AMTRAK OFFICE *of* INSPECTOR GENERAL
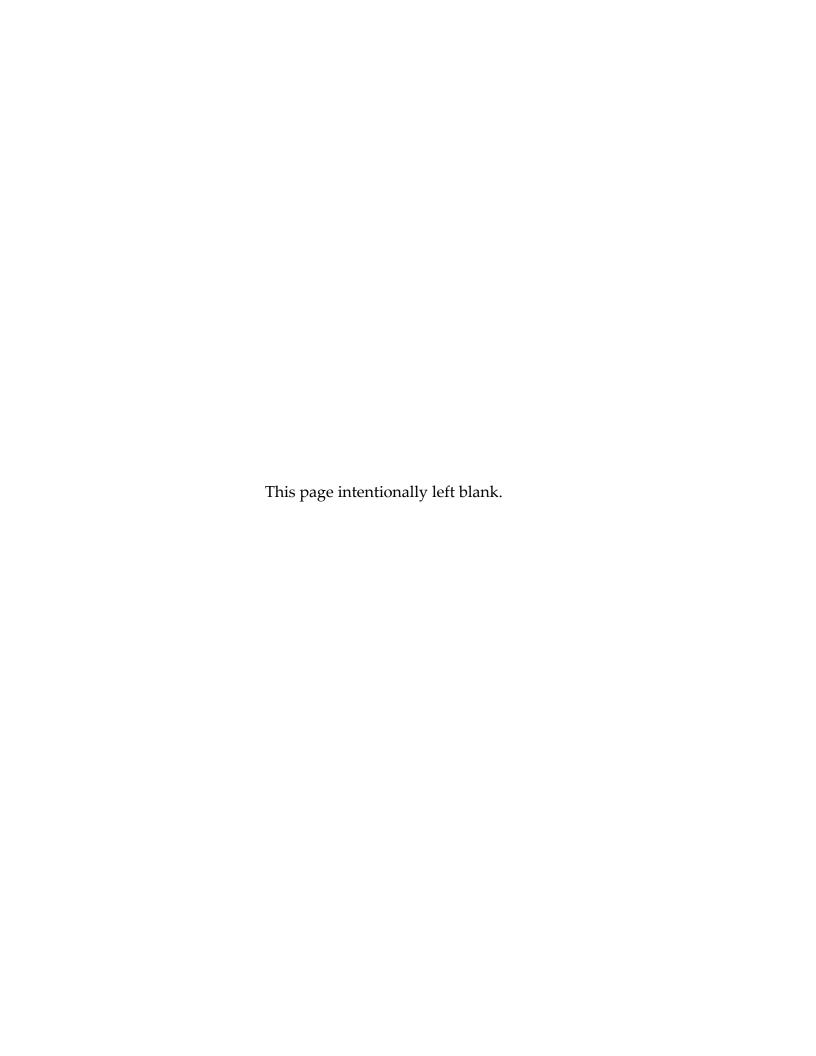## NATIONAL RAILROAD PASSENGER CORPORATION

TRAIN OPERATIONS:
On-Time Performance Reporting Generally Accurate;
Additional Actions Could Enhance Delay Reporting

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Memorandum

To: Scot Naparstek
Executive Vice President/Chief Operating Officer

From: Stephen Lord
Assistant Inspector General, Audits

Date: March 2, 2017

Subject: *Train Operations: On-Time Performance Reporting Generally Accurate;*
Additional Actions Could Enhance Delay Reporting
(OIG-A-2017-007)

On-time rail performance is important to Amtrak (the company) achieving its strategic goals of acquiring and retaining satisfied customers and enhancing its revenues. The company uses two performance metrics to measure the timeliness of its trains:

- **On-time performance.** How a train actually performs compared to its published, scheduled arrival time at each station and final destination on its route.

- **Delays.** How much a train's elapsed run time exceeds its optimum run time at various locations along its route.[1]

The company uses this information to produce a series of widely distributed monthly and quarterly reports, to diagnose why trains are late, and to manage relationships with host railroads—whose tracks the company uses for most of its train routes—in order to improve its trains' performance.[2]

Further, the accuracy of the company's on-time performance and delay information is important to host railroads because the company pays host railroads financial incentives to help keep its trains operating on time. Host railroads use the company's

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[1] Optimum run time is the least amount of time in minutes that a passenger train will take to operate between two time-capture points—at stations and other locations along a route—as agreed upon by the company and a host railroad that owns the track on a particular route. Delays are measured in terms of delay minutes caused by either the company, host railroads, or third parties and are reported based on a uniform per train-mile basis—10,000 miles—to account for differences in route length.

[2] About 72 percent of the miles traveled by the company's trains are on tracks owned by host railroads.

on-time performance and delay information to calculate and invoice on-time performance incentive payments the company owes under contractual agreements. In calendar year (CY) 2015, the company paid host railroads more than $24 million in incentive payments.[3]

Additionally, federal agencies overseeing rail operations use the company's reports to fulfill the following statutory obligations:

- The Federal Railroad Administration uses the information to fulfill a legislative requirement under Section 207 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA)[4] to collect data and publish a quarterly report on the performance and service quality of intercity passenger train operations.

- The Surface Transportation Board can use the information to investigate substandard performance of company trains operating over host railroad tracks, as authorized by Section 213 of PRIIA.

Our audit objectives were to assess (1) the accuracy of the company's reporting of on-time performance and delays for trains operating on host railroad tracks and (2) whether data quality and management control issues affect the accuracy and reliability of performance data. We used the company's performance data to recalculate its CY 2015 quarterly on-time performance for all 39 long-distance and state-supported[5] routes, and to recalculate delays for 14 trains operating on 7 of these routes.[6] For a detailed discussion of our scope and methodology, see Appendix A.

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[3] The company paid host railroads more than $34 million in incentive payments from January 1 through September 30, 2016.

[4] Passenger Rail Investment and Improvement Act of 2008, Pub. L. No 110-432, Div. B, 122 Stat. 4907 (2008).

[5] The company identifies state-supported routes as "Non-NEC Corridor Routes" in the federally mandated PRIIA quarterly reports.

[6] We excluded from our analysis trains operating on the Northeast Corridor because they operate primarily on company-owned tracks, and the focus of this audit was trains operating on host railroad tracks.

SUMMARY OF RESULTS

The company's reporting of on-time performance of trains arriving at final destinations,[7] a key performance metric for trains operating on host railroad tracks, was generally accurate. However, its reporting of delays—the other key performance metric—was less accurate on the routes we reviewed, and opportunities exist to further enhance the accuracy and reliability of these performance data. Accurate performance metrics help ensure that the amount of incentive payments the company pays to host railroads is accurate and also help federal agencies carry out their oversight responsibilities. In addition, the metrics help the company diagnose and address the causes of delays and help meet its strategic goals for customer service.

In CY 2015, the company's reporting of on-time performance for trains operating on host railroad tracks was generally accurate for all of its 39 long-distance and state-supported routes. Our calculations of on-time performance matched about 70 percent of the company's calculations. For the remaining 30 percent, the average difference was less than 1 percentage point between ours and the company's quarterly on-time performance calculations.

However, we found that the company's calculations of delay minutes for 14 trains on the 7 routes we reviewed were generally understated compared to our calculations; the median of these differences was 2.3 percent fewer delay minutes being calculated by the company. Our analysis also showed that the company understated delays in 47 of the 56 quarters calculated for these trains in CY 2015.

We identified a number of data quality issues and management control weaknesses that contributed to the differences between our calculations of delays and the company's calculations, including the following:

- the company's use of different time-capture points for measuring and reporting delays than those in schedules agreed to with host railroads

- missing and erroneous data on train arrival and departure times, and missing data on the causes of delays

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[7] The company also reports on its trains' on-time performance at all stations served. The company uses the same underlying performance data for these calculations as it does to calculate its on-time performance at final destinations; therefore, we did not test the "all stations" on-time performance.

- ineffective quality control processes for collecting missing data

- insufficient restrictions of users' access to data systems

- inadequate documentation of receipt and resolution of host railroad challenges to company data

Over the past several years, the company has taken a number of actions to enhance its reporting of on-time performance and delays. This is a positive development. However, the accuracy and completeness of current delay reporting could be enhanced by strengthening existing management processes and controls. Accordingly, we recommend that the company identify and document appropriate time-capture points to measure and report delays, establish more effective controls for collecting the data used to calculate delays, and strengthen management controls over collected data. In commenting on a draft of this report, the company's Executive Vice President/Chief Operating Officer agreed with our four recommendations and outlined planned actions that, if fully implemented, will address the intent of these recommendations.

BACKGROUND

The Operations department has primary responsibility for collecting, managing, and reporting train on-time performance and delay data. The Information Technology department assists Operations by maintaining the database that stores the data.

The company uses automated and manual processes to collect data and report on its trains' on-time performance and delays. Its automated processes include (1) a system launched in 2008 that automatically captures train arrival and departure times and (2) an electronic delay reporting system implemented in 2014 that uses arrival and departure times to automatically calculate train delay minutes. Its manual processes include conductors recording the causes of delays using an electronic mobile device (iPhone). Additionally, a Business Operations quality control desk in Operations uses a manual process to identify and follow up on missing data and causes for delays.[8] If host railroads challenge the company's delay data, the Project Manager of Operations

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[8] Certain events may prevent the automatic recording of arrival or departure times, such as when a train arrives or departs underneath an overhead bridge or building—as well as when a locomotive's position tracking equipment or automated reporting system fails, is turned off, or has been de-activated.

Research, Planning, and Scheduling in the Operations department reviews the host railroad's challenge and requests or approves any changes needed to resolve the issue.

In recent years, statutory provisions related to on-time performance and delay reporting have faced several legal challenges. For example, since 2013, freight railroads have challenged the constitutionality of Section 207 of PRIIA in the courts.[9] This section provides joint authority to the company and the Federal Railroad Administration to develop metrics and standards for measuring the performance of passenger train operations, including the company's on-time performance and delays.

In addition, in July 2016, the Surface Transportation Board issued a final rule that defines on-time performance and specifies the formula for calculating on-time performance under Section 213 of PRIIA. Section 213 provides that if the on-time performance of any intercity passenger train averages less than 80 percent for any two consecutive calendar quarters, the Surface Transportation Board may initiate an investigation; however, upon the filing of a complaint by Amtrak or other eligible complainants, the Board shall initiate an investigation. The investigation is to determine whether and to what extent host railroads or Amtrak could reasonably address delay causes or failure to achieve the minimum standards. In making its determination, the Board shall make recommendations to improve the service, quality, and on-time performance of the train.[10]

Under the Board's final rule, a train's arrival at, or departure from, a given station is considered to be on time if it occurs no later than 15 minutes after its scheduled time. The rule also specifies the formula for calculating on-time performance based on a

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[9] The most prominent legal challenge was addressed by the U.S. Supreme Court in *Department of Transportation v. Assoc. of American Railroads*, 135 S. Ct. 1225 (2015). The Court remanded the matter back to the U.S. Court of Appeals for the District of Columbia, but held that Amtrak is a governmental, not a private, entity for purposes of determining the validity of the metrics and standards created under Section 207. On remand from the Supreme Court, the D.C. Circuit found that Section 207 violates the Fifth Amendment's Due Process Clause on the grounds that it appoints power to an "unconstitutionally appointed arbitrator." (*Assoc. of American Railroads v. Department of Transportation*, No. 12-5204 (D.C. Cir. 2016)).

[10] In 2012 and 2014, Amtrak initiated two claims against three host railroads for on-time performance that was below the minimum standard of 80 percent for two consecutive quarters. The claims were still outstanding at the conclusion of our audit.

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train's punctuality at all stations rather than just at its final destination in order to
trigger an investigation under Section 213.[11] On August 9, 2016, the Association of
American Railroads petitioned the U.S. Court of Appeals for the District of Columbia
Circuit to review the final rule, claiming that the Surface Transportation Board did not
have the authority to define on-time performance.

ON-TIME PERFORMANCE REPORTS WERE GENERALLY ACCURATE

The company's reporting of a key performance metric—a train's on time performance in
arriving at its final destination—was generally accurate for all 15 long-distance routes
and 24 state-supported routes we analyzed for each quarter of CY 2015. We
independently verified the company's on-time performance calculations for these
39 routes for each quarter of 2015, using the company's performance data. Of these
156 calculations, the company's calculations matched ours in 111 instances (about
70 percent of the calculations).

For the remaining 45 calculations (about 30 percent), the differences between the
company's calculations of on-time performance and our calculations were relatively
insignificant—with an average difference of less than 1 percentage point.[12] For example,
the company's calculation of on-time performance for its Downeaster route for the third
quarter of CY 2015 was 52.8 percent, and we calculated it at 53.7 percent. The
0.9 percent difference was due to the company including a non-revenue train when only
revenue trains should have been included in its calculation, according to a company
Business Operations analyst. Because the differences in calculations were relatively
insignificant for the other routes, we generally did not investigate the specific causes for
the differences we identified. None of the differences we identified significantly moved
the on-time performance percentages either above or below the standard of 80 percent.

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[11] The modified definition and formula for calculating on-time performance have no effect on our audit
results because the effective date is outside the scope of our review.
[12] The company's calculations ranged from 1.2 percentage points greater than to 1.3 percentage points less
than our calculations.

DELAY REPORTS WERE LESS ACCURATE AND COULD BE IMPROVED

The company's reporting of its other key performance metric—delays—was less accurate than its on-time performance reports. Specifically, we found instances in which the company's calculations of delays were understated, meaning that delays were generally longer than reported. For the 14 trains[13] we reviewed on 7 routes, the company calculated fewer delay minutes than we did in 47 of the 56 quarters calculated for these trains in CY 2015. The differences ranged from the company calculating about 10 percent fewer delay minutes than we did for Train 21 in the fourth quarter (3,490 minutes less than the total 36,503 delay minutes we calculated), to 8 percent more delay minutes than we calculated for Train 22 in the first quarter (2,544 minutes more than the total 32,395 delay minutes we calculated), as shown in Figure 1. The median of these differences was 2.3 percent fewer delay minutes being calculated by the company. However, these data should be viewed with some uncertainty, partly because they reflect a limited number of train routes but also because of the data quality issues and management control weaknesses we discuss later in this report.

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[13] Our analysis involved 14 trains in CY 2015—12 trains operating on 6 long-distance routes, and 2 trains operating on 1 state-supported route. We excluded 9 of the 15 long-distance routes from our analysis because either the company had not yet implemented electronic delay reporting on those routes during a portion of our testing period or because of system and data integrity issues discussed later in this report. We also included a state-supported route that operated on the same rail line as one of the long-distance routes reviewed.

Figure 1: Company Quarterly Calculations of Total Delays for 14 Trains Were Mostly Understated in CY 2015

Source: OIG analysis of Amtrak's database containing company data

Notes:
[a] According to a senior manager of the Operations' Host Railroads group, a programming issue caused an incorrect delay calculation resulting in overstated delays for Train 22 in the first quarter; however, the issue has been corrected.

[b] We excluded the third quarter results for Train 51 because of erroneous data in the company's database of train movement times that incorrectly resulted in significant differences between our calculations and the company's calculations of delays during the quarter.

The understatement of delay minutes also affects the accuracy of the company's monthly and quarterly reports of delays and could affect the amount of incentive payments made to host railroads. Because the company had not identified the causes for the understated delay minutes presented in Figure 1, we were unable to determine the portion of these delay minutes attributed to host railroads.

For details about the company's delay calculations and our calculations, see Appendix B.

DATA QUALITY ISSUES AND MANAGEMENT CONTROL WEAKNESSES AFFECT THE ACCURACY AND RELIABILITY OF DATA

We identified data quality issues and management control weaknesses that contributed to the differences in our and the company's calculations of delays.

Data Quality Issues

Data quality issues that we identified included the company using different time-capture points than those in schedules agreed to with host railroads to calculate delays, missing data on train movement times (arrival and departure times) and the causes for delays, and other data quality issues. These issues affect the overall accuracy and completeness of delay reports.

Different time-capture points used to calculate delays. The company made its calculations of total delay minutes using different time-capture points than those in schedules agreed to with the host railroads, which contributed to the differences between the company's and our calculations. Although the company's policy for calculating delays does not stipulate the time-capture points to use as the basis for making delay calculations, Operations and Information Technology management officials responsible for delay reporting told us the schedules agreed to with host railroads are to be used as the basis for calculating reported delays.[14]

However, the company did not always use the time-capture points in these schedules. For all long-distance trains, including the 14 trains we reviewed, the company used additional time-capture points to help identify operating trends on longer sections of track and excluded other time-capture points that the Operations Scheduling group decided were no longer needed for scheduling purposes. For example, the company used 22 additional time-capture points for Train 1 of the Sunset Limited route and excluded 13 time-capture points agreed to with host railroads for Train 91 of the Silver Star route.
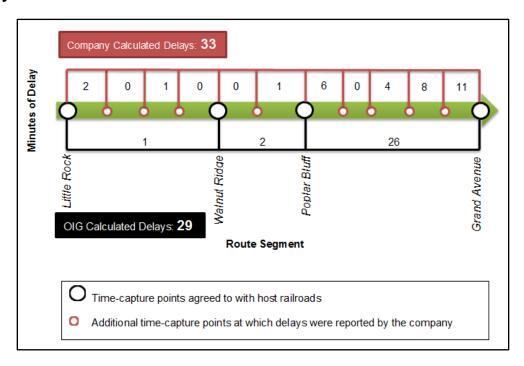
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[14] These management officials are the deputy chief and senior manager in the Host Railroads group and directors of the Business Mobile Systems and Business Analytics groups in Operations, as well as a senior principal business liaison and a principal applications system engineer in the Information Technology department.

The company's inclusion of additional time-capture points could overstate delay minutes, and its omission of time-capture points could understate delay minutes for a given route. For example, on January 1, 2015, the company's addition of 8 time-capture points on a route segment of Train 22 resulted in it calculating a 33-minute delay for the segment, which is 4 minutes greater than the 29-minute delay we calculated using only the 4 time-capture points in the schedules agreed to with the host railroad, as shown in Figure 2.[15]

Figure 2: Example of the Effect That Additional Time-Capture Points Have on Delay Calculations

Source: OIG analysis of Amtrak's database containing delay data and schedules agreed to with host railroads

Missing data on train movement times and causes for delays. The company's business procedure manuals require conductors to account for all delays and manually enter or correct missing or incorrect train movement times; however, conductors did not always do so. In our analysis of 14 trains, we identified train movement times that

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[15] The differences between our and the company's calculations of delays could also be attributable to certain company policies and practices, including a policy that does not account for delays of less than one minute and a practice of not accounting for early arrivals.

were missing from the company's database. In addition, the Business Operations quality control desk identified missing train movement times, including at least 16 occurrences during a three-month period from December 2015 through February 2016. If train movement times are missing from the company's database, delays cannot be calculated.

We also identified instances in which the causes of delay were missing, such as a 60-minute delay for Train 14 on October 31, 2015. The Business Operations quality control desk also identified missing cause information, including 1,617 company-calculated minutes of delay for multiple trains that were missing cause information during the 3-month review period. Because the company's attempts to have the conductors identify the causes of these delays were generally unsuccessful, causes were never entered for 1,040 of these delay minutes—64 percent of the total identified. According to a Business Operations director, if delay causes are not identified, they are not included in the database from which reports of delays are generated.

Host Railroad Group officials acknowledged the accuracy of our finding about missing data. However, they noted that the missing data identified by the quality control desk represent a small portion of the total train movement times and delay minutes for these trains.

Erroneous data on train movement times. We also identified erroneous train movement times and duplicate delay minutes that contributed to differences between the company's and our calculations. For example, in one instance in August 2015, the database of train movement times for two time-capture points for Train 51 were erroneously recorded as having occurred in May. As a result, the company's electronic delay reporting system, which bases its calculations on train movement times, erroneously calculated a delay of more than 130,000 minutes. Although these minutes were subsequently removed from the database from which delays are reported, the inaccurate dates remained in the database of train movement times, causing our calculation to vary significantly from the company's calculated delay minutes for this train. In June 2016, after we brought the error to the company's attention, the entry was corrected. This error was a result of manual entries made to account for missing data.

Delay data from two route segments missing from published reports. In validating the accuracy of processes the company used to prepare its reports of delay, we found that two route segments and related delay minutes were omitted from the Federal

Railroad Administration's published quarterly reports, totaling about 11,000 minutes of delay per 10,000 train miles for the first and second quarters of CY 2015.[16] After we discussed this issue with a Business Operations analyst, he subsequently added the missing route segments to the report for the quarter ending December 2015. The Business Operations analyst told us that a new automated report process designed to prevent such occurrences was implemented in summer 2016.

Weak Management Controls

Weak management controls could also impact the reliability of data used in reporting delays on host railroad tracks. Management control standards state that when appropriate control activities are in place and the information that management uses is accurate, complete, and valid, the likelihood of better decision-making is improved.[17] However, we identified weaknesses in the quality control processes used in collecting data, users' access to data systems, and resolution of host railroad challenges to the data.

Quality control processes for collecting missing data were ineffective. The company's manual processes for identifying and collecting missing data were ineffective. Each day, four staff members with the Business Operations quality control desk manually review data on the previous day's routes for completeness. If train movement times or delay data are missing, the staff will email the supervisors of the responsible conductors and request the missing data. In our review of 209 requests for missing data that the quality control desk made from December 2015 through February 2016, the desk was unsuccessful in collecting the missing data for 155 of these requests—74 percent. In addition, the quality control desk did not follow up with conductors' supervisors to collect the missing data once the initial request was made, according to the senior manager of the quality control desk. When the quality control desk cannot collect missing data, the company excludes the related route segments from its delay calculations, thus affecting the overall completeness and accuracy of its

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[16] More than 5,000 host-responsible delay minutes per 10,000 train miles were omitted for these two route segments in the first quarter, and more than 6,000 host-responsible delay minutes were omitted in the second quarter.

[17] COSO, *Internal Control—Integrated Framework,* May 2013; GAO, *Standards for Internal Control in the Federal Government, GAO-14-704G,* September 2014.

reporting. Company officials told us they have efforts underway to automate and improve this quality review process.

Users' access to data systems was not sufficiently restricted. Many users have access to on-time performance and delay reporting systems, which potentially places the accuracy of the data at risk. Effective information technology control procedures generally restrict users' access to applications or functions commensurate with their job responsibilities.[18] However, more than 6,000 company employees have access rights and can manually enter or change train movement times or delay data. This includes conductors and assistant conductors, who have access for up to two hours after the trip has ended, as well as ARROW system[19] users, who have access for up to seven days, according to a manager in the Information Technology department.

We also identified 17 users with active accounts who were no longer employed by the company and multiple users whose job functions would likely not require the need for rights to manually enter or change train movement times, including baggage clerks, customer relations personnel, call center service agents, and refund desk clerks.

Information technology control standards call for regular reviews of all user accounts and related privileges. A manager responsible for ARROW access told us the user access list is reviewed monthly, quarterly, and annually; however, we found 80 users with multiple identification numbers for accessing the system, raising questions about the effectiveness of these security reviews. These ineffective reviews of user accounts place the accuracy of the data at risk.[20]

Procedures for documenting challenges to delay data were not followed. The company's procedures for documenting host railroads' requests for changes to delay data were not followed. The company's procedures specify that a log of change requests be maintained, including recording the approval or denial of requests to change delay data; however, the company was not maintaining such a log. The change requests were

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[18] COBIT 5 (Enabling Processes), *IT governance framework,* 2012; COSO, *Internal Control—Integrated Framework,* May 2013.

[19] ARROW is the company's reservation and ticketing system, which authorized users can use to manually enter and adjust train movement times.

[20] In its August 2016 report, the independent auditor of the company's audited consolidated financial statements for fiscal years 2014 and 2015 reported a material weakness in the design and operation of information systems controls, including information technology general controls over user access.

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instead maintained in the email account of the sole manager responsible for managing and resolving the requests, thereby potentially jeopardizing the preservation and tracking of such requests if this person were to leave or change positions within the company.

Management control standards for private and public entities state that appropriate documentation enables proper monitoring, provides a means to retain organizational knowledge, and mitigates risks. These standards also suggest that senior management should plan and prepare for succession by developing contingency plans for assignments of responsibility important for internal control.[21] However, according to the manager, the company has no succession management plans in place for this function. If this individual suddenly ceases to be employed by the company, the resolution of host railroad challenges to delay data could be disrupted.

STEPS TAKEN TO ENHANCE ACCURACY OF REPORTING

The company has taken steps to enhance the accuracy of its on-time performance and delay data used to report on the performance of its trains operating on host railroads. In 2008, the company began automating its on-time performance and delay reporting system. In addition, the company took a number of actions during our audit to enhance the accuracy of its data. During the period we reviewed—CY 2015—conductors could override the electronic mobile device warning that alerted them about missing train movement times and delay data, resulting in missing train performance data. To address this issue, the company updated the device in October 2015 to prevent conductors from submitting performance information on the route unless all information is entered. Also during this period, the company upgraded the system to identify and alert conductors of erroneous and duplicate delay data, according to a senior manager in the Operations department.

In February 2016, the company updated its policy for recording and reporting on-time performance and delays. The policy in effect during the period we reviewed had last been updated in 2007 and reflected an organizational structure and procedures that were no longer in place. In addition, no single official was accountable for managing the

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[21] COBIT 5 (Enabling Processes), *IT governance framework,* 2012; COSO, *Internal Control—Integrated Framework,* May 2013.

overall reporting activities, as called for by management control standards.[22] In the 2016 update, the company assigned accountability for these reporting activities to the senior director in charge of the Metrics and Compliance Group in Operations.

These are positive steps toward improving the accuracy of the company's data; however, it is too early to assess the extent to which the recent actions have addressed the weaknesses we identified.

CONCLUSIONS

In recent years, the company has taken steps to enhance the accuracy of the on-time performance and delay data used to report the company's performance of its trains operating on host railroads. This is a positive development. However, we identified a number of weaknesses in the company's processes used to measure, record, review, and report delay data, including the following:

- using different time-capture points than those in schedules agreed to with host railroads
- inaccurate and missing delay data
- ineffective quality control processes for collecting missing data
- insufficient access restrictions to company data systems
- the lack of adherence to company procedures for documenting requests by host railroads for changes in delay data

Taking steps to address these weaknesses could enhance the overall accuracy and reliability of the company's delay reporting. Without such improvements, the company risks making erroneous incentive payments to host railroads and inaccurate reports of substandard performance to federal oversight agencies, as well as misinformed decisions related to the performance of its trains operating on host railroad tracks.

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[22] Management control standards for private and public entities call for having clear policies and procedures, which should be periodically reassessed, as well as establishing clear reporting lines, authorities, and responsibilities for significant management activities.

RECOMMENDATIONS

To enhance the accuracy of the company's reporting of its trains' performance on host railroads, we recommend that the Executive Vice President/Chief Operations Officer, in conjunction with the Executive Vice President/Chief Information Officer, take the following actions:

1. Identify and document appropriate time-capture points to measure delays, and reach agreement with host railroads on any changes made to the agreed-to train schedules used as the basis for measuring and reporting delays.

2. Specify in existing policies and procedures the time-capture points to be used as the basis for measuring, calculating, and reporting delays.

3. Establish more effective controls in collecting train movement times and delay causes to ensure that the data are accurate and complete, such as including automatic edit checks in the company's reporting system to identify erroneous and missing data.

4. Strengthen management controls over the collected data by (a) enhancing quality control processes for reviewing the accuracy and completeness of delay data, (b) limiting user access to data systems, (c) adhering to established procedures for maintaining a log of host railroad data disputes, and (d) establishing a management succession plan to minimize the possibility of disruptions in the process used to manage and resolve host railroad challenges to delay data.

MANAGEMENT COMMENTS AND OIG ANALYSIS

In commenting on a draft of this report, the company's Executive Vice President/Chief Operating Officer agreed with our four recommendations and outlined planned actions that, if fully implemented, will address the intent of these recommendations. All planned actions are estimated to be completed by June 30, 2017. The company's planned actions are summarized below.

- **Recommendation 1.** Management agreed with our recommendation to identify and document appropriate time-capture points to measure delays, and to reach agreement with host railroads on any changes made to the agreed-to train

schedules used as the basis for measuring and reporting delays. Management
stated that for time-capture points that do not appear in the schedules, it will
either discontinue use of these time-capture points for delay reporting or add the
time-capture points to the schedules, in cooperation with host railroads.

- **Recommendation 2.** Management agreed with our recommendation to specify in
  existing policies and procedures the time-capture points to be used as the basis
  for measuring, calculating, and reporting delays. Management plans to modify
  its existing policy to require that time-capture points be included in schedules
  agreed to with host railroads.

- **Recommendations 3 and 4 (a).** Management agreed with our recommendation to
  (1) establish more effective controls in collecting train movement times and delay
  causes to ensure that the data are accurate and complete and (2) strengthen
  management controls over the collected data by enhancing quality control
  processes for reviewing the accuracy and completeness of delay data.
  Management noted that it had addressed these two recommendations through
  actions it had taken during our review, including installing automatic edit
  checks, developing a new audit process to identify open delay-reported
  segments, and implementing a dashboard that identifies incomplete reporting
  segments for its quality control desk that has improved the reporting of delay
  data.

- **Recommendation 4 (b)(c)(d).** Management agreed with our recommendations to
  strengthen management controls over the collected data by:

  - **(b)** limiting user access to data systems. Management stated it has
    reviewed user access to train arrival and departure times and will
    revoke access to those users who have no valid business purpose for
    access to the data. It also stated it will continue conducting quarterly
    reviews of employees to validate that access rights are appropriate to
    their job functions.

  - **(c)** adhering to established procedures for maintaining a log of host
    railroad data disputes. Management stated that it will require host
    railroads to use a standard form to submit delay change requests. It

will retain these requests and related correspondence in a dedicated email box to be created.

- o **(d)** establishing a management succession plan to minimize the possibility of disruptions in the process used to manage and resolve host railroad challenges to delay data. Management stated that it will evaluate alternative options and work with senior management to establish an appropriate succession plan.

Management also provided technical comments that we have incorporated in this report as appropriate. For management's complete response, see Appendix C.

APPENDIX A

Scope and Methodology

This report provides the results of our audit to assess the accuracy of the company's reporting of on-time performance and delays for trains operating on host railroad tracks. The scope of our work focused on validating the company's quarterly on-time performance and delay calculations for trains operating on host railroad tracks during CY 2015. Working principally with groups in the Operations and Information Technology departments, we conducted this audit work from January 2015 through December 2016 in Chicago, Illinois, and Washington, D.C.

To assess the accuracy of the on-time performance and delay reporting, we analyzed the company's policies, procedures, and practices for collecting, managing, and reporting on-time performance and delay information. To identify the company's practices, we met with representatives from the Business Operations, Scheduling, Host Railroads, Transportation, and System Operations groups in the Operations and Information Technology departments. To validate the company's data and report calculations, we used Audit Command Language, a data-analysis tool, to perform the following recalculations:

- **On-time performance**. We recalculated quarterly, on-time performance percentages for all 15 long-distance and 24 state-supported routes at the final destinations and compared our results to the company's published quarterly reports for CY 2015.[23] To determine how many trains on each route arrived on time, we used the company's database of scheduled and actual train arrival times, and we applied its business rules for calculating on-time performance. Trains operating on the Northeast Corridor were excluded from this review because they operate on tracks primarily owned by the company, and the scope of this audit was focused on trains operating on host railroad tracks.

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[23] On-time performance describes the percentage of trains arriving at their final destinations within a mileage-based tolerance (5 to 30 minutes). The company also reports on its trains' on-time performance at "all-stations" served. The all-stations on-time performance is calculated in a manner similar to the on-time performance at their final destinations using the same underlying data; therefore, we did no testing of all-stations on-time performance reporting.

- **Delays.** We recalculated the total delay minutes incurred by company trains operating over host railroad tracks for 7 of the 39 long-distance and state-supported routes, and we compared our results to the company's database of total delay minutes for the four quarters of CY 2015. We limited our review to long-distance routes because of the amount of time that would have been required to collect, prepare, and assess optimum run-time data to analyze all train routes. We analyzed 12 trains operating on 6 long-distance routes, and 2 trains operating on 1 state-supported route. We excluded 9 of the 15 long-distance routes because either the company had not yet implemented electronic delay reporting on those routes during a portion of our testing period or because of data integrity issues. We used the company's database of train movement times (arrival and departure times) to calculate and compare the actual run-and-dwell times to the optimum run-and-dwell times detailed in the train schedules the company agreed to with host railroads.

Additionally, to assess the quality of control processes over the on-time performance and delay data, we interviewed officials of external entities, including the Federal Railroad Administration and three major host railroads. We also evaluated controls over identifying and collecting missing on-time performance and delay data, users' access to data systems, and the resolution of challenges by host railroads to the data.

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

Internal Controls

We reviewed management controls by assessing the company's processes and practices for reporting on-time performance and delays for trains operating on host railroad tracks. To understand how on-time performance and delay data were collected, managed, and reported, we reviewed policies and procedures, prepared narratives and a flowchart to document the data and control processes, and interviewed managers and staff from groups in the Operations and Information Technology departments responsible for the reporting. We also assessed the company's quality control processes

used in collecting on-time performance and delay data, users' access to data systems, and resolution of host railroad challenges to the data. We identified internal control weaknesses that are significant in the context of the audit objectives and that contributed to deficiencies cited in this report. This report identifies opportunities for enhancing the company's management controls over delay reporting.

Computer-Processed Data

To achieve our objective, we relied on computer-processed data in the Information Technology department's on-time performance database from January 1, 2015, through December 31, 2015. We validated the reliability of the data we analyzed in the following manner:

- **For train movement times,** we reviewed the company's initial testing of the National Train Activity Monitoring System, which assessed the accuracy of train movement times produced by the system and subsequent system enhancements. We analyzed host railroad challenges of performance data and found that less than 1 percent of the complaints were related to the accuracy of train movement times. We also interviewed five conductors, officials of three major host railroads, and other company officials, who all stated that they have found the automated train movement times to be generally accurate.

- **For scheduled arrival times at final destinations,** we compared the scheduled arrival time contained in the company's database with the published train schedules that the company agreed to with host railroads for all long-distance trains. The scheduled arrival times in the company's database matched the published train schedules in 41 of 42 times reviewed (98 percent).

Based on our assessment, we concluded that the train movement times and scheduled arrival times at the final destination were sufficiently reliable to be used in meeting our objectives. We could not validate the reliability of benchmark, or optimum, run times agreed to with host railroads due to a lack of supporting source documents and because the company sometimes used different time-capture points than those in schedules agreed to with host railroads.

Prior Audit Reports

In conducting our audit, we reviewed and used information from the following OIG report:

- *BNSF On-Time Performance Incentives: Inaccurate Invoices and Lack of Amtrak Management Review Lead to Overpayments* (Report No. 407-2003), September 24, 2010.

APPENDIX B

Comparison of Company and OIG Calculations of Delay Minutes

Quarter 1, CY 2015

Train Number	Calculated Delay Minutes		Difference Between Company and OIG Calculations	
	Company	OIG	Minutes	Percentage
851	2,167	2,368	(201)	(8.5)
29	17,850	19,017	(1,167)	(6.1)
50	5,822	6,130	(308)	(5.0)
51	5,083	5,294	(211)	(4.0)
30	15,135	15,668	(533)	(3.4)
11	21,401	22,139	(738)	(3.3)
850	2,454	2,528	(74)	(2.9)
21	33,101	34,000	(899)	(2.6)
20	12,554	12,796	(242)	(1.9)
14	17,993	18,228	(235)	(1.3)
19	13,061	13,124	(63)	(0.5)
5	19,001	19,085	(84)	(0.4)
6	20,055	19,873	182	0.9
22	34,939	32,395	2,544	7.9

Quarter 2, CY 2015

Train Number	Calculated Delay Minutes		Difference Between Company and OIG Calculations	
	Company	OIG	Minutes	Percentage
21	36,701	38,627	(1,926)	(5.0)
851	2,200	2,309	(109)	(4.7)
51	6,206	6,420	(214)	(3.3)
5	40,492	41,885	(1,393)	(3.3)
29	17,481	18,006	(525)	(2.9)
30	14,533	14,859	(326)	(2.2)
850	2,846	2,899	(53)	(1.8)
20	17,050	17,288	(238)	(1.4)
50	6,950	7,038	(88)	(1.3)
6	50,706	51,331	(625)	(1.2)
19	17,046	17,227	(181)	(1.1)
11	27,837	27,963	(126)	(0.5)
14	22,705	22,700	5	0.0
22	36,920	36,484	436	1.2

APPENDIX B (Continued)

Comparison of Company and OIG Calculations of Delay Minutes

Quarter 3, CY 2015

Train Number	Calculated Delay Minutes		Difference Between Company and OIG Calculations	
	Company	OIG	Minutes	Percentage
51	6,929	138,144	(131,215)[a]	(95.0)[a]
21	36,146	38,645	(2,499)	(6.5)
851	1,603	1,693	(90)	(5.3)
29	16,527	17,442	(915)	(5.2)
30	14,202	14,603	(401)	(2.7)
850	2,540	2,611	(71)	(2.7)
50	7,162	7,349	(187)	(2.5)
20	18,016	18,321	(305)	(1.7)
19	17,535	17,677	(142)	(0.8)
14	27,244	27,384	(140)	(0.5)
11	29,904	29,969	(65)	(0.2)
5	34,789	34,620	169	0.5
6	44,963	44,250	713	1.6
22	36,394	35,366	1,028	2.9

[a] Erroneous data in the company's database of train movement times incorrectly resulted in a significant difference between our and the company's calculations of delays.

Quarter 4, CY 2015

Train Number	Calculated Delay Minutes		Difference Between Company and OIG Calculations	
	Company	OIG	Minutes	Percentage
21	33,013	36,503	(3,490)	(9.6)
22	31,109	33,605	(2,496)	(7.4)
851	1,502	1,582	(80)	(5.1)
850	2,029	2,121	(92)	(4.3)
29	12,385	12,904	(519)	(4.0)
30	11,393	11,755	(362)	(3.1)
50	7,331	7,517	(186)	(2.5)
19	18,343	18,804	(461)	(2.5)
20	17,564	17,957	(393)	(2.2)
51	6,882	7,020	(138)	(2.0)
14	27,003	27,294	(291)	(1.1)
11	31,167	31,461	(294)	(0.9)
5	32,966	32,470	496	1.5
6	34,309	33,010	1,299	3.9

Source: OIG analysis of company database containing on-time performance and delay data

Amtrak Office of Inspector General
**Train Operations: On-Time Performance Reporting Generally Accurate; Additional
Actions Could Enhance Delay Reporting**
OIG-A-2017-007, March 2, 2017

APPENDIX C

Management Comments

NATIONAL RAILROAD PASSENGER CORPORATION

Memo

AMTRAK

Date	*February 13, 2017*	From	*Scot Naparstek, Executive Vice President/Chief Operating Officer*
To	*Stephen Lord, Assistant Inspector General, Audits*	Department	*Operations*
		cc	*Bill Feidt*
			Ghada Ijam
			Chris Jagodzinski
			Bruce Davidson
			Tony Flynn
			Gary Csop
			Jason Moga
			Matthew Gagnon

Subject   *On-Time Performance Reporting Generally Accurate, Additional Actions Could Enhance Delay Reporting* (Audit Report for Project No. 002-2015)

This memorandum provides Amtrak's response to the OIG Audit Report: "*On-Time Performance Reporting Generally Accurate, Additional Actions Could Enhance Delay Reporting*".

We appreciate the efforts and thoughtful evaluation by the entire OIG audit team, and the spirit in which the recommendations are made. We also welcome the ongoing constructive dialogue we have with OIG's representatives.

Thank you for this opportunity to comment on the audit report. As indicated in our responses, we agree with all of the recommendations. We have assigned responsibility to appropriate Amtrak associates to take timely actions to address each recommendation.

Recommendation 1:
Identify and document appropriate time-capture points to measure delays, and reach agreement with host railroads on any changes made to the agreed-to train schedules used as the basis for measuring and reporting delays.

Management Response/Action Plan:
Amtrak agrees with this recommendation. For any time capture points that do not appear in skeleton schedules, Amtrak will either: a) Discontinue use of these time capture points for delay reporting, or b) Add time-capture points to train schedules, in cooperation with host railroads.

Responsible Amtrak Official: Director Scheduling

Target Completion Date: June 30, 2017

Recommendation 2:
Specify in existing policies and procedures the time-capture points to be used as the basis for measuring, calculating, and reporting delays.

NATIONAL RAILROAD PASSENGER CORPORATION

<u>Management Response/Action Plan:</u>
Amtrak agrees with this recommendation. Amtrak will modify Policy 3.21.1 (Recording of Train Delays and On-Time Performance Reporting) to require that in host railroad territory, all time capture points must be included in the schedules agreed to with host railroads.

Responsible Amtrak Official: Director Business Analytics

Target Completion Date: April 30, 2017

<u>Recommendations 3 and 4a:</u>
Establish more effective controls in collecting train movement times and delay causes to ensure that the data are accurate and complete, such as including automatic edit checks in the company's reporting system to identify erroneous and missing data.

Strengthen management controls over the collected data by enhancing quality control processes for reviewing the accuracy and completeness of delay data.

<u>Management Response/Action Plan:</u>
Amtrak agrees with this recommendation.

In November 2015, Amtrak enhanced the validation logic in the eDR application to include automatic edit checks that ensure train movement times are reasonable relative to schedule to prevent illogical conditions that distort lost time calculations (such as transposing AM/PM designations).

In July 2016, Amtrak developed a new audit process for open delay-reporting segments. The process is focusing on identifying significant impact items, namely unrecorded delay causes exceeding 10 minutes, for direct follow up with Conductor supervisors. A second round of follow-ups with supervisors takes place prior to month end closeout.

In addition to automated alerts to prompt Conductors directly to complete their delay reports, a dashboard of all incomplete reporting segments is now available to Amtrak's QC Desk. The Amtrak QC Desk also now has the ability to send targeted reminders to individual Conductors who do not take action.

Following implementation of these improvements, the compliance rate for reporting delay causes when required is 99.75% (based on an analysis of the first 10 days of January 2017). Conductors successfully used eDR to account for 20,167 of the 20,217 segments requiring lost time explanations. Of the remaining 50 segments, 10 segments representing 50% of the unexplained lost time had already been recovered at the time of the analysis (10 days prior to month end close).

Responsible Amtrak Official: Director Business Mobile Systems

Target Completion Date: Complete.

<u>Recommendation 4b:</u>
Limit user access to data systems

<u>Management Response/Action Plan:</u>
Amtrak agrees with this recommendation.

Amtrak has reviewed each user group with access privileges to functions that allow entry of train arrival and departure times. Amtrak will revoke access for all users who do not require such access. The

NATIONAL RAILROAD PASSENGER CORPORATION

remaining users comprise Conductors, Station Agents, and support personnel who have a valid business purpose for this access.

Amtrak will continue to conduct quarterly reviews of employees to validate that access rights are still appropriate to job function, and revoke access when it is no longer needed for an employee's job function.

Responsible Amtrak Official: Director Business Mobile Systems

Target Completion Date: June 30, 2017

Recommendation 4c:
Adhere to established procedures for maintaining a log of host railroad data disputes.

Management Response/Action Plan:
Amtrak agrees with this recommendation. Amtrak will require all host railroads to submit delay change requests using the Delay Change Request Form, which is a running monthly list exchanged with each host railroad showing the host's requests and Amtrak's official responses as requests are closed out. In addition, Amtrak will create a dedicated Delay Change Request email box, which will be accessible to appropriate Amtrak personnel. All correspondence with host railroads regarding change requests, including updates to the Delay Change Request Form, will be kept in this mailbox and retained in accordance with Amtrak's Records Retention Policy. The correspondence in this mailbox will represent the log of host railroad data disputes and resolutions for purposes of Amtrak's Support Process for Handling Delay Data Change Requests.

Responsible Amtrak Official: Director Scheduling

Target Completion Date: April 30, 2017

Recommendation 4d:
Establish a management succession plan to minimize the possibility of disruptions in the process used to manage and resolve host railroad challenges to delay data.

Management Response/Action Plan:
Amtrak agrees with this recommendation and will evaluate alternative options and work with senior management to establish an appropriate succession plan.

Responsible Amtrak Official: Director Scheduling

Target Completion Date: June 30, 2017

APPENDIX D

Abbreviations

COBIT	Control Objectives for Information and Related Technology
COSO	Committee of Sponsoring Organizations of the Treadway Commission
CY	calendar year
GAO	Government Accountability Office
OIG	Amtrak Office of Inspector General
PRIIA	Passenger Rail Investment and Improvement Act of 2008
the company	Amtrak

APPENDIX E

OIG Team Members

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OIG MISSION AND CONTACT INFORMATION

Mission

The Amtrak OIG's mission is to provide independent, objective oversight of Amtrak's programs and operations through audits 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.

Obtaining Copies of Reports and Testimony
Available at our website www.amtrakoig.gov

Reporting Fraud, Waste, and Abuse
Report suspicious or illegal activities to the OIG Hotline
www.amtrakoig.gov/hotline
or
800-468-5469

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