



# **ASSET MANAGEMENT: Amtrak Followed Sound Practices in Developing a Preliminary Business Case for Procuring Next-Generation High-Speed Trainsets and Could Enhance its Final Case with Further Analysis**

Report No. OIG-E-2014-007 | May 29, 2014



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# REPORT HIGHLIGHTS

## Why We Did This Review

Amtrak is soliciting proposals for up to 28 next-generation high-speed trainsets to increase seating capacity on its premium high-speed service on the Northeast Corridor (NEC) and to replace the 20 trainsets that it currently operates. These new trainsets could generate about \$10.2 billion more revenue than existing trainsets at an incremental cost of up to \$5.1 billion, according to the company's preliminary business case supporting the solicitation.

Given the financial magnitude of this acquisition, we have reviewed the preliminary business case and the supporting documentation and analysis. We compared them with the sound business practices discussed in two prior reports on capital and fleet planning. This report (1) discusses the extent to which the business case incorporated these sound business practices and (2) identifies issues that the company could address to enhance the final business case and improve its assessment of the company's risks in procuring new trainsets.

For further information, contact Calvin Evans, Assistant Inspector General for Inspections & Evaluations at 202-906-4507.

The full report is at [www.amtrakoig.gov/reading-room](http://www.amtrakoig.gov/reading-room)

*ASSET MANAGEMENT: Amtrak Followed Sound Practices in Developing a Preliminary Business Case for Procuring Next-Generation High-Speed Trainsets and Could Enhance its Final Case with Further Analysis (Report No. OIG-E-2014-007, May 29, 2014)*

## What We Found

The company generally followed sound business practices in developing a preliminary business case to support its request for proposals for next-generation high-speed trainsets. We agree with officials from the company's acquisition team that the business case was adequate for soliciting proposals from potential manufacturers.

According to the acquisition team leader, the preliminary business case was intended to be a high-level analysis. After receiving additional information from bidders, the team plans to develop a more detailed business case prior to seeking approval to purchase new equipment. Therefore, we have identified several opportunities to enhance the final business case, which the acquisition team has agreed to address, including:

- **High-level forecasts.** We identified opportunities to improve the company's forecasts of projected ridership, potential capacity constraints, maintenance and overhaul costs, and required infrastructure investments. A more refined analysis in these areas could enhance the final business case and minimize the company's risk in procuring new trainsets.
- **Operational challenges.** The business case assumes that the company can add daily round trips between Washington and New York during peak hours to further increase ridership and revenue. However, the preliminary business case did not address the facility modifications and scheduling issues associated with adding trips during peak hours.
- **Integration of regional equipment needs.** The financial projections in the business case for the NEC business line rely on revenue generated from both high-speed and regional service. However, the equipment in regional service is old and, according to Amtrak, needs to be replaced or refurbished. The preliminary business case did not identify how these needs will be addressed, or the impact that aging regional equipment could have on future maintenance costs and revenue growth.

## Recommendations

As the final business case is developed, we recommend that the issues discussed in this report related to forecasts, preferred alternatives, and integrated planning be addressed appropriately. This could be accomplished by revising the analysis supporting the final business case or by assessing the potential impact of each issue with an expanded sensitivity analysis within the final business case. Amtrak agreed with our recommendation.

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## Memorandum

**To:** Mark Yachmetz, Chief, Strategic Fleet Rail Initiatives

**From:**   
Calvin E. Evans, Assistant Inspector General, Inspections and Evaluations

**Date:** May 29, 2014

**Subject:** *Asset Management: Amtrak Followed Sound Practices in Developing a Preliminary Business Case for Procuring Next-Generation High-Speed Trainsets and Could Enhance its Final Case with Further Analysis* (Report No. OIG-E-2014-007)

In January 2014, the company issued a formal request for proposals to build up to 28 next-generation high-speed trainsets to increase seating capacity on its premium service on the Northeast Corridor (NEC).<sup>1</sup> This new equipment is intended to replace the 20 trainsets that it currently operates in high-speed service. The acquisition effort is led by the Chief, Strategic Fleet Rail Initiatives with assistance from four departments: Finance, Marketing and Sales, Northeast Corridor Infrastructure & Investment Development, and Operations (which we will refer to as the acquisition team). These new trainsets could generate about \$10.2 billion more revenue than existing trainsets at an incremental cost of up to \$5.1 billion, according to the preliminary business case developed by the acquisition team to support the request for proposals.<sup>2</sup>

According to the acquisition team leader, the preliminary business case was intended to be a high-level analysis. After receiving additional information from bidders, the

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<sup>1</sup> Amtrak jointly issued this request with the California High-Speed Rail Authority at the request of the Department of Transportation.

<sup>2</sup> These projections reflect inflation of costs and revenue over a 31-year period. The total cost includes costs for acquiring and operating the equipment, and improvements to related facilities and infrastructure.

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team plans to develop a more detailed business case prior to seeking approval to purchase new equipment.

Given the financial magnitude of the potential acquisition, we reviewed the preliminary business case and its supporting documentation and analysis. We compared them with the sound business practices discussed in two of our prior reports,<sup>3</sup> including:

- identifying equipment needs through analyses of route-specific ridership demand and forecasts of equipment availability
- developing high-quality cost, benefit, and schedule estimates
- analyzing alternatives to cost-effectively meet needs
- assessing risks, including conducting sensitivity analyses on data and assumptions
- integrating procurement plans with corporate business and financial plans

This report discusses (1) the extent to which the preliminary business case incorporated these sound business practices and (2) issues that the acquisition team could address to enhance the final business case and improve its assessment of the company's risk in procuring new trainsets. For a detailed discussion of our methodology, see Appendix A.

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<sup>3</sup> We previously reviewed the company's processes for developing its fleet plan and for developing business cases. For more information, see these two OIG reports: *Asset Management: Integrating Sound Business Practices into its Fleet Planning Process Could Save Amtrak Hundreds of Millions of Dollars on Equipment Procurements* (OIG-E-2013-014, May 28, 2013), and *Corporate Governance: Planned Changes Should Improve Amtrak's Capital Planning Process, and Further Adoption of Sound Business Practices Will Help Optimize the Use of Limited Capital Funds* (OIG-E-2013-020, August 28, 2013).

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## **SOUND PRACTICES WERE FOLLOWED, AND THE PRELIMINARY BUSINESS CASE WAS ADEQUATE FOR SOLICITING PROPOSALS**

The preliminary business case described the potential costs and benefits of several options to increase seating capacity on the company's NEC high-speed service and generally followed sound business practices. Specifically, the acquisition team:

- determined potential equipment needs using ridership demand analysis of Northeast Corridor high-speed and regional routes
- analyzed multiple alternatives to meet equipment needs
- developed extensive forecasts based on actual ridership, operations, and cost data to model the benefits and costs of each alternative
- explored options to reduce acquisition costs by working with the California High-Speed Rail Authority to pursue a joint acquisition of a common equipment platform
- created cross-functional working groups and involved senior management in planning and decision-making
- identified potential risks—including identifying the safety and maintenance waivers that the company needs to obtain from the Federal Railroad Administration in advance of an acquisition—and conducted sensitivity analyses on some data and assumptions to account for possible variations to its forecasts

We agree with acquisition team officials that the business case was adequate for soliciting proposals from potential manufacturers, given the team's need for additional information and minimal risk to the company.

## **FURTHER ANALYSIS AND RISK ASSESSMENT COULD IMPROVE THE FINAL BUSINESS CASE**

In reviewing the preliminary business case, we identified several areas that could be further developed to enhance the final business case and improve the acquisition

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team's assessment of the company's risk in procuring new trainsets. These include refining its ridership and other high-level forecasts, fully addressing the challenges associated with the preferred alternatives, and better integrating this procurement with the overall plans for the NEC business line. We briefed the acquisition team on these areas on March 17, 2014. The sections below summarize the significant issues discussed in that meeting and the acquisition team's comments.

## **High-Level Forecasts Could Be Refined**

Forecasts for the final business case could be enhanced by employing more refined analysis in the following areas:

- **Ridership forecasting.** The model used to forecast ridership utilizes a high-level method to assess the effect of the trainsets' capacity constraints that did not account for variations in demand at different times of day and on different days of the week. Therefore, the accuracy of the ridership and revenue forecasts are not as precise as they could be and may be overstated. Acquisition team officials agreed that this model may have resulted in an inaccurate estimate of projected ridership and stated that they already planned to modify it to address the accuracy of the forecasts.
- **Capacity constraints.** Although the business case projects potential revenue through 2045, growth in potential ridership was forecasted only through 2030. Acquisition team officials said that they opted to hold these forecasts constant after 2030 because forecasts beyond that date were unlikely to accurately project future market conditions or demand for service. They also said they wanted to avoid tying the hands of future decision-makers by potentially not procuring enough capacity to meet future ridership demand. They therefore plan to build future purchase options into the contract to help address this issue. We acknowledge that it is difficult to accurately develop long-term projections. However, without projecting potential capacity constraints over the entire expected life of the equipment, it is unclear how the business case will support the decision to build future purchase options into a contract, and the optimal timing and size of these purchase options.

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- **Maintenance costs.** By replacing existing trainsets, the preliminary business case estimates savings of about \$675 million in projected maintenance costs from 2018 to 2045. However, this level of savings may be unachievable. The estimates were based on the costs experienced by foreign railroads that operate high-speed rail equipment without adjusting these costs to take into consideration Amtrak's experience operating high-speed equipment in the U.S. Therefore, without conducting further analysis, the final business case may understate the costs of operating the new trainsets. The acquisition team officials agreed that this area needed to be looked at more closely in developing the final business case and said that information obtained through the proposal process will help them to better estimate future maintenance costs and potential savings.
- **Overhaul costs.** The preliminary business case estimates that it will cost about \$92 million to overhaul the next-generation equipment from 2018 to 2045. These projected costs are almost 10 times less than the projected costs (about \$885 million) for overhauling the 20 existing Acela trainsets over their lifetime. We agree that some savings in overhaul costs may be achieved by procuring new trainsets. However, the basis for these savings is not clear because the preliminary business case did not contain detailed support for the projected overhaul costs for either Acela or the new trainsets. Therefore, without more detailed support and further analysis to refine the overhaul costs and savings estimates, the final business case may overstate the benefits of procuring the new trainsets. Acquisition team officials stated that overhaul costs and potential savings could be better estimated after they receive proposals, and agree that this area needs to be looked at more closely as the business case is finalized.
- **Infrastructure investment.** The preliminary business case included a capital investment of \$270 million to renew the high-speed track infrastructure between Washington D.C. and New York City. An acquisition team official told us this infrastructure improvement would be needed to improve ride quality regardless of whether new high-speed equipment is purchased. We understand the need to renew the track infrastructure, but we question the inclusion of these capital costs in the business case because these improvements are unrelated to the equipment purchase and unnecessarily increase the capital costs of the procurement. Given this, it may be more appropriate to weigh the relative need for these improvements against other infrastructure projects competing for

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capital funding as part of the company's annual capital planning process. Acquisition team officials said that they planned to revisit these costs before completing the final business case.

**Preferred Alternatives Raise Issues That Have Not Yet Been Addressed**

The preliminary business case discussed six alternatives and determined that two alternatives—to buy up to 28 trainsets—would provide the most benefits.<sup>4</sup> With both of these alternatives, the business case assumes that the trainsets can be used to increase the number of daily round trips between Washington and New York during peak hours. However, the preliminary business case does not assess the potential facility modifications and scheduling issues that will need to be addressed to increase the round trips during peak hours. According to acquisition team officials, expanding service during the peak hours would likely require the following modifications to facilities and schedules:

- Some facilities have limited space for equipment storage and inspection facilities. An acquisition team official said that adding additional round trips will require the company to expand equipment storage and service facilities, and to modify how it cleans and services trainsets after they finish their routes before using them again.
- High-speed and Northeast Regional schedules in and out of New York's Pennsylvania Station must be modified to accommodate additional departures during peak hours. These schedule changes may also require the company to work with commuter rail services that operate on the NEC.
- Further scheduling changes may also be needed to ensure that high-speed trains can bypass regional trains at stations along the NEC.

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<sup>4</sup> The other four alternatives included a range of options: (1) continue to operate the 20 Acela trainsets through 2035, (2) replace Acela with 20 new 400 to 450-seat trainsets, (3) operate Acela through 2035 and buy 8 new trainsets to expand capacity, and (4) replace Acela with 20 new trainsets and improve trip times.

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Therefore, if these issues are not resolved, they could impact the projected financial benefits of the preferred alternatives. Acquisition team officials believe that these issues can be overcome, but noted that doing so will be difficult and agreed that the final business case should identify the risks associated with these issues.

**Integrating Regional Service Equipment Needs Would Enhance the Business Case**

The preliminary business case was not developed in the context of equipment plans for the company's entire NEC business line, which includes both Northeast Regional and high-speed services. Although Amtrak is pursuing the acquisition of the high-speed trainsets based on the projected service life of Acela, its FY 2013 fleet strategy<sup>5</sup> states that the passenger cars in NEC regional service have also exceeded their projected service lives and need to be replaced. However, the business case does not consider how the age and condition of those passenger cars could potentially affect the financial forecasts for the business line. For example:

- The business case does not consider how the increasing costs of operating existing regional equipment may impact the operating costs projected for the business line. It projects costs for regional equipment maintenance through 2045, but does not incorporate increasing costs for maintaining this equipment as it ages, although the company states in its fleet strategy that it expects maintenance costs to increase as equipment ages.
- The business case uses projected future growth in revenue for the business line to calculate the financial benefits of acquiring the new high-speed trainsets. However, it does not address the impact of funding requirements for future regional equipment procurements or major overhauls. Consequently, if funding is not available for regional equipment needs, the quality of regional service may be affected and the growth in revenue for the business line projected in the business case may not be achievable.

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<sup>5</sup> The company's 2013 fleet strategy was incorporated into its 2013 to 2017 Five-Year Financial Plan.

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Therefore, it is unclear whether the company will be able to achieve the projected financial performance for the business line and also meet the overall equipment needs of regional service. Without further integrating the analysis of these issues into the final business case, the projected benefits of the high-speed train acquisition may be overstated. Acquisition team officials acknowledged that it would be ideal to have a comprehensive NEC equipment plan that includes fleet plans for both regional and high-speed rail services.<sup>6</sup> However, these officials did not believe that such a plan would be developed before they submit their final acquisition plan to Amtrak's Board of Directors for approval. Therefore, they agreed that the final business case should identify this issue as a risk.

## **CONCLUSION**

The preliminary business case incorporated sound practices and provided sufficient justification to issue the request for proposals. However, there are opportunities to refine high-level forecasts, address issues associated with preferred alternatives, and integrate planning for NEC equipment that would enhance the final business case. A sound business case will be essential to decision makers as they consider the acquisition's estimated cost and benefits, and the level of risk associated with those estimates. Acquisition team officials said they are committed to addressing opportunities to enhance the final business case.

## **RECOMMENDATION**

As the acquisition team develops its final business case, we recommend that the issues discussed in this report related to forecasts, preferred alternatives, and integrated planning be address appropriately. This could be accomplished by revising the analysis supporting the final business case or by assessing the potential impact of each issue with an expanded sensitivity analysis within the final business case.

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<sup>6</sup> This statement is consistent with the company's new approach to fleet planning.

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## **MANAGEMENT COMMENTS AND OIG ANALYSIS**

On May 22, 2014, Amtrak's Chief of Strategic Fleet Rail Initiatives provided us with comments on a draft of this report in which he concurred with our recommendation and stated that the insights we provided would be useful as the company develops its final business case for this procurement (see Appendix B). The response also included technical comments on some of the issues we identified in the report. Because we had previously incorporated the information contained in the comments into this report based on a discussion with the acquisition team, we did not make any additional changes.

Additionally, as described in one of these comments, the company takes exception to our opposition to the inclusion in the business case of a \$270 million infrastructure investment to improve ride quality. We understand the need to improve ride quality; however, because the work will be needed whether new high-speed trainsets are purchased or not, we continue to believe that this investment should not be included. We will review how this infrastructure investment is addressed in the final business case.

We appreciate the courtesies and cooperation that Amtrak representatives extended to us during this review. If you have any questions, please contact me ([Calvin.Evans@amtrakoig.gov](mailto:Calvin.Evans@amtrakoig.gov), 202.906.4507) or Jason Venner, Senior Director ([Jason.Venner@amtrakoig.gov](mailto:Jason.Venner@amtrakoig.gov), 202.906.4405).

cc: Joseph H. Boardman, President and Chief Executive Officer  
Stephen J. Gardner, Vice President, NEC Infrastructure and Investment Development  
Matthew F. Hardison, Chief Marketing and Sales  
Jerry Sokol, Chief Financial Officer  
Donald J. Stadtler, Jr., Vice President, Operations  
Matthew Gagnon, Senior Director, Business Processes and Management Controls  
Melantha Page, Senior Audit Liaison

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**Appendix A**

**SCOPE AND METHODOLOGY**

This report provides the results of our evaluation of Amtrak's preliminary Next-Generation High-Speed Rail business case. Our objectives for this report were to determine (1) the extent to which the preliminary business case incorporated sound business practices identified in OIG-E-2013-014 and OIG-E-2013-020 and (2) issues that the acquisition team could address to enhance the final business case and improve its assessment of the company's risk in procuring new trainsets. We performed our work from November 2013 through March 2014 in Washington, D.C.

To address our objectives, we initially compared the business case and supporting analysis to the sound business practices we previously identified in our reports OIG-E-2013-014 and OIG-E-2013-020. We also met with acquisition team officials to determine how the team plans to develop a more detailed and comprehensive final business case supporting the potential acquisition of new high-speed trainsets. In addition, we discussed our observations with responsible officials in several departments across the company. During these discussions, we reviewed the company's processes for forecasting operations costs, maintenance costs, and revenue; obtained supporting documentation for those forecasts; and resolved outstanding questions. We discussed the results of our evaluation with Amtrak officials.

We performed this evaluation in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the evaluation to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our objectives.

**Internal Controls**

In conducting the evaluation, the team used prior reports to identify controls that would better enable the company to develop a sound business case, including integrating the plan with other corporate plans, using empirical data to forecast lifecycle costs and support the case, and ensuring that management has oversight of the planning process. Although the company has established a process to develop the

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business that includes some of these controls, the team identified a number of opportunities to strengthen the process. We presented the results of our review in the body of this report.

**Use of Computer-Processed Data**

We did not rely on computer-processed data to determine the findings or conclusions of this report.

**Prior Reports**

In conducting our evaluation, we relied on the following reports from Amtrak OIG:

- *Asset Management: Amtrak is Preparing to Operate and Maintain New Locomotives, but Several Risks to Fully Achieving Intended Benefits Exist* (OIG-E-2013-021, September 27, 2013)
- *Corporate Governance: Planned Changes Should Improve Amtrak's Capital Planning Process, and Further Adoption of Sound Business Practices Will Help Optimize the Use of Limited Capital Funds* (OIG-E-2013-020, September 27, 2013)
- *Asset Management: Integrating Sound Business Practices into its Fleet Planning Process Could Save Amtrak Hundreds of Millions of Dollars on Equipment Procurements* (OIG-E-2013-014, May 28, 2013)
- *Acela Car Purchase: Future Revenue Estimates Were Initially Overstated* (OIG-E-2012-010, March 28, 2012)

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**Appendix B**

**COMMENTS FROM AMTRAK'S  
 CHIEF, STRATEGIC FLEET RAIL INITIATIVES**

NATIONAL RAILROAD PASSENGER CORPORATION  
 60 Massachusetts Avenue, NE, Washington, DC 20002  
 tel (202) 906-2730, fax (202) 906-2850

**Memo**

Date May 22, 2014  
 To Calvin E. Evans,  
 Assistant Inspector General,  
 Inspections and Evaluations



From   
 Department Strategic Fleet Rail Initiatives  
 Subject Asset Management: Amtrak  
 Followed Sound Practices in  
 Developing a Preliminary Business  
 Case for Procuring Next-Generation  
 High-Speed Trainsets and Could  
 Enhance its Final Case with Further  
 Analysis (Draft Evaluation  
 Report 002-2014)  
 cc Joseph Boardman  
 DJ Stadler  
 Gerald Sokol  
 Matt Hardison  
 Stephen Gardner  
 Matt Gagnon  
 Melantha Page  
 Peggy Reid

Message Thank you for the opportunity to review Draft Evaluation Report 002-2014, *Asset Management: Amtrak Followed Sound Practices in Developing a Preliminary Business Case for Procuring Next Generation High-Speed Trainsets and Could Enhance its Final Case with Further Analysis*. Overall, we agree with the report's conclusions and its recommendations as expressed below.

High-Level Forecasts Could Be Refined:

We generally agree with the points raised by the draft evaluation. As was noted, there were a number of data sources that, while appropriate for the preliminary level business case, will be refined for the final business case. As an example, while the model used to make ridership and revenue projections was the best available at the time, in making these projections the team identified enhancements that could improve that model. These are being undertaken and should be completed by mid-summer. Those enhancements will not only be used for the final business case, they will also improve Amtrak's corporate capabilities to project ridership and revenue impacts from other actions affecting the market that accounts for our entire operating surplus. When it comes time for Amtrak to exercise options for more equipment (under the present schedule roughly five years from now) this model with updated inputs, would support development of a new business case that specifically addresses whether to exercise those options.

The one area where we take exception with the draft evaluation is its concerns over including the capital cost of ride quality improvements in the business case. We believe that a high degree of ride quality is an integral part of the premium class service that these

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trains provide and a continued degradation of ride quality could adversely impact the financial performance of the premium service. We see a strong nexus between the two separate capital actions. There is also a strong nexus between including ride quality improvements in our application for financing under the Railroad Rehabilitation and Improvement Financing Program and Amtrak's FY 2015 legislative and grant request to Congress which proposes allocation of the NEC operating surplus to NEC capital investments. While a specific ride quality improvement activity was identified (renewal of the ballast between Washington and New York City), it is anticipated that the specific investments undertaken will be those that yield the greatest benefit to ride quality per dollar expended at the time this financing becomes available.

Preferred Alternatives Raise Issues That Have Not Yet Been Addressed

We agree that at the high-level analysis, certain issues were not addressed or fully developed as they were not drivers of whether Amtrak should release an RFP to identify the capabilities and costs of equipment to meet our future needs. These issues are more appropriate for the final business case. As an example, the maintenance facility requirements to a large degree will be dictated by conditions on the safety approval for this equipment. In another example, specific schedules will be developed for operations based upon the capabilities of the selected equipment. These schedules will identify whether additional investments need be made for meets and overtakes. It should be noted that the business case includes \$300 million for unspecified facility improvements to address issues such as these that might arise.

Integrating Regional Service Equipment Needs Would Enhance the Business Case

The draft evaluation appropriately notes that the timing of the current proposed acquisition is based upon the projected service life of the equipment used to provide *Acela Express* service but does not address the aging passenger cars used for NEC Regional service. The potential that this equipment becomes life expired or becomes significantly more costly to maintain and thus impacts a portion of the net revenue for the NEC Operations business line will be recognized as a risk in the final business case.

We agree that the optimum situation would have been to address the NEC rail fleet needs holistically. Given the timing associated with the creation of the NEC Operations Business Line, however, this was not possible. *Acela Express* accounts for 72% of the operating surplus of the NEC Operating Business Line and thus its equipment needs were given the priority for being addressed in a proposed acquisition. The Amfleet II passenger cars used in NEC Regional service have demonstrated that they are amenable to periodic overhauls and rebuilds and are generally performing well at this time. They are not viewed as presenting a significant risk of systemic failure in the near to mid-term. Thus Amtrak has time, albeit a limited amount, to consider the future approach to providing equipment for NEC Regional service – acquire new or rebuild existing – as part of an overall strategic rail fleet plan.

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Conclusion

Amtrak appreciates the insights provided by the OIG in the draft evaluation and will use them as we develop the final business case.

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**Appendix C**

**OIG TEAM MEMBERS**

Calvin Evans, Assistant Inspector General, Inspections and Evaluations

Jason Venner, Senior Director, Inspections and Evaluations

Joshua Moses, Evaluator

Robert Dyer, Principal Operations Analyst

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**OIG MISSION AND CONTACT INFORMATION**

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**Amtrak OIG's Mission**

Amtrak OIG's mission is to provide independent, objective oversight of Amtrak's programs and operations through audits, inspections, evaluations, and investigations focused on recommending improvements to Amtrak's economy, efficiency, and effectiveness; preventing and detecting fraud, waste, and abuse; and providing Congress, Amtrak management, and Amtrak's Board of Directors with timely information about problems and deficiencies relating to Amtrak's programs and operations.

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