

# **EFFECTS OF AMTRAK'S POOR ON-TIME PERFORMANCE**

*Federal Railroad Administration*

*Report Number: CR-2008-047*

*Date Issued: March 28, 2008*




# Memorandum

U.S. Department of  
Transportation

Office of the Secretary  
of Transportation  
Office of Inspector General

Subject: **INFORMATION:** Report on the Audit of the  
Effects of Amtrak's Poor On-Time Performance  
Federal Railroad Administration  
Report Number CR-2008-047

Date: March 28, 2008

From: David Tornquist   
Assistant Inspector General  
for Rail and Maritime Program Audits  
and Economic Analysis

Reply to  
Attn. of: JA-50

To: Federal Railroad Administrator

This report presents the results of our audit of the effects of Amtrak's poor on-time performance (OTP). This audit was requested by the Surface Transportation Subcommittee of the Senate Committee on Commerce, Science, and Transportation. The objective of this audit was to produce a quantitative assessment of the financial impact of Amtrak's poor OTP.<sup>1</sup> More specifically, we estimated both the impact on revenues and costs as a consequence of Amtrak's poor OTP.

Amtrak's poor OTP significantly undermines the viability of intercity passenger rail as an option for travelers and weakens Amtrak's financial position by reducing its revenues and increasing its operating costs. Between Fiscal Year (FY) 2003 and FY 2007, Amtrak's OTP off the Northeast Corridor (NEC)<sup>2</sup> for long-distance routes<sup>3</sup> fell from an average of only 51 percent to 42 percent, and OTP for non-NEC corridor routes<sup>4</sup> fell from an average of 76 percent to 66 percent. The need to improve mobility, relieve congestion, and reduce oil consumption makes Amtrak's performance and financial health a national concern.

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<sup>1</sup> Our office is also conducting an audit on the causes of Amtrak's poor OTP at the request of the Senate Transportation Appropriations Subcommittee.

<sup>2</sup> The NEC is the route connecting Boston, MA and Washington, DC by way of New York, NY, plus the Springfield, MA-New Haven, CT and Harrisburg, Pa-Philadelphia, PA branch lines.

<sup>3</sup> Routes over 750 miles in length are considered long-distance. Routes shorter than 750 miles are called short-distance or corridor routes.

<sup>4</sup> NEC routes have not exhibited the poor and declining OTP characteristic of the non-NEC routes.

We performed this audit in accordance with the generally accepted Government Auditing Standards prescribed by the Comptroller General of the United States. Exhibit A more fully describes our scope and methodology.

## **ON-TIME PERFORMANCE AFFECTS AMTRAK'S FINANCES**

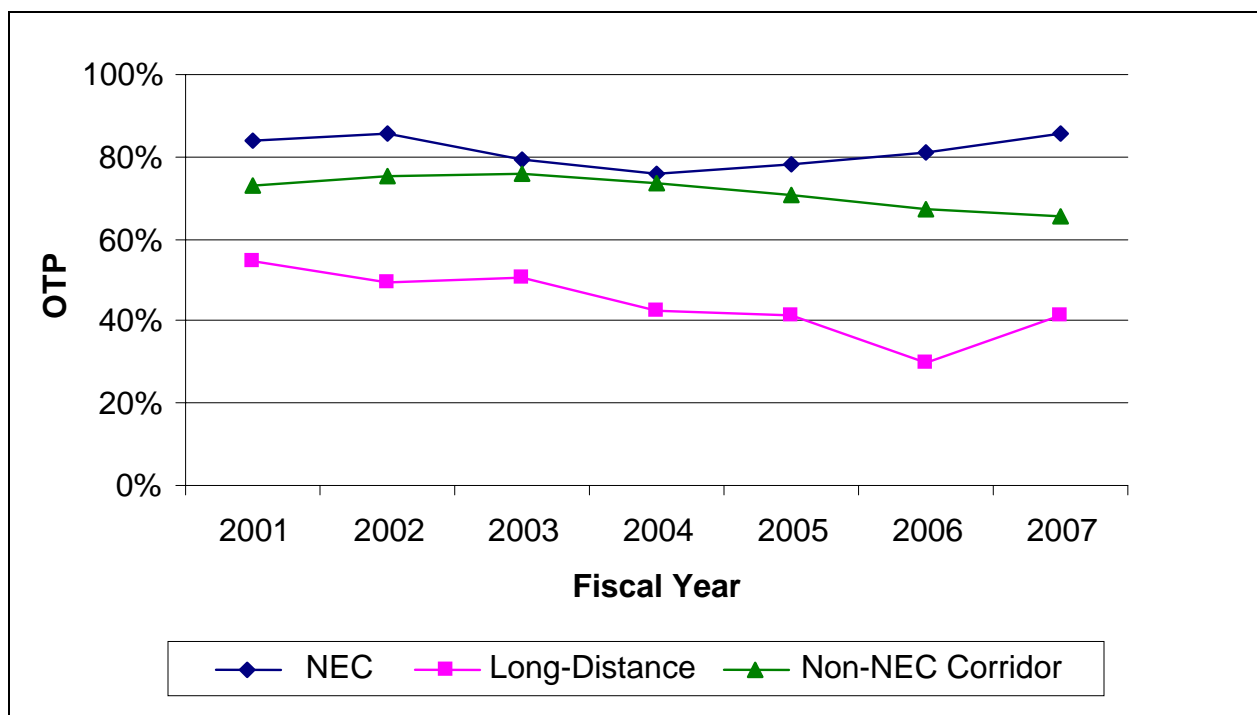
Amtrak is unable to generate sufficient revenues from ticket sales and other sources to cover its operating costs or pay any of its debt or capital costs. As a result, in FY 2008, Amtrak will receive a Federal subsidy of \$1.3 billion, including \$475 million in operating subsidies. Poor OTP reduces ridership on Amtrak trains because potential passengers cannot predict when their train will arrive. It also increases costs, primarily by extending shifts, increasing staffing requirements, and utilizing more fuel. Improving OTP could significantly improve Amtrak's finances. It would generate funds Amtrak could use to increase the incentives to host railroads<sup>5</sup> both to improve the performance of Amtrak trains operating on their tracks or reduce its reliance on Federal operating subsidies.

In FY 2006, average OTP across Amtrak's long-distance routes was only 30 percent. For Amtrak's corridor routes, average OTP was much higher, but still only 67 percent (excluding the NEC). In FY 2007, the OTP of a number of long-distance routes increased substantially, but only enough to raise the average for long-distance routes to 42 percent. The reliability and timeliness of passenger rail largely determines its viability as an alternative means of transportation. Poor OTP has significant negative impacts on Amtrak's financial condition and may undermine Amtrak's ability to retain and grow ridership.

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<sup>5</sup> Host railroads own the track over which Amtrak operates, and are primarily comprised of the six Class 1 railroads.

**Figure 1. Average On-Time Performance of Amtrak Routes**



Source: Amtrak data.

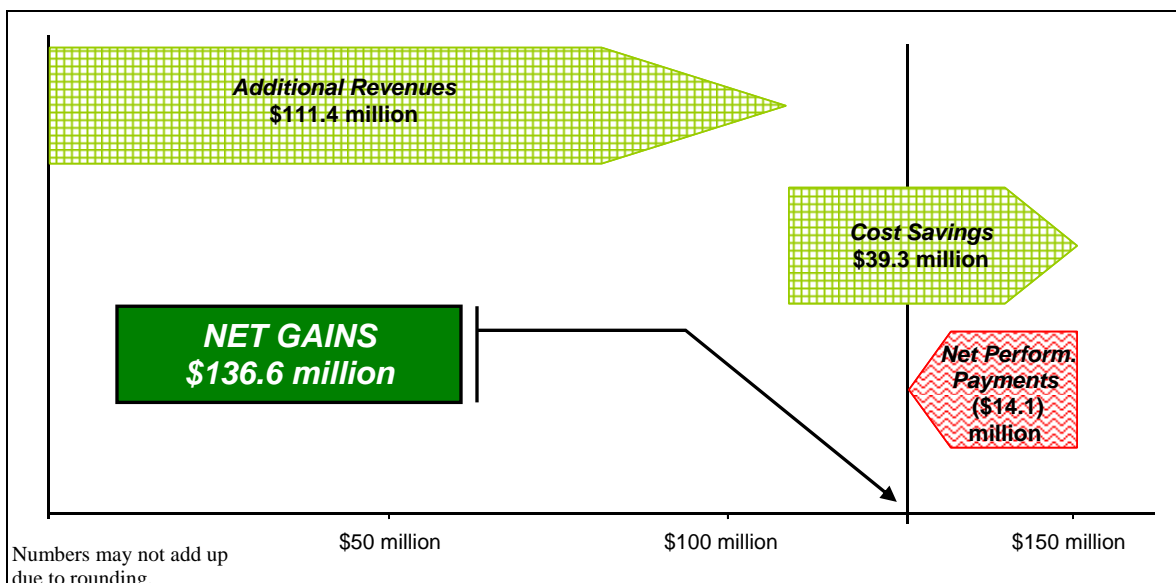
Outside the NEC, where the issue of poor OTP is by far the most apparent, Amtrak owns approximately 100 miles of track and primarily runs on rail lines owned and dispatched by freight railroads. Amtrak has a statutory right to not only operate over the tracks of these host railroads, but has also been granted preference over host transportation in using a rail line, junction, or crossing. However, although there is disagreement between Amtrak and the host railroads as to the exact meaning of this provision, based on its statutory right Amtrak has entered into negotiated agreements with the host railroads that specify the terms of Amtrak's operations over host tracks, which include public train schedules, when scheduled track maintenance can take place, operating speeds, and the level of track infrastructure. These agreements also incorporate the concept of performance payments and penalties. Performance payments are made by Amtrak to the host railroads when certain OTP or delay outcomes are achieved. Host railroads may pay performance penalties to Amtrak when OTP or delays fail to meet certain thresholds.

## RESULTS IN BRIEF

Achieving reliable OTP would substantially improve Amtrak's finances. We estimate, for example, that an 85 percent OTP off the NEC in FY 2006 would have reduced Amtrak's operating loss by 30 percent or \$136.6 million (see figure 2).<sup>6</sup> Amtrak's revenues would increase by \$111.4 million as more travelers would choose to take the train if they become more confident that it will arrive on time. Amtrak's expenses would be reduced by \$39.3 million mostly due to less required overtime as a result of fewer late trains, and lower fuel costs as a result of less time spent idling and less frequent accelerations and decelerations. The improved OTP also would require an increase in net performance payments paid to the host railroads of \$14.1 million.<sup>7, 8</sup>

Working with the host railroads to achieve an 85 percent OTP off the NEC would be a difficult task. However, Amtrak may be able to utilize a portion of the projected benefits to further incentivize the host railroads to provide this enhanced level of service.

**Figure 2. Calculation of Net Effects at 85 Percent OTP**



Source: OIG analysis.

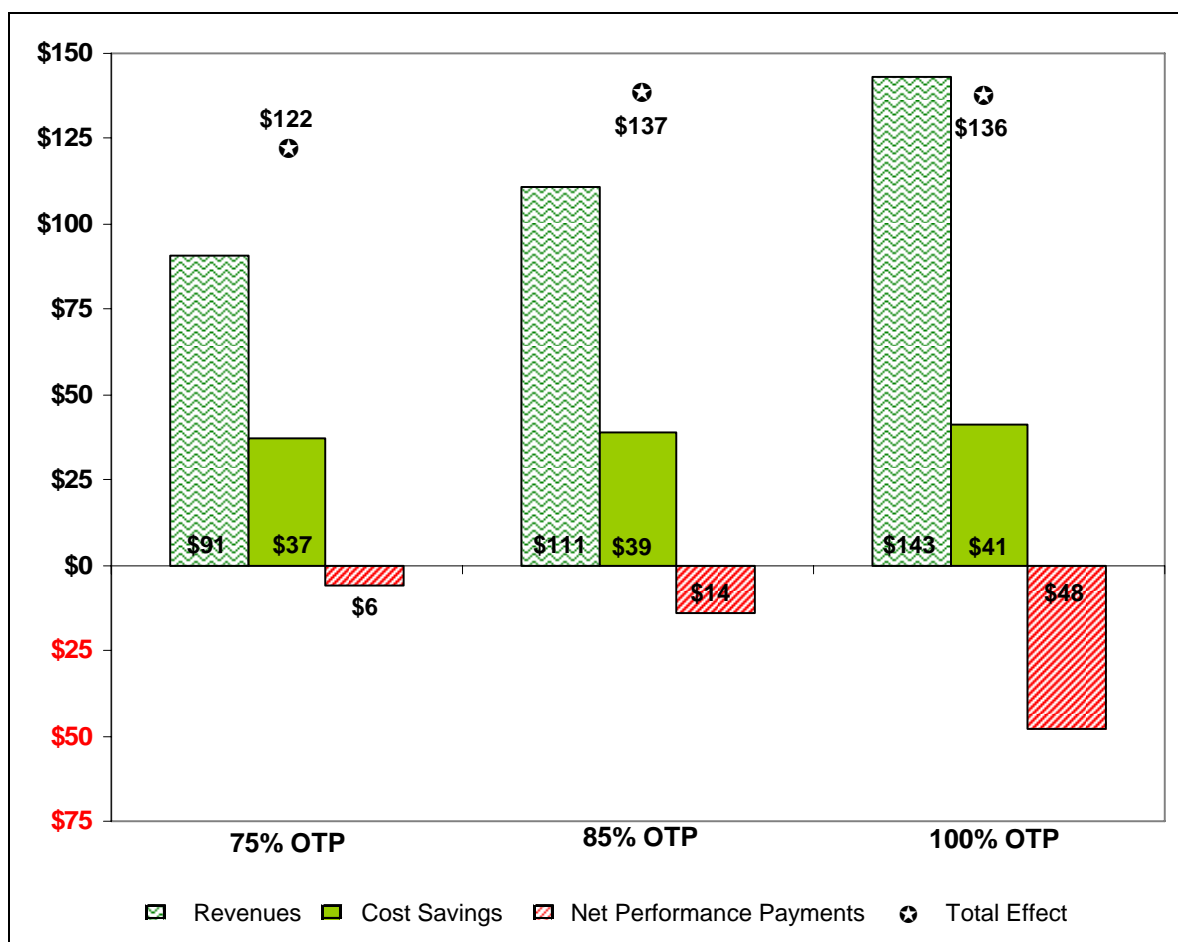
<sup>6</sup> The portion of the reductions in operating losses associated with state-supported routes would largely reduce state payments to Amtrak, and would not generally impact Amtrak's finances. This portion amounts to \$21.5 million for the 85 percent scenario.

<sup>7</sup> Our estimates of performance payments for OTP rates below 100 percent are somewhat understated. They do not take into account factors that would make trains on-time for the purpose of making payments under contractual allowances that would not contribute to improving route OTP. Exhibit A includes a detailed discussion of this issue.

<sup>8</sup> We estimated the impact of OTP on revenues using a set of econometric models. Our estimates of costs savings were developed through the construction of detailed models of staff schedules. We estimated the effects on performance payments using data at the level of individual checkpoints along the routes. Exhibit A provides a more detailed discussion of our approach.

**Achieving reliable OTP would substantially improve Amtrak's finances.** We found that if Amtrak had achieved a 75 percent OTP in FY 2006, it would have experienced an estimated reduction in its operating loss of \$122.1 million. As previously discussed, an OTP of 85 percent across its routes outside the NEC in FY 2006, would have resulted in a \$136.6 million net gain. Improvement to 100 percent OTP would slightly reduce this figure to \$136.4 million (see figure 3). As OTP approaches 100 percent, the large additional revenue gains would be more than offset by marked growth in performance payments paid to the host railroads as a result of the improved OTP, while cost savings would not rise significantly.

**Figure 3. Fiscal Effects of Improved OTP for FY 2006**

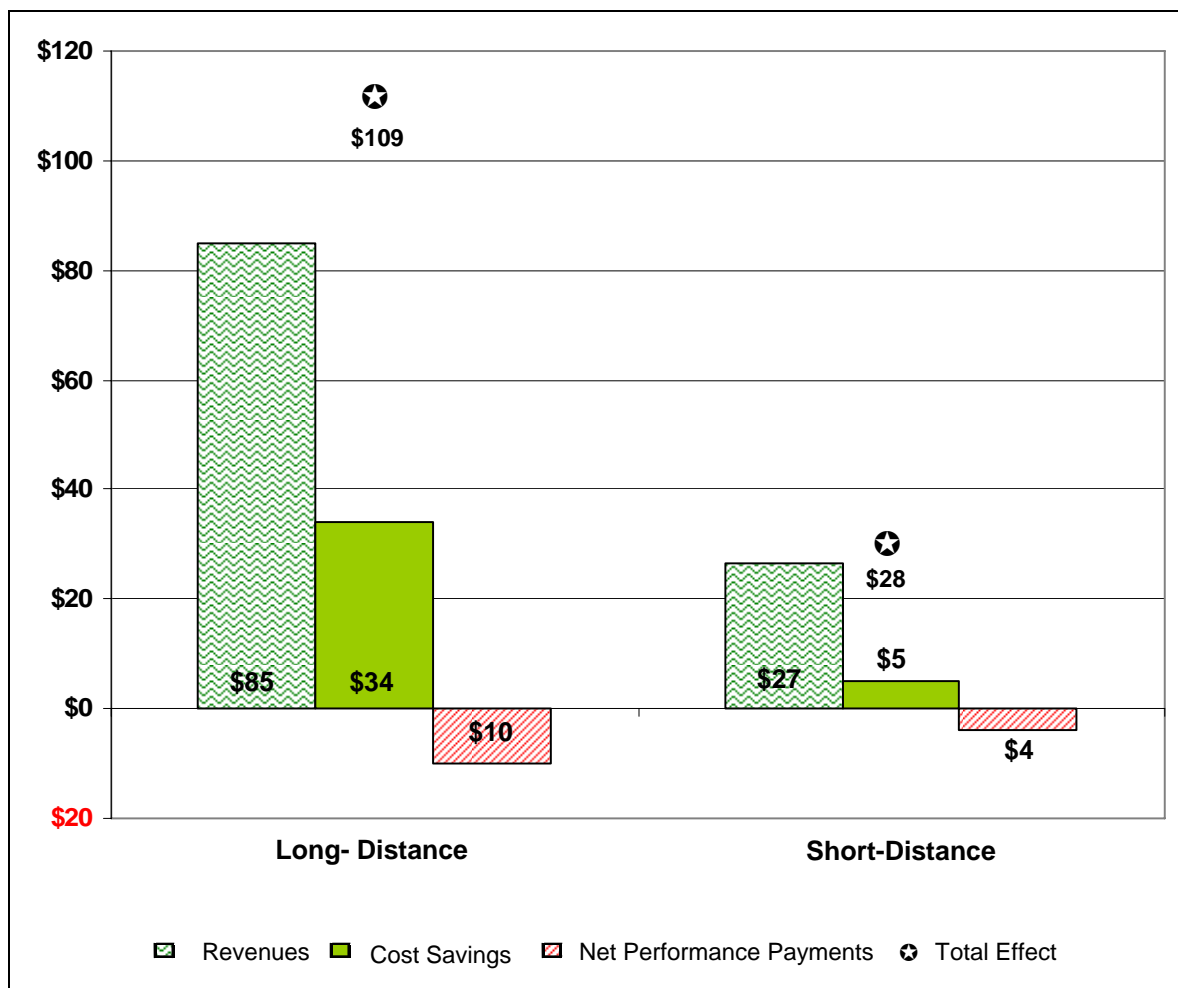


All figures are expressed in millions of dollars. Numbers may not add up due to rounding.  
 Source: OIG analysis.

**Long-distance routes would generate the greatest gains from achieving reliable OTP because their current performance is so poor.** In FY 2006, average OTP across Amtrak's long-distance routes was only 30 percent compared to an average OTP of 67 percent on its short-distance routes. As a result, bringing the long-distance trains up to an 85 percent OTP, an average increase in OTP of

55 percentage points, led to larger changes in revenues and costs than the increase in OTP of only 18 percentage points for short-distance routes. Figure 4 displays a breakdown of results by long-distance versus short-distance routes for the 85 percent OTP scenario.

**Figure 4. Results by Route Type for 85 Percent OTP Scenario**



All figures are expressed in millions of dollars. Numbers may not add up due to rounding.  
Source: OIG analysis.

**Revenue increases would account for the largest share of the improvement in Amtrak finances resulting from achievement of reliable OTP.** Travelers who have the option to choose among transportation modes can readily choose to take the train if they become more confident that it will arrive on time. This makes revenues relatively responsive to changes in OTP. In contrast, Amtrak's operating cost structures, particularly those related to labor, incorporate significant rigidities as a consequence of safety regulations and negotiated agreements. As a result, the variation in Amtrak's operating costs associated with changes in OTP would be moderate by comparison.

**Future increases in fuel and labor costs would only increase the financial importance to Amtrak of achieving reliable OTP.** Fuel prices in FY 2006 were much lower than they are currently. Since we found that better OTP generally reduces fuel consumption, the recent price growth would increase the estimated cost savings from better OTP. In addition, Amtrak recently reached a tentative labor agreement with several of its unions, which includes an increase in wages. This may set a pattern for other labor negotiations. Since better OTP reduces labor hours for some workers, any new agreements which stipulate an increase in wages for those workers would translate into greater cost savings from improved OTP.

## **FINDINGS**

### **Achieving Reliable OTP Would Substantially Improve Amtrak's Finances**

Achieving reliable and improved OTP would increase Amtrak's ridership and therefore its revenues and reduce its operating costs. Travelers who have the option to choose among transportation modes can readily choose to take the train if they become more confident that it will arrive on time. This makes revenues relatively responsive to changes in OTP. The results of our econometric analysis estimated that Amtrak's FY 2006 revenues would have increased by \$111.4 million at an 85 percent OTP level. On the cost side, Amtrak's labor expenses would be reduced mostly due to less required overtime as a result of late trains. Fuel costs would also be cut as a result of less time spent idling and less frequent accelerations and decelerations than would otherwise be required. Our analysis concluded that \$39.2 million in cost savings would have been accrued in FY 2006 had Amtrak achieved an 85 percent OTP off the NEC. Finally, an increase in OTP to 85 percent in FY 2006 would have increased the net performance payments paid to the host railroads by an estimated \$14.1 million due to the improved performance.

When these components are added together, if Amtrak were to have operated at an 85 percent OTP off the NEC in FY 2006, its operating loss would have been reduced by a total of \$136.6 million. These potential returns from reliable OTP could offset a significant share of Amtrak's recent annual cash losses. For example, our estimate of Amtrak's savings had it reached an 85 percent OTP off the NEC in FY 2006 amounts to 30 percent of Amtrak's cash loss in FY 2006 of \$452.4 million.

The finding of substantial returns as a result of reliable OTP holds over a range of OTP rates. Our analysis indicated that OTP rates of 75 percent and 100 percent would result in net gains of \$122.1 million and \$136.4 million, respectively. Both



revenues and net performance payments change considerably over the range of OTP examined, offsetting each other to some extent, while costs fluctuate to a far lesser extent

*Long-Distance Routes Would Generate the Greatest Gains from Achieving Reliable OTP Because Their Current Performance is so Poor*

Across the OTP scenarios examined, the net gains associated with the long-distance routes are almost four times greater than those realized from the short-distance routes. Tables 1 and 2 provide a breakdown of results by route type for the 75 and 100 percent OTP scenarios (figure 4 on page 6 provides similar information for an 85 percent OTP rate).

**Table 1. Results by Route Type for 75% OTP Scenario**

<b>Categories of Effects</b>	<b>Long-Distance</b>	<b>Short-Distance</b>
Incremental Revenues	<b>\$69.5</b>	<b>\$21.1</b>
Cost Savings		
On-Board Services	\$13.0	\$0.9
Trainmen & Enginemen	\$15.3	N/A
Fuel	\$3.9	\$4.3
Total Cost Savings	<b>\$32.2</b>	<b>\$5.1</b>
Incremental Net Performance Payments	<b>(\$3.2)</b>	<b>(\$2.7)</b>
<b>TOTAL</b>	<b>\$98.5</b>	<b>\$23.6</b>

All figures are expressed in millions of dollars. Numbers may not add due to rounding.  
Source: OIG analysis.

**Table 2. Results by Route Type for 100% OTP Scenario**

<b>Categories of Effects</b>	<b>Long-Distance</b>	<b>Short-Distance</b>
Incremental Revenues	<b>\$107.8</b>	<b>\$35.1</b>
Cost Savings		
On-Board Services	\$14.6	\$1.0
Trainmen & Enginemen	\$17.5	N/A
Fuel	\$4.0	\$4.4
Total Cost Savings	<b>\$36.1</b>	<b>\$5.3</b>
Incremental Net Performance Payments	<b>(\$36.6)</b>	<b>(\$11.3)</b>
<b>TOTAL</b>	<b>\$107.3</b>	<b>\$29.1</b>

All figures are expressed in millions of dollars. Numbers may not add due to rounding.  
Source: OIG analysis.

Improvements in OTP on long-distance trains generated greater benefits in every category of effects considered – revenues, costs, and net performance payments – than improvements in OTP on short-distance routes. The primary reason for this is that the poorer OTP of long-distance (30 percent in FY 2006) as compared with short-distance routes (67 percent in FY 2006) translates into a comparatively larger gap between FY 2006 actual OTP rates and target OTP rates for the long-distance routes. As a result, bringing the long-distance trains up to target OTP rates led to larger changes in revenues and costs than the increase in OTP for short distance routes.

There are also more specific reasons for this finding with respect to the two largest categories of Amtrak's labor costs: (1) trainmen and enginemen (T&E), who run the train; and (2) on board service (OBS) staff, who are dedicated to passenger care. T&E crews are guaranteed eight hours pay per shift, which is longer than the travel times on almost all short-distance routes. As a result, if a short-distance train runs late, it may not result in extra pay for these employees.<sup>9</sup> In addition, many short-distance trains have only a single OBS staffer. In contrast, long-distance trains usually carry several types of cars, such as dining cars, lounge cars, and

<sup>9</sup> There were a handful of short-distance routes on which savings related to T&E would likely have accrued in FY 2006 from improved OTP. However, all of those routes shared crews among multiple trains, which made modeling T&E crew scheduling on them impractical.

sleeper cars that require additional, specialized OBS personnel.<sup>10</sup> Therefore, any percentage reduction in labor hours reduces costs to a greater extent on the long-distance routes, due to their much larger OBS staffing base.

*Revenue Increases Would Account for the Largest Share of the Gains from Achieving a Reliable OTP*

Travelers who have the option to choose among transportation modes can readily choose to take the train if they become more confident that it will arrive on time. This makes revenues relatively responsive to changes in OTP. In contrast, Amtrak's operating cost structures, particularly those related to labor, incorporate significant rigidities as a consequence of safety regulations and negotiated agreements. As a result, the variation in Amtrak's operating costs associated with changes in OTP would be moderate by comparison. Table 3 illustrates this for the 85 percent OTP scenario.

**Table 3. FY 2006 Actual Values and Estimates for Improved OTP**

<b>Categories of Effects</b>	<b>Actual</b>	<b>Estimated @85 Percent OTP</b>	<b>Percent Change</b>
Revenues	<b>\$589.1</b>	<b>\$700.5</b>	<b>18.9%</b>
Costs			
On-Board Services	\$92.6	\$77.9	<b>(15.9%)</b>
Trainmen & Enginemen	\$97.7	\$81.7	<b>(16.4%)</b>
Fuel	<u>\$100.8</u>	<u>\$92.6</u>	<b>(8.1%)</b>
Total Costs	<b>\$291.1</b>	<b>\$252.2</b>	<b>(13.6%)</b>
Net Performance Payments	<b>\$15.3</b>	<b>\$29.5</b>	<b>92.8%</b>

All figures are expressed in millions of dollars.  
Source: OIG analysis.

The greater responsiveness of revenues implies that travelers have greater flexibility in choosing their mode of travel than Amtrak has in adjusting its cost structures. If travelers have options, and rail travel is unreliable, they can choose to make their trips by modes other than rail. Should rail travel increase in reliability, then the number of passengers can grow to the extent that travelers previously using other modes choose to take the train.

<sup>10</sup> Staffing on the Auto Train is an exception to this statement, since Auto Train OBS staff function interchangeably.

### *Labor and Fuel Costs Would be Moderately Affected by Changes in OTP*

We determined that the primary cost categories that would be affected by changes in OTP are labor -- T&E and OBS labor in particular<sup>11</sup> -- and fuel. Both T&E and OBS staff can incur overtime when trains run late. In addition, Amtrak builds two hours of leeway into the daily schedules of many T&E crews to reduce the likelihood that delays will cause a crew to run up against its maximum hours of service.<sup>12</sup> Delays increase fuel consumption by increasing the time spent idling. They also result in more frequent accelerations and decelerations than would otherwise be required.

The extent to which labor costs would change as a consequence of improved OTP is limited by a variety of significant constraints. Some of these are a consequence of safety regulations. For example, regulations specify the number of hours enginemen can work in a single shift. Others derive from negotiated agreements. For example, during each shift a T&E crew can only work within a single, predefined geographic area, the boundaries of which are set through labor negotiations. Consequently, the labor cost savings are relatively moderate.

Even though improved OTP would lead to a reduction in some very fuel-intensive activities, the percentage change in fuel consumption that would result from improved OTP is also limited. Fuel consumption is primarily driven by the amounts required to pull a given amount of tonnage over a certain distance, which improved OTP would not affect.

### *Net Performance Payments Would Vary Substantially Over the Range of OTP Considered*

Net performance payments would rise should OTP improve from FY 2006 rates to any of the target rates considered, as, at a minimum, performance penalties would no longer be collected. Net performance payments are projected to increase to \$5.8 million at the 75 percent OTP scenario primarily because of penalties no longer received or used to offset payments to host railroads.<sup>13</sup>

The penalties collected are not as large as might be expected given the poor OTP characterizing so many routes because in many agreements a host railroad's liability for penalties is capped at the level of the performance payments received

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<sup>11</sup> We also considered the impacts on mechanical workers, but could not independently estimate them. Amtrak's calculations of the increments in these labor costs due to poor OTP are imprecise and relatively small, \$0.5 million to \$1.7 million in FY 2006.

<sup>12</sup> When a T&E crew reaches its maximum hours of service, it must cease operations, and the train it was running cannot start up again until a relief crew arrives. The original crew continues to be paid until it is dropped off at its destination.

<sup>13</sup> Most of Amtrak's agreements with the host railroads call for performance penalties to be assessed when OTP falls below 70 percent, and require performance payments to begin when OTP rises above 80 percent.

by that host in the previous year. This significantly reduces the penalties for continual poor performance. About \$41.5 million in penalties was excused in FY 2006 as a consequence of capping provisions.

At the higher target OTP levels, Amtrak would make additional performance payments to the host railroads. Achieving an 85 percent OTP in FY 2006 would have caused net performance payments to host railroads to grow by \$14.1 million. We further found that performance payments would have grown by \$47.9 million in the 100 percent OTP scenario. The finding of financial benefits from reaching better OTP rates far in excess of the associated changes in net performance payments raises the possibility of further incentivizing host railroads to support improved OTP.

### *Increases in Fuel and Labor Costs Would Only Increase the Financial Importance to Amtrak of Achieving Reliable OTP*

Our estimates of the fuel cost savings generated from achieving reliable OTP would rise in proportion with the cost of fuel per gallon. In FY 2006, Amtrak paid an average of \$1.63 per gallon of fuel. More recently, in January 2008, the average fuel price paid by Amtrak reached \$2.20. Therefore, if Amtrak had faced that price throughout FY 2006, our fuel cost savings estimates would have risen 35.0 percent.

Amtrak has reached a tentative agreement with its T&E workers that incorporates higher wages, and its labor agreement with its OBS workers has expired. Since better OTP generally reduces labor hours for T&E and OBS workers, and overtime hours in particular, any new agreement that stipulates an increase in their wages above those paid in FY 2006 would translate into greater cost savings from improved OTP than those projected in this report.

## **CONCLUSION**

Achieving reliable OTP would substantially improve Amtrak's finances. We estimated, for example, that reaching an 85 percent OTP off the NEC in FY 2006 would have provided Amtrak with an additional \$136.6 million. In addition to the financial benefits for Amtrak, the estimated increase in riders indicates that improving OTP is an important element in making rail a more viable alternative for travelers. A large number of travelers who had previously used other modes would choose to travel by rail if it was reliably on-time. This has implications for reducing congestion on airways and roads. Working with the host railroads to achieve an 85 percent OTP off the NEC would be a difficult task. However, Amtrak may be able to utilize a portion of the projected benefits to further incentivize the host railroads to provide this enhanced level of service. That is,

Amtrak could increase its performance payments to host railroads to encourage them to improve the performance of Amtrak trains operating on their tracks.

We appreciate the courtesies and cooperation of Amtrak representatives during the preparation of this audit. For any questions concerning this report, please call me at (202) 366-1981 or Betty Krier, the Project Manager, at (202) 366-1422.

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cc: Audit Liaison, OST, M-1  
Audit Liaison, FRA, RAD-43  
Amtrak Liaison

## **EXHIBIT A. SCOPE AND METHODOLOGY**

### **SCOPE**

This audit was requested in February 2007, by the Subcommittee on Surface Transportation of the Senate Committee on Commerce, Science, and Transportation. The objective of the audit was to estimate quantitatively the effects of Amtrak's poor OTP on its "bottom line". This required estimation of the effects of poor OTP on Amtrak's revenues, costs and net performance payments. CRA International (CRA) calculated the revenue gains from improved OTP. We produced the results for the costs and net performance payments. Routes on Amtrak's Northeast Corridor were excluded from the analyses because they did not exhibit the poor and declining OTP characterizing the rest of the system. Specifically, we excluded the Acela, Metroliner, Regional, and Keystone routes.

We performed this audit in accordance with generally accepted Government Auditing Standards prescribed by the Comptroller General of the United States.

### **METHODOLOGY**

Pending legislation<sup>14</sup> would impose penalties on host railroads should Amtrak OTP fall below 80 percent due to reasons within a host railroad's control. In recognition of this, we focused our analysis on an OTP of 85 percent because it represents a limited improvement over the 80 percent OTP threshold. We chose OTP rates of 100 percent and 75 percent to represent the upper and the lower bounds, respectively, of reliable OTP. We derived our results by modeling what revenues, costs and net performance payments would have been in FY 2006 at each of the target OTP rates, and then taking the difference between our modeling estimates and actual values. We conducted checks of all the data used in the analyses to assess reasonableness and concluded that the data was sufficient to support our conclusions.

#### **Revenues**

First, CRA estimated the impact on Amtrak ridership from changes in minutes of delay. CRA expected that delays would only affect ridership if they persisted for some time. CRA further expected that reputational effects and the variability of delay would also matter. The measure of delay used in the econometric model of the relationship between ridership and minutes of delay incorporated all of these

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<sup>14</sup> S.294 – The Passenger Rail Investment and Improvement Act of 2007, Sec. 209.

considerations. That measure was the accumulated delay for all trains arriving and departing from the point of origin for the given trip divided by its standard deviation. Other independent variables entering into the estimation accounted for the relative attractiveness of other travel modes and economic growth.

Second, in order to convert the ridership-delay relationship to the delay-OTP relationship, CRA estimated current standardized delay as a function of OTP. Third, the relationship between ridership and changes in OTP was derived from the results obtained in the previous stages. Fourth, the ridership associated with improved OTP multiplied by Amtrak's average yields provided the revenues at the OTP targets. Finally, CRA generated the revenue gains by comparing the revenues at the target OTP rates with actual FY 2006 revenues. The data used for all the estimations covered FY 2001 through FY 2006.

## **Costs**

We identified cost items that varied with on-time performance through interviews with Amtrak staff and a line-by-line examination of the costs in Amtrak's Route Profitability System (RPS) for FY 2006. These cost items were: three types of labor (OBS, T&E, and Maintenance) and fuel. We limited our cost analyses to routes with an OTP less than 75 percent for FY 2006 because we did not expect significant cost savings from small increases in OTP for these routes. (This criterion excluded one long-distance and two corridor routes.) We interviewed Amtrak staff to determine the most appropriate means of modeling the cost items.

We developed our cost models based on Amtrak schedules from the System Timetable for Spring-Fall, 2006. The 100 percent OTP scenario was modeled exactly to schedule. We calculated the increase in run-times associated with the 75 and 85 percent OTP rates by analyzing six years of monthly delay data for all Amtrak trains. We isolated the observations with OTP rates similar to the target rates, and derived an average increase in run-time for each scenario. For example, an OTP rate of 85 percent was associated with an average increase in run-time of 1.99 percent for long-distance routes and 4.59 percent for corridor routes. We adjusted schedule times for each model using these parameters.

### *On-Board Service Labor*

OBS staff in FY 2006 included chefs, food specialists, and lead service attendants. It also included lounge, parlor, coach car, and sleeping car attendants. All of these positions are subject to labor agreements that guarantee a minimum of 180 hours per employee. On long-distance routes, most Amtrak OBS staff works on a train as it travels from the initial departing station to the terminal station, and then returns to the initial station by working the same route back after a scheduled break. The OBS staff also consists of "extraboard" employees that work when



full-time employees are unavailable. Our long-distance OBS models incorporated all of these considerations, as well as information on break times from actual Amtrak staff schedules. Our final headcount estimates were compared to Amtrak's actual headcount by route for FY 2006, when possible, to check for reasonableness.

For corridor routes, OBS staff can work on several different routes during a trip, which made it difficult for us to calculate monthly labor requirements. Instead, we used information from Amtrak on the monthly number of hours scheduled and the headcount for each position for each route. This information was based on planned route schedules and therefore was a good estimate of the number of hours of labor required to operate Amtrak corridor routes at 100 percent OTP. Since the savings in OBS costs from achieving target OTP rates amounted to a relatively small percentage of existing OBS costs, we limited our OBS analyses to those routes that had at least \$0.5 million in OBS expenses in FY 2006. This meant we excluded 14 out of the 20 corridor routes from our analyses.

### *Trainmen and Enginemen Labor*

Trainmen and enginemen (T&E) schedules on Amtrak trains are largely determined by labor agreements and federal regulations, and these largely shaped our modeling of these costs. The basic T&E crew for a long-distance train is composed of a passenger engineer (engineman), a passenger conductor (trainman) and an assistant passenger conductor (trainman). A second passenger engineer is required for all shifts longer than six hours. Amtrak also incorporates padding into its trainmen and enginemen schedules in response to poor OTP on its long-distance routes. Specifically, Amtrak adds two hours of holdover in scheduling many T&E crews. We concluded that this padding could be reduced to one hour for the improved OTP scenarios used in our analyses.

The first step of our analysis was to calculate the cost of a crew for a single run of each route using the most cost-effective crew configuration. We used five different crew configurations for our analysis, all of which complied with federal regulations and labor agreements. Once the most cost-effective crew configuration was chosen for each route, we multiplied the frequency of roundtrips by the crew costs per roundtrip and derived the total labor costs for T&E crews.

There were only a handful of corridor routes to which T&E savings would likely accrue from improved OTP, because travel times on most corridor routes are less than the hours guaranteed for T&E per shift. However, the sharing of T&E crews servicing in those two routes with other routes made isolating their costs impractical.

## **Exhibit A. Scope and Methodology**

### *Maintenance Staff Labor*

We interviewed Amtrak staff to determine a method for modeling labor costs for maintenance staff that would vary with different levels of OTP. At each route endpoint, Amtrak performs turnaround servicing on its trains. When trains run late, maintenance staff may incur overtime waiting for them. However, Amtrak does not currently precisely track the number of labor hours associated with trains running late. Amtrak provided us with an estimated range of overtime costs attributable to poor on-time performance in FY 2006 of \$0.5 to \$1.7 million. Due to the imprecision and low value of the estimate, along with our inability to verify it, we decided not to factor the potential savings from maintenance costs into our estimates.

### *Fuel*

We used Amtrak's methodology for estimating fuel use by train as the basis of our model and then adjusted the fuel use to account for better OTP. Amtrak divides fuel use into four major components, as follows: locomotive fuel, which is the fuel required for the locomotive to pull itself; car fuel, which is the fuel required for the locomotive to pull the cars behind it in the train; hotel fuel which encompasses the fuel to run the train's amenities, such as HVAC, whether the train is moving, stopped, or delayed; and idle fuel, which is the fuel used by a locomotive to idle in a yard or terminal. We modeled each of these to derive total fuel usage at each of the target OTP rates.

### **Net Performance Payments**

Performance incentives and penalties are typically determined on a monthly basis at the level of dozens of individual check points. Amtrak provided performance incentives and penalties data for FY 2006 at the individual check point level. We used this data to model performance incentives and penalties at the target OTP rates for a set of host railroads that together accounted for 95 percent of potential performance incentives off the NEC. We also used this data to determine the actual performance payments and penalties paid in FY 2006.

In practice, there are discrepancies between the OTP used for the purposes of calculating net performance payments and the OTP reported at the route level. They derive from there being factors that affect OTP that are beyond the host railroads' control, such as weather or an Amtrak equipment failure. Trains affected by these factors are excluded from the calculation of OTP for the purposes of net performance payments, but are included in the calculation of route OTP. Exact determination of the net performance payments required at a certain route OTP necessitates accounting for the excluded trains.

### **Exhibit A. Scope and Methodology**

We were able to incorporate the additional payments needed if some of the excluded trains were to be made to be on-time. Those trains are tracked in the Amtrak data as “do not count” or “did not operate”, and largely represent those whose OTP is beyond the host railroads’ control due to weather or third party actions. However, there were two other sources of trains that would be considered on time for payment but not for route purposes that we did not account for. The first of these are trains that are considered to be “on-time due to allowances”. These trains largely represent those whose performance is beyond host railroads’ control due to problems originating with Amtrak. The second are trains that are on-time within the tolerance for each checkpoint (generally 10 minutes on the long-distance routes), but are late within the tolerance of the route. Amtrak does not maintain data on the numbers of trains in either category. Our lack of accounting for these factors means that our estimates of net performance payments required for the 75 percent and 85 percent OTP scenarios were somewhat understated. Our estimates for the 100 percent OTP scenario were not affected by these factors.

**EXHIBIT B. MAJOR CONTRIBUTORS TO THIS REPORT****THE FOLLOWING INDIVIDUALS CONTRIBUTED TO THIS REPORT.**

<b><u>Name</u></b>	<b><u>Title</u></b>
David Tornquist	Assistant Inspector General for Rail and Maritime Program Audits and Economic Analysis
Mitchell Behm	Program Director
Betty Krier	Supervisory Economist/Project Manager
Jerrod Sharpe	Economist
Jovanny Roque	Economist
Keith Klindworth	Economist
Chia-Mei Liu	Economist

The following pages contain textual versions of the graphs and charts found in this document. These pages were not in the original document but have been added here to accommodate assistive technology.

## Effects of Amtrak's Poor On-Time Performance

### Section 508 Compliant Presentation

<b>Figure 1. Average On-Time Performance of Amtrak Routes (percent)</b>							
	Fiscal Year						
	2001	2002	2003	2004	2005	2006	2007
NEC	83.76	85.52	79.29	75.78	78.17	81.00	85.51
Long-Distance	54.38	49.51	50.84	42.56	41.38	29.99	41.60
Non-NEC Corridor	73.25	75.49	75.65	73.51	70.44	67.33	65.50

<b>Figure 2. Calculation of Net Effects at 85 Percent</b>			
Additional Revenues + Cost Savings - Performance Payments = Net Gains			
\$111.4 million	\$39.3 million	\$14.1 million	\$136.6 million

<b>Figure 3. Fiscal Effects of Improved OTP for FY 2006</b>			
Categories of Effects	75 percent	85 percent	100 percent
Revenues	<b>\$90.6</b>	<b>\$111.4</b>	<b>\$142.9</b>
Cost Savings			
On-Board Services	\$13.9	\$14.7	\$15.6
Trainmen & Enginemen	\$15.3	\$16.0	\$17.5
Fuel	\$8.2	\$8.2	\$8.4
Total Cost Savings	<b>\$37.3</b>	<b>\$38.9</b>	<b>\$41.4</b>
Net Performance Payments	<b>(\$5.9)</b>	<b>(\$14.2)</b>	<b>(\$47.9)</b>
<b>TOTAL</b>	<b>\$122.0</b>	<b>\$136.1</b>	<b>\$136.4</b>

**Figure 4. Results by Route Type for 85 Percent  
OTP Scenario  
(in millions)**

Categories of Effect	Long-distance	Short-distance
Revenues	\$ 85	\$ 27
Costs		
On-Board Services	14	1
Trainmen & Enginemen	16	N/A
Fuel	4	4
<i>Subtotal</i>	\$ 34	\$ 5
Performance Payments	(\$ 10)	(\$ 4)
Total	\$ 109	\$ 28