29 bridges to be replaced because upgrading was not feasible. According to an FRA official, the number now should be 24 based on more in-depth studies.

ELECTRIFICATION, SIGNALING AND TRAFFIC CONTROL, AND COMMUNICATIONS

The scope of work planned for these project elements has not changed significantly from August 1977. As shown below, however, the budgets have increased considerably, which NECIP officials said was primarily due to better cost estimates for the work.

	<u>August 1977</u>	<u>January 1979</u>
	(millions)	
Electrification	\$234.8	\$349.9
Signaling and traffic control	163.3	259.7
Communications	<u>24.7</u>	<u>33.6</u>
Total	<u>\$422.8</u>	<u>\$643.2</u>

Due to the major changes in other project areas and statements from agency officials that the work scope of the electrification, signaling and traffic control, and communication project elements had not changed significantly, we did only a limited amount of work on these elements. An FRA document that compared the August 1977 plan to the February 1978 plan showed the following changes:

- Improvements to the catenary system and power supply between New Rochelle and New Haven were deleted.
- Improvements to the electrification and signaling system for certain commuter authorities were added.

This same document showed that there were no changes to the communication element. According to DCP, the scope of the January 1979 plan is basically the same as the February 1978 plan.

FENCING

The fencing of overhead bridges has been cut back significantly and, as a result, on-time reliability and passenger and crew safety have been compromised. Several matters regarding the fencing element must still be resolved:

- A decision on whether to install intertrack fencing at commuter stations, which could require large expenditures to provide access for the handicapped.
- A decision on overhead bridge fencing installation and the impact this has on the question of ownership and future maintenance responsibilities for such bridges.
- Amtrak plans for maintaining any fencing installed.

The changes in the fencing budget were as follows:

	<u>Aug. 1977</u>	<u>Feb. 1978</u>	<u>Jan. 1979</u>
	----- (millions) -----		
Federal funds	\$48.5	\$39.2	\$46.6
Matching funds from Massachusetts	<u>0</u>	<u>2.8</u>	<u>2.8</u>
Total	<u>\$48.5</u>	<u>\$42.0</u>	<u>\$49.4</u>

The January 1979 plan added system security with a \$3.5 million budget to the fencing element. System security includes the installation of equipment to detect intrusion, criminal activity, and fire at stations, service facilities, tunnels, etc.

Fencing is needed to improve on-time reliability and passenger and crew safety. An estimated 35 percent of the corridor is fenced to some degree, but much of the fencing was constructed by abutting landowners and does not meet NECIP standards. Fencing would preclude delays to trains caused by the intrusion of persons, animals, and foreign objects on the right-of-way. According to FRA, Amtrak reported a total of 5,084 incidents of debris on track, vandalism, train stonings, etc., on the Northeast Corridor during the first 4 months of 1977.

Right-of-way fencing

The January 1979 plan provides for fencing about 150 miles of the more than 900-mile perimeter of the railroad property. This is an increase of about 36 miles over the August 1977 plan. According to a DCP official, the increased fencing is possible with about the same budget because a less expensive type of fencing was substituted in certain areas.

Under the current plan, fencing will be placed at each area where Amtrak police reports indicated three or more intrusions during the first 9 months of 1977. This level was based on the funds available for right-of-way fencing. DCP officials acknowledged that it would be desirable to fence the entire corridor or at least every area where there is a record of intrusion, but budget restrictions would not permit it. They also acknowledged that in some instances, such as shootings or stonings, fencing is not very helpful, but again the budget is not adequate to permit the construction of adequate protection in all areas.

Amtrak officials commented that in some areas, right-of-way fencing might reduce intrusions onto the corridor and thus improve on-time reliability, but in some areas the fence will just become a maintenance headache. They cited a 2-mile stretch of track in Baltimore where chain link fence had been installed about 2 years ago and which is now virtually destroyed. We checked the fence's condition and noted many openings had been cut, some entire sections were down, and many gates were off their hinges.

Overhead bridge fencing

The number of overhead bridges to be fenced was cut from all bridges--about 528 bridges--to about 125 bridges. According to DCP officials, only those overhead bridges which have no fencing will be fenced. As a result, many overhead bridges in the corridor will have fencing that does not meet the NECIP standards, which require a minimum height of 8 feet above the walkway. A DCP official stated that if an overhead bridge had a fence or barrier of any type, no improvements would be made to that structure. DCP and Amtrak officials told us that, to the extent that the existing structures differ from NECIP recommended fence type, the elimination of these bridges from the program would compromise passenger and crew safety. DCP files contain numerous examples of incidents that overhead bridge fencing is intended to prevent. For example, a memo noted that in Amtrak's Boston Division debris is continually thrown onto passing trains. It also noted that a particularly insidious practice is lowering heavy objects from overhead structures to hit the moving train at the engineer's location. Because of this, Amtrak is placing wire mesh in front of the windshield to protect the crew.

According to FRA, DCP, and Amtrak officials, an issue that must be resolved in fencing the overhead bridges is the question of ownership. The concern is that if the bridge is fenced, this would be an admission of ownership and Amtrak would then be responsible for maintaining not only the fence but the bridge itself.

The Department of Transportation told us that the cutbacks in fencing have not been significant with regard to safety. It stated that detailed field inspections led to a better assessment of real need, not a compromise, and that the fencing budget will continue to change as more detailed design information becomes available and safety concerns become more apparent.

In our opinion, the cutback in overhead bridge fencing is significant because many of the bridges dropped from the

project have fences that are only 4 or 5 feet above the walkway, which is 3 to 4 feet less than the 8-foot minimum height NECIP standard.

Pedestrian access structures

This area refers to the overhead or undergrade crossings that would be required if suburban commuter stations are fenced. The budget and scope of work for this item was unclear in the August 1977 plan and the course of action is still undecided. The issue is whether or not the expenditure is worth the additional safety that would result. An additional factor that further complicates the situation is the legal requirements for providing facilities for the handicapped. According to DCP analyses, revising stations that limit access will require ramps, crossing modifications, fencing, etc., at an estimated cost of \$685,000 for a typical station. With 83 stations requiring modifications, the estimated total cost would be about \$57 million. The fencing project budget as of January 1979 contains only \$46.6 million in Federal funds, of which \$1.7 million is allocated to pedestrian access structures.

GRADE CROSSINGS

All at-grade crossings, both public and private, will be eliminated except for five crossings in the New London, Connecticut, area. The benefit from eliminating at-grade crossings is improved safety. The scope of this work has been basically unchanged since the August 1977 implementation plan. FRA entered into memorandums of understanding with FHWA whereby FHWA agreed to administer programs to eliminate both private and public grade crossings on the corridor.

Under the public crossings item, all crossings except for the five in the New London area will be eliminated at an estimated cost of \$78 million. In the August 1977 plan, public grade crossing eliminations were shown to be funded by FHWA. Subsequently, the Secretary of Transportation decided that NECIP should provide the funds for grade crossing elimination. FRA's NECIP director noted that if NECIP furnished such funding, work in other areas would have to be cut back. The issue was addressed by the House and Senate conferees in the Conference Report on the Department of Transportation's fiscal year 1979 NECIP appropriation which stated that "* * * no funds under this appropriation shall be used for the elimination of rail grade crossings without the prior approval of the House and Senate Appropriations Committees."

The January 1979 redirection study report shows that \$12 million of NECIP funds were obligated in fiscal year 1978 to fund FHWA public grade crossing renewal projects, which accounts for the increased budget for grade crossings from the August 1977 plan.

STATIONS

Changes to the station element have been relatively minor. According to FRA and DCP officials, the changes will have relatively little impact on passenger comfort and no impact on passenger safety--the two areas that station improvements were intended to benefit.

According to DCP officials, the \$7.5 million cut in the station budget between August 1977 and January 1979 will basically affect passenger comfort items, such as reduced heating and air conditioning system improvements and a cut-back in parking areas. According to a DCP official, plans for station improvements were preliminary and the number of parking spaces involved will not be known until final design is completed. A rough estimate shows 500 spaces being cut.

SERVICE FACILITIES

Reducing the service facilities budget will affect service reliability. Generally, two basic types of service facilities exist (1) those for maintaining fixed plant--tracks, bridges, signals, stations, etc. and (2) those for maintaining equipment or rolling stock--locomotives, cars, etc.

The service facility budget has fluctuated widely. In the August 1977 plan it was \$104 million, in the February 1978 plan it was \$89 million, and in the January 1979 plan it is \$159.9 million. As an example of the changes in work, the major overhaul facility, estimated at \$28.5 million in the August 1977 plan, was eliminated from the February 1978 plan and subsequently added back in the January 1979 plan at an estimated cost of \$46.6 million. Likewise a maintenance-of-way repair facility in Bristol, Pennsylvania, was added in the February 1978 plan but deleted from the January 1979 plan. In commenting on our draft report, the Department of Transportation stated that no repair facilities are or have been planned for Bristol. The Department is in error; Bristol is shown in the NECIP February 1978 planning document and a maintenance facilities status report dated April 18, 1978.

The major difference between the August 1977 and the January 1979 plans is the elimination of four maintenance-of-way facilities.

According to FRA and DCP officials, the reductions will affect trip times because it will take longer to make repairs in an emergency. For example, under the August 1977 plan, maintenance-of-way facilities were a maximum of 50 to 60 miles apart. However, with the cutback of four facilities, this distance will not be maintained and, therefore, it will take a repair crew longer to reach certain locations.

The Department of Transportation agreed that reductions in maintenance-of-way facilities may add to maintenance costs, but stated that the reductions will not affect the reliability of train operations or scheduled trip times. It said that the impact on trip times would only apply during an emergency which occurs so infrequently, and the time increment is so small, that the trip time impact would be insignificant. The Department could not, however, furnish data to support its comment that emergency work is infrequent. While the time increment may be small, a difference of only a few minutes could mean the difference between a train being on time and being later than the 5-minute lateness standard.

TUNNELS

The tunnel project element is basically unchanged from the August 1977 plan. Improvements are being undertaken to improve operational reliability and safety and reduce future maintenance. From August 1977 to January 1979, the budget for tunnel work increased by about \$10 million to \$29.7 million. Although changes to the tunnel element have not been made, there are certain areas where, according to DCP documents, project systems assurance criteria have not been complied with. The Department of Transportation noted that the NECIP design manual (which sets up design criteria) provides that in the absence of regulatory requirements, system safety requirements should be considered only where feasible in improving existing tunnels. Examples of deviations from the safety requirements in the design manual follow.

- The B&P tunnel in Baltimore will not be provided with safety walks because of the costly reconstruction required.
- The 3,000-foot-long Union tunnel exceeds the 2,500-foot emergency exit spacing criteria, but in DCP's opinion this excess distance does not create an unsafe condition and is not large enough to warrant the estimated \$300,000 required to provide an emergency exit. The Department said that the tunnel portals are visible from any point within the tunnel and

there is excellent natural ventilation and so an additional exit is not needed.

--Fire lines will not be provided in the B&P, Union, and East Haven tunnels even though corridor criteria provide for fire lines in all tunnels. The Department said that fire extinguishers will be provided at each tunnel portal, which it considers to be adequate for these tunnels.

CONCLUSIONS

The scope of work for NECIP has been reduced from that originally intended in the August 1977 draft implementation master plan. The reductions will result in

- increased future maintenance costs for Amtrak,
- reduced passenger comfort,
- reduced on-time reliability, and
- reduced safety.

To date there have been problems in NECIP management and in Amtrak's construction work (see chapters 4 and 5). If these problems cause further cost overruns and no additional funding is authorized to cover the overruns, additional cutbacks in the scope of work will have to be made.

AGENCY COMMENTS AND OUR EVALUATION

In its comments on our draft report, the Department of Transportation objected to our use of the project scope as described in the August 1977 draft implementation master plan as the benchmark against which to measure the impact of changes to NECIP's scope. The Department stated that the August 1977 plan was only one draft plan in a series of such plans and it needed further refinement.

We recognize that the August 1977 plan was a draft needing refinement. As in any study that is intended to measure change, however, a benchmark must be selected. We believe that using the August 1977 plan as a starting point is reasonable for the following reasons:

- It was issued over 18 months after the NECIP authorizing legislation of February 5, 1976, and was based on much study and analysis.

--It was used as the basis for the NECIP draft environmental impact statement, the Department's 1977 annual report on NECIP, and project planning until at least March 1978.

--It was the first plan that presented a program designed to meet the funding and time frame limits of the authorizing legislation.

The Department stated that the plan recommended in the January 1979 redirection study report will not reduce passenger comfort, reduce on-time reliability, or reduce safety. It stated, however, that the recommended program will lead to increased maintenance costs compared to past maintenance outlays, and noted that it was the deficient past maintenance levels that resulted in the existing deteriorated condition of the corridor. It also stated that our comment that performance goals had been compromised by revisions to work scopes in the various project elements had been superseded by the January 1979 \$2.4 billion recommended program.

Based on our analysis of the January 1979 plan, the work scopes for many project elements are still considerably less than the work scopes shown in the August 1977 plan and are basically the same as the February 1978 plan we covered in detail during our review. We believe that our presentation of the impacts of the reductions is valid.

The Department commented that criteria to establish and measure self-imposed performance goals is an important aspect of planning and management. It noted that there are innumerable alternatives to meet these goals, but the congressionally mandated goals have never been compromised. It further stated that this was the reason for the redirection effort and why an additional authorization was requested in the President's fiscal year 1980 budget.

We recognize that self-imposed performance goals are important to a project's internal planning and management. We considered these NECIP goals in evaluating the impact of changes to the project elements. We believe, however, that the Department's comments do not address the point of our report--that NECIP work scopes have been reduced from what was originally planned and that these reductions have had a negative impact on the anticipated results of the project.

CHAPTER 4

PROJECT MANAGEMENT NEEDS

TO BE IMPROVED

NECIP has now passed the midpoint of the 5-year implementation schedule mandated by the 4R Act. To date, project management has not been effective and the following problems have resulted:

- Planning has not been completed. FRA has not completely defined the work to be accomplished; the roles and responsibilities of FRA, DCP, and Amtrak have not been fully defined; and many key issues still need to be resolved.
- FRA, Amtrak, and DCP are not fully prepared to carry out NECIP. Amtrak's NECIP organization has not been finalized, contractual arrangements are not complete, and NECIP planning and control systems are not implemented or operational.
- Resources have been wasted and inefficient and/or duplicative work has been performed which could total millions of dollars.

The NECIP triad management structure has contributed to the above problems.

PLANNING IS INCOMPLETE

As of February 16, 1979, 3 years after NECIP was authorized, much of the planning needed for the project still had not been completed. FRA had not completely defined the work to be accomplished and realistic work budgets, schedules, and estimates did not exist. The roles and responsibilities of the three management organizations--FRA, DCP, and Amtrak--had not been completely defined. There were also a number of key issues which were still unresolved, including

- interactions with other corridor users,
- maintenance and operations on the improved corridor, and
- indemnification of DCP against third-party liability.

NECIP is not defined

FRA has not yet defined the actual NECIP project. The project was originally intended to be described in general terms by the system performance specifications and in detail by the program requirements document and the implementation master plan. As of February 16, 1979, these documents had not been finalized or officially approved.

The lack of a defined project hinders the operations of all organizations. For example, without a defined project it is nearly impossible to combine track availability, work schedules, and resources to determine realistic schedules and resource requirements. Because Amtrak must continue to operate the corridor during NECIP, construction activity is constrained by revenue operations. One of the most critical planning elements is track availability for construction operations. Without a defined project it is nearly impossible to plan long-range track availability.

Similarly, a long-range logistical plan cannot be completed without a defined project. NECIP management cannot determine the total staff, material, and equipment requirements. For example, since FRA has not fully defined the project, Amtrak officials stated that they cannot plan beyond 1 year. This hinders Amtrak's ability to determine total resource needs and Amtrak cannot guarantee that adequate resources will be available to complete all work. It may be necessary to purchase other equipment and hire more personnel or Amtrak may find it has excess staff and equipment.

The impact of poor project definition on resources can already be seen. Amtrak has purchased \$2 million in hopper cars and \$3 million in material that DCP found may not be needed. In addition, Amtrak leased over \$6 million in equipment in 1977 and over \$2 million in 1978, some of which was leased in place of purchase because Amtrak's plans assumed a 1981 NECIP completion date, even though it was known that NECIP would not be completed until 1983.

The Department of Transportation told us in January 1979 that a major milestone in program planning had been achieved with the publication of the redirection study report and that, as a result, FRA anticipated that several key program planning documents would be published in the next 2 months. The Department also said that systems to accumulate costs and to report costs against budget had long been established, but the baseline of a firm and realistic program had been lacking.

The redirection study report does not contain enough detailed information on work scopes, schedules, and costs to determine if it is in fact a "major milestone." Such a determination cannot be made until the program planning documents have been published, which has not yet occurred. The fact that 3 years, out of what was supposed to be a 5-year program, have passed without a "firm and realistic program" being established indicates that FRA has not done a good job of administering NECIP.

The Department stated that the decision to purchase hopper cars was made on the basis of a requirements analysis and that, although the cars could not be effectively used in 1978, it remains to be seen whether the investment was wasted. Amtrak told us that the cars had been purchased with the approval of all parties concerned and that it could still use the cars for ballast as necessary and would try to use them in 1979. The comments do not refute our point that a valid analysis of requirements cannot be made until NECIP has been fully defined.

The Department said that our statement that \$3 million in material may not be needed was incorrect. As previously indicated, our statement was based on a DCP analysis. This analysis of Amtrak's inventory records was sent to FRA in July 1978, but FRA never told Amtrak about DCP's findings. DCP told us in January 1979 that the earlier inventory should no longer be relied on because better records had become available as a result of an Amtrak corporate inventory. We found, however, that the Amtrak corporate inventory did not distinguish between Amtrak's own material and the material purchased for NECIP. Therefore, the question of the need for the materials has not been resolved. Amtrak told us that it had never been told by DCP that it had excess material and that it does not order any materials unless authorized by DCP through FRA. Amtrak also said that, in some areas, it had questioned the materials it had been told to order and reduced the quantity.

The Department also told us that a review of Amtrak's leasing revealed that most of the leased equipment was for the purpose of performing work while equipment authorized for purchase was actually procured and delivered. The Department agreed that Amtrak's administration and control of leased equipment was not wholly satisfactory. It also noted that the NECIP stretchout did not have much of an impact on Amtrak's track program because most of this work was planned to be completed by 1981. Amtrak also told us that it decided to lease equipment for 1977 because equipment could not be made available through purchase in time to support the schedules. Amtrak said that most of the leased

equipment has been returned to the lessors since purchased equipment is now available. Amtrak also said that it is continuing to lease some specialized equipment which will not be needed after NECIP completion.

While most of the leased equipment may have been leased only until purchased equipment became available, some of the equipment may not have had to be leased. (See p. 95.) Also, because Amtrak's equipment utilization control systems were not functioning, no one can determine what leased equipment was actually used or needed in 1977. FRA and Amtrak are still trying to resolve this issue. Our point on the effects of project stretchout on Amtrak applies to all Amtrak work, not just track work.

Organizational roles are not defined

FRA has not completely defined the roles and responsibilities of the three organizations involved in managing the project--FRA, Amtrak, and DCP. This has resulted in unclear lines of authority and responsibility which leads to confusion and program delays.

For example, FRA, as the NECIP project manager, is supposed to develop high-level plans, such as system specifications and requirements, but has yet to do so. Amtrak, as construction manager, is responsible for equipment procurement, training, operations, and other construction-related activities. Instead of high-level planning, FRA personnel are involved in Amtrak's detailed, day-to-day decisions. For example, under the contract with Amtrak, FRA must approve Amtrak purchases over certain dollar values (usually \$100,000). But FRA has insisted on approving each equipment purchase or lease. In one case, FRA questioned Amtrak's purchase of some padlocks, supplies, and \$2,500 in equipment rentals. In other cases, FRA questioned the need for a \$26,000 piece of equipment and the leasing of a pickup truck.

According to FRA and Amtrak officials, much time is spent corresponding, documenting, justifying, analyzing, and approving actions that would be routine decisions in most organizations. This process dissipates the resources of both organizations and keeps them from more productive activity.

Amtrak must divert its attention from construction activities to proposals, analyses, and justifications. Amtrak does not have the latitude to manage its day-to-day operations. For example, if construction operations require

a certain kind of cars, Amtrak should be allowed to use its railroad skills to prepare specifications and purchase the cars. It should not be necessary to have an outside consulting firm such as DCP prepare a detailed package for Amtrak, which was what was being done under NECIP. The Department of Transportation told us that DCP is no longer preparing complete solicitation packages for Amtrak procurements.

Other responsibilities and authorities are also unclear. DCP and Amtrak do not have a contractual relationship. Under FRA's contract with DCP, DCP is the principal engineering contractor and is responsible for such things as design, work package preparation, construction supervision, and inspection. FRA's contract with Amtrak, however, does not fully specify DCP's role and responsibilities or DCP's interaction with Amtrak. Rather than having DCP work directly for and with Amtrak, FRA has interposed itself between them. Without a formal relationship, Amtrak and DCP must rely on informal arrangements and coordination or else funnel all work through FRA. During 1977, the latter relationship existed as DCP and Amtrak mainly corresponded with FRA, not each other. Amtrak and DCP had more of an adversary than a cooperative and coordinated relationship.

The lack of a well defined contractual relationship between DCP and Amtrak has caused problems with the completion and quality assurance of Amtrak work. For example, DCP is supposed to monitor and inspect Amtrak's construction activities yet DCP has no authority to direct Amtrak crews, even when work is being done incorrectly. Rather than preventing or correcting deficient work, DCP can only report to FRA and FRA can then direct Amtrak to take corrective action. Therefore, while the FRA/DCP contract delegates responsibility for NECIP implementation to DCP, DCP does not have the authority to insure proper implementation. Amtrak told us that, if DCP were under direct contract to Amtrak, Amtrak would have the authority to give DCP more responsibility for implementing NECIP.

Amtrak did not have prior experience on a large construction project but DCP is supposed to have such experience. However, DCP does not have the authority to directly assist Amtrak.

The lack of clearly defined authority, responsibility, and interactions causes confusion in the program. In our opinion, the three organizations do not understand their roles or how they should interact, causing operation on a crisis-to-crisis basis with little or no realistic long-range planning being completed.

The Department of Transportation contended that the roles and responsibilities of the major participants--FRA, DCP, and Amtrak--were clearly spelled out. The Department views the relationship as basically being between FRA and its prime construction contractor, Amtrak, with DCP being a support organization to FRA. The Department said that, for example, FRA has been involved in high-level planning and that the redirection study was evidence of such planning.

Our report clearly shows that, while FRA does have overall responsibility for NECIP, there is confusion as to the exact roles of the three participants. Further, during June 1978 hearings on NECIP held by the Subcommittee on Government Activities and Transportation, House Committee on Government Operations, Amtrak and DCP officials testified that there was confusion over roles and responsibilities and there was a need to clarify them. In January 1979, the President of Amtrak told us that the basic problem of the project was the institutional relationships. He said that, while FRA had made enormous efforts to improve relationships, the interfaces between FRA, Amtrak, and DCP were not smooth and would require an extensive revision if they are to be improved. With respect to the Department's comment about FRA's involvement in high-level planning as evidenced by the redirection study, we believe that the fact that it has taken 3 years to come up with what the Department describes as a firm and realistic program amply demonstrates that FRA's involvement has not been all that it should be.

The Department also said that FRA has attempted to limit its involvement in Amtrak's day-to-day activities to that which is required to support the authorization to expend Federal funds and to insure conformance and adherence to the Federal Procurement Regulations. This may be true, but based on our review much more is needed to improve program management.

Unresolved issues

Many key issues must be resolved before NECIP can be effectively implemented. These issues range from the manner in which the various corridor users will interact, that is, how train schedules and operations will be coordinated, to how the corridor equipment will be maintained. To operate the corridor in the most efficient manner, these issues should be dealt with before operations begin on the improved corridor, rather than waiting to work out details on a piecemeal basis later.

Interaction with other corridor users

The NECIP budget includes funds for converting certain commuter equipment for compatibility with the upgraded electrification and signaling systems. However, FRA will not fund replacements for those vehicles considered obsolete and not warranting conversion.

Commuter service on the Northeast Corridor is provided by the following State agencies: the Maryland Department of Transportation, Southeastern Pennsylvania Transportation Authority, New Jersey Department of Transportation, Metropolitan Transportation Authority, Connecticut Department of Transportation, and Massachusetts Bay Transit Authority.

Several areas of disagreement exist between FRA and the commuter agencies, including

- whether the Federal Government or the commuter agencies will handle the contracts for vehicle conversion,
- the number of vehicle conversions NECIP will fund,
- the source of funds for replacing vehicles considered obsolete, and
- who will bear the liability for possible problems with vehicles during and after conversion.

In a September 29, 1978, letter to FRA, the commuter agencies stated that they would incur \$110 million for vehicle conversion and replacement because of NECIP. The commuter agencies told FRA that, pending resolution of their differences, they would make no commitments to implement NECIP and would not assist in establishing a train planning unit. This unit is supposed to be a coordinating body to represent corridor users in such matters as preparing integrated schedules and dispatching and operating priority rules.

Unresolved issues also exist concerning Conrail's future use of the improved corridor. Conrail has budgeted funds for vehicle conversion and replacement but not for installing an automatic train control on its locomotives. Conrail has expressed concern that higher maintenance costs due to the improvements may cause a rise in its freight charges or its operating subsidy for commuter operations. Conrail has also questioned some aspects of the NECIP communications and electrification work.

As of February 16, 1979, the commuter and Conrail issues had not been resolved.

Maintenance and operations
on the improved corridor

As of February 16, 1979, the maintenance-of-way, maintenance-of-equipment, and operations plans for the corridor had not been finalized.

As the program continues to be redefined, it is difficult to determine future maintenance requirements. Future maintenance costs, however, could be higher than current costs because the tolerances for high-speed track are more stringent than current tolerances, additional facilities will need to be maintained (such as the new electrification system between New Haven and Boston), and some NECIP work is being deleted, which will result in higher future maintenance costs for Amtrak.

The lack of agreement over future maintenance costs can be seen in the conflicting cost estimates prepared by NECIP managers. Although the NECIP program has not been definitized, DCP estimated that annual maintenance after 1981 would be \$54 million. Amtrak's 5-year plan, however, indicates that annual maintenance costs may be as high as \$106 million by fiscal year 1982.

Indemnification of DCP

Although over 2 years have passed since the DCP letter contract was signed on October 26, 1976, a definitized contract has not yet been negotiated. According to DCP officials and the FRA Administrator, the question of indemnification of DCP and its subcontractors is the primary reason for the contract not being definitized. The letter contract provided for several options by which DCP could be protected from third party liability:

- Government indemnification of DCP.
- Government purchase of insurance on behalf of DCP.
- DCP purchase of insurance.
- Any combination of the above.

Although project planning has been based on having the entire \$1.75 billion available for the project, \$100 million was estimated to be needed for indemnification. Project work

would have to be cut back by \$100 million if NECIP funding of indemnification was required.

To resolve the indemnification question, the Department of Transportation and Related Agencies Appropriation Act, 1979 (Public Law 95-335, August 4, 1978) provided that the provisions of Public Law 85-804 (50 U.S.C. 1431) shall apply to NECIP. This law has been used by other Government agencies to indemnify contractors and would not require that the \$100 million be set aside from NECIP's funding. As of February 28, 1979, the Secretary of Transportation had not prepared a document outlining the nature or amount of the coverage to be provided, the contractors to be covered, or which risks qualify for indemnification, as required by executive orders and other regulations.

In January 1979, the Department of Transportation told us that resolution of the indemnification question, while a serious issue, was not the impediment to contract definitization. It said that the redirection study had to be finalized before contract pricing could be definitized. This latest position contradicts the statements that indemnification was the main impediment made by the FRA Administrator and DCP officials at the June 1978 hearings on NECIP held by the Subcommittee on Government Activities and Transportation, House Committee on Government Operations. The Department said, however, that resolution of the DCP/FRA indemnification problem is expected soon.

The Department also took exception to the use of a criterion that gauges management effectiveness by whether all agencies that deal with FRA and the Department totally agree with all policy decisions, referring specifically to the areas of disagreement between FRA and the commuter agencies. The Department said that FRA plans to provide specifications and funds to the commuter agencies by which they would contract for vehicle conversion. We are not contending that all agencies have to totally agree with all policy decisions. Our point is that, after 3 years, there are still several major unresolved issues between FRA and the commuter agencies and that this is one of many key issues which must be resolved before NECIP can be effectively implemented.

FRA, AMTRAK, AND DCP ARE STILL NOT
PREPARED FOR NECIP

When the 4R Act was enacted in February 1976, no NECIP management structure existed. The basic contractual arrangements had to be completed and all three organizations had to create and staff the new organizations. In addition, FRA

and Amtrak had to learn tasks that they had never before performed, since both lacked construction experience.

Each organization has undergone leadership changes. As of January 1979, Amtrak's NECIP organization had not been finalized; the contractual arrangements between Amtrak, FRA, and DCP were not finalized; and NECIP planning and control systems were not implemented or operational.

Until the management structure is finalized, expertise developed, and management control systems implemented, NECIP performance will probably continue to be less than optimal.

FRA's and Amtrak's organizations continue to undergo changes

The FRA and Amtrak NECIP organizations have undergone a number of changes since the 4R Act was enacted. In our opinion, these changes have hindered efficient program implementation and caused confusion.

FRA has had four NECIP leaders since the 4R Act was passed. The Amtrak NECIP organization has undergone at least eight reorganizations since 1976. As of January 1979, Amtrak had not defined the roles of its NECIP units. This constant reorganization has made FRA and DCP coordination with Amtrak very difficult. Amtrak's organizational instability is discussed on page 95.

The Department of Transportation stated that FRA's and Amtrak's organizational changes were made to improve project efficiency and effectiveness and that organizational adjustments are common to any major mobilization. We agree that the intent of organizational changes is to improve management's effectiveness. However, such changes are disruptive and often slow progress for a period of time, and the more frequent the changes the more impact they will have.

FRA and Amtrak lack needed experience and expertise

When NECIP was authorized, neither Amtrak nor FRA had experience in managing a major construction project. Both organizations had to establish and build staffs to manage the project.

FRA reached an interagency agreement with FHWA to use professional civil engineers with highway experience on NECIP. The majority of the FRA staff still does not have railroad experience; only 8 persons out of 75 had railroad experience as of June 1978.

The Department of Transportation disagreed that FRA lacks the needed experience and expertise to complete NECIP. It said that aspects of NECIP require railroad engineering experience and that this expertise is provided to FRA by consultants working in close coordination with Amtrak and is further supported by foreign consultants. According to the Department, the rest of the project is largely conventional civil engineering and the Department's personnel fully satisfy the need for design and construction program managers. The consultants and Amtrak can provide FRA railroad expertise, but we still believe that FRA's lack of in-house railroad experience may have been a contributing factor to some of its management problems experienced to date. Also, if FRA had more in-house railroad expertise, all the outside consultants may not have been needed.

During fiscal year 1977, Amtrak's work force grew from a few hundred to more than 1,500 employees. Most of these employees did not have railroad experience and required extensive training to develop skills. As discussed in chapter 5, Amtrak productivity in 1978 has improved slightly over 1977, but Amtrak still has not developed a construction management capability or appropriate internal systems.

Contractual arrangements

As of January 1979, NECIP contractual arrangements had yet to be finalized. Although Amtrak and FRA have signed a cost reimbursement contract, negotiations have not been completed in several areas. The FRA/DCP contract has not been finalized and FRA and DCP are still attempting to negotiate contract duties and costs. The DCP/Amtrak relationship has not been fully defined.

FRA's contract with Amtrak was signed on August 29, 1976, giving FRA overall project management and Amtrak a combined construction contractor and systems coordinator/operator role. The contract does not address the Amtrak and DCP relationship or the total amount of Amtrak work. The size and cost of Amtrak's NECIP organization is not settled, and the roles, responsibilities, staffing levels, and costs of the Amtrak NECIP organization are still being determined.

The cost reimbursement contract imposes certain performance conditions on Amtrak, but there are no real penalties if Amtrak ignores the contract. This has happened in many instances. Amtrak leasing during 1977 indicates the poor functioning of the Amtrak/FRA contract. Amtrak was supposed to request FRA approval for leases over \$10,000. Amtrak told us that it requested FRA approvals but they were not forthcoming or were untimely. Amtrak also said that it

believed that the FRA requirement was impractical because of the project's extreme urgency. According to an FRA official, however, Amtrak did not comply with this requirement in most cases and 1977 leasing costs were estimated to be about \$3.5 million above FRA funding. During 1978, Amtrak did not request approval for some leases and extensions, making it difficult for FRA to determine what had been leased or purchased. FRA retroactively ratified Amtrak's actions in July 1978, even though Amtrak violated the contract. FRA has yet to disallow any Amtrak costs in spite of the contract violations. Amtrak told us that it recognizes that there were weaknesses in its control of leased equipment and that it has instituted corrective measures.

NECIP planning and control system is not finalized

As of January 1979, NECIP did not have a finalized management planning and control system. One of the important factors in awarding the contract to DCP was its competence and expertise in comprehensive project control systems. The system was scheduled for delivery during 1977, but had still not been finalized as of January 1979.

The major system planning elements and their original due dates and status as of January 1979 are as follows:

<u>Planning element</u>	<u>Original due date</u>	<u>Jan. 1979 Status</u>
System documentation:		
System performance specifications	2/77	Not finalized
Program requirements	4/77	Not finalized
Implementation master plan	5/77	Not finalized
Cost estimating system	2/77	Not finalized
Scheduling system:		
Construction phasing and scheduling	4/77	Not finalized
Logistics plan	3/77	Not accepted
System safety program plan	6/77	Not implemented

The major control elements and their original due dates and status as of January 1979 are as follows:

<u>Control element</u>	<u>Original due date</u>	<u>Jan. 1979 Status</u>
Integrated cost system: Management planning and control system	1/77	Not finalized
Quality assurance system: Quality assurance plan	4/77	Not finalized
Quality control plan	8/77	Not finalized
Change control system: Configuration management and change control	2/77	Finalized 1/78

NECIP's three primary guiding documents are supposed to be:

- System performance specification. A comprehensive statement of performance goals that NECIP will provide when completed. The specification was to be in quantitative measures for use as the basic standard for NECIP design and construction and to form the basis for developing the program requirements.
- Program requirements. An outline of the specific improvements required to satisfy the system performance specification goals and to provide technical input to the implementation master plan.
- Implementation master plan. The primary document indicating how and when design and construction work is to be performed.

As of January 1979, none of these three documents had been finalized. The system performance specification has never been completed. The program requirements used by DCP are unofficial, inaccurate, incomplete, and often unclear. The Department of Transportation told us that, because of the "frequent and rapid iterations of program options" considered during the redirection study, FRA had relieved DCP of the burden of keeping this list current. The implementation master plan was released in draft form in August 1977 and was later reduced in scope, but was never officially updated.

NECIP MANAGEMENT STRUCTURE IS NOT EFFECTIVE

NECIP, with its time and budget constraints, requires a management structure that can closely coordinate plans and work, while responding quickly and efficiently to

problems. The triad structure does not appear capable of meeting this requirement. NECIP performance has been marked by schedule slippages, delays, and poor coordination and communication.

Most project completion dates are slipping

NECIP estimates show that most work is experiencing a continuous slippage on completion dates. The estimates show that 62 percent of the individual projects are not meeting the March 1978 schedules. Compared with the original August 1977 schedules, 98 percent of the projects are experiencing delays, with about 35 percent having a schedule slippage of at least 1 year. Several station, service facility, and section improvement projects showed slippages of over 2 years.

The slippages are occurring in all areas from design to construction. FRA analyzed the design reviews that were to be accomplished in March and April 1978 and found that eight of the nine reviews scheduled had been delayed for a number of reasons, including lack of DCP support and poor weather.

A DCP analysis showed that 85 percent of the designs to be awarded had slipped, some by as much as 9 months. These design slippages were attributed to

- indecision and/or uncertainty about program requirements,
- changing scopes of work,
- unresolved conflicts on location of facilities,
- program stretchout to 1983,
- internal FRA processing, and
- FRA failure to provide a program development plan.

Work package processing is cumbersome, time consuming, and of questionable value

To date, most of the construction work has been Amtrak's responsibility. FRA assigns work to Amtrak through a document called a work package. The work package describes the work to be accomplished and contains performance schedules and cost estimates. DCP usually prepares the work packages with Amtrak's assistance. Once prepared, DCP forwards the package to FRA for review and concurrence. FRA is then supposed to negotiate the work package with Amtrak for price,

schedule, and allowable costs. Each negotiated and executed work package becomes a modification to the FRA/Amtrak contract.

The process of defining, delineating, negotiating, and approving work for Amtrak has proven to be very cumbersome and time consuming. Ideally, a work package would be fully coordinated and its contents agreed on before DCP prepares the actual documentation. Since FRA and Amtrak are supposed to concur with the contents before the work package is developed, there should not be many processing delays. This has not been the case and the processing has had problems in all areas. In some cases, agreements on work scope were not reached before the package was processed and changes in work scope then required reprocessing the package. In other cases, delays occurred because of difficulty in reaching agreement on the detailed specifications. FRA internal reviews have also often delayed processing. Finally, Amtrak has rejected some work packages during the final stages. Some examples of problems in this area follow.

1. Work trains are needed for the construction work and FRA asked DCP to prepare a work package in August 1977. While DCP was developing the specifications, the basic concepts for the equipment changed twice and DCP's May 1978 work package was found to be inadequate. FRA, DCP, and Amtrak did not agree on the specifications for the trains or even agree on the number of trains to be purchased until June 1978. Construction work for 1978 was delayed and 1979 work may be affected because these trains were not available when needed.
2. The work package for purchase of 20 rehabilitated locomotives for use in construction work omitted provisions for operating and maintaining the locomotives. When they were delivered in June 1978, it was found that there were no funds authorized for fuel, spare parts, and other maintenance items. Also, the work package authorized cab signals and radio equipment for the locomotives but neglected to include the funding for these items. FRA and DCP said that the need to fund locomotive operating expenses was known from the start of the procurement and the funds were covered by a separate work package. Amtrak officials, however, told us that the need for operating funds was not known until after the locomotives had been delivered. Amtrak had to use non-NECIP funds to operate the locomotives until FRA and DCP could develop and process a work package for the operating expenses. This work package had not been finalized as of January 1979.

It is difficult to determine what is being achieved by the various reviews. Most work packages are modified or changed after they have been executed, indicating that they may not be initially complete. As of January 1979, 75 percent of the Amtrak work packages were changed after they were executed. In some cases, the work packages do not define the work to be done, but only estimate the work, which permits quicker processing but pushes unresolved design problems into the construction phase.

Because Amtrak's contract is on a cost-reimbursable basis, FRA pays Amtrak for all allowable costs and has yet to disallow any Amtrak costs. It is questionable whether the lengthy negotiations over cost and schedules serve any purpose. The 1977 track work program, for example, initially had a cost estimate of \$22 million and was to be completed by December 1977. The work package funding was later increased to \$28 million and the completion date extended until March 1978.

The Department of Transportation agreed that improvements are needed in processing work packages and said that efforts are being made to modify the procedures. The Department, however, believed that our report oversimplified the process and made broad conclusions without adequate justification. We disagree. Our statements and opinions on work package processing are based on a review of many work packages and the supporting documentation. We found many examples of the types of problems discussed in the report. Of necessity, we have only presented a relatively brief description of the process and have included only a few examples to illustrate our points.

NECIP coordination and communication need improvement

In our opinion, the triad structure requires a high degree of coordination and communication to be an effective management concept. This has not occurred. Instead, the coordination and communication among DCP, FRA, and Amtrak appeared to be poor in every area reviewed. The following are just a few examples of the lack of coordination and communication among the triad managers.

In December 1977, DCP sent a proposed 3-year track program to Amtrak for comment. Amtrak and DCP had supposedly jointly developed the program. Amtrak not only did not comment on the DCP work schedules, locations, etc., but sent FRA a different schedule for track work. The Amtrak schedule had not been coordinated with DCP.

During 1978, FRA and DCP had a meeting on Amtrak's construction efforts. DCP and FRA discussed critical corridorwide issues including many Amtrak problems such as

- inappropriate use of manpower and equipment,
- inadequate maintenance and repair,
- lack of right-of-way cleanup,
- erratic schedule adjustments,
- lack of long-range planning,
- role of division engineers,
- role of supervisors,
- role of Amtrak's Philadelphia office, and
- Amtrak's failures on plans and specifications.

Yet, FRA did not invite Amtrak to attend the meeting. It is difficult to see how FRA and DCP can resolve Amtrak problems without Amtrak participation.

Interlocking work was delayed during 1978 because Amtrak and DCP could not agree on work plans. The interlocking work accounted for over 20 percent of the planned 1978 track program. It was not until August 1978 that FRA, DCP, and Amtrak began agreeing on

- which interlockings to rehabilitate,
- how to physically accomplish the work,
- the preliminary engineering data that DCP was to provide,
- the interlocking design criteria, and
- the interlocking scopes of work.

The Department of Transportation said that lines of coordination and communication among DCP, FRA, and Amtrak are working well. The Department said that the 4-year track program--which was not the program we cited--was coordinated in October 1977 and that all current track work plans have been agreed upon by DCP, Amtrak, and FRA. We believe the lines of coordination and communication are working anything but well and that the material presented

in our report, which contains only a few of the many examples of problems we found during our review, demonstrates a need for improvement. Concerning the Department's comments on the 4-year track work program, it is interesting to note that between January and June 1978, FRA, DCP, and Amtrak were trying to resolve what work had been completed during 1977 and what work remained to be done.

INEFFECTIVE PROJECT MANAGEMENT
HAS RESULTED IN WASTE
AND INEFFICIENCY

The NECIP management's failure to adequately plan and manage the project has resulted in wasted resources and inefficient and/or duplicative work. We were unable to determine the total dollar amounts involved because some things were not readily quantifiable and we did not review every NECIP activity. The amount of funds wasted or unnecessarily spent, however, could be in the millions of dollars.

Examples of waste and inefficiency are discussed below.

Unused design work

The failure to fully define NECIP and the numerous changes in the work scope have resulted in a considerable amount of design work for projects no longer included in NECIP.

Initially, DCP developed scopes of work for its design contractors who then started designing the individual projects. Many of these individual projects were subsequently eliminated to stay within the NECIP budget and so the design work is no longer needed.

For example, DCP spent almost a year developing and negotiating the scope of work for a particular bridge. FRA later decided to reduce this bridge project from replacement to rehabilitation. DCP's year of effort was wasted and DCP was forced to renegotiate the subcontract.

As of January 1979, about \$22 million had been spent for design engineering. DCP was unable to tell us the amount spent for unused designs. We reviewed several design projects and found that \$138,000, or 40 percent, of the \$344,000 spent on these projects was for design and engineering work which will not be used because of program changes.

The Department of Transportation told us that it realizes that some design work will not be used in

construction, but this is not due to ineffective program management. It said that in any major project, the design effort includes the exploration of options and, as a natural consequence, some design work is discarded as infeasible or not the best among options explored. We do not believe that the Department's comments address the situation we found. The design work we discussed was work for individual projects which were later dropped from NECIP due to changes and cut-backs in NECIP's scope. If overall plans had been developed earlier, the scope of work could have been determined earlier and FRA would have known what was going to be included in NECIP.

Equipment and material purchases
and leasing may be excessive

Without a defined NECIP program it is not possible to determine the total material and equipment resources required. NECIP management has not developed overall logistics plans; consequently, the requirements are developed on a piecemeal basis, annually for each program element. For some of the simpler elements, such as track work, however, DCP has made a broad estimate of needs. FRA and Amtrak purchased materials and equipment to meet these needs, but these purchases may be more than needed. A DCP review of Amtrak's purchases found almost \$3 million in ties, rail, and other material that may have exceeded estimated requirements. For example, DCP found that Amtrak had purchased over 5,000 tons of rail that appeared to be in excess of NECIP needs.

Similarly, Amtrak purchased sixty 100-ton hopper cars for almost \$2 million. The cars were delivered in May 1978, but an FRA inspection during September 1978 found that the cars were unused, sitting on a siding and rusting. DCP stated that the cars were not required since adequate equipment was already available to perform the operations. As of January 1979, NECIP management was trying to determine what to do with this equipment. One option under consideration was to attempt to lease the cars to someone else until needs could be determined.

As discussed on pages 95 and 103, Amtrak's leasing of too much equipment during 1977 was unofficially estimated to amount to \$1 million to \$2 million, and about \$1 million of Amtrak's spare parts inventory was considered to be excess or obsolete.

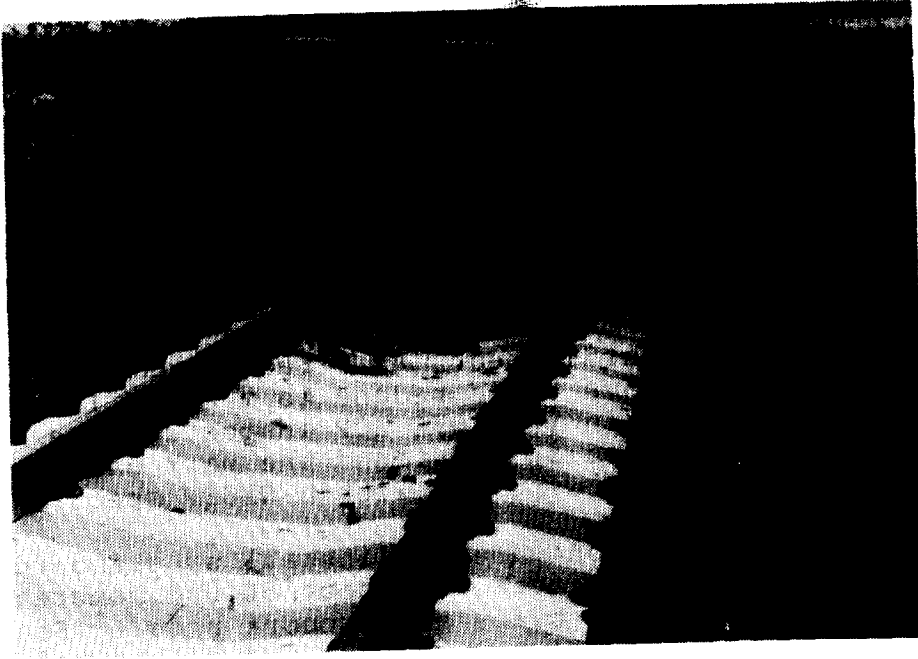
Some construction work may have
to be redone

There are several areas where Amtrak has performed work or used material that does not meet NECIP specifications. It may be necessary to redo the work or replace the material at a later date. The 1977 and 1978 track work was often completed before specifications were available or the work was properly coordinated. As a result, some of the work will probably have to be redone to meet NECIP specifications. For example, in mid-1978 DCP inspected some curves which Amtrak had worked on and found the work unacceptable because the alignments were not within NECIP specifications.

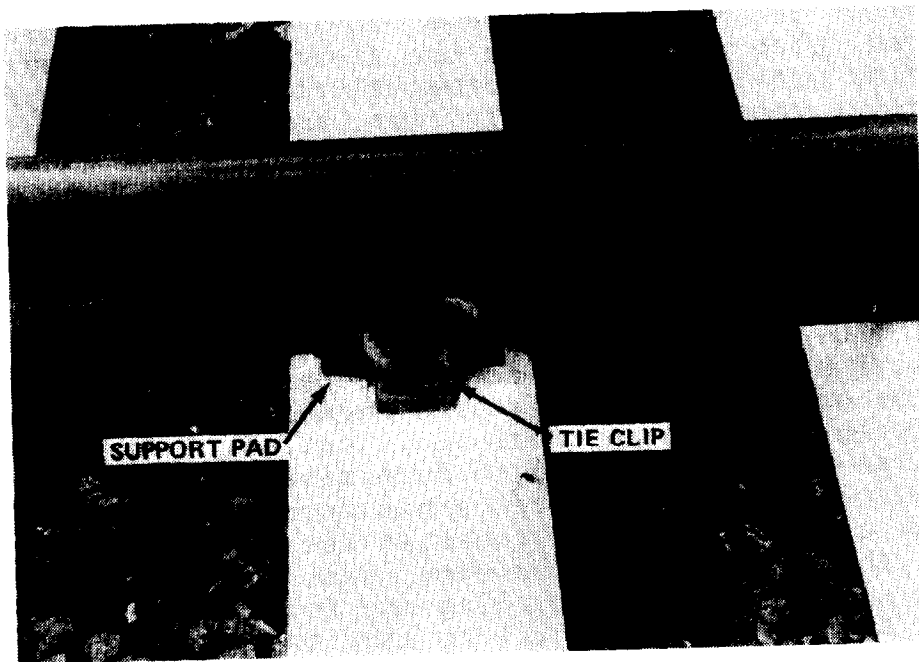
Amtrak also has continued to install substandard materials. Amtrak has installed about 50,000 concrete ties, with associated binding clips and support pads. (See photos on p. 74.) The ties, clips, and pads may all be below FRA specifications. The ties have not passed all their tests. Amtrak's tests have also indicated that, because of high resistance, the ties may cause hazardous electrical shocks during the passage of trains. The Department of Transportation said that this statement was inaccurate because the Amtrak tests were made on a nonelectrified section of railroad which does not have the elaborate crossbonding and grounding provisions of a normal electrified area. Rather than delay construction activities, Amtrak, at FRA's direction, has continued to accept and install these questionable ties. The estimated cost of the concrete ties already installed is about \$2 million. Amtrak has also used bonded insulated joints which have failed tests and are below original NECIP specifications.

The Department of Transportation agreed that some work will have to be redone. The Department said, however, that the concrete ties have been deemed acceptable, the pads are within approved contract modification requirements, and the clips are being tested to determine adequacy. The Department said that no evidence has been developed that would support a conclusion that the ties are unsatisfactory or unsafe. The fact remains, however, that the ties have not yet passed all the tests, including one for freeze-thaw conditions, and so there is still no assurance that they are satisfactory. With respect to the support pads, they did not meet the original NECIP specifications, but FRA later modified the specifications. As the Department agrees, the clips are still being tested.

Amtrak told us that DCP had admitted that its original specifications for bonded insulated joints could not be met



CONCRETE TIE CLIP AND SUPPORT PAD



CONCRETE TIES NEAR ABERDEEN, MARYLAND

and so they were changed. According to Amtrak, only one manufacturer met the revised specifications and so they were again modified so that two manufacturers could bid on the joints.

A January 1979 DCP report stated that concrete tie, fastener, pad, and insulator problems have caused acceptance problems and recommended that production be curtailed until specifications have been met.

Use of consultants

FRA and Amtrak have used consulting firms for NECIP work. FRA and Amtrak have not adequately planned, directed, coordinated, and monitored the consultants' work and, as a result, work has been terminated before completion and results of completed tasks were of questionable value or not used. The major consultants include:

- DCP as the principal architect and engineering contractor; its contract with FRA may eventually total over \$300 million.
- Bechtel Incorporated which supports FRA's engineering and operations staff under a \$10 million contract.
- Dynatrend Incorporated which supports FRA's project control division under a \$4 million contract.
- Arthur Andersen and Company which supported Amtrak in developing management systems under a \$3 million contract.

DCP

FRA has not adequately directed and monitored DCP's activities. Almost all of the major management planning and control system elements, which were scheduled to be delivered by DCP in 1977, had not been finalized as of January 1979. Program managers have, therefore, been relying on interim DCP documents to monitor NECIP. DCP's documents often are inaccurate, based on invalid assumptions, and seem to be of questionable value. A few examples of problems in DCP's work are discussed below.

The implementation master plan, developed by DCP, is supposed to be the primary document showing how and when design and construction work is to be performed. The August 1977 draft plan contained inconsistent data and omitted important information. Also, the plan has not been systematically updated to reflect changes in the budget and

scope of work. For example, in the August 1977 plan the summary sections showed that 400 undergrade bridges were to be replaced or repaired, while the individual project sections only identified 350 bridges. The August plan also omitted \$35 million for maintaining maintenance-of-way equipment. The unofficial February 1978 plan FRA and DCP used until January 1979 also contained questionable information. For example, this plan omitted post-1981 costs, such as inflation, even though it was known then that NECIP would not be completed in 1981.

DCP's program requirements document is intended to be an outline of the specific improvements to be accomplished. This document is not up-to-date and some of the data in it seems questionable. For example, the station element does not contain correct cost estimates or reflect the current scope of work. The data on track work does not agree with other planning documents. The Department of Transportation told us that it would be more cost effective to only update the requirements after the NECIP concepts have been finalized.

Planning budgets and cost controls for NECIP are key management elements and one of DCP's primary requirements. Yet DCP failed to provide sufficient information on how it would accomplish this key management task when it prepared its cost estimating format. This document, originally submitted on August 1, 1977, contained inconsistent data and insufficient details on the DCP/Amtrak interaction.

Several Dynatrend analyses of DCP's schedule and cost reports showed them to have variances in schedules, untimely data, significant differences between actual and budgeted costs, arbitrarily assigned completion dates, and schedule omissions. One FRA official termed the reports "relatively meaningless * * * inaccurate or unrealistic," although FRA has spent over \$600,000 on them.

DCP's cost estimates sometimes seem to be understated. Recently, for example, DCP's original estimates for two stations and a bridge were 35 to 80 percent below the bids received for the work. Amtrak also told us that, in analyzing the estimates for the 1979 track program, it had found all estimates to be understated by at least 23 percent.

Bechtel

Bechtel's scope of work includes monitoring, reviewing, and analyzing the work of other NECIP contractors. For example, Bechtel was supposed to review DCP's planning and

design submittals to FRA, including the implementation master plan, design management plan, program requirements report, and other documents. The following tasks are examples of Bechtel's work:

- Review Amtrak's comments on a DCP presentation of NECIP tasks.
- Review Amtrak and DCP work package plans and specifications.
- Review all DCP, Amtrak, and subcontractor construction inspection reports.
- Review DCP contract deliverables.
- Provide FRA with draft responses to DCP.
- Provide staff to coordinate DCP and Amtrak efforts to provide NECIP workforce training.
- Provide a leader to coordinate FRA, DCP, and Amtrak operations planning efforts.

FRA has failed to direct and monitor Bechtel's work to insure its usefulness. We reviewed several Bechtel work products and found them to be of questionable value to the ultimate NECIP users. For example, during mid-1978 Bechtel prepared an analysis of Amtrak's available labor resources. We reviewed this analysis with an Amtrak NECIP official who found the report useless. The official stated that the report had not been coordinated with Amtrak and was based on invalid assumptions. Bechtel told us that its study results had been presented at a joint meeting with Amtrak, DCP, and FRA and that its report influenced decisions made during the redirection study.

Another Bechtel task was to inventory Amtrak's Government-furnished property. Undertaken from January to May 1978, as a combined Bechtel/DCP effort, the task cost over \$200,000. The report showed large Amtrak property discrepancies, including almost \$10 million in unreported equipment and a 63.5 percent property discrepancy. On the basis of the inventory, the FRA NECIP director termed Amtrak's property control and accounting activities "woefully inadequate" and its monthly procurement and financial summary reporting as being "at the brink of irresponsibility." Amtrak did a preliminary review of the Bechtel report and resolved a majority of the discrepancies. Amtrak considered the Bechtel inventory to be "lousy" and the charges of serious discrepancies to be "unfounded."

In another case, FRA paid both Bechtel and DCP to develop logistics plans. After paying DCP over \$70,000 during 1977 to initially develop a logistics plan, FRA did not consider the DCP report to be adequate. Rather than have DCP restructure its report, FRA contracted with Bechtel in January 1978 to develop a new logistics plan. The records do not show FRA's reasons for the action and no one in FRA could recall the rationale.

Dynatrend

Dynatrend has been involved in Northeast Corridor work since 1975. Originally designated the program planner for NECIP, Dynatrend now chiefly supports FRA's project control division. Dynatrend's emphasis has shifted from planning to budgeting, scheduling, and other analysis.

We reviewed some of Dynatrend's work and found that FRA failed to effectively plan, use, and implement the work products. In some cases, FRA changed the task requirements during development or cancelled tasks before they were completed. FRA is also paying DCP to develop systems reportedly already developed by Dynatrend.

FRA's \$400,000 contract with Dynatrend between 1975 and 1977 included five basic tasks:

1. Surveying organizations with experience similar to NECIP's.
2. Developing a program management organization structure.
3. Designing a management planning and control system.
4. Developing a schedule/cost network and a program information center.
5. Implementing systems.

The results of Dynatrend's tasks are indicative of FRA's planning and use of NECIP contractors. The work under task 2 was delivered, but FRA did not follow Dynatrend's recommendations. Task 3 was completed, but FRA never implemented the product and now considers it obsolete. The information center (task 4) is not being used, while the network was never implemented. FRA later contracted with DCP to develop a management planning and control system and a schedule/cost network. DCP did not extensively use Dynatrend's work because FRA told DCP that the work was obsolete.

Even though FRA made limited use of Dynatrend's earlier work, it extended the contract for additional tasks at a cost of \$3.6 million. The results to date are similar to the earlier results:

- An accounting, budgeting, inventory, and purchasing system study was never completed.
- A planning and status system was never implemented.
- The maintenance of a management information center was discontinued.

Dynatrend is now monitoring and summarizing DCP and Amtrak reports. One of Dynatrend's primary tasks is special studies, but these studies often are not finalized or used. For example, Dynatrend prepared drafts of a Conrail/Amtrak interface plan and a program development plan. A Dynatrend official told us that neither plan was finalized for NECIP use due to FRA indecision.

Arthur Andersen

Amtrak retained Arthur Andersen in September 1976 to develop vital management systems for NECIP. FRA and Amtrak could not agree on the value of the work being performed by Arthur Andersen and FRA stopped funding the contract in March 1978, after \$3 million had been spent, even though some of the final systems had not been installed.

For example, Arthur Andersen had spent 15 months and received \$600,000 to develop a Government-furnished property system, but the work was incomplete when funding for the contract stopped. Also, design work for an estimating system cost over \$500,000, but an FHWA audit found that the work was of little value because Amtrak personnel disregarded key procedures.

According to Arthur Andersen, several systems were designed and were scheduled for installation shortly after the March stoppage. For example, the Government-furnished property system and a management reporting system were to be started up in April 1978, but were never installed because of the funding cutoff.

FRA's and Amtrak's disagreement about the usefulness of Arthur Andersen's work illustrates the problems in communications among NECIP organizations. FRA criticized Amtrak's management of the contract because Amtrak did not sign a contract with Arthur Andersen until 1 year after the work had started. FRA also found the work descriptions to

be extremely vague and questioned the sole-source selection of Arthur Andersen, noting that the choice was a poor one and that the expertise was widely available at a fraction of the cost charged by this contractor.

According to Arthur Andersen, however, FRA had been repeatedly notified of contract negotiations and the work that was under way. Arthur Andersen said that the contract provided generalized work statements and specific task orders were issued to detail the work to be performed. Arthur Anderson also said that Amtrak had defended its selection based on Arthur Andersen's qualifications and its knowledge of Northeast Corridor activities and that Amtrak believed FRA approved the contract actions because FRA had approved the budget requests including Arthur Andersen's work and had approved the payment of fees and expenses.

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The Department of Transportation said that it did not believe our report demonstrated our conclusions on FRA's use of consultants. It said that, for example, the information on DCP's activities actually demonstrated FRA's active role in monitoring DCP's work products. The Department noted that many of the planning elements cited could be approved now that the redirection study has been completed. The Department also said that, with respect to the limitations of the various reports made by DCP and Bechtel, we should review them and express our own opinion as to their adequacy.

We do not agree with the Department's reasoning and believe that the material presented in our report demonstrates that FRA has not adequately directed and monitored its contractors. If FRA had been effectively monitoring and directing DCP, the problems with DCP would certainly have been lessened. With respect to the Department's comment about us making our own evaluation of DCP's and Bechtel's work, a review of DCP and Bechtel was not part our work scope, which covered FRA's administration of NECIP. Our comments on DCP and Bechtel are based on evaluations made by FRA and Amtrak officials involved in the contractors' work.

The Department also disagreed with our conclusion that NECIP management's failure to adequately plan and manage the project had resulted in wasted resources and inefficient and/or duplicative work which could be in the millions of dollars. The Department claimed that we had only cited \$138,000 in design costs that will be lost because of program changes. The Department ignored the many other examples we cited in this section and misinterpreted the

example on design costs. The \$138,000 was based on a small sample of \$344,000 out of \$22 million spent for design engineering and represented 40 percent of what we sampled.

PROJECT MANAGEMENT COSTS MAY BE EXCESSIVE

The program management and systems engineering elements constitute the NECIP project management cost. Through January 1979, project management costs amounted to about \$127 million, about 34 percent of total NECIP expenditures. An FRA official said the management costs had been high due to the extensive initial engineering required. He said that FRA hoped to reduce such costs to 20 to 25 percent of total costs by NECIP completion.

During the 1978 work season, about 57 percent of the people working on NECIP were performing project management activities. About 1,700 people were engaged in management activities while only about 1,300 were actually doing construction work.

FRA and DCP officials estimated that management costs for a project the size of NECIP should not exceed 10 to 12 percent. We noted that on several large Corps of Engineers projects the management costs ranged from 8 to 10 percent of total costs.

The Department of Transportation does not believe that our report supports the conclusion that project management costs may be excessive. The Department said that the extensive initial engineering required is why NECIP design costs appear high when compared to more conventional projects. We do not agree with the Department. In looking at management costs, we considered the estimated cost at completion of the project--20 to 25 percent of total costs--which would take care of any distortion in the early part of NECIP caused by the initial engineering. These costs appear to be high based on other projects' costs and on comments by FRA and DCP officials.

CONCLUSIONS

Shortcomings in NECIP management have resulted in numerous problems:

- Basic planning is not completed.
- The roles and responsibilities of the three management organizations are not completely defined.
- Key issues are still unresolved.

--FRA, Amtrak, and DCP are still not fully prepared for NECIP, and no finalized management planning and control system exists.

--Ineffective management has caused waste and inefficiency which could amount to millions of dollars.

--Project management costs appear to be excessive.

The three-party management structure is not working effectively and has contributed to the above problems. We believe that NECIP's problems cannot be solved and the project implemented effectively unless and until the management arrangement is simplified and more direct authority, responsibility, coordination, and communication lines are established.

FRA is the overall program manager and has the final authority and responsibility for the entire program. FRA, however, has not been effective, and major overall decisions and determinations have not been made, including such basics as defining NECIP and what the roles of the major participants are. FRA has failed to resolve these basic issues and instead has been involving itself in detailed day-to-day work, in which, we believe, it should not be involved. During our review, middle-level managers throughout the NECIP organizations continually expressed doubt that FRA was really helping NECIP. Some believed that FRA's activities were more detrimental than beneficial, others believed that FRA was superfluous to the program, and still others believed that FRA's role was inappropriate because it was trying to have a day-to-day involvement rather than acting as the program manager.

Amtrak should play a more responsible role in NECIP construction. As the owner of most of the Northeast Corridor and operator of intercity passenger service on the corridor, Amtrak is the only organization which can coordinate construction and operations by itself and which will have a continuing role in the Northeast Corridor after NECIP is completed. Amtrak should directly interact with DCP--which probably has most of the expertise on NECIP--and construction contractors on the scheduling and operational constraints involved in maintaining train service during construction.

We believe that NECIP could be managed more effectively and efficiently if Amtrak were made a true construction manager and given the responsibility and authority for completing construction work within specified time and funding limits. DCP and the construction contractors should work

directly with Amtrak without having FRA interposed as a middleman.

We do not see any overriding reasons for keeping FRA involved directly with NECIP. If a role for FRA exists, it should be one confined to top-level funding and monitoring responsibilities. FRA should not try to involve itself in day-to-day decisions and operations. After FRA assumes a more limited role in NECIP, or is taken out of the project altogether, there should no longer be a need for the services of contractors such as Bechtel and Dynatrend which have been hired by FRA to provide the expertise it lacks.

AGENCY COMMENTS AND OUR EVALUATION

Department of Transportation comments

The Department of Transportation said that when NECIP was authorized, no plan or program existed to achieve the mandates of the legislation and that, at the beginning of NECIP, the policy of concurrent planning, design, and construction was adopted in an effort to meet the 1981 completion date. The Department said that, in retrospect, there could be no doubt that the initial efforts to achieve concurrency also achieved inefficiencies, schedule difficulties, and many other problems. According to the Department, NECIP, as a result of the redirection study, has for the first time a firm recommended program and a realistic schedule and cost estimate. The Department said that the lack of such a program had contributed to many problems which our report cited and that the redirection study resolved most of the substantive issues we raised.

The Department stated that our report was written from a mistaken perspective because it was written as if NECIP were a conventional construction project, which was not the case; it said that:

- NECIP was the largest and most complex railroad project undertaken in this country in many years.
- Many of the required skills did not exist anywhere in the country at the start of NECIP.
- The 4R Act goals were the result of compromise and NECIP program planning had to restart upon the act's passage. The redirection study demonstrated that the 4R Act's goals, schedule, and budget were mutually impossible to achieve.

--Amtrak was expected simultaneously to assume responsibility for the most complex rail operation in the United States, address the impact of years of deferred maintenance by former owners, and assume its share of one of the largest and most difficult rail construction projects in U.S. history.

--With a 5-year project deadline, the Department was required to create an effective project management team and concurrently initiate a parallel program development, design, and construction effort.

The Department believed that, viewed from this perspective, a significant achievement by competent professionals in the face of an overwhelming task emerges. It agreed that further improvement in project management effectiveness and structure is necessary and said that it has been working with Amtrak to modify and refine procedures and has been discussing refinements in the management structure with Amtrak and DCP. FRA has been preparing the fundamental documents that reflect a baseline design and construction configuration, budget, and schedule and that serve as the basis for effective project control.

The Department said that it supports enhancing Amtrak's role, but strongly opposes the proposition that the Department's pivotal role in controlling program development and engineering design should be reduced. Further, since NECIP funds are authorized independently of the Amtrak budget, the Department believes Amtrak would have no incentive to make the most beneficial trade-offs between investment and operating costs. The Department also said that the Federal interest in the corridor includes (1) freight and commuter service and (2) achieving a balance in the improved corridor to maximize total return on funds; it does not believe Amtrak is suited to perform this role.

The Department strongly disagreed with our suggestion that funding for NECIP be held down until NECIP has been fully defined, basic planning is completed, and key issues resolved. It said that the biggest single problem with which NECIP management had to contend was the lack of a fully defined program and that the redirection study essentially removed the basis for our suggestion. The Department said that failure to approve the fiscal year 1980 budget request will create havoc in the planning area.

Our evaluation

We find it hard to accept that many of the required skills did not exist at the start of NECIP. Most of the

project work is to correct deferred maintenance, which is a normal railroading function, and the former Penn Central had years of experience in operating high-speed service on the Northeast Corridor before the 4R Act. The Department stated that its redirection study had demonstrated that the 4R Act's goals, schedule, and budget were mutually impossible to achieve. In our opinion, the redirection study report presents a case for saying that NECIP now cannot be completed within the constraints of the 4R Act, but it does not demonstrate that all the goals could never have been met.

We recognize that NECIP is a difficult undertaking and that it may have been necessary to initially undertake concurrent efforts because of the 4R Act's tight time frame. We believe, however, that these factors only emphasize the need for FRA to have fully defined and planned the project as soon as possible so that it could establish an effective program to implement NECIP. The Department acknowledges that the lack of a firm program and a realistic schedule and cost estimate contributed to NECIP's problems. The fact that the Department says, over 3 years after the original 5-year program was authorized, that FRA is now preparing the "fundamental documents" demonstrates what has been wrong with NECIP's management.

With respect to the Department's claim that the redirection study had resolved most of the substantive issues raised in our report, we believe that this has not been demonstrated. The redirection study does not specifically address the management and organization problems which we found. Further, the redirection study report does not contain enough detailed information on work scopes, schedules, and costs to determine if the study has in fact established a firm and realistic project. Such a determination cannot be made until the project planning documents have been issued and evaluated.

We believe our report demonstrates that FRA's involvement during the period covered by our review was not effective. To improve project management, FRA's role should be reduced to an overall monitoring and funding role or eliminated altogether. If FRA is taken out of a direct role in NECIP, funding for the project could be authorized through the Amtrak budget process which should overcome the Department's objections on making trade-offs. Amtrak owns most of the corridor and operates the intercity passenger service, but we do not see how this would preclude Amtrak from giving adequate consideration to the freight and commuter users of the corridor. Also, Amtrak will be responsible for corridor operations after NECIP is finished and will have to be involved with other users then.

With respect to the Department's comments on reduced funding for NECIP, as noted above the redirection study report does not specifically address NECIP's management problems and there is no firm assurance that it represents a fully defined program. Due to NECIP's problems to date, which have been caused at least partly by the management structure and the lack of realistic plans, we believe the Congress should consider what level of funding is desirable until it is assured that the management problems are being solved and realistic plans are established.

Amtrak comments

In commenting on our report, the President of Amtrak told us that

"As I see it, the basic problem of the improvement project is the institutional relationships. The historical record will clearly show that the first year of construction was lost. Major policy differences existed between the Executive Branch and Amtrak. That late start continues to affect the project because the institutional relationships that were created continue to be unwieldy. I should say at this point that the Federal Railroad Administration has made enormous efforts to improve their relationships. The problem is that, even with the best of will, the interfaces between FRA, Amtrak and DeLeuw, Cather/Parsons are not smooth and will require extensive revision if they are to be improved. On this point, FRA has given me their assurance of a willingness to discuss changes. We anticipate this will be done shortly."

ALTERNATIVES AVAILABLE

Alternatives available for improving NECIP's management structure include:

- Transferring responsibility for NECIP implementation from the Department of Transportation and FRA to Amtrak, which would require that the Congress amend the 4R Act. If this were done, funding for NECIP could be handled similarly to the way in which Amtrak's subsidies are now handled.
- Requiring FRA to confine itself to a top-level funding and monitoring role and avoid getting involved in day-to-day detailed work. This change could be directed by the Secretary of Transportation.

Regardless of which alternative is chosen, the Congress should determine what level of funding is desirable until it is assured that the management problems are being solved and realistic plans are established. Also, the contractors--except DCP--hired to provide technical expertise for FRA should be terminated.

CHAPTER 5

AMTRAK'S PERFORMANCE NEEDS

TO BE IMPROVED

Amtrak's construction work has consistently run behind schedule while exceeding estimated costs. Amtrak's NECIP organization has not been able to show that it can effectively manage the construction program because Amtrak has not assigned overall responsibility for project performance, the organization has undergone many changes, and its management system and internal controls have many weaknesses.

AMTRAK'S CONSTRUCTION PERFORMANCE HAS BEEN UNSATISFACTORY

During 1977 and 1978, Amtrak's construction work has been behind schedule and the cost of most of the work has exceeded the budget. Through December 29, 1978, Amtrak had received \$88.5 million for construction work.

<u>Description</u>	<u>Funding</u> (millions)	<u>Status at Dec. 29, 1978</u>		
		<u>Scheduled percent completed</u>	<u>Actual percent completed</u>	<u>Percent of funding used</u>
1977 track work	\$27.6	100	63	104
1978 track work	31.3	100	57	83
Undercutting and ballast cleaning	2.8	100	30	Not available
Rail welding	1.2	50	47	36
Pelham Bay Bridge	0.4	100	100	82
Woonasquatucket Bridge	3.7	54	38	32
44-bridge repair program	2.7	96	94	101
Portal Bridge	2.0	100	100	86
30-bridge painting program	1.4	100	85	91
75-bridge rehabilitation program	3.1	55	31	34
Additional 1978 bridge work	1.2	85	10	27
Communication and signaling	6.2	Not available	22	51
Electrification	4.9	Not available	9	48
Total	<u>\$88.5</u>			

Some elements have already had their work scopes reduced to stay within budget and others are going to need additional funds to complete the scheduled work. For example, the 44-bridge repair program has had 15 bridges deleted from its scope of work, yet Amtrak has retained the original \$2.7 million budget to repair the remaining 29 bridges. Similarly, the 30-bridge painting program has been reduced to 26 bridges; work is still behind schedule and costs are still overrunning.

Amtrak's performance will substantially affect the total project costs and the amount of work that can be accomplished. For example, Amtrak was originally scheduled to perform track work for about \$235 million. The estimated cost of Amtrak's work has risen sharply; an October 1978 DCP estimate was \$348 million.

Amtrak's portion of the NECIP work has not been established, however, one DCP document estimated that Amtrak will be responsible for \$700 million of the total project. While it is not possible to estimate the total impact of Amtrak's performance on the project, it must improve or NECIP will have to be reduced to stay within budgeted costs.

An Amtrak analysis of its track work productivity for 1977 and 1978 showed that its work crews spend over 50 percent of their time on nonproductive efforts:

<u>Time category</u>	<u>1977</u>	<u>1978</u>
	(percent)	
Productive work	48	45
Travel	16	15
Delays due to traffic	16	13
Repairs to equipment	11	15
Other delays	<u>9</u>	<u>12</u>
Total	<u>100</u>	<u>100</u>

The 1977 and 1978 track work programs were the largest Amtrak work elements to date and are major examples of Amtrak's performance. In 1977 Amtrak accomplished less than two-thirds of its planned work, but spent more than the total budget. As of December 29, 1978, the 1978 track program had accomplished only 57 percent of planned work while spending 83 percent of the budget. The 1978 program shows some improvement over 1977, but Amtrak's productivity rates and unit costs indicate that the planned 4-year track work program could take longer to perform and cost considerably more than anticipated.

1977 track work

The 1977 program was originally scheduled to be completed by December 31, 1977, at a cost of over \$22 million. When Amtrak could not complete the work on time, the program was extended until March 1978, and the budget increased to about \$28 million. In spite of the increased budget and extended time, Amtrak completed only 63 percent of the originally scheduled work. DCP's estimated value of the completed work was about \$13 million, determined by multiplying the units in place by the estimated cost per unit.

The implementation of the 1977 track work program was based on several schedules prepared by Amtrak. The first schedule, dated April 12, 1977, was the only schedule officially approved by FRA and showed a December 31, 1977, completion. The second published schedule, dated July 15, 1977, adjusted the time frame and production rates. Most of the activities were scheduled for completion by March 31, 1978; the schedule for a small percentage of the activities was extended to May 1978. The third published schedule, dated September 20, 1977, reduced the program by 21 percent from the first schedule. Later, a winter work program and some support activities were added to the scope of work. Even with the reduced schedule, Amtrak completed only 80 percent of the work. DCP estimated that it may cost \$51.6 million to complete the initially scheduled \$22-million program.

According to an Amtrak official, the 1977 track work element was hastily conceived and conducted. Instead of extensive initial planning, the NECIP management decided to simultaneously develop plans, expand staff, and begin construction. DCP attributed Amtrak's low productivity during 1977 to

- inexperienced crews;
- lack of adequate, well organized direction and definition of roles;
- inadequate equipment;
- inadequate material;
- lack of trained field supervisors;
- restricted track time; and
- inadequate materials control and logistics management.

DCP was not prepared to provide design and engineering support for Amtrak's 1977 program and had not prepared the plans and the specifications for the 1977 work. Hence, Amtrak often did work without having specifications or detailed plans. A part of the 1977 work may have been wasted due to a lack of initial planning and poor work quality. Crews were told to surface and align track without being given final alignments and elevation specifications. The track included in the continuous welded rail, undercutting, and surfacing work units may have to be resurfaced and re-aligned to bring them within specifications. The 1977 program, therefore, may have a detrimental impact on the total program since additional program funds may be needed to redo some of the 1977 work.

1978 track work

The 1978 track program was developed jointly by FRA, DCP, and Amtrak but is not progressing much better than the 1977 program. As of December 29, 1978, Amtrak had accomplished only about 57 percent of the work scheduled. Amtrak's productivity is less than planned and the unit costs for its work are generally higher than estimated, as shown in the following examples:

<u>Item</u>	<u>Planned unit cost</u>	<u>Actual unit cost (12-30-78)</u>
Joint elimination and renewal per weld	\$ 400	\$ 500
Interlockings	234,000	428,000
Undercutting per track mile	19,000	28,000
Wood tie renewal per tie	21	28
Continuous welded rail installation per track mile	24,000	45,000

DCP projected that Amtrak will complete about 63 percent of the scheduled work. The program has been extended and likely will cost more than budgeted. All of the major elements of the 1978 track work are in cost overrun positions.

For example, the program for the track laying system--equipment which installs new rail and concrete ties--was rescheduled three times from the original 107 miles to 49 miles. Since only 44 miles were completed during 1978, the remaining work from the original plan will have to be rescheduled in future years. In addition, the costs of this work are projected to overrun the budget by 70 to 90 percent. Therefore, this element, with a \$3 million budget, will probably need another \$3 million to complete the scope of work.

As of December 29, 1978, the continuous welded rail and rail grinding elements were extended to April 1979 and June 1979, respectively, while the interlocking work carryover into 1979 was being studied.

Estimates to complete the 1978 work budgeted for \$27 million are as high as \$16 million in additional costs. The 1978 work has been hindered by problems similar to those encountered in 1977. In addition, the quality of some 1978 work was below standard. Amtrak had not corrected many deficiencies in its work.

DCP summed up Amtrak's 1978 track work performance as having been

"*** characterized by cost overruns, schedule delays and poor quality of work. Amtrak has not demonstrated the ability to plan, supervise and execute work with even a remote semblance of good management."

In October 1978, DCP recommended to FRA the following actions to improve Amtrak's performance:

- Improve resource management: improve material supply logistics, obtain additional track time, and establish an effective equipment maintenance and repair program.
- Improve management: establish and maintain clear lines of authority and responsibility, improve field supervision, control absenteeism, and plan daily field work in advance to eliminate obstructions and minimize delays.
- Increase equipment.
- Increase the labor force.

Amtrak told us that equipment problems and a lack of plans were reasons for its 1978 performance. Amtrak noted that some work elements will be completed and some unit costs decreased. Amtrak said that it never received DCP's October 1978 recommendations and pointed out that it is difficult to plan and supervise when complete programs are not furnished, which is DCP's responsibility.

AMTRAK NEEDS A STABLE, UNIFIED NECIP ORGANIZATION WITH DEFINED ROLES

Amtrak's NECIP organization has not shown that it can effectively manage the construction program. The organization does not appear able to effectively plan or implement

the program within time and cost constraints. In our opinion, two main reasons appear to be responsible for the management problems.

First, Amtrak has not assigned overall internal accountability and responsibility for NECIP performance. The latest (September 1978) organizational plan continues to perpetuate a basic division in responsibility between the units responsible for planning and those responsible for construction.

Second, Amtrak's NECIP organization has undergone many changes since its inception. Rather than identifying the actual needs and roles necessary to accomplish the NECIP program, Amtrak has increased its NECIP staff without formalizing its internal structure.

A single NECIP organization is needed

Amtrak's Northeast Corridor (NEC) organization is the major railroad operating unit within Amtrak and it is Amtrak's largest revenue generating, passenger serving unit. Amtrak's NECIP organization is the largest construction operation in Amtrak. The NEC and NECIP organizations are separate units and each reports to a different Amtrak vice president. Amtrak's NECIP planning and project control functions are under the NECIP organization while the NECIP construction operations are under the NEC organization.

We noted numerous reported instances of internal conflict. For example, in late 1978 DCP reported that NECIP work was being halted because NEC work had priority. DCP also reported that NECIP equipment was being used on NEC work without considering the impact on NECIP schedules. FHWA audit reports raised serious doubts about Amtrak's ability to segregate and track NEC and NECIP costs and expenditures.

Under this situation, the units responsible for NECIP planning do not have the authority to see that the work is accomplished on time and within cost. The NEC units having authority over construction and operations are not responsible for NECIP planning or goals. The organization must be structured so that someone is responsible and accountable for all NECIP operations.

We believe that it is essential that the NECIP construction and operating units be under the same control and authority as the units responsible for planning and scheduling the improvements. With these units operating independently, no one can be held accountable for overall NECIP performance.

A formal stable NECIP organization is needed

Since NECIP began in 1976, Amtrak has reorganized its NECIP organization at least eight times. These reorganizations have occurred with such rapidity that the NECIP organization's functional statements have not been updated since 1976. As of January 1979, Amtrak had not defined the roles and responsibilities of its NECIP units. The changes have blurred the roles and responsibilities within Amtrak, causing internal and external confusion. Accountability is also hindered since the staff is always new.

The turnover in personnel has had an adverse impact since project inception. When Amtrak took over the corridor from Conrail in 1976, plans and requirements were prepared to establish the Amtrak NEC organization. These plans were never implemented because Amtrak brought in a different staff to manage NEC. This staff did not use any of the previously prepared plans but initiated its own planning. This original NEC management staff has since been supplemented, changed, and/or rearranged. As one Amtrak official stated, "There is no such thing as job continuity in the NEC."

Externally, this lack of organizational continuity has affected FRA and DCP. A constant complaint from FRA and DCP staff was: "I don't know who my counterpart is at Amtrak." For example, over a 4-month period Amtrak had four different persons responding to inquiries in the bridge program. The Amtrak NECIP organization's instability has hindered project performance by making the necessary interactions very difficult.

1977 leasing--an example of poor organizational stability and accountability

Amtrak leased over \$6 million in equipment during 1977. During the year, three units--NECIP procurement, NECIP maintenance-of-way equipment, and NEC--were involved with leasing equipment and vehicles. Lines of responsibility for accounting and control of leased equipment was unclear to the people implementing NECIP. Consequently, some leased equipment was not fully used, equipment was accepted without proper inspections for damage, some leases were extended without authorization, and other leases were continued even after purchased equipment arrived or the need for the leased equipment had expired.

Amtrak's records were not adequate to determine the amount of leased equipment that was needed and used in 1977.

However, we obtained informal estimates from FRA and others ranging from \$1 million to \$2 million for equipment that was not needed or used by Amtrak during 1977. An FRA official estimated that over \$500,000 had been wasted because Amtrak did not return equipment on time.

A review of Amtrak's equipment utilization reports revealed some cases where equipment was reported as not being used at all, or had a reported usage of 3 or 4 days out of a 10-month period. Some Amtrak officials said that their reporting system was not functioning properly last year, while other NECIP officials believed that the leased equipment actually was not used. A January 1979 FHWA audit report stated that equipment utilization system deficiencies were so significant that financial representations of equipment utilization costs incurred and equipment utilization credits due FRA were questionable.

FRA cited several examples of leased equipment not being used. At one location, 17 pieces of leased equipment were idle because Amtrak did not have enough operators. In another instance, some leased equipment was idle for 4 to 5 weeks waiting for repairs. FRA also cited examples of leased equipment which was sitting for 2-1/2 months in Amtrak's yards and shops waiting for location assignments. Amtrak could not confirm or deny these FRA reports because its records did not show equipment utilization.

FRA and Amtrak are trying to reconstruct and justify the amount of equipment leased during 1977. FRA noted a number of problems in reviewing Amtrak's reports, including:

- Equipment leased for gangs during periods when the gangs were not working.
- House trailers rented for gangs that were not housed in trailers.
- Equipment leased for gangs that did not exist.
- Equipment leased for gangs doing non-NECIP work.

We examined some leasing records and found examples of equipment being leased for about \$3,000, but only used 3 hours in 5 or 6 months. Other equipment, also costing about \$3,000, was used for only 36 hours in 5 months.

FRA also noted that Amtrak was paying leasing rates which were much higher than standard rates. FRA checked 10 types of equipment and found that Amtrak was paying higher than standard rates on all 10 types. Some equipment was

leased for over 3 times the standard rates. The higher rates ranged from \$40 per month to \$4,200 per month above the standard costs. Amtrak, however, believes that the standard rates do not reflect market prices.

As of February 13, 1979, Amtrak and FRA still were not able to resolve \$2 million of the 1977 leasing costs.

We also noted that Amtrak, in its rush to start work, had failed to prepare lease versus purchase analyses. Amtrak's internal system did not assign responsibility for determining whether equipment should be leased or purchased. At the start of the 1977 program, Amtrak leased some equipment that should have been purchased. In some cases Amtrak paid more in lease payments than it cost to purchase the equipment. For example, Amtrak leased several pickup trucks at over \$6,400 each, when the vehicles could have been purchased for about \$5,500 each.

Further, we noted instances of Amtrak leasing and then purchasing equipment at a total price higher than if it had originally purchased the equipment. The excess cost on these purchases ranged from \$9,000 to over \$125,000. For example, the cost of a new ballast regulator was about \$66,000, yet Amtrak paid a total of \$89,000 to lease and eventually purchase the machine. Amtrak said that it believed that it had saved money on some lease negotiations.

Amtrak recognized that weaknesses existed in the overall control of leased equipment, but disagreed with FRA's estimate of unneeded equipment. Amtrak cited FRA funding delays and the rush to start the work as reasons for the leasing problem. Amtrak stated that corrective measures, including having a responsible organization, have been instituted to preclude future problems.

AMTRAK'S NECIP MANAGEMENT SYSTEM AND INTERNAL CONTROLS NEED IMPROVEMENT

The Amtrak NECIP organization has been audited and investigated by FHWA and other groups. These efforts have raised serious questions about the accuracy, reliability, and validity of many Amtrak NECIP activities.

For example, FHWA has audited Amtrak's NECIP operations at FRA's request. FHWA has had a continuing problem issuing unqualified opinions about the integrity of Amtrak's financial system and the validity of costs claimed; the audit reports disclosed deficiencies in Amtrak's

- proposal preparation and documentation,
- indirect cost proposals,
- control of spare parts inventory, and
- procurement procedures.

In June 1978 the FHWA Director of Program Review and Investigations told FRA that "The overall monitoring of the NECIP both from a technical and financial standpoint leaves something to be desired."

The Department of Transportation commented that the FHWA audit reports have been helpful in focusing attention on the areas requiring corrective action. The Department feels that significant improvements have occurred. As examples, it cited improved materials specifications, inspection of materials during their manufacture, and records and controls.

FRA, DCP, and others have also spent considerable time reviewing Amtrak reports and records. They reviewed Amtrak's

- monthly procurement reports,
- equipment inventory reports,
- purchase order files,
- inventory and equipment utilization data, and
- gang equipment reports.

FRA officials found conflicting data in every report.

The major questions raised by these audits cover Amtrak's procurement, accounting, and logistics activities.

Procurement

The FHWA audits pointed out that Amtrak:

- Did not have adequate controls to determine responsible prospective contractors. In one instance, Amtrak awarded contracts to suppliers who failed to deliver about 66 percent of the required material. According to Amtrak correspondence, the poor contractor performance had a "monumental impact" on the 1977 track program.

- Needed controls to ensure that material charged to NECIP was allowable. Amtrak spent over \$350,000 for material below specifications, outside adequate performance, or violating purchase order requirements.
- Failed to comply with the Federal Procurement Regulations as required by the FRA/Amtrak contract. Over \$10 million was spent on contracts which did not have public bid openings, where bid price examinations were not available, and where FRA contracting officers' consent was not solicited in advance.
- Allowed unauthorized personnel to procure materials, equipment, supplies, and professional services.
- Used contractor services without preparing requisitions. In more than 50 percent of the cases, Amtrak started using a contractor's service without having a definite requisition. In one case, it was not prepared until almost 1 year after the contractor had started work.

We found that Amtrak has been lax in its equipment acceptance practices and has failed to document contractor performance or enforce contractual performance penalties. For example, a track geometry car, which was delivered in May 1978, has yet to pass its acceptance tests but most of the over \$800,000 purchase price has been paid. The car does not contain all of the equipment required in the specifications and some of the on-board equipment needs modification.

In another instance, Amtrak purchased 20 rehabilitated locomotives for almost \$6 million for work train service. A DCP inspection in late August 1978 revealed problems indicating that Amtrak had accepted the locomotives even though they had not been rehabilitated properly. Defects were later corrected.

Accounting

DCP and FHWA analyses have raised questions about Amtrak's time-reporting system and the charges being billed to NECIP. These reviews indicated that Amtrak's accounting system may not accurately reflect or track NECIP labor costs.

FHWA auditors reviewed Amtrak's labor charging system and found several discrepancies. FHWA's June 1978 audit report stated that almost one-third of Amtrak's expenditures

on a bridge project were questionable. Amtrak concurred and blamed the problem on field coding errors. Similarly, an audit of the station improvement program showed that Amtrak had miscoded all of the costs in question and was charging FRA for work that had not been done. Amtrak said that the costs have since been transferred to the correct areas. After a number of audits with similar results, FHWA concluded that Amtrak's labor charging system had insufficient control to insure proper charges.

Another example of questionable NECIP charges concerns spare parts. During 1977, Amtrak claimed almost \$3 million in spare parts expenditures. However, an FHWA audit found that Amtrak's accounting system was not adequate to identify, allocate, and accumulate allowable labor and spare parts material costs. The audit also found a large number of misclassified and/or unsupported accounting transactions. Forty-eight percent of the reviewed transactions were found to be classified incorrectly.

Amtrak believes that the questionable charges resulted from differing FRA, FHWA, and Amtrak interpretations of work scopes. Amtrak stated that, with respect to the unsupported transactions, its system of charging out spare parts was consistent with railroad industry practice, but did not satisfy requirements imposed by the FRA/Amtrak contract. Amtrak said that an acceptable system has now been developed.

DCP has questioned Amtrak's accounting system and time charges on several occasions. In one case, DCP compared its daily inspection reports with Amtrak production reports. Supposedly, the DCP and Amtrak reports were both derived from the Amtrak timekeeper's records, but a comparison of the staffing levels in the reports showed the Amtrak production reports to be significantly different from the DCP reports.

<u>Date (1978)</u>	<u>DCP check with Amtrak timekeeper</u>	<u>Amtrak production report</u>
July 17	152 men	144 men
July 18	109 men	65 men
July 19	83 men	64 men
July 20	135 men	65 men

DCP also noted that Amtrak did not have charges for crews that were actually working.

One DCP official stated in an internal memo that:

"If field-level timekeeping/payroll functions are as bad as the * * * information indicates, then cost overruns, inaccurate payroll records and erroneous production reports are prevalent throughout the Amtrak system."

Amtrak was not able to reconcile or dispute the DCP report, but believed that DCP should not have used its production report for manpower analysis.

Logistics

A number of internal control problems have been noted in Amtrak's logistical capabilities. These revolve around material control and equipment maintenance.

Material control

Amtrak procedures to verify material deliveries distributed along the right-of-way were not being followed. In June 1978, DCP notified FRA that over 4,000 ties were stolen in the Baltimore area. During the investigation it was discovered that Amtrak could not determine if the ties were ever delivered. Since delivery could not be proven, Amtrak could not be certain if the ties were stolen.

Amtrak inventory records are another problem area. While attempting to develop the material needs for the 1979 track program, DCP tried to determine the amount of material ordered, received, used, and on-hand at Amtrak. After several months of effort, DCP found that the Amtrak inventory records were often incorrect, incomplete, and irreconcilable.

A DCP sample of Amtrak's records showed that almost \$3 million in excess material may have been purchased. DCP and Amtrak could not resolve the differences; therefore, DCP had to estimate the material purchased and used in 1977. DCP believed that Amtrak's system apparently could not track materials through the purchasing, inventory, and construction cycles. An Amtrak corporate inventory for fiscal year 1978 revealed a \$16 million variance between book and physical inventories.

Amtrak disagreed with the DCP assessment of its inventory records and stated that DCP used incomplete information and did not interact with appropriate Amtrak staff. Amtrak also stated that its system functions properly if the proper documentation is generated and forwarded by the field operations.

Regarding the Amtrak corporate inventory that revealed a \$16 million variance between book and physical inventories, Amtrak believes that this variance is not an actual materials discrepancy but is a combined problem of system interfacing and misunderstanding at the field level concerning material documentation.

The DCP/Amtrak disagreement over inventory records is another example of poor coordination on the project.

Amtrak's defense of its system applies only to the system's functioning and does not state that proper documentation has been forwarded by the field operations. As noted on page 103, numerous problems with materials and spare parts continue to be revealed.

Equipment maintenance

In early 1978, one Amtrak official termed Amtrak's maintenance of field equipment "horrendous." Also in 1978, DCP stated that Amtrak needed to establish an effective equipment maintenance and repair program. FRA stated that Amtrak had urgent problems in equipment maintenance and spare parts. Amtrak has not set up a proper equipment accountability system or trained its work crews to properly maintain equipment. Further problems included

- insufficient spare and repair parts on gangs,
- lack of a maintenance plan,
- no resolution of winter shop facilities,
- inadequately trained equipment repairmen, and
- an inadequate machine shop at Bristol, Pennsylvania.

The lack of equipment maintenance affects NECIP in many ways. For example, the 1977 winter rehabilitation program suffered when the 1977 track program was extended to March 1978. This extension reduced the time available for necessary equipment rehabilitation. Amtrak did not have enough time, trained mechanics, or plans to properly service the equipment during the winter of 1977. This problem was further reflected in the slow start of the 1978 track program when many machines broke down, were not ready, or needed immediate repairs. Amtrak told us that it has made improvements in its 1978-1979 winter program.

Continuing problems

A November 1978 Arthur Andersen study report of maintenance-of-way materials and spare parts revealed continuing problems in these areas. Arthur Andersen found:

- No central material control function encompassing requirements planning through procurement, receipt, inventory management, and use.
- No effective information system for tracking spare parts or materials and reporting accountability measurements, such as actual use versus estimated requirements, inventories on hand by specific location, and carry-over of unused material.
- Inaccurate material accounting reports.
- Inaccurate and untimely computer system inventory information.
- Inadequate division facilities for maintaining effective stores control over receipts, issues, and on-hand materials.
- No effective way to hold anyone accountable for materials at warehouses, division level, or work sites.
- Cumbersome spare parts procurement processes that do not sufficiently respond to requirements.

The Arthur Andersen report stated that Amtrak management estimated that about one-half (\$1 million) of the spare parts inventory was excess or obsolete.

CONCLUSIONS

Amtrak's performance on NECIP construction work has not been good. Its work has consistently run behind production schedules while exceeding cost estimates. This situation will seriously affect NECIP if conditions do not improve. Given NECIP's budget constraints, overruns in cost will mean a reduced level of NECIP improvements and production slippages will further stretch out the program completion dates.

Amtrak's NECIP organization has not shown that it can effectively manage the construction program. Amtrak has not assigned overall responsibility for NECIP performance. Its NECIP organization has undergone numerous changes, and Amtrak has not defined the organization's role. Amtrak's

NECIP management system and internal controls have many weaknesses.

RECOMMENDATIONS TO THE PRESIDENT OF AMTRAK

We recommend that Amtrak assign overall responsibility to one individual for NECIP performance and establish a stable NECIP organization with a clearly defined role to help assure that its construction work is completed on time and within cost estimates. We also recommend that Amtrak take immediate steps to correct the weaknesses identified in its management system and internal controls.

AGENCY COMMENTS AND OUR EVALUATION

Agency comments

Amtrak did not specifically comment on our recommendations, but agreed that there was no question that there was waste and inefficiency at the beginning of NECIP and that part of this can be attributed to Amtrak. Amtrak said that it has since made improvements and is prepared to operate effectively within available funding limits to the extent that it has the freedom to do so. Amtrak said that the basic problem of NECIP was the institutional relationships.

The Department of Transportation agreed that Amtrak's construction performance had not met targeted goals, but said that our report failed to recognize that these were symptoms of a transition that was inevitable for Amtrak. The Department noted that Amtrak assumed ownership of the corridor in April 1976 and responsibility for rail operations by September 1976, and that Amtrak had never been responsible for operating and maintaining a railroad before the 4R Act. The Department said that it had expected Amtrak would have serious problems with setting up an effective organization, implementing and maintaining an efficient and effective NECIP management information system, and carrying out a large construction program.

The Department said that current trends indicate a measurable improvement in job supervision, production quality and quantity, and unit costs. The Department said that the 1979 work year is a critical production year and it hopes Amtrak's performance will improve significantly. The Department also said that, because of these improvements, FRA will continue to assign more and more responsibility to Amtrak. According to the Department, our report failed to explore in depth the question of whether Amtrak performance was improving and the Department was convinced that Amtrak's performance was improving in all areas, although further improvement is clearly required.

The Department found our positions in chapters 4 and 5 to be conflicting because we believed major problems existed with Amtrak's performance, but were proposing that Amtrak be made a true construction manager and given the responsibility and authority for completing construction work within specified time and funding limits. According to the Department, FRA is the only one qualified to set time and funding limits, and the limits cannot be set without FRA control over design and cost estimating. The Department agreed that much could be done to transfer primary construction management responsibility, but said that we had missed the significance of FRA's and DCP's role in program definition and design management where the need for FRA/DCP control is greatest. The Department said that transferring DCP's contract to Amtrak would be costly, disruptive, and probably infeasible at this stage of NECIP, and eliminate the external mechanism for evaluation and control of Amtrak. The Department believed that transferring program development and design management to Amtrak would be asking Amtrak to perform a wider policy role which it cannot be expected to manage.

Our evaluation

Our review of Amtrak's performance covered both 1977 and 1978 work. We found no significant improvement in Amtrak's performance during 1978 and serious problems continue to exist, as noted in our report. Also, Amtrak's latest organizational structure still does not appear to resolve the split in responsibility and authority between Amtrak's planning and operating groups. We recognize that there were unavoidable start-up problems in Amtrak's operation, but we do not believe it is a tenable position to continue at this late date to attribute Amtrak's continuing problems to start-up difficulties.

The Department perceived a conflict between our proposals in chapters 4 and 5 and cited a number of reasons why it believed FRA should retain a major role in NECIP. While we believe Amtrak's performance has not been good, we also believe that FRA has done no better in managing NECIP. We think that Amtrak should have a major role in NECIP because of its unique role as owner of the corridor and operator of intercity passenger service on the corridor. As for the Department's reasons for keeping FRA in a major role, we believe that the areas cited by the Department are the very areas where FRA has failed to perform effectively, therefore not playing an essential role in NECIP. Amtrak, with DCP expertise, certainly should be able to perform at least as well as FRA in managing NECIP and would also have the advantage of not working under the current ineffective

three-party management structure. Because Amtrak and DCP have each been involved in NECIP from the beginning and have had to work with each other, we do not believe that there would be any insurmountable problems in changing DCP's role to an Amtrak contractor. The President of Amtrak told us that he believed such a change would not cause much trouble and would be desirable.

WARREN G. MAGNUSON, WASH., CHAIRMAN

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JAMES R. CALLOWAY
 CHIEF COUNSEL AND STAFF DIRECTOR

United States Senate

COMMITTEE ON APPROPRIATIONS
 WASHINGTON, D.C. 20510

April 7, 1978

The Honorable Elmer B. Staats
 Comptroller General of the United States
 U. S. General Accounting Office
 441 G Street, N. W.
 Washington, D.C. 20590

Dear Mr. Staats:

As you know, the Railroad Revitalization and Regulatory Reform Act of 1976 authorized the Northeast Corridor Improvement Project (NECIP) as a comprehensive program to improve facilities, installations, and other physical plant components on the railroad system between Boston, Massachusetts and Washington, D.C. Responsibility for implementing the NECIP was assigned to the Secretary of Transportation and this responsibility has been delegated to the Northeast Corridor Project Office, Federal Railroad Administration.

In light of the numerous changes in schedules and funding levels reported to this Subcommittee, we are requesting that GAO review the NECIP to evaluate how effectively it is being managed. As Senators representing States in the Northeast Corridor, we are particularly interested in determining whether present plans will provide the same quality physical facilities as originally envisioned and whether the project will be completed within the funding and timeframe specified in the Act.

We would expect a briefing on your findings by September, 1978 and a final report no later than January, 1979. Please ask your staff to contact the Minority Subcommittee staff to work out an appropriate scope of the study.

Thank you for your prompt attention and assistance.

Sincerely yours,

Clifford P. Case
 Senator Clifford P. Case
 Ranking Minority Member
 DOT and Related Agencies Subcommittee

Charles McC Mathias, Jr.
 Senator Charles McC Mathias, Jr.
 Member
 DOT and Related Agencies Subcommittee

Lowell P. Weicker, Jr.
 Senator Lowell P. Weicker, Jr.
 Member
 DOT and Related Agencies Subcommittee



OFFICE OF THE SECRETARY OF TRANSPORTATION

WASHINGTON, D.C. 20590

ASSISTANT SECRETARY
FOR ADMINISTRATION

January 29, 1979

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

Dear Mr. Eschwege:

We have enclosed two copies of the Department of Transportation reply to the General Accounting Office (GAO) draft report "Problems With The Northeast Corridor Improvement Project."

The draft report cites many deficiencies in planning, funding, and execution. The picture is not nearly as bleak, however, as one might assume in reading the GAO observations. Therefore, the main purpose of this response is to put the observations into perspective, to correct a number of inaccuracies, and to report upon the progress of various corrective actions that are either underway or have been completed.

The legislation that established the Northeast Corridor Improvement Project (NECIP) directed the achievement of new, faster service on the Corridor by a specific date. No plan or program to achieve these mandates existed at the time the legislation was issued. At the beginning of the Northeast Corridor Project, the policy of concurrent planning, design, and construction was adopted in an effort to meet the 1981 completion date. In retrospect, there can be no doubt that the initial efforts to achieve concurrency also achieved inefficiencies, schedule difficulties, and a host of other problems that result from an expedited effort. Many of these have been observed by the GAO audit. Essentially all have received Federal Railroad Administration (FRA) attention.

As a result of Secretary Adams' Redirection Study, the NECIP for the first time has a firm recommended program and a realistic schedule and cost estimate that are awaiting action by the new Congress. It was the lack of such a program that contributed to the many problems which the draft report has cited. The various organizations involved in the NECIP--primarily FRA, De Leuw, Cather/Parsons and Amtrak--are prepared to carry out the recommended \$2.4 billion authorization program effectively. We hope that GAO will give careful consideration to our comments and make the suggested changes to the report.

In accordance with the GAO's request at a meeting on January, 11, 1979, we have structured Enclosure A to be in a relatively short, narrative form so that GAO may include it in its entirety in their final report. Enclosure B is a much more detailed analysis on a point-by-point factual basis and is intended primarily to facilitate GAO's efforts in preparing an accurate final report.

If we can further assist you, please let us know.

Sincerely,



Edward W. Scott, Jr.

Enclosures

ATTACHMENT A

DEPARTMENT OF TRANSPORTATION REPLYTOGAO DRAFT OF A PROPOSED REPORT ENTITLEDPROBLEMS WITH THE NORTHEAST CORRIDORIMPROVEMENT PROJECTSUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

The Railroad Revitalization and Regulatory Reform Act of 1976 (4R Act) directed the Secretary of Transportation to implement a 5-year, \$1.75-billion project to improve rail passenger service on the Northeast Corridor between Boston, New York, and Washington. The 4R Act directed that regularly scheduled and dependable service meeting specific trip-time goals be established by February 1981.

The draft report concludes that:

1. The project will not be completed until 1984 and the trip-time goals cannot be met within the \$1.75 billion authorized. Costs to complete the project, and meet other objectives specified in the legislation, could be as high as \$5 billion. The Congress should decide what level of improvement is desirable and what additional funding, if any, should be provided.
2. Because budgeted costs were being exceeded, the scope of the project was reduced which will result in increased future maintenance costs, reduced passenger comfort, reduced on-time reliability, and reduced safety.
3. The project is managed by a three-party management structure composed of the Federal Railroad Administration, Amtrak, and an architect/engineering contractor. There are many problems in the way the project is progressing, for example, basic planning is not completed and the three-party management structure is not effective.

SUMMARY OF DEPARTMENT OF TRANSPORTATION POSITION *

The draft report is written from a mistaken perspective. It is written as if the Northeast Corridor Improvement Project (NECIP) were a conventional construction project, conventionally authorized and funded. This is not the case. The Department acknowledges that the project has had a history of problems, but in evaluating this history, the draft report has failed to address a number of critical factors.

First, the draft report focuses almost entirely on the history of the NECIP and the troubled process of trying to devise and manage a program to fit a set of legislated performance goals, funding and time constraints which clearly represented a political compromise rather than an achievable program. Careful review of the recently released Northeast Corridor Improvement Project Redirection Study, January 1979, will show that the draft report's observations as to NECIP scope, schedule and budget have already been resolved by the Department. Thus, the Redirection Study, which the Secretary initiated in January 1978, resolves in detail the large majority of the substantive issues raised in the draft report. FRA has already taken decisive action to attack the problems identified by the draft report.** The Department strongly urges that the final report recognize the program recommendations in the Redirection Study.

* De Leuw, Cather/Parsons (DCP), the engineering and project management contractor, has participated in the preparation of this reply to the GAO draft report. DCP has not participated in those issues that relate to the Federal Railroad Administration and Amtrak organizations and qualifications or recommendations for Congressional action, DCP has neither the qualifications nor the prerogative to respond to these points. Accordingly, this document also represents DCP's submission to the GAO.

** Due to the timing of the audit, the GAO reviewers did not have the opportunity to analyze the current program (the Redirection Program) since it contained premature budget information that the Department was unable to release.

Next, the draft report evaluates the past effectiveness of the management of the project against an unrealistic standard, i.e., the legislative goals, funding and time constraints. In developing comments on the draft report, the Department has determined that the following statements are beyond dispute.

1. This is the largest and most complex railroad project undertaken in this country in many years, perhaps ever, and it is taking place on the most heavily utilized railroad trackage.
2. Many of the required skills, including those pertaining to 120-mile-per-hour passenger operations, simply did not exist anywhere in the country at the beginning of the project.
3. The 4R Act's NECIP goals, budget and schedule were the result of a last-minute legislative compromise. They were not grounded on a comprehensive plan and, in fact, the NECIP program planning had to start again, essentially from scratch, upon passage of the Act. As the Redirection Study demonstrated, the 4R Act's goals, schedule and budget were mutually impossible to achieve.
4. Immediately after the passage of the 4R Act, Amtrak was expected simultaneously to assume responsibility for efficient management of unquestionably the most complex rail operation in the United States, face up to the devastating impact of many years of deferred maintenance by the former owners of the Corridor properties, and embark upon its share of one of the largest and most difficult rail construction projects in U.S. history.
5. In the face of the five-year project deadline, the Department was required to create an effective project management team and concurrently initiate a parallel program development, design, and construction effort.

In short, achievement of all of the legislative goals was unrealistic - a fact which the draft report does not adequately consider.

Viewed from this perspective, the Department believes that the effectiveness of NECIP management takes on quite a different aspect. What actually emerges is a significant achievement by competent professionals in the face of an overwhelming task. Some lessons have been learned the hard way, of course, and with the luxury of hindsight, some decisions might have been made differently. The Department agrees that further refinement may be desirable in the NECIP's management structure, and FRA has been discussing such refinements with Amtrak and DCP. Concurrent with the finalization of the Recommended Program, FRA has been preparing those fundamental management documents that reflect a baseline design and construction configuration, budget, and schedule, and that will serve as the basis for effective project control. Working with Amtrak, FRA is also modifying and refining procedures to insure maximum efficiency and effectiveness in the management of that program.

The Department agrees with the draft report recommendations that Congress assess its expectations from the NECIP and adopt a realistic program scope, schedule and budget for the project. In the Redirection Study, the Department has provided the Congress with recommendations to accomplish just that. The Department believes that the Redirection Study report provides a response to many of the criticisms in the draft report on the subjects of NECIP program scope, schedule and budget.

The Department agrees that further improvement in project management effectiveness and structure is necessary; we have already taken steps in this direction. The Department does not agree with the draft report's assessment of past management effectiveness because the draft report understates the difficulty of the task and does not acknowledge the significance of management actions already taken. Finally, the Department recognizes Amtrak's past shortcomings, but believes that Amtrak's performance can be improved. As a result the Department supports the concept of enhancing Amtrak's role as fast as Amtrak develops the capability for assuming such responsibilities. The Department strongly opposes the proposition that FRA's pivotal role in controlling program development and engineering design should be reduced. In the

final analysis, it is only the Department and not Amtrak which can target NECIP funds to achieve maximum Federal return, both from intercity passenger service and from those commuter and freight concerns which are beyond Amtrak's corporate mandate.

Despite disagreement with substantial parts of the draft study, the Department believes that the GAO review has served a constructive purpose. There is agreement that the NECIP has had serious problems and that Congressional action must be taken. The Department has acted and is looking forward to working with GAO in evaluating the effectiveness of these actions and in formulating further initiatives as they are required.

The Department has not commented specifically on the report's Digest but has addressed the GAO findings on a chapter-by-chapter basis.

DEPARTMENT OF TRANSPORTATION POSITION STATEMENT

The Department maintains that a substantial number of the findings in the draft report are either inaccurate, are not supported by the available facts outlined in the report, or are lacking in perspective of the legislative history of the 4R Act. In combination, these findings contribute to mistaken conclusions concerning achievements and management effectiveness.

CHAPTER I - INTRODUCTION

The legislated trip-time, service-reliability, and completion-date goals and funding authorization for NECIP were arrived at in the absence of any program definition, engineering analyses or management planning that would demonstrate that the goals of the 4R Act could be achieved for the funds authorized.* The draft report, although recognizing this historical fact, describes as one of its purposes, a determination of "whether present plans will provide the same quality physical facilities as originally contemplated" (p.1). This statement implies that at the time of enactment, a specific program of improvements existed that would permit achievement of the goals for the funds authorized. No such program existed.

* This is fully documented in The Great Railway Crisis: An Administrative History of the United States Railway Association, March 1978, which the draft report cites.

Furthermore, the draft report arbitrarily adopts a program benchmark for evaluating management performance when, in fact, the program described was only one draft plan in a series directed at achieving a firm \$1.75-billion program. Selection of a GAO program benchmark occurred with the decision that the August 1977 draft NECIP Implementation Master Plan (IMP) would be used as the "basis for determining the originally contemplated quality of facilities. (p.1) This decision has created a second fundamental problem. The Department was aware that, as in the two prior draft plans, further work was required. Project features were not firm, and there were clear indications that significant refinements were needed both in construction schedules and costs.. This factor, coupled with the knowledge that NECIP planning was initially concentrating on high-speed intercity service without full consideration of freight and commuter services, led Secretary Adams to initiate the Redirection Study.

CHAPTER II - PROJECT COST, SCHEDULE AND ANTICIPATED RESULTS

The Department agrees that construction work will continue through 1983 and that trip-time goals cannot be reliably met within the \$1.75 billion authorized. The Redirection Study, released in January 1979, conclusively demonstrates that the major goals of the 4R Act were never achievable within the targeted completion date and the funding specified. Furthermore, the Redirection Study (Part IV) has resulted in a recommended \$2.4-billion program, that will save on future maintenance costs, increase passenger comfort, increase on-time reliability, and maintain a high level of safety. The Department strongly urges that the results of the Redirection Study be reflected in the final GAO report.

Estimated Completion Dates and Estimated Cost

The recommended program resulting from the Redirection Study will accomplish every goal enumerated in Section 703 of the 4R Act with two exceptions. First, the NECIP cannot meet the goal of regularly scheduled and dependable intercity rail passenger service between Washington and New York and between New York and Boston at the trip times called for in the 4R Act by February 1981. The Redirection Study has clearly demonstrated that this target date could never have been achieved. Second, the trip-time and reliability goals cannot be met within the funds originally authorized. Four key factors contributing to these conclusions are: the unusual size and technical complexity of the undertaking in conjunction with the need to

rapidly assemble a team of capable engineers and designers; the fact that Amtrak neither owned nor operated the Corridor when the NECIP was enacted and had no construction experience; the need to maintain acceptable levels of intercity passenger, commuter, and freight service during construction; and the number and variety of institutions with which FRA must work and with which innumerable agreements must be formally reached, e.g., the rail system operators, other Federal agencies, state and local governments in an eight-state area plus the District of Columbia, a variety of regional transportation planning and operating entities, contractor and labor groups, and a host of other interest groups.

With respect to improvements in facilities on the three feeder lines, i.e., Harrisburg to Philadelphia, Albany to New York City, and the New Haven-Springfield-Boston inland route, the record demonstrates that these lines could not be improved within \$1.75 billion authorized and this was known at the time the 4R Act was enacted. The record also shows that the Department has never considered construction improvements for the feeder lines to be achievable under the current NECIP authorization. (See Hearings Before the Government Activities and Transportation Subcommittee, June 1978, p. 269.)

The Department disagrees with the inclusion in the draft report of the discussion on "Other improvements for the NECIP" (p.18). These improvements were being considered in connection with studies that FRA was doing in preparing the report required under Section 703(1)(E) of the 4R Act, and related to the feasibility of achieving 2-hour-30-minute and 3-hour trip times on the south and north segments of the Corridor, respectively. The use of these study evaluations of future options in a post-NECIP time frame to evaluate the present status of the NECIP is inappropriate and misleading since the Act called for feasibility studies and not performance at these trip times.

The scope of the NECIP, as far as planned improvements by 1984 are concerned, should not exceed the \$2.404 billion recommended in the Redirection Study report. The 2-Year Report, submitted to Congress in February 1978 in partial fulfillment of the reporting requirements of Section 703(1)(E) of the 4R Act, contains a comprehensive description of potential further enhancements to the Corridor (appendices H and J). The 2-Year Report discusses the fact that in support of Amtrak's Corridor operations the Department intends to continue research exploring the feasibility of using relatively inexpensive tilt-body vehicles, as opposed to fixed-facility improvements, to achieve 2-hour-30-minute and 3-hour trip times.

Safety-Related Speed Limits for Track

With respect to safe rail operations, no aspect of NECIP is given greater attention. Throughout every phase of planning, design, and construction, safety considerations have been given the highest priority. Both Amtrak and NECIP have corresponded with the FRA Office of Safety regarding the safe operation of high-speed trains at the completion of the NECIP. The Office of Safety has indicated that they anticipate no problem in permitting 120-mph train operation on class 6 track. The facts that Penn Central operated passenger trains on the Corridor as recently as a few years ago at authorized speeds above 110 mph, and that foreign railroads regularly operate at speeds as high as 132 mph, demonstrate that 120-mph operations over a rebuilt railroad with modern signaling and communications is entirely feasible.

Demand Projections are Questionable and Operating Losses are Anticipated.

Amtrak and FRA agree that during the construction period, rail passenger trips on the Corridor will remain at about 11 million annually. Delays caused by construction as well as unreliable Amtrak equipment have led to a lengthening of trip times and probably account for some passenger diversions to other transportation modes. Mechanical failures have caused Amtrak to substitute locomotive-hauled trains (GC-1s and Amfleet) for Metroliner service. Ridership should improve as a result of the Metroliner rebuilding program currently underway. For example, the response to initial Metroliner service in 1969 clearly demonstrated considerable support for improved rail service.

Concerning long-term ridership projections and the ultimate profitability of Amtrak's Corridor operations, appendices C and K of the 2-Year Report identify combinations of service levels, fares, demand-growth assumption, and costs that show breakeven or profitable operations in the future. Amtrak and FRA are actively pursuing these options. A market-research effort sponsored by FRA with NECIP funds and being jointly conducted by Amtrak and FRA personnel gives clear evidence of this.

The draft report has misinterpreted the comments of the Director of the Northeast Corridor Project with respect to a statement attributed to him that Amtrak's high-speed service will continually operate at a deficit. The Recommended Program will provide a rail system that, with prudent Amtrak management and aggressive marketing innovations, should be more than able to cover Corridor operating costs and thus will not require an annual appropriation to cover operating deficits.

Conclusion

The Department suggests that the conclusions of this chapter of the draft report be revised to reflect the Redirection Study's Recommended Program including the program scope, budget and schedule, and the ability of that program to meet the trip-time goals of the 4R Act.

To avoid confusing readers, the Department suggests that the final GAO report avoid speculating on how much might be invested in the Corridor in the post-NECIP environment. This subject is simply too complex, offers an almost infinite range of possible investments, and bears little relationship to the audit charter. If it is essential to address this subject in the final report, readers would be better served by a reference to the Department's 2-Year Report and the fact that the 4R Act requires updating of this report by February 1982.

CHAPTER III - PLANNED PROJECT IMPROVEMENTS HAVE BEEN CURTAILED

The Recommended program will not lead to reduced passenger comfort, reduced on-time reliability, or reduced safety. With regard to increased future maintenance costs, the Recommended Program will lead to increased maintenance costs compared to past maintenance outlays. Deficient past levels of investment in maintenance resulted in the existing deteriorated condition of the Corridor. In the improved post-NECIP environment, track maintenance costs will be minimized for the level of maintenance that must be sustained.

The draft report's statement that performance goals have been compromised by the revisions to work scopes in the various project elements has been superseded by the \$2.4-billion Recommended Program. The project element changes that allegedly would have adverse impacts on project quality were: route realignments, track structures, bridges, fencing, stations, and service facilities. The quality measures were trip times, service reliability, passenger comfort, safety, and maintainability.

Changes in Work Scope and Their Impact

Curves will be improved with proper spiral leads and superelevation, which will make a marked improvement in passenger comfort above what is currently in place. Any impact of route realignments on track-maintenance costs would be slight. One of the main reasons for reducing the route-realignment budget was the fact that trip-time savings in other areas could be made at a lower cost and still achieve the mandated running times. The Recommended Program provides for a

theoretical Washington-to-New York trip time of slightly over 2 hours, 31 minutes with five stops, which is well within the legislated trip-time goal.

[See GAO note, p. 131.]

The draft report's discussion of passenger comfort in the context of "jerk rates and lateral imbalance" in the curves suffers from a lack of a qualitative analysis of the relative importance of these factors to perceived passenger comfort. Empirical data gathered by FRA on experimental runs on the Corridor mainline and by other railroads led to the conclusion that initial NECIP standards were unnecessarily rigid and required relaxation. Passenger comfort under the Recommended Program will be enhanced over present-day levels and will fall within the American Railway Engineering Association (AREA) recommended limits.

The net effect on maintenance costs of reductions in the track structure program is insignificant. In cases where interlockings are reconfigured to add crossovers, maintenance costs may be slightly increased, but the incremental costs would be more than offset by the benefits derived from increased operating flexibility, line capacity, and schedule improvement.

The Department and DCP also dispute the draft report's claim that the August 1977 and February 1978 programs compromised on service reliability when the budget for track structures, bridges, fencing, and service facilities was developed. On-time performance as related to the recommended curve-realignment program would not be affected. In the case of the reduction in the number of maintenance-of-way (MOW) bases, it is correct that additional travel time from a MOW base to a repair site may add slightly to maintenance costs, but the reliability of train operations and scheduled trip times will not be affected. All bridges with structurally related speed restriction will be improved. The current program focuses available funds on those bridges most in need of rehabilitation, but it omits none that are rated lower than necessary for current and future traffic.

With regard to safety, particularly the fencing of overgrade bridges and the right-of-way, the proposed cutback has not been significant. Originally, the cost of fencing was to be shared on an equal basis with the local or state authorities on the Corridor. Because the fencing program is essentially safety oriented, FRA decided to assume the full cost of the program except in Massachusetts, where the State is sharing the cost of fencing a part of the right-of-way that would not otherwise have been fenced. Detailed field inspections led to a better understanding of the need for safety fencing at various locations and to a reexamination of the extent of the need, but this reevaluation process simply represents a better assessment of real need, not a compromise. The fencing budget will continue to change as more detailed design information becomes available and safety concerns become more apparent.

Conclusion

In summary, the development of criteria to establish and measure improvement to self-imposed performance goals is an important aspect of any project's internal planning and management process. There are innumerable alternative means to achieving the end. However, the Congressionally mandated goals have never been compromised. That is the reason that the Department instituted the comprehensive redirection effort, and that is why the Secretary of Transportation, through the President's FY 80 budget, is requesting the additional authorization.

The Department now recommends a new level of funding to meet the trip-time goals of the 4R Act. This request is for \$654 million of additional funding to bring the total NECIP Federal authorization to \$2.404 billion and the total project funding to \$2.5 billion. The Department proposes that Congressional action on the feeder-line improvements and possible further improvements to the Corridor mainline await the results of the 6-year Report due in February 1982.

CHAPTER IV - PROJECT MANAGEMENT NEEDS TO BE IMPROVED

The Department does not believe the information included in the chapter demonstrates that the project management has been ineffective. In addition, the Department believes many of the problems noted in the draft report have been or shortly will be solved with completion of the Redirection Study. The Department also disagrees with the conclusions as to wasted resources and inefficient or duplicative work, as well as the "triad" management structure.

Planning is Incomplete

The draft report cites as an example of management ineffectiveness the fact that planning was incomplete at the time of audit. However, long before the arrival of the audit team, the Department had recognized that major problems existed with the program. With recognition came appropriate action. One action that the Secretary took in January 1978 was to initiate the redirection effort. It is not surprising, then, that an audit team arriving in the middle of the intensive redirection effort would conclude that planning was incomplete. Incomplete planning as manifested by activities during the redirection effort should not have been construed as being indicative of ineffective management.

NECIP is Not Defined

With the publication of the Redirection Study report, a major milestone in program planning has been achieved. As a result, FRA anticipates the publication, within the next two months, of several key program planning documents, including the System Performance Specification, Program Requirements, and the Corridor Master Plan.

Nevertheless, DCP and the Department also disagree with the statement in the draft report that no cost control system exists in the project. The systems to accumulate costs and to report costs against budget have long been established; it is the baseline of a firm and realistic program which has been lacking for reasons that have been discussed earlier.

The draft report cites as the "impact" of poor project definition an Amtrak purchase of \$2 million in hopper cars and \$3 million in material that may not be needed. The decision to purchase the hopper cars was deliberately made on the basis of a requirements analysis which supported that decision. Although the cars could not be effectively used in 1978, whether or not the investment was wasted remains to be seen. In regard to the purchase of excess materials, the statement is wrong, and has no basis in fact.

The draft report also cites total equipment leased by Amtrak during 1977 and 1978 as an impact of poor project definition. However, a review of Amtrak's equipment leasing reveals that the majority of leased equipment was for the purpose of performing work while equipment authorized for purchase was actually procured and delivered. This is not to say that Amtrak administration and control of leased equipment was

wholly satisfactory; it was not. Also, it should be noted that the 1983 stretchout does not have much of an effect on Amtrak's track program, because most of this work is still planned to be completed by 1981.

[See GAO note, p. 131.]

Organizational Roles are Not Defined

Contrary to statements in the draft report, the Department contends that the roles and responsibilities of the major participants (FRA, DCP, and Amtrak) are clearly spelled out. Although project management is referred to as a "triad," the Department views the relationship as basically being between FRA and its prime construction contractor, Amtrak, which also owns and operates the Corridor. DCP is and always has been, conceptually and contractually, a support organization to FRA. Despite a statement in the draft report to the contrary, the fundamental relationship intended between DCP and Amtrak is clearly spelled out in section 2.01 of the FRA-Amtrak contract executed on August 29, 1976. Similarly, DCP's responsibilities to FRA are spelled out in a detailed description of the scope of work against which DCP has been performing since October 26, 1976. This scope description has been available to Amtrak since it was first published, and it has stood the test of time to the extent that few changes have been necessary in the interim.

In summary, the Department believes the draft report fails to demonstrate that there is a lack of a clearly defined authority and responsibility and that such a lack has caused confusion, or that the three organizations do not understand their roles or how they should interact. For example, FRA has been involved in high-level planning, and the Redirection Study is evidence of such planning.

The draft report criticizes FRA's involvement in the day-to-day activities of Amtrak, the elaborate reviews and processing of work packages, and FRA's failure to permit Amtrak to make routine decisions. FRA has deliberately attempted to limit its involvement in Amtrak day-to-day and routine activities to that which is required to support the authorization to expend Federal funds and to insure conformance and adherence to the Federal Procurement Regulations. This is an area to which Amtrak had no exposure prior to NECIP and is but an example of where FRA had to involve itself in greater detail than it desired while Amtrak gained experience in this complex area.

Unresolved Issues

The draft report cites as another example of project management "ineffectiveness" "several areas of disagreement" between FRA and the commuter agencies. The commuter agencies were notified in a memo from the Secretary dated September 14, 1977, that the cost of converting the commuter rolling stock to accommodate the upgraded Corridor electrification system would be borne by FRA with NECIP funds and, where it was not economically feasible to convert rolling stock because of its age, the Urban Mass Transportation Administration (UMTA) would support the commuter agencies in replacing the vehicles. In the case of a group of vehicles in Southeastern Pennsylvania Transit Authority (SEPTA) Reading and Pennsylvania Division and some New Jersey Department of Transportation (NJDOT) vehicles, FRA has initiated a contract effort, with the cooperation of the commuter agencies involved, and the Urban Mass Transportation Administration (UMTA), to ascertain whether conversion or replacement is appropriate and the number of vehicles that should be involved. Also contrary to the draft report, FRA plans to provide specifications and funds to the commuter agencies by which they will contract for vehicle conversion.

In summary, the Department takes exception with a criterion that gauges management "effectiveness" by whether or not all agencies that deal with FRA or the Department totally agree with all policy decisions. This point is well worth keeping in mind with respect to certain issues, such as cost sharing, that are very difficult to resolve to the total satisfaction of all parties.

FRA's and Amtrak's Organizations Continue to Undergo Change and Lack Needed Experience and Expertise.

With respect to the draft report's criticism of FRA and Amtrak's organizational change, these changes were made to improve project efficiency and effectiveness. The Department believes that organizational adjustments are common to any major mobilization. The Department disagrees that FRA now lacks the needed experience and expertise to complete the project. There are technically challenging aspects of the NECIP which require railroad engineering experience, particularly in the areas of track configuration, signaling, communications, electrification, and scheduling. This expertise is provided to FRA by consultants working in close coordination with Amtrak, and is further supported by foreign consultants. The balance of the program is largely conventional civil engineering. The need is for highly qualified and experienced design and construction program managers; the Department personnel fully satisfy that need.

Contractual Arrangements

The Department acknowledges that certain contractual arrangements have not been completed, but attempts are being made to do so. For example, the amount of the overhead rate to be applied to Amtrak work could not be resolved in the absence of supporting Amtrak cost data. A large part of the problem centers around the fact that prior to the NECIP Amtrak did not employ accounting systems structured to provide for an apportioning of various general and administrative costs to Amtrak activities. Amtrak and FRA are attempting to resolve the problem. Both DCP and FRA have been working to solve the indemnification problem, and a settlement is expected soon. As mentioned on page 14 of our comments, we believe the present FRA-Amtrak contract adequately defines the role of DCP.

[See GAO note, p. 131.]

Work Package Processing is Cumbersome, Time Consuming, and of Questionable Value

The Department agrees that improvements are needed in processing work packages, and efforts are being made to modify the procedures. We believe, however, that the draft report oversimplifies the process and makes broad conclusions without adequate justification. Thus, statements such as "it is difficult to determine what is being achieved by the elaborate reviews and processing" and "it is questionable whether the lengthy negotiations over cost and schedules serve any purpose" need to be revised or deleted.

NECIP Coordination and Communication Needs Improvement

Lines of coordination and communication among DCP, FRA, and Amtrak basically are working well. The Four-Year Trackwork Program was coordinated in October 1977. Although individual

plans subsequently were proposed that required additional coordination, all current trackwork plans have been agreed upon by DCP, Amtrak and FRA.

[See GAO note, p. 131.]

Ineffective Project Management has Resulted in Waste and Inefficiency

The Department disagrees with the broad conclusion that NECIP management's failure to adequately plan and manage the program has resulted in wasted resources and inefficient and/or duplicative work. The Department suggests that the statement relating to wasted funds that could amount to millions of dollars be deleted.

The draft report charges that waste and inefficiency resulting from ineffective project management "could be in the millions of dollars." Yet only \$138,000 is cited specifically in design costs that will be lost because of program changes. The Department realizes that some design work will not be used in construction, but this is not due to ineffective project management. In any major project, the design effort includes exploration of options. As a natural consequence, some design work is discarded as infeasible or not the best among options explored. To say that such effort is wasted is wrong.

Some Construction Work May Have to be Redone

The Department agrees that some work will have to be redone. As to the installation of substandard materials, the concrete ties have been deemed acceptable and the pads are within the approved contract modification requirements. The clips are being tested to determine adequacy. Also, it should be noted that the test results with respect to premature failure have been withdrawn by the testing laboratory, and no evidence has been developed to date that would support a conclusion that the concrete ties that have been installed are unsatisfactory or unsafe.

Use of Consultants

The Department does not believe the draft report demonstrates the overall conclusions drawn as to FRA's use of consultants. For example, the statement that FRA has not adequately directed and monitored DCP's activities is not supported by the information that follows. On the contrary, the information presented actually demonstrates the active role played by FRA in monitoring the work products of DCP. Also, as mentioned previously, many of the planning elements cited by the draft report as not being finalized, e.g., the Corridor Master Plan and Program Requirements, can be approved now that the Redirection Study has been completed.

As to the limitations of various reports made by DCP and Bechtel, GAO should review them and express its own opinion as to their adequacy, not quote the opinions of others.

[See GAO note, p. 131.]

Project Management Costs May be Excessive

The Department does not believe that the draft report's analysis at all supports the conclusion that the project management costs may be excessive. As mentioned in the draft report, the extensive initial engineering required is the reason why NECIP design costs appear high by comparison with more conventional projects.

Conclusions

As our comments above indicate, The Department does not believe the draft report demonstrates that FRA has been ineffective in its role of implementing the NECIP. In addition, many of the problems that are alleged to have resulted from shortcomings in the management of NECIP either have been or shortly will be resolved as a result of the Redirection Study. As to the theme which "kept surfacing" in GAO's discussions with middle-level managers, the Department suggests this information be deleted because it constitutes anonymous opinion and is not supported by detailed facts.

Concerning the conclusion that Amtrak play a more responsible role, the Department agrees that Amtrak should be responsible for as large a part of the construction effort as it is capable of managing, and without undue staffing curtailments on completion of the project, but we believe very strongly that FRA must take the lead in program development and design.

Alternatives Available

The Department does not believe the report demonstrates the need for consideration of the two alternatives included, and we recommend they be deleted. More important, the Department does not concur that either FRA should limit its involvement to an oversight role or Amtrak should be the primary agency responsible for project execution. Since project funds are authorized independently of the Amtrak budget, Amtrak would have no incentive to make the most beneficial trade-offs between investment and operating costs. There is a still broader reason for Department control over the development of the program: the Federal interest in the Corridor extends to freight and commuter service and in achieving a balance in the improved Corridor so as to maximize the total return on total funds not just on high-speed passenger service; Amtrak is not suited to perform this broader role.

The Department very strongly disagrees with the draft report's suggestion that "the Congress may wish to consider keeping future funding for NECIP to a minimum level until NECIP has been fully defined, basic planning is completed, and key issues resolved" (p. 84). The biggest single problem with which NECIP management had to contend was the lack of a fully defined program. The Redirection Study essentially removes the basis for this suggestion. The Recommended Program and ancillary documents do fully define the program and represent completion of basic planning insofar as either NECIP total authorization requirements or fiscal year 1980 appropriation requirements are concerned. The Department believes that its earlier refutation of the draft report charge that key issues are still unresolved is sufficient to warrant deletion of GAO's drastic suggestion. Failure to approve the fiscal year 1980 appropriation request will create havoc in the total planning area of all three major organizations. For example, a plan for the fiscal year 1980 Amtrak track program is already far advanced. Failure to approve a firm and realistic program, budget and schedule will perpetuate the worst possible condition under which FRA, DCP and Amtrak have had to operate.

CHAPTER V - AMTRAK PERFORMANCE NEEDS TO BE IMPROVED

The record clearly shows that Amtrak's construction performance has not met targeted goals, and the draft report has taken due note of this fact. The draft report states that Amtrak's failure to effectively manage construction is because Amtrak has fragmented responsibility for NECIP project performance, and Amtrak has compounded the problem by continually reorganizing its NECIP staff. Furthermore, Amtrak's NECIP management system and internal controls were cited as having many weaknesses.

The draft report fails to recognize that these are symptoms of a transition that was inevitable for Amtrak. Although the 4R Act was passed in February 1976, Amtrak did not assume ownership of the Corridor rail facilities until April 1976. Operation and maintenance responsibilities were transferred to Amtrak gradually until, by September 1976, Amtrak had assumed full responsibility for all rail operations on the Corridor.

Before the 4R Act, Amtrak had never been responsible for operating and maintaining a railroad. The Department fully expected that Amtrak would have problems, and serious ones, with setting up an effective organization, implementing and maintaining an efficient and effective NECIP management information system, and with carrying out a construction program that both FRA and Amtrak knew would eventually total several hundred million dollars. To compound its problems, Amtrak inherited from Conrail a great deal of run-down maintenance equipment and a staff that was short on experienced operations and maintenance supervisory personnel. Further aggravating matters was the need to initiate a NECIP track program in fiscal year 1977 because of the targeted achievement date for 4R Act trip-time goals.

The finding that Amtrak work consistently has been behind schedule and over cost, is true, but not complete. The draft report concentrates upon the start-up experience when a shortage of qualified personnel was having its major impact. The trends that the Department currently sees indicate a measurable improvement in job supervision, production quantity and quality, and unit costs. The work year 1979 program is a critical production year, and the Department is hopeful of significantly improved performance by the Amtrak forces who now have their initial organizational experience behind them. It is because of these improvements that FRA will continue to assign more and more responsibility to Amtrak. Examples of such assignments in recent months were: (a) FRA's designation of Amtrak personnel to chair a joint FRA-DCP Amtrak group in developing an equipment maintenance procedures manual essential to the conceptual design and location of equipment maintenance facilities; (b) with respect to the redirected \$2.4-billion program, FRA designation of Amtrak to take the lead in working with DCP personnel in a detailed week-by-week analysis of the track improvement subprogram's impact on train schedule reliability from 1979 to 1982; and (c) FRA assistance to the Amtrak Market Research Department in meeting their responsibility for determining and evaluating characteristics of high-speed rail service that will appeal to various market groups.

Conclusion

[See GAO note, p. 131.]

Viewed in the light of the foregoing analysis, the question which the draft report has failed to explore in depth is whether or not Amtrak has been improving in its NECIP organization effectiveness, in its implementation and operation or management control systems, and in its adherence to construction project work scope, budget, and schedule. Based on analysis of FRA data, the Department is convinced that Amtrak's performance is improving in all areas, though further improvement is clearly required.

Overall, the Department finds the draft report's recommendations in chapters 4 and 5 to be in complete conflict. If GAO believes that "Amtrak does not have prior experience on a large construction project," or that "Amtrak's NECIP organization has not been able to show that it can effectively manage (even) the construction program," or "Amtrak's NECIP Management System and Internal Controls Need Improvement," or that "some form of penalty provision is needed

to give Amtrak an incentive to complete its work on time and within budget," how can GAO readily conclude that "NECIP could be managed more effectively and efficiently if Amtrak were made a true construction manager and given the responsibility and authority for completing construction work within specified time and funding limits"? Who but FRA is qualified to set such time and funding limits, and how could they be set without FRA control over design and cost estimating? If the draft report's recommendations are primarily aimed at the transfer or primary responsibility for construction management, the Department agrees that much can be done in this direction, but then the draft report has totally missed the significance of FRA's and DCP's role in program definition and design management where the need for FRA/DCP control is greatest. If the draft report is recommending transfer of the DCP contract to Amtrak (which would be costly, disruptive and probably infeasible at this stage of the NECIP), then there would be no external mechanism for evaluation and control of the organization which the draft report has concluded needs a penalty provision to create an incentive to complete its work on time and within budget. Transfer of program development and design management would clearly be asking Amtrak to perform a wider policy role which it cannot be expected to manage.

The Department believes that the draft report's recommendations are simplistic and would actually accomplish very little. A much more accurate diagnosis and prescription would be:

1. All organizations have undergone a painful - but predictable - learning experience. Mistakes have been made by all, but progress is evident also.
2. With publication of the Redirection Study, most of the key program issues have been identified and resolved. Because program definition is the key to effective management, Congress should expedite its consideration of the recommendations in the Redirection Study.
3. In order to permit better control over project cost, and to limit disruption of service during project construction, project spending should be flattened out as proposed in the Redirection Study.
4. In the light of the program conclusions in the Redirection Study, and the draft report's analysis of past management problems, the organizational roles of FRA and Amtrak should be reassessed in order to streamline program management. FRA should emphasize its proper role as program developer and coordinator, design manager, and construction efficiency and quality supervisor; Amtrak should focus on

improving its performance as the railroad operator, procurement expeditor, and railroad construction manager. Both organizations should continue to strengthen their efforts to improve the working coordination.

GAO note: Deleted comments relate to matters discussed in our draft report, but omitted from this final report.

National Railroad Passenger Corporation, 400 North Capitol Street, N.W., Washington, D.C. 20001 Telephone (202) 383-3000



January 17, 1979

Mr. Henry Eschwege, Director
United States General
Accounting Office
Washington, DC 20548

Dear Mr. Eschwege:

I very much appreciate the time you and your staff afforded Amtrak on January 12 to fully discuss your draft report on the Northeast Corridor Improvement Project. I have attached a copy of the specific items addressed during the meeting which I request be incorporated in Amtrak's official response.

There is no question that there was waste and inefficiency at the beginning of the project. Part of this can be attributed to Amtrak and we must accept responsibility for that. In the ensuing period, we have eliminated certain conflicting organizational structures. We have revised our materials management organization and procedures. Equipment, parts and materials are subject to clear responsibility and accountability. To the extent we have the freedom to do so, we are prepared to operate effectively within available funding limits.

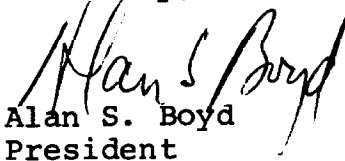
As I see it, the basic problem of the improvement project is the institutional relationships. The historical record will clearly show that the first year of construction was lost. Major policy differences existed between the Executive Branch and Amtrak. That late start continues to affect the project because the institutional relationships that were created continue to be unwieldy. I should say at this point that the Federal Railroad Administration has made enormous efforts to improve their relationships. The problem is that,

even with the best of will, the interfaces between FRA, Amtrak and DeLeuw, Cather/Parsons are not smooth and will require an extensive revision if they are to be improved. On this point, FRA has given me their assurance of a willingness to discuss changes. We anticipate this will be done shortly.

[See GAO note 1.]

I have attached copies of the latest organization charts which we discussed. Please let me know if you require any additional information. It will be provided posthaste.

Sincerely,


Alan S. Boyd
President

enclosure [See GAO note 2.]

- GAO note:
1. Deleted comments refer to matters discussed in our draft report, but omitted from this final report.
 2. Enclosure not included.

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