QUALITY OF SERVICE
PROVIDED TO RAIL SHIPPERS

Federal Railroad Administration

Report Number: CR-2011-045
Date Issued: February 15, 2011

Memorandum

U.S. Department of Transportation
Office of the Secretary
of Transportation
Office of Inspector General

Subject: INFORMATION: Report on the Audit of the Quality of Service Provided Rail Shippers Report No. CR-2011-045

Date: February 15, 2011

From: Mitchell Behm
Assistant Inspector General for Rail, Maritime, and Economic Analysis

Reply to Attn. of: JA-50

To: Federal Railroad Administrator

Railroads in the U.S. transport a wide range of goods, from raw materials to consumer goods. However, for a number of years, commodity shippers have had concerns about the quality of the service that railroads provide them. They have complained about a lack of railcars when and where they needed them, delivery of significantly less tonnage than contracted for, and disruptions in services. In 2006, these complaints began to draw greater attention, with Congress and regulatory agencies holding a number of hearings on the issues. Congress then directed the Office of Inspector General (OIG) to examine service disruptions since 2004, and in particular, incidents in which rail carriers failed to make timely shipments of commodities such as coal, wheat, ethanol, and lumber.[1]

The objectives of this audit were to: (1) assess the availability of service guarantees from freight railroads to shippers of coal, wheat, lumber, and ethanol since 2004; (2) assess the quality of service provided to these shippers during the same time period; and (3) identify the causes of deficiencies in service to shippers during this time.

We conducted this audit in accordance with generally accepted government auditing standards. We reviewed internally-held railroad information and publically-available data; interviewed Class I railroad[2] representatives, shippers of coal, wheat, ethanol and lumber, and independent railroad experts; and, met with staff of the Surface Transportation Board (STB). Consistent with the

[1] This requirement was included in Conference Report 110-446, accompanying the Consolidated Appropriations Act of 2008 (P.L. 110-161).

[2] Class I railroads are the largest railroads in the U.S.

congressional request, we limited our scope to data from 2004 through 2009. Exhibit A provides more information on our scope and methodology. We are making no recommendations since the issues pertaining to freight transportation discussed in the report fall under the purview of the STB, an independent entity outside the Department of Transportation.

RESULTS IN BRIEF

Rail service guarantees in general have become more difficult for commodity shippers to obtain, especially through contracts. While tariff-based service options[3] can provide some service guarantees, they are predetermined by the railroads, and only contracts can provide shippers with negotiated guarantees. However, the share of shipments moving under contracts has declined since 2004 for all the commodities we examined. Moreover, when new contracts were negotiated, they generally offered fewer service guarantees than the expired contracts they replaced. As a result, commodity shippers have fewer overall protections against service problems than in the past. The decline in service guarantees may have occurred because railroads experienced adverse consequences from providing them during the most recent economic expansion. In addition, according to documents prepared for investors and railroad experts, some railroads view contracts as limits on their flexibility to adjust their customer mix in order to maximize profits as demand fluctuates.

The quality of freight rail service has varied considerably since 2004, but the railroads make only limited information about the quality of their service available to the public. Service quality[4] was relatively low in 2004 and 2005, and then improved gradually for some railroads in 2006 and 2007, and dramatically for all railroads in 2008 and 2009. We identified this pattern using data on railroads' internal performance measures, and statements by shippers and railroad representatives. Public data on railroad performance, however, is very limited and includes only indirect measures of railroad service quality. Furthermore, no public records are kept on significant service disruptions that result in poor service quality. As a result of these factors, publically-available data is insufficient to monitor service quality.

Demand levels, derailments, and weather events have all driven the fluctuations in rail service quality since 2004. However, dramatic changes in demand for rail service had the greatest impact. Specifically, a surge in demand in 2004 contributed heavily to poor service. Conversely, a drop in demand during the

[3] A railroad tariff is a publication that shows the service terms set by the carrier. At a minimum, tariff-based shipping must be provided by a freight railroad upon "reasonable request" with "reasonable dispatch." .

[4] We relied on many measures, such as on-time percentages and numbers of railcars past expected delivery dates, and many interviews to gauge service quality.

recession of 2008 and 2009 allowed railroads to make significant improvements in the quality of their services. Derailments in the Powder River Basin of Montana and Wyoming caused service problems throughout the country in 2005 and 2006, but especially in western states. Most weather events cause localized service disruptions, but in 2005, a series of extreme events, including Hurricanes Katrina and Rita, hampered rail service delivery in several parts of the country. Given demand's significant role in determining quality, the quality of service provided to commodity shippers can be expected to reemerge as an issue when high demand returns.

This report contains no recommendations.

BACKGROUND

Most freight rail tonnage in the United States is moved by four railroads—Burlington Northern Santa Fe (BNSF) and Union Pacific (UP), which service the western half of the country, and CSXT and Norfolk Southern (NS), which service the east. In 2007, these railroads transported 90 percent of the ton-miles[5] moved by U.S. railroads, and in 2009, they accounted for 90 percent of U.S. railroad revenues. We focused our audit on the services these railroads provided.

The number and nature of commodity shippers served by railroads vary widely by commodity. Wheat shippers number in the thousands and range considerably in size. While most are grain elevator operators, some are large wheat processors or exporters. Electric utilities, who bargain with railroads over shipping arrangements for coal, are relatively few in number. For example, according to BNSF officials, ten customers account for 60 percent of its coal business. Lumber shippers are either lumber producers or brokers supplying large sales outlets.

Shippers of different commodities use rail to differing extents. For example, wheat, coal, and ethanol productions are located far from major markets, and the shipment of those commodities depends almost entirely on rail. Coal, because of its bulk, is transported primarily by long, large-volume trains. Increasingly, wheat also moves in large single-commodity trains. Because shipment sizes and distances to markets tend to be smaller for forest products than for coal and wheat, trucks sometimes provide a competitive shipping alternative to rail for lumber.

Various rail service options exist for commercial shippers, and each makes different provisions for service guarantees. Under tariffs, railroads are only required to provide "reasonable" service. They publically post tariff rates for interested shippers to see, and a shipper that chooses the option accepts the posted tariff by tendering its goods to the railroad for transport. The STB interprets and

[5] A ton-mile is the movement of one ton of cargo the distance of one mile.

enforces this "reasonable" standard of service. A contract, on the other hand, may result from negotiations between a shipper and a railroad, and may incorporate a specific service guarantee with a penalty that applies if the terms of the guarantee are not met. Only a contract offers a shipper the possibility of a negotiated service guarantee. The railroads also make special rate offerings available to wheat and lumber shippers, the terms of which, like tariffs, they publically post and which may include some service guarantees that they have predetermined. In recent years, some railroads have also developed special rate offerings for coal shippers that include commitments, such as to ship minimum volumes.

Shippers of different commodities need different types of service guarantees. Wheat merchants often attempt to obtain guarantees that railcars will arrive at their facilities for loading within promised timeframes, and railroads offer such guarantees through special rate offerings or contracts. Wheat millers attempt to obtain service guarantees through rail contracts to ensure a dependable supply of wheat to their processing facilities. However, no more than 30 percent of wheat shipments moved under contract from 2004 through 2009, the smallest share of any commodity we examined.

Lumber shippers also tend to be most concerned with service reliability, with respect to both availability of equipment for loading and predictability of delivery. Railroads provide these guarantees to lumber shippers through special rate offerings, and may also agree to them in contracts. Since 2004, the majority of lumber shipments have been transported under contracts.

Coal shippers usually seek guarantees covering transit time or cycle time (the time it takes for a train to make the trip from a mine to a utility and back) and monthly volumes delivered. Cycle times are of concern primarily to shippers that use their own train sets, while all utilities need to receive sufficiently large monthly deliveries of coal in order to avoid suspension of operations or having to turn to more expensive fuel sources. Generally, coal shippers negotiate these guarantees into contracts, the option under which the vast majority of coal moves.

It is unclear what service guarantees ethanol shippers would demand if they could obtain them. We found no evidence that railroads have ever extended service guarantees to ethanol shippers, even though a substantial share of ethanol moves under contracts.

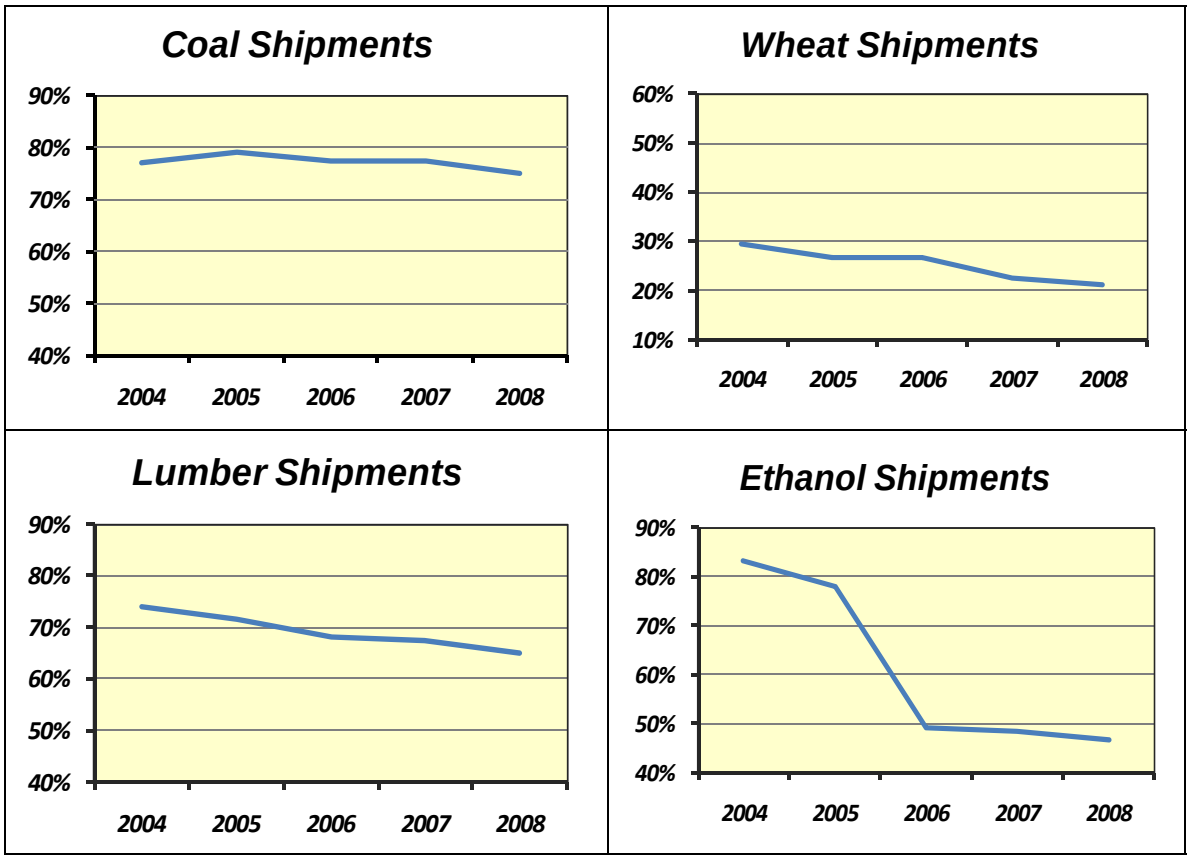
SHIPPERS HAVE DIFFICULTIES OBTAINING GUARANTEES OF SERVICE QUALITY

Today, commodity shippers experience considerable difficulty obtaining service guarantees from the railroads. Those seeking to negotiate service guarantees into contracts encounter the most difficulty. During our study period, railroads have been increasingly reluctant to provide service guarantees, which may be a result of their having experienced adverse consequences from providing them during the most recent economic expansion. In addition, some railroads see contracts as preventing them from having the flexibility they need to adjust their customer mix in order to maximize profits as demand levels change.

A number of coal and lumber shippers, as well as some wheat shippers, have spoken about the difficulty of obtaining service guarantees beyond the minimum standard available under tariffs. Both lumber and wheat shippers have reported reductions in the guarantees provided under special rate offerings. The problem of obtaining service guarantees is most acute, however, for shippers seeking to negotiate contracts.

Since 2004, the share of shipments moving under contracts has declined for all four of the commodities we examined, as shown in Figure 1 on the next page. Grain shippers have reported that most carriers were replacing contract with tariffs during the study period. Many coal and lumber shippers we interviewed stated that, despite their efforts, they have not obtained contracts with their servicing railroads in recent years. In fact, some of these shippers claimed that railroad representatives refused to discuss contracts with them. Our interviews with railroad officials produced mixed evidence on their use of contracts. For example, representatives from one railroad indicated that they had encouraged some customers to use tariffs or special rate offerings instead of contracts during at least part of our study period. However, representatives from other railroads informed us that their willingness to contract with commodity shippers had not changed since 2004.

Figure 1: Share of Shipments by Contract, Fiscal Years 2004 through 2008



Source: STB data

A number of lumber and coal shippers reported a relative lack or total absence of service guarantees in recent contracts. Other coal shippers informed us that railroads tie contract service terms to those available under tariffs or special rate offerings. Since the terms of tariff-based service can change with only 20 days notice, such contracts do not offer fixed guarantees. In coal contracts, railroads now tend to only guarantee volumes to be delivered, and have largely discontinued guarantees of cycle or transit times. One railroad representative characterized new contracts as less punitive to the railroads. Indeed, that railroad's new contracts only allow commodity shippers the option of walking away from the agreement if the railroad fails to perform. Previously, the railroad had to make payments to shippers when it did not meet service guarantees. A representative of another railroad stated that the service guarantees now available from his railroad under contracts are the same as the guarantees under tariffs--"reasonable dispatch."

Coal and lumber shippers that engaged in contract negotiations during our study period characterized the negotiations as "one-sided," with the railroads setting contract terms. Some of these shippers were recently approached by railroad representatives about entering into contracts, but found the railroads to be fairly inflexible in negotiating terms. Since 2004, three of the four railroads in our study have introduced "signature-less," or unilateral contracts that eliminate the negotiation process. The railroads alone determine the terms of these contracts, and consider shippers to have accepted the terms when they tender goods for shipment.

Railroads may have become wary of providing service guarantees, in part because during the most recent economic boom they experienced several adverse consequences as a result of negotiated guarantees. First, railroads had to pay penalties for poor performance contained in service guarantees as traffic levels bumped up against capacity constraints. Second, contractual commitments to commodity shippers limited the amount of higher-profit traffic the railroads could take on when demand surged. As early as 2004, the fact books that one railroad produced for investment analysts addressed this concern, stating that the railroad intended to maintain flexibility to adjust its customer mix in order to maximize yield by moving some customers from contracts to tariffs.

FREIGHT RAIL SERVICE QUALITY HAS VARIED SINCE 2004, BUT PUBLIC INFORMATION ON IT IS LIMITED

The quality of freight rail service was relatively low in 2004 and 2005, improved gradually for some railroads in 2006 and 2007, and jumped to high levels for all railroads during 2008 and 2009. The publically-available data on railroad performance, however, only measures railroad service quality indirectly. Furthermore, no public records are kept on significant service disruptions that may result in poor service quality.

Freight Rail Service Quality Varied Greatly from 2004 through 2009

During our study period, the quality of service for freight rail shippers varied greatly. The most direct indicators of this quality are the railroads' own internally-held performance measures, which the railroads provided to us. Many of those performance measures map directly to the service aspects that shippers are most concerned about. For example, the list of performance measures tracked includes: on-time percentages; numbers of cars past their expected placement dates; cycle times; and transit times. Some railroads also compile indices gauging customer satisfaction.

The railroads' various internal performance measures tell a relatively consistent story. Most indicate that service quality was poor in 2004 and 2005. It appears to

have recovered gradually for some railroads through 2007, then leaped to comparatively high levels for all railroads in 2008 through 2009. Our interviews with commodity shippers and railroad representatives generally confirmed the pattern depicted by the railroads' measures. Shippers highlighted 2004 and 2005 as years of notable problems, and characterized 2008 and 2009 as years in which they received good service. Representatives of some railroads provided similar assessments, with some adding that service gradually improved during 2006 and 2007.

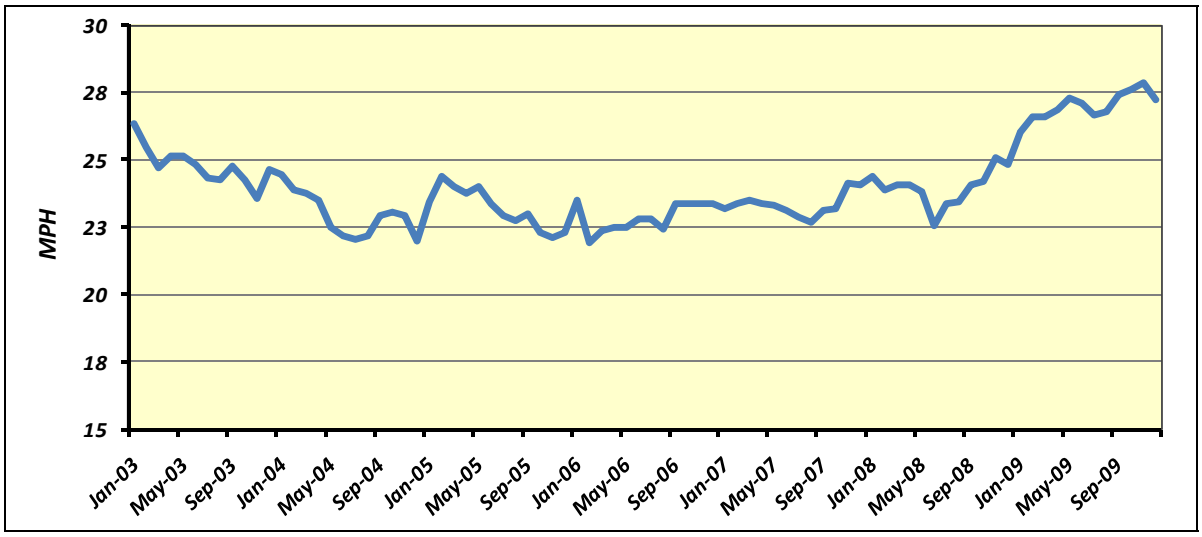
Railroads Make Little Information on Service Quality Available to the Public

While railroads' internal performance measures can provide direct indicators of service quality, public information is limited since published measures of railroad performance relate only indirectly to service quality. The most relevant of the publically-available information measures average train speeds and average time spent at terminals (dwell times)—measures that primarily gauge network performance. Higher train speeds imply that a rail network's traffic moves smoothly, and trains spend less time in terminals when railroad operations are well-coordinated. If the rail network and operations are not functioning well, it is unlikely that shippers are receiving good service. Consequently, low average train speeds and high average terminal dwell times imply that service quality is most likely poor. However, high average train speeds and low average terminal dwell times do not necessarily imply that shippers are receiving good service.

Figures 2 and 3 chart the courses of these two measures for BSNF over our study period. The two measures tell different stories. Both indicate that BNSF's network experienced difficulties in 2004. However, in 2005, terminal dwell times dropped sharply, but train speeds remained low until late 2008. Many factors affect these measures, making it difficult to use the data to monitor service quality. Monitoring is further hampered by an absence of public data on significant service disruptions, which can adversely affect railroad performance[6].

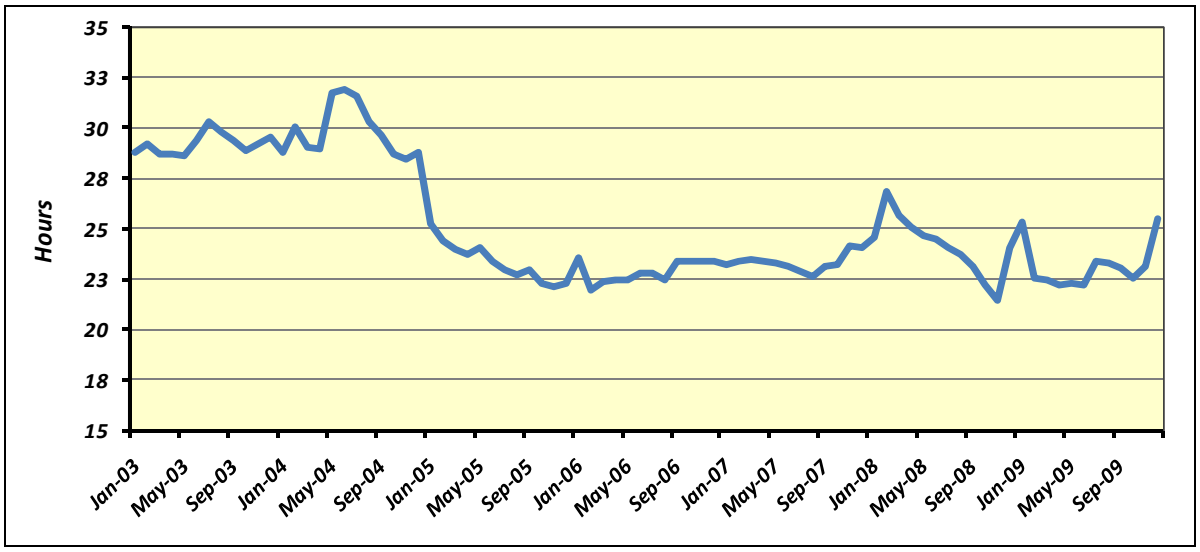
[6] Other studies have reached the same conclusion. See "A Study of Competition in the U.S. Freight Railroad Industry and Analysis of Proposals That Might Enhance Competition," prepared for STB by Laurits R. Christensen Associates, Inc., Madison, WI, November 2008, and "Rail Transportation of Coal to Power Plants: Reliability Issues," Library of Congress, Congressional Research Service, Washington, DC, September 26, 2007.

Figure 2: Average Train Speed - BNSF, January 2003 through December 2009



Source: Association of American Railroads (AAR) data compiled by STB

Figure 3: Average Terminal Dwell - BNSF, January 2003 through December 2009



Source: AAR data compiled by STB

DEMAND FOR SERVICE, DERAILMENTS, AND WEATHER EVENTS DROVE FLUCTUATIONS IN SERVICE QUALITY FROM 2004 THROUGH 2009

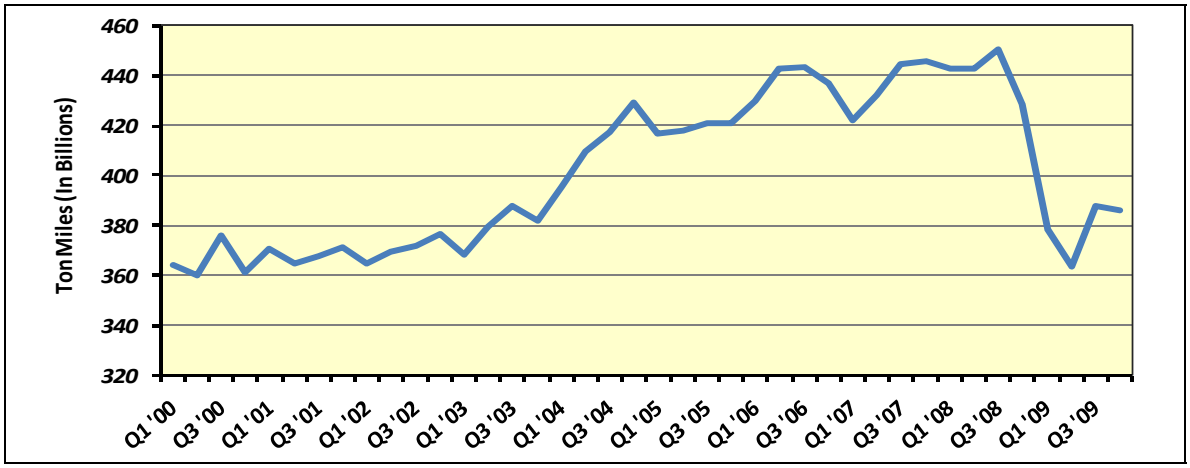
Since 2004, dramatic changes in demand for freight rail service have largely caused the fluctuations in the quality of service reported by shippers. Both rail representatives and shippers cited demand as an important determinant of service quality. Derailments in the Powder River Basin of Montana and Wyoming negatively affected service throughout the country in 2005 and 2006, but most seriously in western states. Extreme weather further hampered service in many locations in 2005.

Both Railroads and Shippers Cited Level of Demand as an Important Determinant of Service Quality

During the study period, striking changes in demand for freight rail service brought about the fluctuations in service quality that shippers experienced. Figure 4 graphs revenue ton-miles–the ton-miles of cargo transported for which railroads receive payment–for Class I railroads for this period.[7] Revenue ton-miles started to rise in 2003, jumped in 2004, and continued to climb into 2008, when they reached record highs as demand grew dramatically. This increase in demand was driven primarily by growth in traffic volumes in the western half of the country. From the last quarter of 2008 through 2009, demand for rail service fell sharply across the country as the economy went into recession, leading to a comparable reduction in revenue ton-miles.

[7] While there are seven Class I railroads, we focused on the four that accounted for 90 percent of Class I railroad revenue ton-miles in 2007.

Figure 4: Revenue Ton Miles - Class I Railroads, January 2000 through December 2009



Source: AAR data

The surge in demand in 2004 contributed significantly to poor service in the early years of the study period. Representatives from several railroads explained that railroads cannot respond quickly to unexpected, substantial growth in demand. They need a minimum of 6 to 9 months to train additional crews, a longer time to purchase rolling stock, and even longer to upgrade infrastructure.

None of the railroad personnel we interviewed anticipated the demand surge. One independent expert stated that railroads remained in cost-cutting mode well into 2004. Indeed, not until March 2004 did Class I railroad employment begin to reverse the downward trend it had exhibited since the late 1990s. An STB representative noted that during the early years of the surge, railroad crews were "timing out," meaning that they reached the limit of their legally-allowed hours of service before other crews became available to replace them. Representatives of one railroad noted that they normally plan for 2 to 4 percent in annual growth, but as early as 2003, demand increased by nearly 12 percent and continued to grow through 2007, forcing the railroad to catch up. The representative of another railroad informed us that the railroad used every switching terminal in its system to handle demand before it peaked. An independent rail expert concurred with these assessments, noting that from 2004 through 2007, the railroad network was "stressed due to excessive demand versus available capacity," and that this stress had a negative impact on service.

Both shippers and railroad representatives we spoke with cited a drop-off in demand as the reason that railroads could improve service quality in 2008 and 2009. None of the shippers we interviewed indicated that they had any service problems in 2008 or 2009. One railroad representative stated that it is "easy to run the railroad" under such low demand.

Derailments in the Powder River Basin and Extreme Weather Also Affected Rail Service Quality

Derailments in the Powder River Basin (PRB) of Wyoming and Montana significantly affected coal deliveries from 2005 through 2006. According to the Energy Information Administration, the PRB is one of the United States' most important coal-producing areas. While PRB coal primarily supplies utilities in the western half of the country, it is also shipped to power plants in the east. In May 2005, two major derailments occurred in the PRB. Remedying the conditions underlying these derailments required replacing the ballast under 90 miles of track, a significant and disruptive undertaking that lasted into 2007. Every coal shipper we interviewed reported that these events affected its service, and both western railroads admitted to service problems in their coal networks after the derailments occurred.

Weather also significantly disrupted rail service during the study period. Usually, the effects of weather events are felt in relatively localized areas. In 2005, however, a series of major events–Hurricanes Katrina and Rita, and flooding on the west coast and in Kansas–tore up or washed out track in several parts of the country. These weather-related disruptions exacerbated existing service problems.

CONCLUSION

Commodity shippers currently receive far fewer protections in the form of service guarantees from freight railroads than in the past. This reduction in service guarantees is significant since service quality can vary considerably, particularly with levels of track congestion. Fewer service guarantees means that commodity shippers are more at risk for experiencing service problems, a risk that will increase with higher demand as the economy revives. Furthermore, railroads offer little data to the public that allows for evaluation of the quality of their services, making it extremely difficult for any government agency to monitor service quality and identify emerging problems.

EXHIBIT A. SCOPE AND METHODOLOGY

The objectives of this audit were to: (1) assess the availability of service guarantees from freight railroads to shippers of coal, wheat, lumber, and ethanol since 2004; (2) assess the quality of service provided to these shippers during the same period; and (3) identify the causes of any deficiencies in service to shippers during this time.

To obtain information to address these objectives, we interviewed: representatives of the four largest railroads; representatives of shipper trade organizations for coal, wheat, lumber, and ethanol; representatives of individual shippers; independent rail experts; and, STB staff. Representatives of the major railroads provided us with presentations that, for the most part, were prepared in response to our questions. We reviewed testimonies from all relevant hearings held since 2004 by congressional committees, the Federal Energy Regulatory Commission, and STB. We also reviewed documentation of all other relevant STB proceedings and the minutes of meetings held by the Rail Energy Transportation Advisory Committee, an adjunct to STB. We reviewed relevant studies and audits.

To obtain further information on the types of service guarantees that freight railroads provided to shippers, we collected data from the railroads on the share of contracts versus tariffs where available, and similar data from STB. We obtained additional information on the quality of service provided to shippers by collecting data on service quality measures from the major railroads and the Association of American Railroads (AAR) data compiled by STB on railroad performance. In support of our investigation of the causes of rail service deficiencies, we obtained data on: the types and geographical distribution of complaints received by STB; rail traffic volumes from AAR; and data on railroad employment from STB.

We conducted our work from November 2008 through January 2011 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 objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

EXHIBIT B. ACTIVITIES VISITED OR CONTACTED

Railroad Experts

William Wilson, Professor, North Dakota State University

Carl Martland, Professor (Retired), Massachusetts Institute of Technology

Randy Resor, Office of the Secretary, U.S. Department of Transportation

Government Agencies

Energy Information Administration

Federal Railroad Administration

Surface Transportation Board

Trade Associations

Edison Electric Institute

National Grain and Feed Association

Forest Products Association of Canada

American Forest & Paper Association

National Rural Electric Cooperative Association

American Public Power Association

Renewable Fuels Association

Rail Shippers

Confidential interviews of fifteen coal utilities

Confidential interviews of four lumber and forest products shippers

Railroads

Norfolk Southern

CSX Transportation

Burlington Northern Santa Fe

Union Pacific

Exhibit B. Activities Visited or Contacted

EXHIBIT C. MAJOR CONTRIBUTORS TO THIS REPORT

Name	Title
Betty Krier	Supervisory Economist/ Program Director
Keith Klindworth	Economist
Sandra Menjivar	Analyst
Susan Neill	Writer/Editor

Figure 1: Share of Shipments by Contract, Fiscal Years 2004 through 2008

Coal Shipments	
Year	**Share (%)**
2004	77
2005	79
2006	77
2007	77
2008	75
Wheat Shipments	
Year	**Share (%)**
2004	30
2005	27
2006	27
2007	22
2008	21
Lumber Shipments	
Year	**Share (%)**
2004	74
2005	72
2006	68
2007	67
2008	65
Ethanol Shipments	
Year	**Share (%)**
2004	83
2005	78
2006	49
2007	48
2008	47

Source: STB Data

Figure 2: Average Train Speed - BNSF, January 2003 through December 2009

Date	MPH
Jan 2003	26.34
May 2003	25.16
Sept 2003	24.75
Jan 2004	24.44
May 2004	22.48
Sept 2004	22.90
Jan 2005	23.43
May 2005	24.03
Sept 2005	22.98
Jan 2006	23.53
May 2006	22.50
Sept 2006	23.40
Jan 2007	23.18
May 2007	23.30
Sept 2007	23.15
Jan 2008	24.38
May 2008	23.84
Sept 2008	24.05
Jan 2009	26.04
May 2009	27.30
Sept 2009	27.40

Source: Association of American Railroads (AAR) data compiled by STB

Figure 3: Average Terminal Dwell - BNSF, January 2003 through December 2009

Date	Hours
Jan 2003	28.78
May 2003	28.60
Sept 2003	29.33
Jan 2004	28.76
May 2004	31.75
Sept 2004	29.60
Jan 2005	25.25
May 2005	24.03
Sept 2005	22.98
Jan 2006	23.53
May 2006	22.50
Sept 2006	23.40
Jan 2007	23.18
May 2007	23.30
Sept 2007	23.15
Jan 2008	24.53
May 2008	24.68
Sept 2008	23.15
Jan 2009	25.30
May 2009	22.30
Sept 2009	23.05

Source: AAR data compiled by STB

Figure 4: Revenue Ton Miles - Class I Railroads, January 2000 through December 2009

Quarter	Ton Miles
Q1 2000	364,063,621,000
Q3 2000	376,029,673,000
Q1 2001	370,383,313,000
Q3 2001	367,728,975,000
Q1 2002	364,915,982,000
Q3 2002	371,861,694,000
Q1 2003	368,389,879,000
Q3 2003	387,603,472,000
Q1 2004	395,609,191,000
Q3 2004	417,287,746,000
Q1 2005	416,723,258,000
Q3 2005	420,956,404,000
Q1 2006	429,821,938,000
Q3 2006	443,578,785,000
Q1 2007	421,798,001,000
Q3 2007	444,282,069,000
Q1 2008	442,522,998,000
Q3 2008	450,620,164,000
Q1 2009	378,299,141,000
Q3 2009	387,472,518,000

Source: AAR Data