

**BEFORE THE
SURFACE TRANSPORTATION BOARD
Finance Docket No. 36873**

**UNION PACIFIC CORPORATION AND UNION PACIFIC RAILROAD COMPANY
—CONTROL—
NORFOLK SOUTHERN CORPORATION AND NORFOLK SOUTHERN
RAILWAY COMPANY**

**Verified Statement
Of Elizabeth M. Bailey, Ph.D.**

April 27, 2026

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1 QUALIFICATIONS, ASSIGNMENT AND SUMMARY OF CONCLUSIONS

1.1 Qualifications

1. My name is Elizabeth M. Bailey. I am a Vice President at Charles River Associates (“CRA”), a global consulting firm that offers economic, financial, and strategic expertise to law firms, corporations, accounting firms, and governments. I have over 20 years of experience in antitrust and competition matters across a wide variety of industries.
2. I have advised clients on mergers and acquisitions proceedings before antitrust regulators in the United States and Canada. My expertise includes a wide variety of industries including trucking, rail, barge, ocean-going cargo tankers and vessels, intermodal containers, coal, oil and natural gas, electricity, consumer retail goods, among many others.
3. I have taught advanced corporate finance to executives at The Wharton School at the University of Pennsylvania and have been a lecturer in the Finance Group at the Haas School of Business at the University of California, Berkeley, and a clinical associate professor at the W.P. Carey School of Business at Arizona State University.
4. I have published articles in the American Economic Review, The Journal of Industrial Organization, Managing IP, and The Electricity Journal, among others. I was a senior editor of the ABA Antitrust Law Section’s Antitrust Law Journal. I have been appointed an editor of other ABA antitrust publications, including the Antitrust Magazine and The Antitrust Source.
5. I hold a BA in Economics and Mathematics from Colgate University and a PhD in Economics from the Massachusetts Institute of Technology. My curriculum vitae is attached

as Appendix A. A list of the materials that I relied upon is attached as Appendix B. I reserve the right to update my opinions as I receive additional information.

1.2 Background and Assignment

6. I have been asked by counsel for Union Pacific Corporation and Union Pacific Railroad Company (collectively referred to as “UP”) to analyze the competitive effects of the proposed merger between UP and Norfolk Southern Corporation and Norfolk Southern Railway Company (collectively referred to as “NS”). The proposed merger between UP and NS (collectively, the “Applicants”) would create a post-transaction integrated railroad (referred to as the “combined railroad”) that connects the western United States to the eastern United States.
7. My assignment in this matter is to evaluate the potential competitive benefits from the proposed merger and to analyze potential losses of horizontal competition.
8. I was also asked to undertake analyses addressing parts of the Surface Transportation Board (“STB”) regulations describing the information that applicants proposing mergers of Class I railroads must provide to the STB.¹ Specifically, I was asked to provide certain data and analyses specified in 49 CFR § 1180.7(b)(2), (3), and (4). These are discussed further in Section 6.

¹ See United States, Code of Federal Regulations, 49 CFR § 1180.7 (“Market analyses”).

9. At my direction, CRA staff assisted me in performing these analyses and preparing this statement. Neither CRA's compensation nor my compensation depends on my opinions or the outcome of this matter.

1.3 Introduction and Summary of Conclusions

10. I find that the combination of UP and NS will result in substantial competitive benefits and greater economic efficiency, and my analysis shows these gains outweigh the limited potential horizontal anticompetitive effects.
11. The limited potential horizontal harm and substantial benefits from the proposed merger make sense, in part, given the structure of the U.S. rail network. UP operates in the West of the United States, while NS operates in the East. UP and NS rail networks connect through the interchange of traffic at several gateways around the Mississippi watershed. Between four and six Class I railroads operate at the gateways around the Mississippi watershed because all Class I railroads meet and interchange traffic in this same geographic area.
12. This rail network structure matters, in part, because it means there are at least two key implications for competitive effects that are confirmed by economic analysis.
13. First, the merger will create single-line services linking customers with parts of the United States that, today, can only be reached by routes requiring connections through multiple railroads. In addition, the benefits of faster, more reliable single-line services will extend beyond existing customers of UP and NS interline services to include customers that divert shipments from truck or other rail services.

14. Second, the limited geographic overlap between UP and NS in a part of the United States that is well served by other Class I railroads limits the scope for potential horizontal competitive harm.
15. The reasons for my conclusion that the combination of UP and NS will result in substantial competitive benefits and greater economic efficiency that outweigh the limited potential horizontal anticompetitive effects are as follows:
16. First, the proposed merger of the Applicants' railroad networks is a predominantly vertical merger with little horizontal overlap. I explain this further in Section 2.
17. Second, combining these complementary networks would likely generate benefits for customers, potentially affecting over 2.831 million loaded cars and intermodal container units ("carloads") every year.² I explain this further in Section 3.
18. One component of this overall figure comes from potential benefits for customers affecting the approximately 877,000 carloads that UP and NS interchanged in 2023. The combined railroad will replace these interline services with single-line ones. I find that the combined railroad will be more likely to make operating improvements, offer more competitive service, and ensure reliable service on these routes than UP and NS would absent the merger.
19. In addition, customers served by other railroads would also be expected to benefit because those other railroads would likely respond to the presence of faster, more reliable single-line service from the merged railroad. Therefore, 877,000 carloads is an underestimate of the

² 877,000 carloads on UP/NS interline routes + 1.954million carloads diverted to the combined railroad = 2.831 million.

number of carloads that would benefit from the single-line services offered by the combined railroad. I explain these points further in Section 3.1.

20. The second component of the overall benefit figure is from customers that switch to the improved single-line services from truck or from other rail services. The Applicants estimate that approximately 1.954 million carloads would be diverted, and it is appropriate to include them in my estimate of the scope for potential benefits.
21. Third, compared to the expected pro-competitive benefits of the proposed merger, there is limited scope for harm from the loss of horizontal competition between UP and NS. I consider three types of competition and find:
22. **Access to customers.** The merger will not materially reduce access to customer facilities or to BEAs.
 - a. I find only five customer facilities (of which only two are currently active) that are currently served only by UP and NS and that would potentially be served by only one railroad after the merger. I understand that the Applicants have offered commitments that would preserve rail competition for these customer facilities. Even without these commitments, the proposed merger would impact only {{ }} carl[REDACTED] these customer facilities. I explain this further in Section 4.2.
 - b. There is no BEA for which the proposed merger will result in the number of railroads changing from 2-to-1 or 3-to-2, either when considering traffic originating at the BEA, or terminating at the BEA. I explain this further in Section 4.2.
23. **Within-corridor competition.** There is limited scope for competitive harm to transport freight across overlapping parts of the same corridor. There are more than one thousand

BEA-BEA corridors where both UP and NS operate. Of these, I find no corridors where there would be a loss of competition from a reduction from 2-to-1 in the number of railroads operating on overlapping segments of the corridor. There are at most 15 corridors where there might be competitive harm from a reduction in the number of railroads operating on overlapping segments of the corridor from 3-to-2, and at most {{[REDACTED]}} carloads of freight on these 15 corridors in 2023 that might experience competitive harm. I explain this further in Section 4.3.

24. **Between-corridor competition.** There is limited scope for competitive harm from the loss of source and destination competition. The analysis initially flags {{[REDACTED]}} total carloads for additional review. Further analysis similar to that used in reviewing other rail mergers unflags all of these carloads. I explain this further in Section 4.4.

1.4 Materials Responsive to STB Regulation 49 CFR § 1180.7(b)(2), (3) and (4)

25. In addition to conducting an assessment of the benefits and the scope for potential harm from a loss of horizontal competition, I provide certain data and analyses responsive to STB regulation 49 CFR § 1180.7(b)(2), (3) and (4) as discussed in Section 6. In accordance with the Board’s regulations, the data reported in Appendices D, E, and F are restricted to major points on the parties’ combined system, major corridor-commodity pairs, and major origin-commodity pairs / major destination-commodity pairs. *No such restriction* is applied to any other analyses that are discussed throughout this statement as my competitive assessment of the benefits and the scope for potential harm from a loss of horizontal competition. In addition, I understand that the STB requested that Applicants provide projected market share

data that are consistent with the projected traffic diversions performed for Applicants by David Hunt, which are separately provided in his Verified Statement.

* * *

26. The remainder of my statement explains these conclusions in greater detail and provides the facts and details that support them.

2 OVERVIEW OF THE INDIVIDUAL AND COMBINED RAILROADS

27. In this section of my statement, I briefly describe the current operations of UP and NS railroads, the limited amount of horizontal overlap between the two railroads, and the expanded transcontinental reach of the proposed combined railroad. I also discuss the competition that these railroads currently face and will continue to face after the proposed merger.

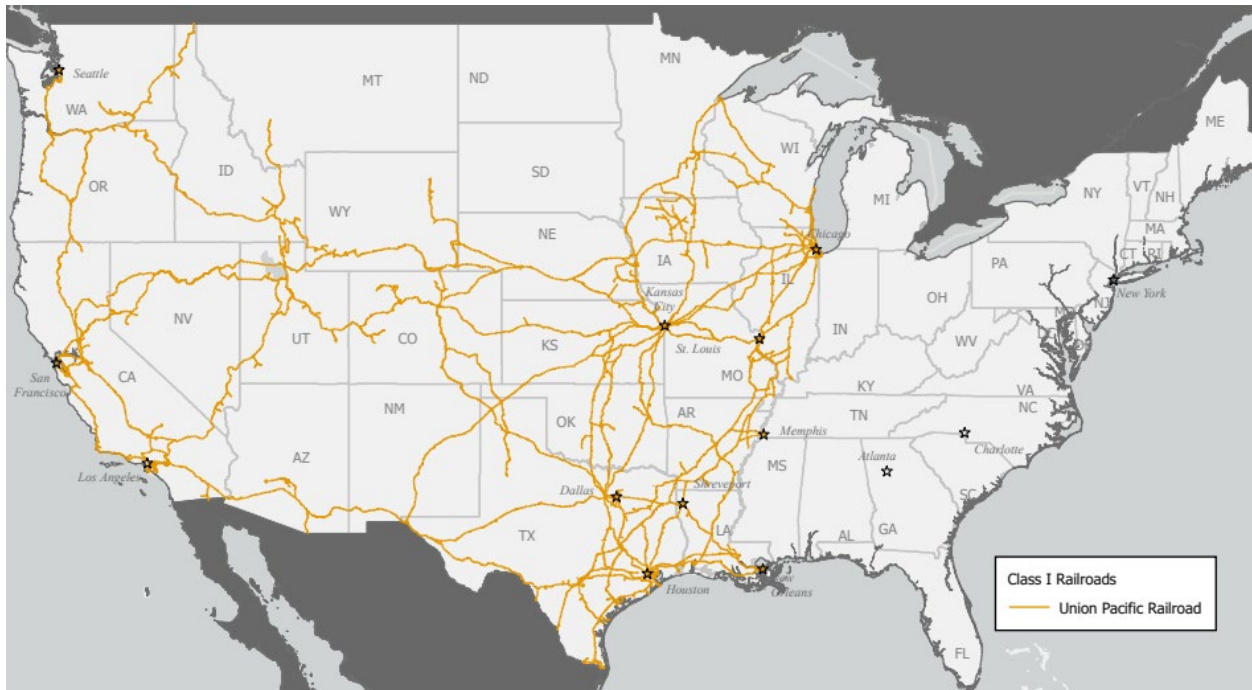
2.1 Individual UP and NS Railroads

28. UP’s rail network spans approximately 33,000 route miles and serves 23 states in the western and central United States.³ UP “serves many of the fastest-growing U.S. population centers, operates from all major West Coast and Gulf Coast ports to Eastern gateways, connects with

³ See Union Pacific, “Company Overview,” available at https://www.up.com/aboutup/corporate_info/uprover/index.htm (accessed April 16, 2026); UP owns over 26,000 route miles and operates the approximately 6,600 remaining route miles via trackage rights or leases. See Union Pacific Corporation, 10-K, Fiscal Year Ended December 31, 2025 (“UP 10-K 2025”), at p. 22.

Canada’s rail systems, and is the only railroad serving all six major Mexico gateways.”⁴ UP is headquartered in Omaha, Nebraska.⁵ Exhibit 1 shows the UP railroad map.⁶

Exhibit 1: UP Railroad Map



Source: Surface Transportation Board, “Railroad Map Depot,” available at <https://www.stb.gov/resources/railroad-map-depot/> (accessed November 20, 2025).

29. NS’s rail network spans approximately 19,000 route miles and serves 22 states in the eastern portion of the country.⁷ It connects the Southeast, East, and Midwest of the United States

⁴ See UP 10-K 2025 at p. 5.

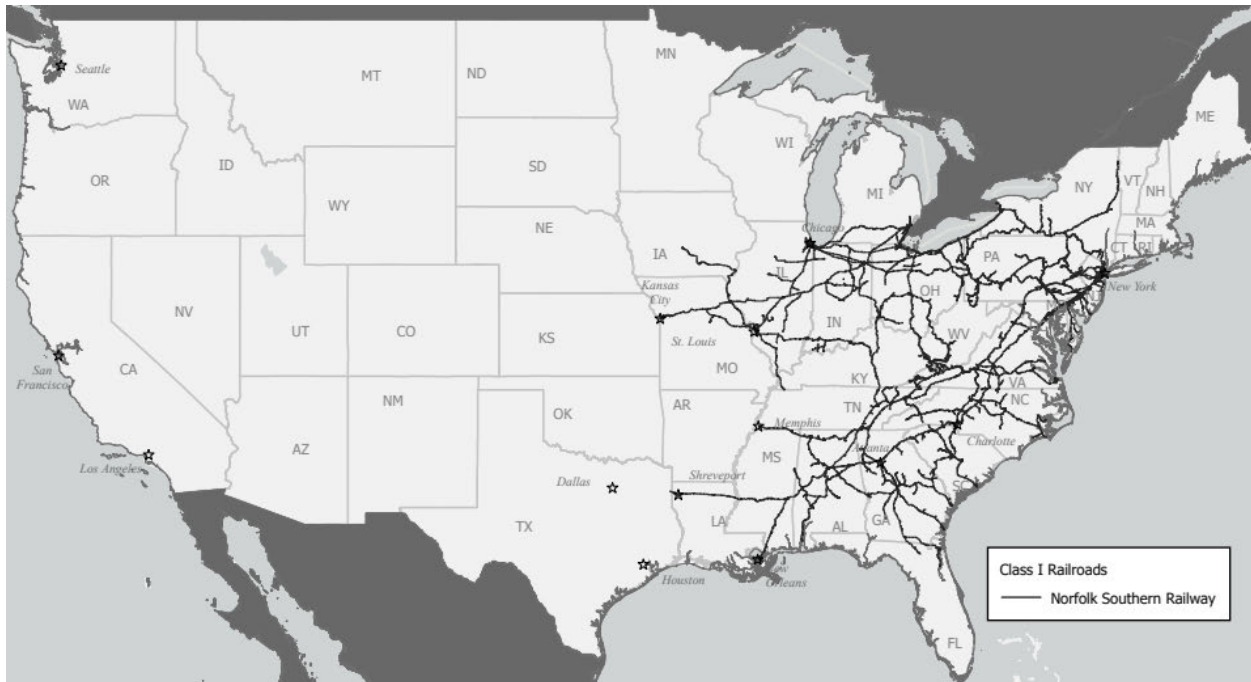
⁵ See UP 10-K 2025 at p. 22.

⁶ The map identifies selected cities with a star marker.

⁷ NS also serves the District of Columbia. NS owns approximately 14,500 route miles and operates under lease, contract, or trackage rights another 4,500 route miles. See Norfolk Southern Corporation, 10-K, Fiscal Year Ended December 31, 2025 (“NS 10-K 2025”), at K3-K5.

and includes rail lines to and from several Atlantic and Gulf Coast ports.⁸ NS is headquartered in Atlanta, Georgia.⁹ Exhibit 2 shows the NS railroad map.

Exhibit 2: NS Railroad Map



Source: Surface Transportation Board, “Railroad Map Depot,” available at <https://www.stb.gov/resources/railroad-map-depot/> (accessed November 20, 2025).

30. Both UP and NS are Class I freight railroads.¹⁰ They provide rail freight service along with four other Class I freight railroads operating in the U.S.: BNSF Railway (“BNSF”), Canadian National Railway (“CN”), Canadian Pacific Kansas City (“CPKC”), and CSX

⁸ See NS 10-K 2025 at K3.

⁹ See NS 10-K 2025 at K3.

¹⁰ Class I railroads are the largest railroads in the United States. In 2024, Class I railroads are those with annual operating revenues of at least \$1,074,600,816. See Surface Transportation Board, “Economic Data,” available at <https://www.stb.gov/reports-data/economic-data/> (accessed October 28, 2025) (“STB Economic Data”). In 2024, UP’s and NS’s gross freight revenues were \$24.1 and \$12.1 billion, respectively. See Surface Transportation Board, “Freight Commodity Statistics,” 2024, available at <https://www.stb.gov/reports-data/economic-data/freight-commodity-statistics/> (accessed November 19, 2025) (“STB Freight Commodity Statistics”) (QCS-UP-2024.xlsx, sheet “QCS_Annual,” cell AB481; QCS-NS-2024.xlsx, sheet “QCS Page 12,” cell L18).

Transportation (“CSXT”) (collectively, there are six “Class I railroads”).¹¹ Like UP, NS, and other Class I railroads, Class II and Class III short line railroads also provide rail freight services.¹²

31. Exhibit 3 shows 2024 volume (by carloads¹³ and tons) and gross freight revenue for each Class I railroad in the U.S. In 2024, UP transported 8.3 million carloads, earning \$24.1 billion in freight revenues¹⁴ and NS transported 7.1 million carloads, earning \$12.1 billion in freight revenues.¹⁵ According to annual reports published by UP and NS, in 2023 UP transported approximately 8.1 million carloads and NS transported approximately 6.7 million carloads.¹⁶

¹¹ See U.S. Department of Transportation Federal Railroad Administration, “Freight Rail Overview,” available at <https://railroads.dot.gov/rail-network-development/freight-rail-overview> (accessed October 28, 2025) (“U.S. Department of Transportation Freight Rail Overview”). Kansas City Southern Railway and Canadian Pacific completed their merger in 2023 and are now known as Canadian Pacific Kansas City. See Canadian Pacific Kansas City, “About CPKC,” available at <https://www.cpkc.com/en/about-cpkc> (accessed October 28, 2025).

¹² The other types of railroads are Class II and Class III, which are also classified based on the annual operating revenues of the railroad. See STB Economic Data. As of 2025, there are 22 regional railroads and 584 local/short line railroads in the United States. See U.S. Department of Transportation Freight Rail Overview.

¹³ Most of the analyses concern loaded movements. Some commodities are transported in intermodal containers and a freight railcar may carry more than one intermodal container unit at once. For such shipments, I count each intermodal container rather than the freight railcar that carries it. Accordingly, for the purposes of my analyses, I treat loaded railcars and individual intermodal container units equivalently, and throughout this statement I use the term “carloads” to refer to the total of loaded railcars plus loaded individual intermodal container units.

¹⁴ STB Freight Commodity Statistics (QCS-UP-2024.xlsx, sheet “QCS_Annual,” cells T481 and AB481).

¹⁵ STB Freight Commodity Statistics (QCS-NS-2024.xlsx, sheet “QCS Page 12,” cells J18 and L18).

¹⁶ Union Pacific Corporation, 10-K, Fiscal Year Ended December 31, 2023, at p. 27; Norfolk Southern, “Annual Report,” 2023, at K26.

Exhibit 3: Class I Railroads’ Carloads, Tons, Mileage, and Gross Revenues in 2024

Company	Carloads (000)	Tons (000)	Mileage Operated (000)	Gross Freight Revenue (000)
BNSF	9,589	486,590	33	\$24,126,994
UP	8,334	451,217	33	\$24,135,427
NS	7,094	320,045	19	\$12,143,528
CSX	6,190	342,916	20	\$13,147,519
GTC (CN)	2,254	171,136	5	\$3,457,229
SOO/KCSR (CPKC)	1,910	135,810	8	\$3,561,929
Total	35,371	1,907,714	118	\$80,572,625

Notes:

Gross freight revenue, carloads, and tons figures include less-than-container loads. Carloads and tons figures are for total revenue freight carried. Data for CN and CPKC were published by Grand Trunk Corporation (“GTC”) (for CN) and Soo Line Railroad Company (“SOO”)/Kansas City Southern Railway Company (“KCSR”) (for CPKC). CN and CPKC data are limited to U.S. operations. Mileage operated is limited to U.S. mileage.

Sources:

Surface Transportation Board, “Freight Commodity Statistics,” 2024, available at <https://www.stb.gov/reports-data/economic-data/freight-commodity-statistics/> (accessed November 19, 2025) (QCS-BNSF-2024.xlsx, sheet “QCS Page 12,” cells J18, K18, and L18; QCS-UP-2024.xlsx, sheet “QCS_Annual,” cells T481, W481, and AB481; QCS-NS-2024.xlsx, sheet “QCS Page 12,” cells J18, K18, and L18; QCS-CSX-2024.xlsx, sheet “ACS,” cells J487, K487, and L487; QCS-GTC-2024.xlsx, sheet “QFCS,” K637, L638, and M638; QCS-SOO-KCSR-2024.xlsx, sheet “CPKC - QCS,” cells N424, O424, and P424). Surface Transportation Board, “Annual Report Financial Data,” 2024, available at <https://www.stb.gov/reports-data/economic-data/annual-report-financial-data/> (accessed November 19, 2025) (R1-BNSF-2024.xlsx, sheet “702,” cells J14-J16, J18-J25, J27-J36, and J38-J44; R1-UP-2024 Sch 702 Final.xlsx, sheet “702,” cell J46; R1-NS-2024.xlsx, sheet “702,” cell J17 and J19-J41; R1-CSX-2024 Sch 702 Final.xlsx, sheet “702,” cell J45; R1-GTC-2024.xlsx, sheet “702-P64,” cell J45; R1-SOO-KCSR-2024.xlsx, sheet “64 S702,” cell Q49). GTC was created by CN in 1970, *see* Trains, “Canadian National merger family tree,” available at <https://www.trains.com/trn/railroads/history/canadian-national-merger-family-tree/> (accessed November 19, 2025). Soo Line Railroad Company and the Kansas City Southern Railway Company are wholly-owned subsidiaries of CPKC, *see*, Canadian Pacific Kansas City, “Annual Report,” 2024 at p. 47. *See* worksheet “Exhibit 3.xlsx.”

2.2 Combined Railroad

32. The proposed merger of UP’s and NS’s railroad networks would create a unified transcontinental network, the only one of its kind in the United States.¹⁷ Because of the limited horizontal overlap between UP’s and NS’s railroad networks, this is a largely end-

¹⁷ *See* Union Pacific, “Union Pacific and Norfolk Southern to Create America’s First Transcontinental Railroad,” available at <https://www.up.com/press-releases/growth/norfolk-southern-transcontinental-nr-250729> (accessed October 28, 2025) (“UP and NS to Create America’s First Transcontinental Railroad”).

to-end, vertical merger of railroads that meet at several interchanges near the center of the continental United States. The combined network would stretch from Seattle, San Francisco, and Los Angeles to the Northeast and Mid-Atlantic regions, as well as southeast to cities such as Atlanta and Jacksonville.¹⁸ It would also encompass rail lines in the center of the country from Minneapolis, Chicago, and Detroit in the north, to Dallas, Houston, and the United States-Mexico border in the south.¹⁹ The proposed combined railroad would connect over 50,000 route miles across 43 states, linking the West Coast to the East Coast of the United States.²⁰ As a result, the combined railroad network would connect major ports, border crossings, and railroad hubs providing customers and consignees the option of a new single-line railroad service between points in the eastern and western United States that today can be served only by interline service. New single-line service will benefit customers by creating efficiencies that cannot otherwise be achieved without the proposed merger.²¹

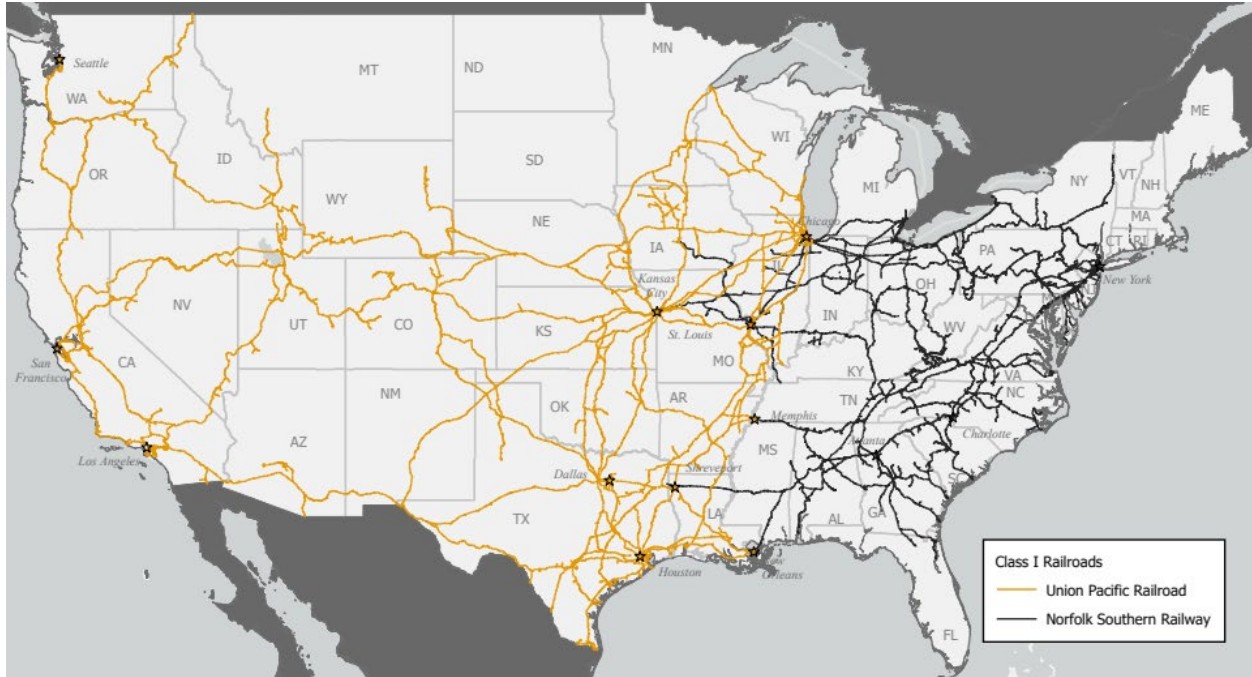
¹⁸ See Exhibit 4.

¹⁹ See Exhibit 4.

²⁰ See UP and NS to Create America's First Transcontinental Railroad.

²¹ See Section 3 for further discussion.

Exhibit 4: Combined Railroad (UP + NS) Map



Source: Surface Transportation Board, “Railroad Map Depot,” available at <https://www.stb.gov/resources/railroad-map-depot/> (accessed November 20, 2025).

2.3 Geographic Overlaps Between the UP and NS Railroads Are Limited

33. As discussed earlier in Section 2.1, UP and NS mostly serve distinct geographic areas, with little horizontal overlap between the UP and the NS railroad networks.
34. The primary horizontal geographical overlap between UP’s and NS’s railroad networks is in just four states—Illinois, Iowa, Missouri, and Louisiana—with a small additional horizontal overlap in Memphis, TN. Exhibit 4 shows the states that UP and NS railroads run through and which of these states are common to both.
35. When assessing competitive horizontal overlaps, I first review the geographic areas where the networks of UP and NS are both present. I consider the STB’s BEA areas, which represent areas that are considered economically integrated by the U.S. Department of

Commerce, Bureau of Economic Analysis.²² BEAs do not follow the same geographic boundaries as states and some BEAs are part of two or more states.²³ There are 172 BEAs in the United States,²⁴ and 168 of them where at least one Class I railroad operates.²⁵ UP operates in 80 BEAs and NS operates in 74 BEAs, but they both operate in only 10 BEAs.²⁶ Exhibit 5 is a map of the BEAs in the United States identifying which BEAs are served by UP, which are served by NS, and which are served by both UP and NS.²⁷

²² Prior railroad transactions also conducted economic analyses at the BEA level. *See* Verified Statement of W. Robert Majure, “Canadian Pacific Railway Limited, et al. – Control – Kansas City Southern, et al.,” Finance Docket No. 36500, October 29, 2021, (“Majure VS”). *See also*, Verified Statement of Christopher A. Vellturo, “An Analysis of the Competitive Effects of the Proposed Combination of the Canadian National and Wisconsin Central Railroads,” April 6, 2001 (“Vellturo 2001 VS”) and Verified Statement of Christopher A. Vellturo, “Canadian National Railway Company and Grand Trunk Corporation – Control – EJ&E West Company,” Finance Docket No. 35087, October 29, 2007 (“Vellturo 2007 VS”).

²³ *See*, for example, the Chicago-Gary-Kenosha, IL-IN-WI; New Orleans, LA-MS; and Reno, NV-CA BEAs. *See* Railinc, “2023 Surface Transportation Board Carload Waybill Sample Reference Guide,” March 5, 2025, available at <https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf> (“2023 STB CWS Reference Guide”), at pp. 83-84.

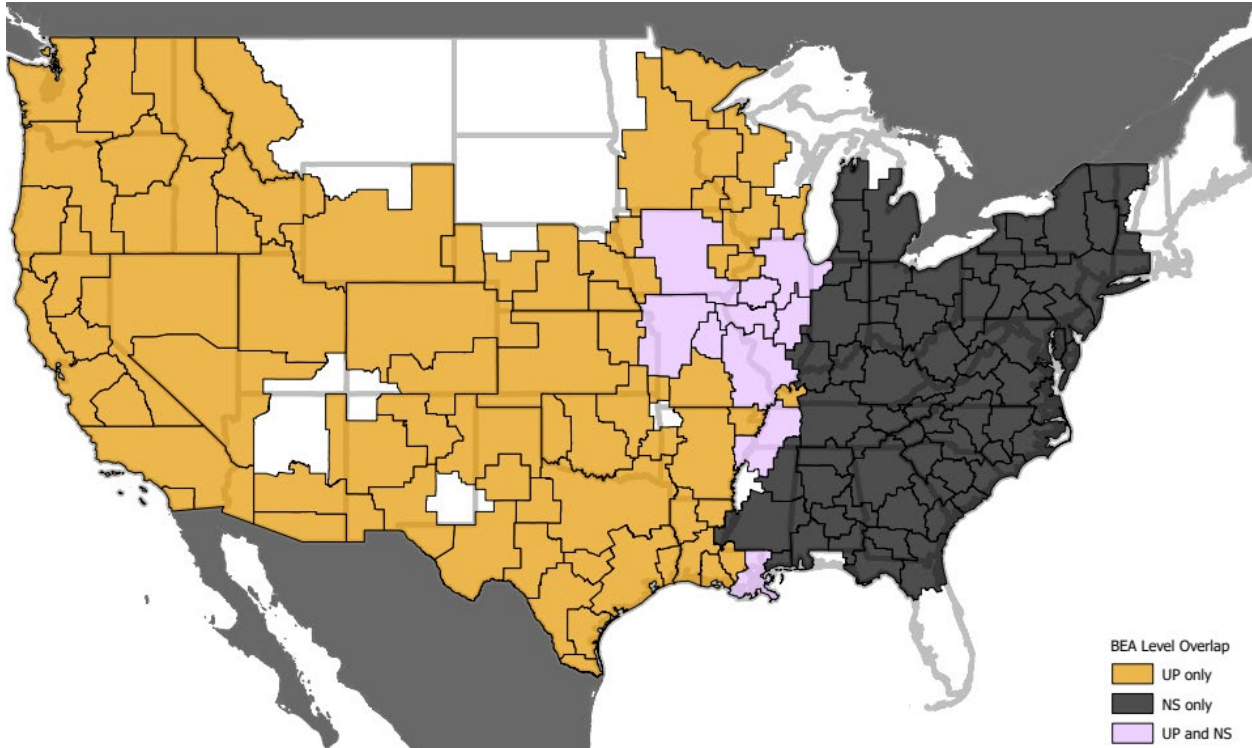
²⁴ The 2023 STB CWS Reference Guide defines 172 BEAs in the United States. *See* Table 4-4 “STB BEA Codes” in 2023 STB CWS Reference Guide at pp. 83-85.

²⁵ A BEA is reported as being served by a Class I railroad if a Class I railroad has a freight station in the BEA. *See* In-text calculation workpapers. There are two BEAs listed in STB’s CWS Reference Guide that do not correspond to any SPLC in the file 1-A-Raw_UPRR_AAR_Station_Master.txt (“Railinc Station Master”): Honolulu, HI and Farmington, NM-CO. The horizontal geographic overlap analysis based on where freight stations are located may differ from that based on the combined waybill data discussed in Section 4. These differences are likely attributable to at least two reasons: first, the combined waybill data provide only routes that are used and second, the waybill data for Class II and Class III railroads from the CWS represent only a sample of their freight rail movements as opposed to the full universe of such movements.

²⁶ *See* In-text calculation workpapers.

²⁷ Even though UP and NS both interchange in Shreveport, LA, NS neither serves Shreveport nor operates there. NS has haulage in Shreveport for interchange only. For this reason, the Shreveport-Bossier City, LA-AR BEA is not considered a BEA where UP and NS both operate. NS has a “longstanding agreement” with CPKC in which “NS has rights to use the Meridian Speedway, which connects with UP in Shreveport and NS in Meridian. Under the agreement, UP and NS can commercially interchange intermodal traffic at Shreveport, with CPKC providing the transportation between Shreveport and Meridian.” *See* the Joint Verified Statement of Eric Gehringer and John F. Orr, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873, (“Gehringer-Orr VS”), at ¶ 175.

Exhibit 5: Map of BEAs Served by UP or NS



Sources: See workpaper “Exhibit 05.do.”

2.4 UP and NS Overlaps Are Limited to the Central Region of the United States

36. As discussed above, UP and NS both operate in the Midwest and south-central regions of the United States where the two railroads connect. The horizontal overlap between UP and NS is limited to the central region of the US, regardless of whether one considers the UP and NS railway networks or the common BEAs. There will continue to be competition in the geographic areas served by both UP and NS post-merger because at least two other Class I railroads operate in all of these areas.²⁸

²⁸ See In-text calculation workpapers.

37. Exhibit 5 shows the 10 BEAs where UP and NS both operate. In each of the 10 BEAs where UP and NS both operate, there are at least two additional Class I railroads that serve the BEA. Indeed, five of these 10 BEAs are served by all six Class I railroads, and another three are served by five Class I railroads.²⁹
38. In addition, within the BEAs where both UP and NS operate, UP and NS currently have five main points of traffic interchange where freight is transferred between the two railroads. After the proposed merger, these interchange points will become points of vertical integration and will create single routes from pre-merger interline routes. These interchange points are Chicago, IL; St. Louis, MO; Kansas City, MO; Memphis, TN; and New Orleans, LA.³⁰ All six Class I railroads serve three of these five interchange points – Chicago, St. Louis, and New Orleans. Five Class I railroads serve Memphis, four serve Kansas City. Exhibit 6 summarizes this information.

²⁹ See In-text calculation workpapers.

³⁰ See Gehringer-Orr VS at ¶ 152.

Exhibit 6: Class I Railroads Serving Main UP/NS Interchange Locations

Location	Number of Class I Railroads	UP	NS	BNSF	CN	CPKC	CSXT
Chicago, IL	6	Y	Y	Y	Y	Y	Y
New Orleans, LA	6	Y	Y	Y	Y	Y	Y
St. Louis, MO	6	Y	Y	Y	Y	Y	Y
Memphis, TN	5	Y	Y	Y	Y		Y
Kansas City, MO	4	Y	Y	Y		Y	

Notes: Whether a Class I railroad has a presence in each city is identified by SPLC (Standard Point Location Code). Chicago, IL is identified by SPLC 380000. St. Louis, MO is identified by SPLC 567500. Kansas City, MO is identified by SPLC 566900. Memphis, TN is identified by SPLC 439900. New Orleans, LA is identified by SPLC 647000. Railroad providers are identified by unique SCACs (Standard Carrier Alpha Code). Shreveport, LA is excluded from this table because NS has haulage for interchange at this location but it neither serves nor operates there.

Sources: See workpaper “Exhibit 6.xlsx.” Main interchange locations are identified in Gehringer-Orr VS at ¶152.

39. To summarize, although UP and NS are large railroad networks that cover significant portions of the United States, their points of horizontal overlap are limited, confined to the central region of the United States. The Applicants are never the only two Class I railroads in the BEAs in which they both operate, and at least two other Class I railroads will continue to serve each of these BEAs post-merger.³¹

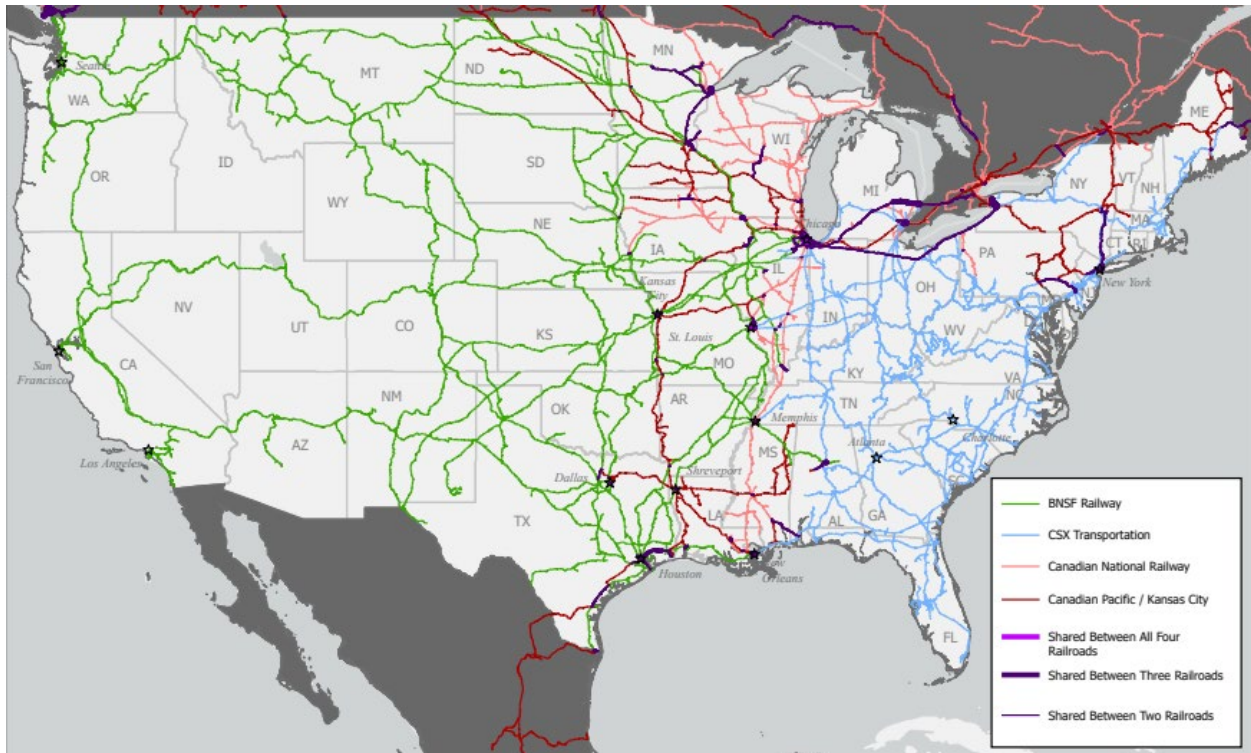
2.5 Horizontal Competition

40. As discussed earlier, in addition to UP and NS, there are four other Class I railroads in the United States: BNSF, CN, CPKC, and CSXT. The map in Exhibit 7 shows that these four Class I railroads have a combined network that spans the United States. Exhibit 7 shows BNSF routes in green, CN routes in pink, CPKC routes in dark red, and CSXT routes in blue. BNSF’s railroads span the western United States. CN’s and CPKC’s railroads each connect the northern and southern portions of the central United States and extend through

³¹ See In-text calculation workpapers.

Canada. CPKC connects Canada to Mexico. CPKC also has some routes in the northern portion of the eastern United States. CSXT's railroads cover the eastern United States.

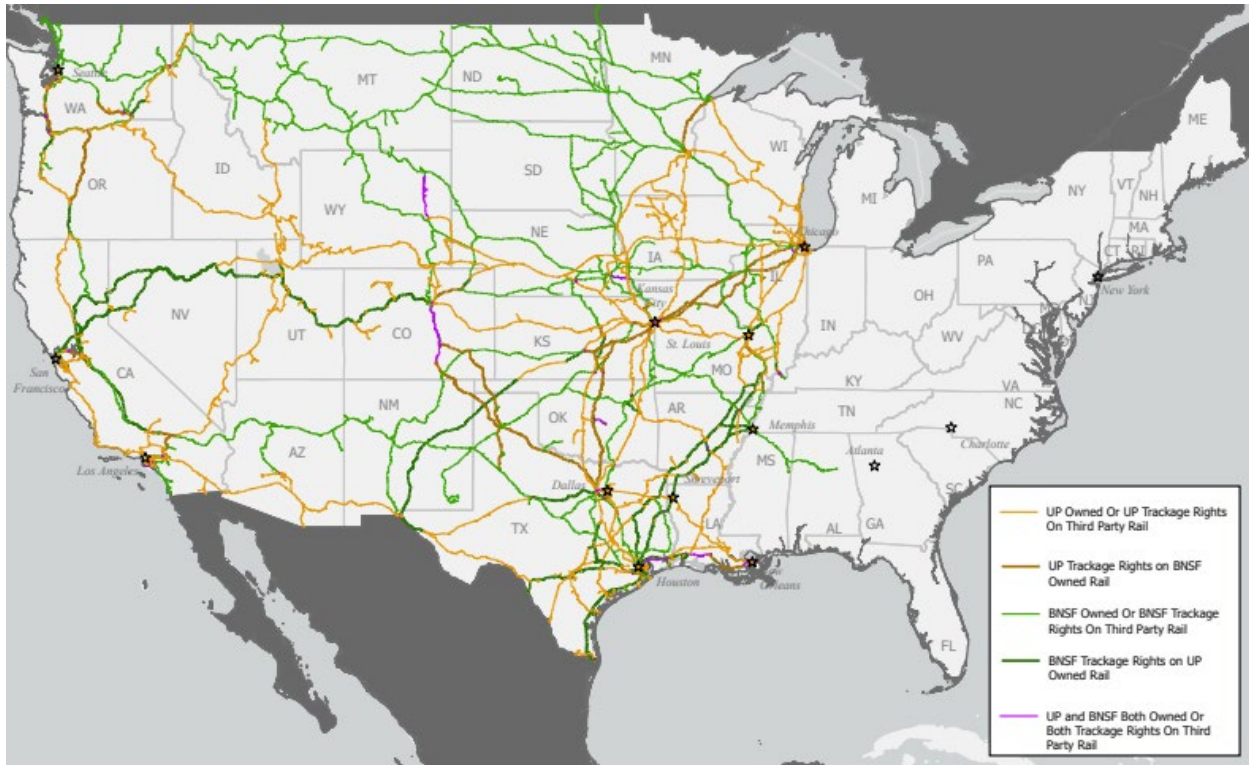
Exhibit 7: BNSF, CN, CPKC, and CSXT Railroad Routes Map



Source: Surface Transportation Board, “Railroad Map Depot,” available at <https://www.stb.gov/resources/railroad-map-depot/> (accessed November 20, 2025).

41. BNSF operates largely in the same geographic area as UP. The map in Exhibit 8 shows that both BNSF and UP operate on rail lines spanning the western portion of the country. The lighter shades of green and yellow represent rail lines that BNSF and UP respectively own or have a right to operate on per agreements with third-party railroads (i.e., all other railroads other than BNSF and UP). The darker shades of green and yellow represent rail lines that UP and BNSF respectively own but on which the other party can operate. Routes in purple represent rail lines owned or operated on by both BNSF and UP.

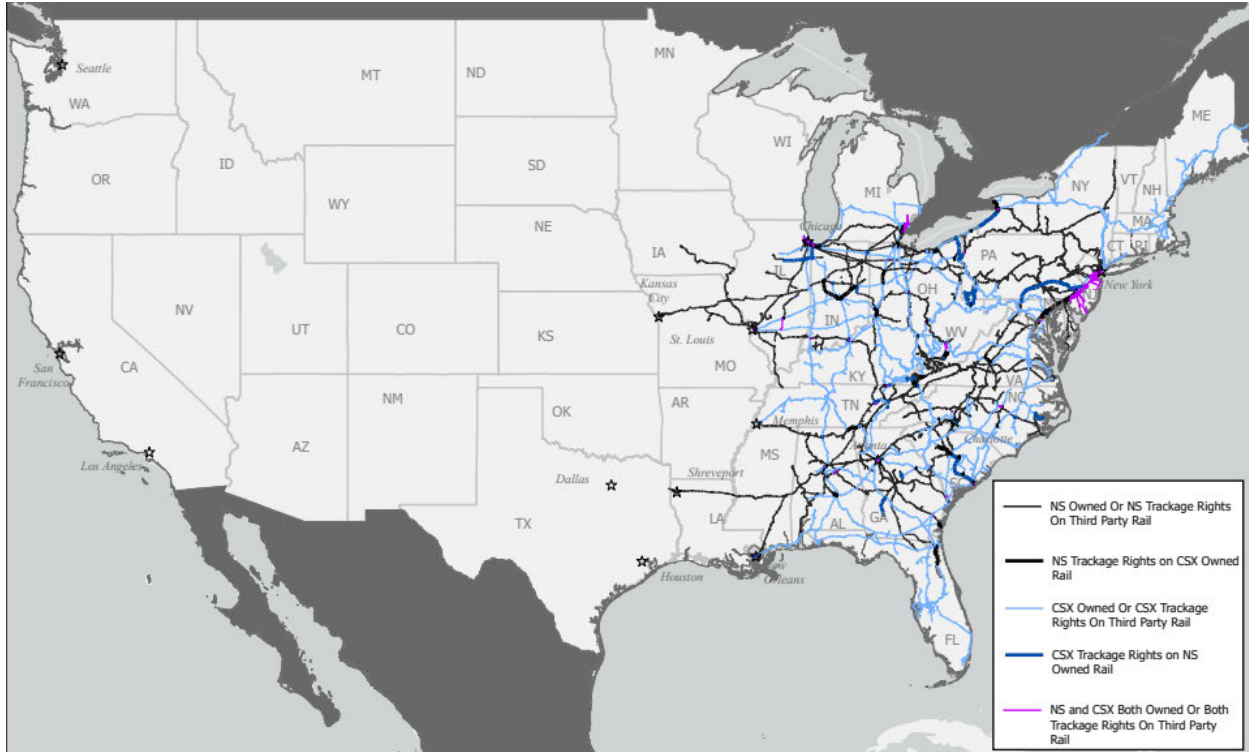
Exhibit 8: BNSF and UP Railroad Route Map



Source: Surface Transportation Board, “Railroad Map Depot,” available at <https://www.stb.gov/resources/railroad-map-depot/> (accessed November 20, 2025).

42. CSXT operates largely in the same geographic area as NS. The map in Exhibit 9 shows that both CSXT and NS operate on rail lines spanning the eastern portion of the country. The light blue and thin black lines represent rail lines that CSXT and NS respectively own or have a right to operate on per agreements with third-party railroads (i.e., all other railroads other than CSXT and NS). The dark blue and thick black lines represent rail lines that NS and CSXT respectively own but on which the other party can operate. Routes in purple represent rail lines owned or operated on by both CSXT and NS.
43. As shown in Exhibit 7, Exhibit 8, and Exhibit 9, BNSF, CN, CPKC, and CSXT all operate in the central region of the country, where UP and NS also operate.

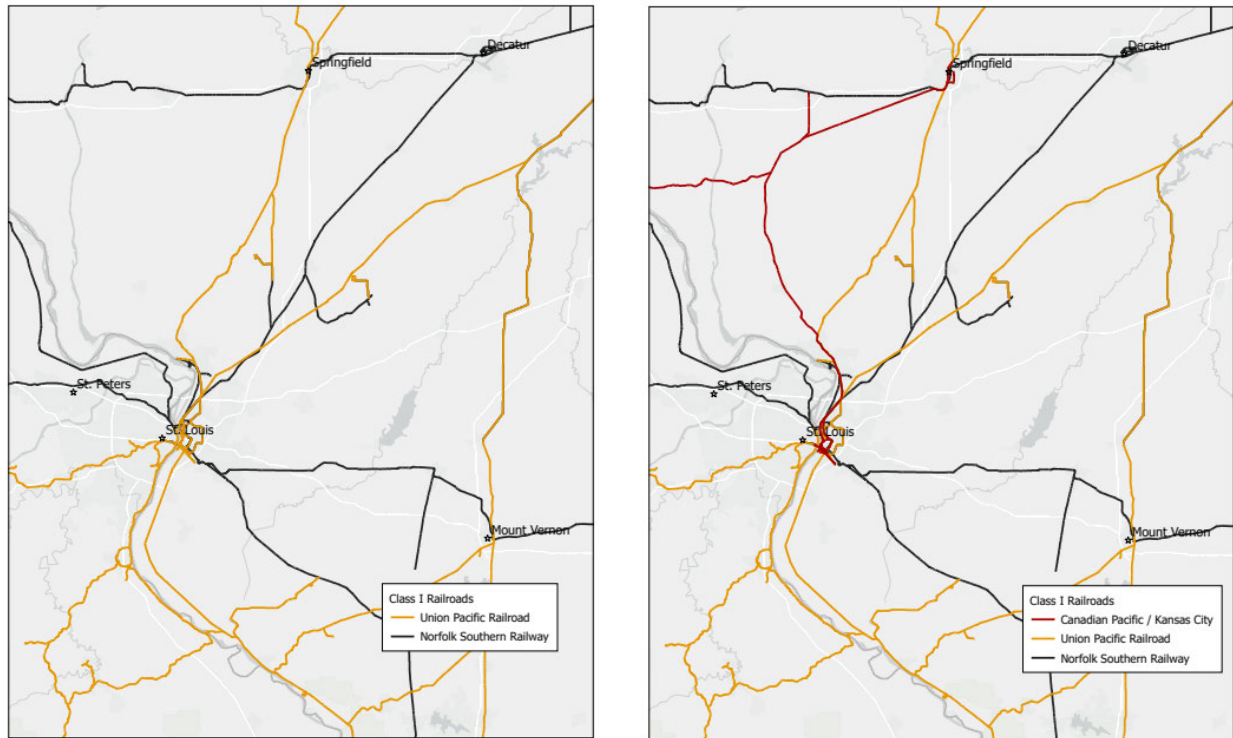
Exhibit 9: CSXT and NS Railroad Route Map



Source: Surface Transportation Board, “Railroad Map Depot,” available at <https://www.stb.gov/resources/railroad-map-depot/> (accessed November 20, 2025).

44. As a result, customers will continue to have a choice of competing Class I rail service providers post-merger. For example, while both UP (orange) and NS (black) currently offer service between Springfield, IL and St. Louis, MO (left panel of Exhibit 10), another Class I railroad (CPKC; dark red), also connects those two cities (right panel of Exhibit 10). As a result, rail customers located in Springfield and St. Louis will continue to have competing Class I rail service options after the proposed merger.

Exhibit 10: Springfield, IL - St. Louis, MO Corridor Served by CPKC, NS, and UP



Source: Surface Transportation Board, “Railroad Map Depot,” available at <https://www.stb.gov/resources/railroad-map-depot/> (accessed November 20, 2025).

45. After the proposed merger, both BNSF and CSXT will continue to compete with the combined railroad to carry freight across the United States. In addition, CN and CPKC will continue to compete with the combined railroad in the central region of the United States, since they both often operate in the geographies where UP and NS operate.³² And, as discussed above, for each of the 10 BEAs where UP and NS both operate, at least two other Class I railroads also compete in each of these 10 BEAs.

³² BNSF and CPKC each operate in 9 of the 10 BEAs where UP and NS both operate. CN operates in 8 of the 10 BEAs where UP and NS both operate. CSXT operates in 7 of the 10 BEAs where UP and NS both operate. See In-text calculation workpapers.

3 BENEFITS FROM THE PROPOSED MERGER

46. Section 2 relied on station location data to show that the railroad networks of UP and NS are largely complementary and not horizontally overlapping. This section assesses the extent to which combining these complementary assets under common ownership could strengthen competition to transport freight to the benefit of customers.
47. My assessment of the benefits from combining the networks under common ownership starts with the fact that the combined railroad will replace interline services where UP and NS currently must interact independently to transport freight between points on their respective networks, with single-line services operated by one railroad. Viewed through the lens of economics, and based on my review of the evidence provided in the Verified Statements in this matter, I find that:
48. In 2023, UP and NS interchanged approximately 1,240,000 cars and intermodal units³³ on interline services, of which approximately 877,000³⁴ were loaded. The combined railroad will have stronger incentives to seek and implement operating efficiencies for the single-line services that would carry these cars than UP and NS acting independently do. The combined railroad will also have stronger incentives to price single-line services aggressively and to ensure reliability, compared to the Applicants' independent incentives when marketing and delivering interline services today. The benefits from the improved incentives are unlikely to be achieved in full without the proposed merger. This figure will underestimate the scope

³³ “In 2023, the two railroads interchanged approximately 1,632 cars of manifest traffic, 1,647 containers of intermodal traffic, and 122 cars of bulk shipments per day.” *See* Gehringer-Orr VS at ¶ 152. $(365 \times (1,632 + 1,647 + 122) = 1,241,365)$.

³⁴ *See* In-text calculation workpapers.

for benefits because it does not account for improvements made on competing rail options as a competitive response to the new single-line services. I discuss this further in Section 3.1.

49. Some customers that currently use other railroads or trucks to transport their freight would benefit from having a single-line option from the proposed combined railroad. The Application includes one measure of the potential scope of this benefit: an estimate that roughly 1.954 million carloads would divert from truck or other railroads to take advantage of better services.³⁵ Those diversions are far less likely to happen absent the proposed merger, nor is the full range of investments needed to support this additional traffic likely to be forthcoming if the proposed merger does not proceed. Moreover, this figure understates the full extent of benefits because customers served by other railroads would also be expected to benefit, even if they did not switch, from the other railroads' likely response to the presence of faster, more reliable single-line service from the merged railroad. I discuss this further in Section 3.2.
50. In developing my opinions, I rely on (1) the Joint Verified Statement of Eric Gehringer and John F. Orr ("Gehringer-Orr VS"), which describes the Operating Plan of the combined railroad; (2) the Joint Verified Statement of Kenny Rocker and Claude E. Elkins ("Rocker-Elkins VS"), which describes the benefits from a marketing perspective; (3) the Verified Statement of David T. Hunt ("Hunt VS") which estimates the diversion of traffic from truck and from other railroads to take advantage of improved services; (4) the Verified Statement of John W. Turner ("Turner VS") which describes the investments that the combined railroad

³⁵ See Verified Statement of David T. Hunt, "Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company," STB Docket No. 36873 ("Hunt VS"), at Exhibit 2-4.

intends to make to support the growth in traffic which UP and NS expect to attract as a result of the proposed merger; (5) the Verified Statement of Katherine N. Novak (“Novak VS”), which describes Committed Gateway Pricing and customer facility access; and (6) the Verified Statement of Mark George (“George VS”) which gives an overview of the rationale behind the proposed merger³⁶

3.1 Scope for Benefits for Traffic Currently Interchanged between UP and NS

51. In 2023, UP and NS interchanged approximately 877,000 carloads on interline services connecting customers in the eastern United States with customers in the western United States.
52. The combined railroad is likely to have stronger incentives to make single-line services faster and more reliable, and more competitive, compared to the pre-merger incentives of UP and NS in relation to the interline services they replace. This is because the proposed merger would internalize externalities that currently exist between UP and NS when they operate interline services. An externality occurs when a decision one party makes imposes a benefit or cost on a third party. Independent firms producing complementary goods or complementary services do not account for how their actions affect other parties. Acting independently (i.e., choosing decisions based only on the firm’s own interest), the first firm

³⁶ Gehringer-Orr VS; Joint Verified Statement of Kenny Rocker and Claude E. “Ed” Elkins, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873 (“Rocker-Elkins VS”) ; Hunt VS; Verified Statement of John W. Turner, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873 (“Turner VS”); Verified Statement of Katherine N. Novak, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873 (“Novak VS”); Verified Statement of Mark R. George, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36863 (“George VS”).

ignores the effects of its actions on the second firm. A merger between these two firms aligns incentives: a common owner internalizes externalities as the combined entity will, post-transaction, take into account the effect of each firm's actions on the overall combined firm.³⁷ The next sections describe these changes to the combined railroad's incentives in more detail.

3.1.1 Incentives to implement operating improvements

53. The combined railroad would have stronger incentives to seek and implement ways to make its single-line services faster and more reliable. The Gehringer-Orr VS describes the changes that the proposed combined railroad plans to make to the planning and operation of its services. The statement describes two versions of the Operating Plan for the combined railroad: the Optimized Plan, which identifies operating changes that the combined railroad could implement immediately following the merger, assuming current volumes and patterns of traffic; and a Growth Plan, which identifies additional changes to accommodate the extra traffic that the Applicants expect to be diverted from truck and other rail operators, based on the Hunt VS.³⁸ In this section I focus on the operational changes described in the Optimized Plan.
54. One reason why single-line services operated by the proposed combined railroad likely will be faster and more reliable is that cars will be handled fewer times during their journey under

³⁷ For a discussion of externalities, *see*, among others, Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, HarperCollins (1994) ("Carlton and Perloff"), at pp. 115-123.

³⁸ *See* Gehringer-Orr VS at ¶¶ 15, 27, 31.

the Optimized Plan.³⁹ Trains are typically comprised of blocks of cars bound for different destinations.⁴⁰ Individual railcars may be switched into yards to be sorted and classified or reclassified into blocks and blocks may be removed and attached to different trains multiple times over the course of their journey. These “handlings” introduce delay and variability.⁴¹ Interchanges on interline routes can be particularly time consuming as they often involve two (or more) handlings, one on each of the interchanging networks.⁴² The Rocker-Elkins VS reports that interchange points between carriers can add between 24 and 48 hours of dwell time.⁴³ Interchanges also make services less reliable as the hand-off between two independent railroads creates operational risk.⁴⁴

55. Under the Optimized Plan, the proposed combined railroad is expected to eliminate over 930,000 handlings per year by converting current interline services into single-line services.⁴⁵ The Optimized Plan also describes changes to the way that some formerly interline services between UP and NS will be routed, which, together results in reductions in handling.

³⁹ See Gehringer-Orr VS at ¶¶ 8 and 27.

⁴⁰ For a description of how freight trains are built, see Association of American Railroads, “Freight Rail FAQs,” available at <https://www.aar.org/faqs/> (accessed November 21, 2025).

⁴¹ See Gehringer-Orr VS at ¶ 27. “Reducing intermediate handlings improves service reliability for customers by eliminating events that introduce variability into the system.”

⁴² See Hunt VS at § 3.4. “Even at large gateways, most railcars must be handled twice (at the originating and terminating railroads’ terminals) before continuing.”

⁴³ See Rocker-Elkins VS at ¶ 50. “Transfers between carriers can add 24 to 48 hours of dwell time and reduce the utilization of locomotives and cars that should be moving freight.”

⁴⁴ See Hunt VS at § 3.3. “[T]he more interchanges, the greater the risk that a railroad will not be able to meet its service handoff plan for a railcar.” The Hunt VS Section 3.3 reports empirical analysis that uses the number of interchanges as a proxy for service reliability.

⁴⁵ See Gehringer-Orr VS at ¶ 6. “Applicants project implementation of their optimized plan will remove approximately 2,550 handlings of cars and containers per day.” (2,550 × 365 = 930,750).

56. These improvements derive from multiple operational changes. For example, under the Optimized Plan, the combined railroad will introduce new, more efficient routes that is anticipated to have trains pass through the current interchange points without the need for any handling there at all.⁴⁶ For example, the combined railroad will introduce a new direct train from North Platte, NE to Conway, PA, that will run through Chicago without any handling.⁴⁷ To implement these plans, the combined railroad will assemble blocks at yards within UP's legacy network that are destined for points within NS's legacy network, and vice versa.⁴⁸
57. Another change is that some interchanges between UP and NS involve the same railcar or intermodal unit being handled multiple times. The combined railroad will reduce some of these handlings. For example, the proposed combined railroad anticipates consolidating some of the UP and NS yards in Chicago, which would allow the Applicants to reduce the number of handlings for traffic passing through the gateway.⁴⁹
58. An example illustrates how the proposed merger would create stronger incentives to improve services by internalizing externalities between UP and NS. One type of improvement in the Optimized Plan is to operate existing trains on more efficient routings that run through the

⁴⁶ See Gehringer-Orr VS at ¶¶ 27, 182-184.

⁴⁷ See Gehringer-Orr VS at ¶ 190.

⁴⁸ See Gehringer-Orr VS at ¶¶ 183-184, 230. "In addition, Applicants will change the way traffic currently flows through current interchanges to implement more efficient train and blocking concepts they have developed in the planning process...The planned changes to current traffic flows centrally involve creating new trains with deeper network blocking while optimizing movements through mid-continent gateways."

⁴⁹ Gehringer-Orr VS at ¶¶ 203-204, 207. "UP/NS also will reduce complexity and consolidate automotive shipment distribution by shifting operations from UP's Chicago Heights automotive facility into NS's Hegewisch automotive facility, eliminating intermediate handlings between the two facilities."

points of interchange between UP's and NS's legacy network without needing any handling. Before the proposed merger, this routing would involve one of the Applicants (e.g., UP) using its yards to assemble blocks destined for points within the other Applicant's (e.g., NS's) network.⁵⁰ When creating blocks at its yards, UP's economic incentive is to consider the commercial implications only for its own business. Its incentives will differ from those of the combined railroad for at least two reasons. First, UP receives only a part of the profit for interline services with NS as independent entities, but the combined railroad would receive all of the profit from single-line services. Second, UP has little incentive to incur costs itself in order to reduce NS's costs of delivering interline services. As a result, as an independent entity pre-transaction, UP has weak economic incentives to support the capacity and expend the resources needed to sort and reclassify cars to better serve NS's interests. However, a combined railroad would have the full incentive to optimize UP's and NS's combined network.

3.1.2 Incentives to offer improved service terms

59. The combined railroad would also have stronger incentives to compete for business. Customers typically contract with railroads for interline services in one of two ways. They may contract with one railroad, which arranges for carriage for part of the journey using interline agreements with other railroads on the route. Alternatively, customers may contract separately with each railroad using Rule 11, an accounting rule set by the Association of

⁵⁰ See Gehringer-Orr VS at ¶ 183. I refer to route as direction from A to B. I refer to routing as a particular way to travel this route: one routing could travel with an interchange in Memphis and one with an interchange in St. Louis.

American Railroads that allows each railroad on an interline service route to issue its own invoice to the customer for the services it provides. With interline pricing, customers negotiate a single rate with one of the carriers and receive a single invoice for the full route. With Rule 11 pricing, on the other hand, customers negotiate separately with each of the railroads that serve portions of the overall route and receive a separate segment-specific invoice from each carrier.⁵¹

60. From an economic perspective, both of these options are inefficient because they involve multiple negotiations. With interline pricing, the customer contracts with a single railroad, which is then responsible for the complex task of collecting and distributing charges on behalf of each carrier of the shipment.⁵² With Rule 11 pricing, the administrative burden is placed onto the customer, who must negotiate rates directly with each carrier on the interline route.⁵³ Single-line services, by contrast, give customers the ability to obtain quotes for shipments more quickly. UP and NS typically provide quotes for single-line shipments within one business day, but it can take up to seven days to get quotes for interline shipments.⁵⁴

⁵¹ See, for example, Rick LaGore, “Rule 11 vs. Railroad Interline Agreements - A shipping comparison,” InTek Logistics, June 18, 2025, available at <https://www.inteklogistics.com/blog/rule-11-railroad-interline-agreement-comparison> (accessed April 15, 2026). See also, Association of American Railroads, “Railway Accounting Rules,” March 30, 2026, available at <https://public.railinc.com/sites/default/files/documents/RAR.pdf> (“Railway Accounting Rules”).

⁵² See Railway Accounting Rules. (“On an interline shipment, the carrier responsible for collecting freight and other applicable charges, acts for and on behalf of the participating interline carriers in the collection and forwarding of all funds due in connection with such charges and further acts as guarantor to the other participating interline carriers with respect to the collection of all individual charges which comprise such funds.”)

⁵³ The simplification of a customer invoicing is a key benefit of single-line services described in the *Rocker-Elkins VS*. See *Rocker-Elkins VS* at ¶ 12 (“Instead of juggling multiple contracts, multiple carriers, and multiple sets of rules, customers will have true one-stop shopping.”)

⁵⁴ See *Rocker-Elkins VS* at ¶ 10.

61. Moreover, there is an externality between the two (or more) railroads that together offer an interline route that could slow down negotiations and lead to worse terms for customers. There are at least two ways in which the rate offered by one railroad for its part of a route could affect the profits of railroads operating other parts of the route.
62. The prices offered by one railroad can affect whether a customer decides to use a particular rail option, rather than a competing rail option or truck, and thereby affecting the profits of other participating railroads.
63. Once a customer has accepted the terms for a route, those prices affect the volume shipped, because prices affect the marginal price the customer pays for transporting additional units; as a result, the profits of other railroads that would participate on that route are affected.
64. Each railroad would prefer the other railroad to offer price concessions on its part of the service in order to reach an agreement with the customer, or to offer terms with a lower marginal rate to encourage the customer to ship more freight. A railroad that offers better terms bears the full cost of making the concession, but the benefits—the additional contract or extra volume that results—are shared with the other railroad. There is an externality between the railroads because more attractive terms offered by one of them benefit the other, leading to an incentive misalignment.
65. The proposed merger is likely to address both problems – separate negotiations and the relatively weaker incentives to offer price concessions. The customer will negotiate with a single sales team from the combined railroad that will be able to offer terms for the full route, avoiding a second negotiation with a different team at another railroad. Moreover, post-merger the combined railroad will internalize the externality between UP and NS because

the combined railroad would get the full benefit of any additional business or volume won through offering better terms. All else equal, internalization of the externality increases the economic incentive to offer better terms compared to independent railroads in negotiations over interline services. Consistent with economic theory, higher quality services (such as faster service) coupled with enhanced incentives to compete can result in lower quality-adjusted prices.

66. My conclusion that the proposed combined railroad is likely to have enhanced incentives to compete is based on well-accepted principles in the economics literature on price effects when complements come under common ownership. These ideas appear in several forms, including the elimination of double marginalization. Double marginalization arises when two firms with market power in the same supply chain successively set their own price. The upstream firm will often charge the downstream firm a price that includes a profit margin above its costs. The downstream firm will treat this margin as part of its own costs (since that is the price it pays the upstream firm), and may charge a margin on top of that, resulting in customers paying a price that includes two margins (this is the “double marginalization”). If the firms merge, however, the combined firm bases its pricing decision on the costs of the upstream input, rather than a price that includes a markup on those costs, thereby eliminating the double marginalization, which is then expected to result in lower prices.⁵⁵

⁵⁵ On double marginalization and double markups, *see*, for example, Carlton and Perloff at pp. 523-527.

3.1.3 Incentives to ensure reliable services

67. Post-transaction, the combined railroad will also have enhanced incentives to ensure reliable single-line services in the face of operating difficulties. Compared to a combined entity, standard economic reasoning shows that a standalone UP will generally put less weight on ensuring that interline services arrive on time for two reasons. First, UP shares the benefits (i.e., gets partial benefits) of meeting the expectations of interline customers with NS, whereas the proposed combined railroad would gain the full benefit. Second, customers have limited visibility into interline operations, making it difficult to determine which railroad is responsible when delays occur. This lack of observability creates an environment in which NS may bear a portion of the reputational harm that results when UP provides poor service on its part of the interline route.⁵⁶ As a result, neither railroad fully internalizes the (positive) benefits from high service quality nor do they fully internalize the (negative) costs of low service quality.

3.1.4 These benefits are unlikely without the proposed merger

68. Independent firms can attempt to coordinate activities using contracts that specify the obligations of each firm and allocate the benefits from better coordination. However, if the changes associated with the Optimized Plan could be easily implemented outside of the proposed merger, one would expect UP and NS to have already done so. They have not.

⁵⁶ Blame shifting is a material consideration for railroads. See *Rocker-Elkins VS* at ¶ 51. (“The problem isn’t just time—it’s accountability. When two carriers share a shipment, it’s harder for customers to get clear pricing, tracking, and service commitments. If a delay occurs, no single railroad owns the full responsibility for addressing the problem. That fragmented accountability undermines the consistency that customers expect and erodes confidence in rail’s reliability.”)

69. A large body of economic literature has identified certain conditions under which bilateral contracting between independent firms is unlikely to achieve efficient market-based coordination.⁵⁷ First, efficient coordination is more difficult when the environment is sufficiently complex that parties cannot feasibly specify in advance all relevant states of the world or prescribe optimal actions for each. This is referred to as an “incomplete” contracting environment because it is impossible for agents to explicitly write out all possible contingencies for either a contract or informal agreement. This means that unforeseen circumstances not covered by the agreement can arise, in which case the parties will need to negotiate ex post over their respective obligations and responses. Second, when these unforeseen circumstances arise, coordination suffers further when parties lack reliable mechanisms to resolve disputes over their respective obligations and implement the jointly optimal (rather than privately optimal) course of action in a timely and costless fashion. Third, coordination is more difficult when firms must take actions or undertake investments that are specifically tailored to the relationship. For example, a supplier may invest in specialized equipment or machinery calibrated to a counterparty’s technical requirements, which cannot be redeployed to serve other customers without substantial cost or loss of value. This is referred to as “asset specificity.” When any of these features are present in a particular economic interaction, it substantially raises the transaction costs associated with

⁵⁷ See, for example, Ronald H. Coase, “The Nature of the Firm,” *Economica*, vol. 4 (1937), pp. 386-405; Kenneth J. Arrow, *The Organization of Economic Activity: Issues Pertinent to the Choice of Market Versus Nonmarket Allocation*, in 1 *The Analysis and Evaluation of Public Expenditures: The PPB System* 47 (Joint Econ. Comm., 91st Cong., 1st Sess. 1969); Oliver E. Williamson, “The Vertical Integration of Production: Market Failure Considerations,” *Papers and Proceedings of the Eighty-Third Annual Meeting of the American Economic Association*, vol. 61, no. 2 (1971), pp. 112-123. On the limitations of contracts as commitment devices, see, for example, Benjamin Hermalin, Avery Katz, and Richard Craswell, “The Law and Economics of Contracts,” in *Handbook of Law and Economics*, editors A. Mitchell Polinsky and Steven Shavell (New York: Elsevier, 2007), at pp. 5-7.

implementing efficient bilateral agreements.⁵⁸ And when all three features are present simultaneously, economic theory predicts that vertical integration (i.e., bringing the transaction within a single entity) is often the best solution.⁵⁹

70. Interline rail services are a good example. For two independent railroads to successfully operate an interline rail service, they must coordinate the movement of a single shipment across distinct, but connected networks. A shipment originating on one railroad's network must be transferred at an interchange point, handled according to agreed-upon procedures, and transferred to the second railroad's network (often where it is handled again) prior to reaching its final destination. The train must move over the network subject to congestion and competing traffic. At the interchange, the cars must be set out on designated tracks, categorized, and accepted by the receiving railroad in a timely fashion. The receiving railroad must incorporate those cars into its operating plan, re-sort the cars if needed, and form the new outbound train before final dispatch.⁶⁰ At each step, the railroads must make coordinated decisions despite uncertain and highly unpredictable operating conditions (*complexity*); they must rely on assets and operating choices that are largely outside of the

⁵⁸ See, for example, Oliver E. Williamson, "Transaction Cost Economics: The Governance of Contractual Relations," *Journal of Law and Economics*, vol. 22, no. 2 (1979), pp. 233-261 ("Williamson (1979)"); Paul L. Joskow, "Asset Specificity and the Structure of Vertical Relationships: Empirical Evidence," *Journal of Law, Economics, and Organization*, vol. 4, no. 1 (1988), pp. 95-117; Michael H. Riordan and Oliver E. Williamson, "Asset Specificity and Economic Organization," *International Journal of Industrial Organization*, vol. 3, no. 4 (1985), pp. 365-378; Howard A. Shelanski and Peter G. Klein, "Empirical Research in Transaction Cost Economics: A Review and Assessment," *Journal of Law, Economics, and Organization*, vol. 11, no. 2 (1995), pp. 335-361.

⁵⁹ See, for example, Oliver E. Williamson "The Logic of Economic Organization," *Journal of Law, Economics & Organization*, vol. 4, no. 1 (1988), pp. 65-93. ("integration is reserved for those transactions where bilateral adaptability needs are great (namely, those where asset specificity and uncertainty are substantial).")

⁶⁰ For a discussion of rail interchange logistics, see Matt Culver, "The Ins and Outs of Rail Interchanges," RSI Logistics, September 12, 2024, available at <https://www.rsilogistics.com/blog/the-ins-and-outs-of-rail-interchanges/> (accessed April 16, 2026).

railroad’s control (*asset-specificity*); and they must implement real-time adjustments to ensure that trains remain on schedule (*adaptability*).⁶¹

71. It is for these reasons that alliances, partnerships, and other joint pricing arrangements, while they do sometimes occur, are generally fragile and prone to inefficiency.⁶² Unlike an integrated firm, which can adjust priorities and reallocate resources in real time as conditions evolve, a partnership between independent firms must rely on ongoing negotiation to respond to unanticipated events.⁶³ Bilateral agreements that are designed to maximize joint profits under particular operating conditions do not necessarily extend across all possible states of the world. As a result, these arrangements tend to break down as circumstances change, leading to costly renegotiation and suboptimal performance.⁶⁴ The transaction costs associated with sustaining an efficient partnership are simply too high.
72. The high transaction costs associated with operating an interline rail service are compounded by the fact that it is generally impossible for railroads to fully specify in advance how interline services should be performed under all possible operating conditions. As a result,

⁶¹ Adaptability is a critical factor in railroad operations. *See* Turner VS at ¶ 61 (“operational fluidity of yards and terminals is critical to the successful implementation of a transaction and effective service to shippers.”)

⁶² *See* George VS at ¶ 7. (“History shows, however, that, while partnerships can help, the benefits they can deliver are limited given that physical interchanges still exist, management teams change with time, and incentives don’t align as the financial and other interests of one party often prevail over the collective interest that benefits the consumer.”)

⁶³ *See* George VS at ¶ 59. Railroad alliances are inherently less adaptable than an integrated firm because they “require new agreements for every material change, resulting in missed market opportunities for customers while railroads haggle over how to respond.”

⁶⁴ *Rocker-Elkins VS* at ¶ 145. (“What customers want instead is a railroad that can turn on a dime, and that cannot happen when every decision requires a negotiation and a contract. A merged company can create a new block of traffic, adjust operating plans, or launch a new service in days, not months... Alliances, by contrast, require new negotiations every time something changes. And while lawyers are drafting the contracts, customers lose opportunities.”)

interline agreements suffer from contractual incompleteness. They leave room for interpretation and discretion in how interline service obligations are fulfilled when situation-specific circumstances arise, such as a missed switch or unexpected congestion, which invariably creates incentives to prioritize privately optimal actions over what is jointly optimal for the interline service. In economic terms, incomplete contracts give rise to opportunism that undermines contracting parties' ability to make economic coordination work. As Williamson (1979) explains in a seminal work on transaction costs, mitigating opportunism in order to implement more efficient coordination is a "leading factor in explaining decisions to vertically integrate."⁶⁵

3.2 *Scope for Benefits to Other Customers*

73. In addition to customers that use interline services between UP and NS, expanded single-line services offered by the combined railroad are also likely to benefit many customers that currently use competing rail routes or other transport options (e.g., truck). Customers can switch from their current options to take advantage of the improved services from the combined railroad. Moreover, competing railroads may improve their own terms or service quality in turn to remain competitive.
74. The Hunt VS includes an estimate of the additional traffic that the Applicants expect to attract to the single-line services of the combined railroad. It estimates gross diversions of 1.954 million carloads and intermodal units per year, which include diversions from other

⁶⁵ See, for example, Williamson (1979) at footnote 4. ("The joining of opportunism with transaction-specific investments (or what Klein, Crawford, and Alchian refer to as 'appropriable quasi rents') is a leading factor in explaining decisions to vertically integrate.")

railroads, extensions of intermodal moves that dray over 250 miles, and diversions of traffic that currently moves by truck.⁶⁶

75. To accommodate this additional traffic, UP and NS would need to make additional infrastructure investments as described in the Turner VS, which provides a summary table of expected infrastructure projects needed to support the anticipated increase in traffic on the single-line services operated by the combined railroad: These investments total over \$900 million, and include investments in yard and terminal expansion, siding extensions, and signal updates.⁶⁷
76. These investments are unlikely to occur in full without the proposed merger. The reason is that they require investments, such as constructing additional mainline, yard, or terminal capacity to accommodate higher volumes,⁶⁸ that are highly specific to the interline relationship and whose profitability depends on coordinated action by both railroads. However, as discussed above, each railroad controls only its portion of an interline shipment, and no contract can fully account for the range of operating conditions that may arise or ensure that both parties carry out the plan as intended. This creates a risk that one railroad will bear the cost of making these changes without realizing the expected benefits if the other does not follow through. Anticipation of that risk discourages both parties from making the

⁶⁶ See Hunt VS at Exhibits 2-4 and § 2.3. The Hunt VS also includes a net estimate of diversions that account for the fact that some of the diverted carloads/intermodal units are currently served by UP or NS for part of the move. However, gross diversion estimates more accurately reflect the volume of carloads/intermodal units that would see a benefit from the combined railroad's single-line services.

⁶⁷ Turner VS at Table 14.

⁶⁸ See Turner VS at ¶ 84 ("Applicants plan to invest approximately \$480 million (in 2023 dollars) in projects to increase main line capacity on the combined network.") and Turner VS at ¶ 95 ("Applicants plan to invest approximately \$364.6 million (in 2023 dollars) in merger-related projects to increase capacity in UP/NS intermodal, manifest, and automotive yards and terminals to accommodate volumes projected in the Growth Plan.")

necessary investments, preventing the plan from being implemented at all absent the merger.⁶⁹

77. In the economics literature, this is a well-known market failure called a “hold-up problem.”⁷⁰

It arises when firms must make investments that are specific to a relationship but cannot fully specify in advance how the returns from those investments will be realized or shared.

In such settings, each party faces the risk that the other may not take the actions needed to fully support the investment. That risk weakens incentives to invest in the first place, even where the underlying arrangement would be jointly profitable. To solve the hold-up problem and achieve efficient levels of investment, the economics literature identifies vertical integration as likely the best solution.⁷¹ The reason is that vertical integration aligns ownership rights and residual profits, allowing the combined firm to internalize the full benefits of relationship-specific investment.

3.3 Diversions Reflect Increased Competition as a Result of the Transaction

78. As discussed above, efficiencies from the merger will lead to the diversion of some traffic as described in the Hunt VS. These diversions are included in the projected future shares

⁶⁹ The risk that the benefits of investment will not materialize due to the actions of another is a material consideration for railroads. *See* Geringer-Orr VS at ¶ 10 (“As separate railroads, UP and NS naturally focus on maximizing their own revenues and minimizing their own costs, and each is understandably reluctant to invest substantial resources when realizing the returns depends on the future actions of the other.”)

⁷⁰ *See* Williamson (1979). *See also*, the property rights theory of Sanford J. Grossman and Oliver D. Hart, “The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration,” *Journal of Political Economy*, vol. 94, no. 4 (1986), pp. 691-719 and Oliver D. Hart and John Moore, “Property Rights and the Nature of the Firm,” *Journal of Political Economy*, vol. 98, no. 6 (1990), pp. 1119-1158.

⁷¹ *See*, for example, Bengt Holmström and John Roberts, “The Boundaries of the Firm Revisited,” *Journal of Economic Perspectives*, vol. 12, no. 4 (1998), pp. 73-94. (“If the supply relationship faces more extensive hold-up problems, the best solution may be vertical integration, with all parts of the body being procured internally rather than outside.”)

that are presented in the Hunt VS to comply with the requirements of STB Regulation 49 CFR § 1180.7(b)(3) and (4). For the purposes of a competitive assessment, however, it should be clearly understood that such diversions are a benefit of the proposed merger; it would not be appropriate as a matter of economic analysis to consider the diverted traffic and any associated increases in the post-merger firm’s market shares, even those that come at the expense of the parties’ competitors, as a potential competitive harm or as evidence suggesting the potential for such harm.

79. The 2023 Merger Guidelines (“MG”) issued by the U.S. Department of Justice and the Federal Trade Commission (“Antitrust Agencies”) consider whether a merger may entrench or extend an already dominant position. The effect of such mergers ‘may be substantially to lessen competition’ or ‘may be . . . to tend to create a monopoly’ in violation of Section 7 of the Clayton Act. Mergers that entrench or extend a dominant position can also violate Section 2 of the Sherman Act. At the same time, the Antitrust Agencies distinguish between mergers that lead to anticompetitive entrenchment and mergers that lead to growth due to increased competitive capabilities: The “Agencies distinguish anticompetitive entrenchment from growth or development as a consequence of increased competitive capabilities or incentives.”⁷² The focus of the MG is on harm to the competitive process.⁷³

⁷² U.S. Department of Justice and Federal Trade Commission, “Merger Guidelines,” December 18, 2023, available at <https://www.justice.gov/d9/2023-12/2023%20Merger%20Guidelines.pdf> (“MG”), at § 2.6.

⁷³ MG at § 1.

80. In addition to distinguishing anticompetitive entrenchment from growth that is caused by increased capabilities, the MGs do not consider “future network growth that may occur through competition on the merits” as anticompetitive.⁷⁴
81. The Gehringer-Orr VS describes the changes that the proposed combined railroad plans to make to the planning and operation of its services, including the Growth Plan, which identifies operational changes to accommodate the extra traffic that the Applicants expect to be diverted from truck and other rail operators, based on the Hunt VS. These changes arise from the combined railroad’s stronger incentives to make single-line service faster and more reliable. The Hunt VS estimates an additional 1.954 million carloads and intermodal units per year on the combined railroad due to improved services post-merger.
82. To identify situations in which a merger might lessen competition, the Agencies consider the pro forma change in market shares at the time that the merger is consummated as an initial indicator. These pro forma changes to market shares do not take into account any change in the output of the merged firm that results from the merger – even though such changes may be likely or anticipated to occur following the consummation of the merger. That is, the change in market shares as a result of the merger is captured by adding the two merging parties’ pro forma market shares prior to the transaction. The changes are thus a snapshot of the increased market share of the merged firm due to the pro forma combination.

⁷⁴ Steven C. Salop, “The 2023 Merger Guidelines: A Post-Chicago and Neo-Brandeisian Integration,” *Review of Industrial Organization*, vol. 65 (2024), pp. 79-128 (quoting MG at § 2.6.A. n.36.).

83. Additive shares are also computed as a part of the between-corridor geographic analysis that I undertake (as discussed later in my verified statement) and were customarily calculated in previous railroad mergers as well.⁷⁵
84. An economic analysis of a merger's potential anticompetitive effects and procompetitive benefits does not stop with pro forma combination of market shares. When evaluating the potential for competitive harm, the Antitrust Agencies also consider whether consumers will be worse off post-transaction, because, for example, the merged firm will be able to profitably raise prices or reduce output in the future. Any reduction in output in the future is a possible adverse consequence of the loss of competition.⁷⁶
85. In contrast, mergers may also generate efficiencies which allow the merged firm to provide benefits to customers such as increased output, improved quality or service, greater innovation, and/or lower prices after the merger. These changes in output, which may result in changes to market shares after the merger is consummated, are procompetitive consequences of the merger.⁷⁷ In this matter, for example, the combined railroad is projected to gain share from rail competitors as well as from trucking competitors according to the Hunt VS. This change in the post-merger railroad's output, however, is not a reflection of potential competitive harm. Instead, those shifts in volume are a consequence of the combined railroad's increased competitive capabilities. In other words, the increases in the

⁷⁵ For example, see the between-corridor analysis in Majure VS at pp. 52-72.

⁷⁶ MG at § 1.

⁷⁷ MG at § 3.3.

market share of the combined railroad reflect more robust competition post-merger, as customers shift business in response to the efficiencies created by their merger.

86. Considering increases in post-transaction market share attributable to diversion from rail competitors and trucking competitors as a reduction in competition would be analytically incorrect. Rather, the correct interpretation of such share increases is diversion as a result of the kind of “growth or development as a consequence of increased competitive capabilities or incentives” described by the MG.^{78,79}
87. My competitive assessment compares carloads affected due to potential competitive harm with carloads that are expected to experience competitive benefits. The diversions in traffic calculated in the Hunt VS are thus appropriately accounted for as carloads that benefit from the transaction.

4 HORIZONTAL COMPETITIVE EFFECTS ANALYSES

88. This section analyses the scope for adverse horizontal competitive effects. I find that, compared to the scope for benefits of the proposed merger, there is limited scope for potential harm from the loss of horizontal competition between UP and NS.
89. Using waybill data, I analyze potential loss of horizontal competition. Access competition is discussed in section 4.2, competition within corridors is discussed in section 4.3, and

⁷⁸ MG at § 2.6, ¶ 1.

⁷⁹ This basic concept in industrial organization is also noted by Gugler and Siebert (2007), who state that “[o]ne feature common to most models of industrial organization analyzing mergers is that increased market shares postmerger is a sign of increased efficiency of merging firms, or alternatively that the efficiency effects of the merger outweighed any market power effects.” Klaus Gugler and Ralph Siebert, “Market Power versus Efficiency Effects of Mergers and Research Joint Ventures: Evidence from the Semiconductor Industry,” *The Review of Economics and Statistics*, vol. 89, no. 4 (2007), pp. 645-659 (“Gugler (2007)”), at p. 650.)

competition between corridors is discussed in section 4.4. These analyses show that there is limited scope for potential harm from adverse competitive effects.

90. I begin by describing the data used in these analyses and then describe each analysis in turn.

4.1 Data for the Analyses

91. This section discusses the data that is used to assess horizontal competition for the analyses described in sections 4.2, 4.3, and 4.4.

4.1.1 Data sources

92. The analyses described below rely on data for loaded railcar movements as well as non-rail freight movements.⁸⁰ These data originate from the following three sources.
93. First, I have full traffic tape data provided by all six Class I freight railroads (BNSF, CN, CPKC, CSXT, NS, and UP) for the years 2019-2024. Each record in the traffic tape includes information on the origin, destination, commodity, carloads, tons, and revenue, among others, for each respective railroad.
94. Second, I use the STB’s Confidential Carload Waybill Sample (“CWS”).⁸¹ The CWS is a stratified sample of U.S. rail traffic waybills, containing detailed information on an individual shipment for the reporting railroad, including origin, destination, commodity,

⁸⁰ Railroads also transport empty railcars back to customers. However, although this generates revenue, the vast majority of a railroad’s revenues are earned on movement of loaded railcars, not empty cars. I therefore analyze waybills for revenue movement of loaded cars only. I focus on linehaul movements and linehaul revenues (e.g., reciprocal switching moves are excluded when indicated in the data). *See* Appendix C.

⁸¹ A waybill is a shipping document that accompanies freight during transport and includes detailed information about the shipment.

carloads, tons, and revenue, among others.⁸² The CWS is used to supplement the full traffic tape data provided by the six Class I freight railroads with data for Class II and Class III railroads.⁸³ Each record in the CWS represents a separate waybill and the sample is designed to be representative of the universe of rail freight waybills terminated by the reporting railroads.⁸⁴ While CWS records cover only a sample of all freight rail movements, the CWS also includes expansion factors provided by the STB to scale up the CWS so that the data are representative of the U.S. population of waybills.⁸⁵ I had access to CWS data for 2019-2023.⁸⁶ The STB modified sampling methodology beginning in year 2021, so overall fewer records are sampled in years 2019 and 2020.⁸⁷

95. Third, I use S&P Global Market Intelligence—Transearch data for freight movements shipped by non-rail modes (e.g., trucks, pipeline, water) in 2023.⁸⁸ These data contain information on the tons of freight transported by different modes between origins and destinations where either the origin or destination is in the United States. Each record reports,

⁸² See Surface Transportation Board, “Carload Waybill Sample,” available at <https://www.stb.gov/reports-data/waybill/> (accessed November 24, 2025) (“STB CWS”).

⁸³ The CWS data are also used to supplement revenue information for certain waybills. See Appendix C.

⁸⁴ CWS “is a stratified sample of carload waybills for all U.S. rail traffic submitted by those rail carriers terminating 4,500 or more revenue carloads annually.” See STB CWS. Surface Transportation Board, “Procedure for Sampling Waybill Records,” January 1, 2021, available at <https://www.stb.gov/wp-content/uploads/STB-Statement-81-1-Procedures-for-Sampling-Waybill-Records-2021-Edition.pdf>.

⁸⁵ The STB provides two types of expansion factors – a theoretical expansion factor and an exact expansion factor. I use the theoretical expansion factor because it is available for all observations. See 2023 STB CWS Reference Guide at pp. 61 and 77. CWS records also include freight moves that originate in Mexico or Canada if they terminate in the U.S.

⁸⁶ The 2024 CWS data were made available by the STB on March 20, 2026, which did not allow sufficient time to incorporate the additional year of data into my analyses.

⁸⁷ See STB CWS.

⁸⁸ I use a copy of Transearch data for the non-rail freight tons and revenues on a BEA-BEA, STCC4 basis. These data sourced from Transearch are combined with revenue estimates in Hunt VS as described in Appendix B.1.1 of the Hunt VS.

by commodity type,⁸⁹ the tons shipped between a pair of BEAs by each transportation mode such as truck, water, or pipeline.⁹⁰

4.1.2 *The combined waybill data*

96. The “combined waybill data” consolidate the following waybill data: (1) 2019-2024 traffic tapes for the six Class I railroads, and (2) 2019-2023 CWS data.
97. In addition, I supplement the combined waybill data with Transearch data on freight traffic by non-rail modes of transport, such as trucks and water for 2023.
98. Appendix C describes how the combined waybill dataset is constructed.
99. Using the combined waybill data for a competitive analysis is conservative. Horizontal competitive concerns are likely to be over-identified because while there is complete 2019 - 2024 information for Class I railroad movements, the only information available for Class II and Class III railroads is provided in the CWS.⁹¹ Because the CWS is a sample where records are sampled with different frequencies (e.g., some are at a rate of 1 out of 40), information on movements in the CWS is incomplete and therefore the analyses described below understate competition from Class II and Class III railroads.⁹² For example, if

⁸⁹ The Transearch data typically report tons at the 4-digit standard transportation commodity code (“STCC”) level. For a small share of volume, the Transearch data are only available at the 2-digit or 3-digit commodity code level.

⁹⁰ The Transearch data identify whether movements are transported by truck, air, pipeline, water, and “other” non-rail freight modes. For a detailed description of these data, *see* S&P Global Market Intelligence, “Transearch Tutorial Documentation,” December 19, 2024, at p. 7; S&P Global Market Intelligence, “Transearch Reference Guide 2023”; *see also*, S&P Global Market Intelligence, “Transearch 2023 Modelling Methodology Documentation,” April 16, 2025.

⁹¹ Not every railroad included records for shipments that both originate and terminate outside of the United States. *See* Appendix C for details.

⁹² *See* 2023 STB CWS Reference Guide at p. 53.

waybills for movements from some origins and destinations were not among the waybills sampled for the CWS or included in the traffic tape data for Class I railroads, then there is no further information available to identify those movements.

4.1.3 Quantity measurement

100. My analyses use information on traffic volumes to identify potential horizontal competitive concerns. Depending on the specific analysis, traffic is measured either in counts of carloads or in tons shipped. Whenever possible, carloads are used because there are some discrepancies in how tons are recorded among different sources.⁹³ Because data for non-rail movement from Transearch report freight flows in tons, in the analyses where I incorporate non-rail movements, I also rely on tons as units of measurement of both rail and non-rail traffic. Measures of carloads include both railcars and individual intermodal container units.⁹⁴
101. Although revenues are not used for these analyses, revenue information is included in Appendices E and F to respond to 49 CFR § 1180.7(b)(3) and (4).⁹⁵ Due to unique data limitations in the combined waybill data, the total shipment revenue is often underreported. One of the reasons is that revenues for Class II and Class III railroads for single-line and interline movements are sometimes unobserved. For example, for an interline route involving UP and a Class II railroad, the Class II railroad's revenues are not observed when

⁹³ See Appendix C.

⁹⁴ Throughout this statement, “carloads” refers to the sum of loaded railcars or, in the case of intermodal shipments, the sum of intermodal containers. See *supra* footnote 13 for a discussion about railcars and individual intermodal container units.

⁹⁵ See Appendix E and F for additional details.

Rule 11 pricing is used unless the Class II's segment is sampled in the CWS. As a result, revenue-based analyses are likely to be less reliable. See Appendix C for further details.

4.1.4 Data quality screens

102. Traffic tapes provided by the six Class I railroads contain records from business operations and include certain inconsistencies and discrepancies described in Appendix C. CWS data from the STB are provided as a sample, so they are incomplete. To address inconsistencies and discrepancies in the traffic tapes provided by the six Class I railroads, as well as the CWS, I applied additional quality screens. Records subject to potential limitations, such as invalid commodity codes, origin or destination SPLCs, or routing information, were flagged as unreliable and therefore removed from my analyses when subject to potential limitations. See Appendix C for details. To further ensure that the analyses described below include sufficient data to draw meaningful conclusions the following additional screens are applied.
103. Three distinct filters are applied to account for small sample size. To draw meaningful conclusions about competition, a sufficient traffic volume needs to be observed at a point or along a corridor. First, a minimum average carload volume of 365 carloads per year over the 2019-2024 period is applied. This minimum volume requirement of 365 carloads per year is similar to the one carload per day requirement used in prior rail merger analyses.⁹⁶
104. Second, a “minimum 10 waybills in a year” requirement is applied for similar reasons. This minimum size restriction has been used in previous railroad transactions to account for the

⁹⁶ An alternative minimum carload shipment of 100 per year on average does not meaningfully change results. See Exhibit 12 workpapers.

CWS sampling and its limitations, resulting in a dataset that can be used for analyzing the impact of a railroad merger.⁹⁷ With the lowest waybill sample rate being 1 out of 40 (for single car intermodal shipments), limiting the analysis to corridors with at least 10 waybills in a year is similar to 365 carload shipments in a year for reliability.⁹⁸

105. Third, routings with fewer than 10 carloads in every year over the 2019-2024 period are excluded from analyses that use observed carloads to identify which operators are present. Routings with fewer than 10 carloads in every year often appear to be idiosyncratic and most likely involve a record, movement, or billing error.

4.2 Analysis of Access to Customers

106. I analyze the scope for adverse competitive effects from situations where UP and NS both serve the same customer location or the same geographic area. I find no significant scope for adverse competitive effects at either of these levels.

⁹⁷ See Majure VS at ¶ 90. “[M]easurement of shares as a reliable description of choices, has been recognized in the Board’s recent decision to adjust the Waybill sampling methodology to better capture smaller shipments. With the thin observation of these shipments that was still used in the 2019 Waybill Sample, the initial screen can be triggered by shares based on as few as 2 observed shipments which mathematically has to give one carrier at least 50 percent even if that is not an accurate representation of competition. This issue was indirectly addressed in past implementations of this test by imposing a minimum of one carload per day on candidate BEA area-commodity pairs. I will use an equivalent threshold for reliability of the screen.” See also, Vellturo 2001 VS at pp. 11-12. “For example, there are only 21 product/DBEA pairs where the combined volumes of the two railroads amount to more than a carload a day... I understand that the Board has stated that it must approve a transaction of this type ‘unless there will be adverse competitive impacts that are both ‘likely’ and ‘substantial.’” The small CN/EJ&E volumes within the 50/10 product/DBEA pairs indicate that this Transaction will not entail any such anticompetitive effects.” See also, Vellturo 2007 VS at p. 88.

⁹⁸ The lowest sample rate of waybills in the STB CWS Reference Guide is 1 out of 40. Using the 1 out of 40 sample rate, the minimum whole number of waybills that would be functionally equivalent to requiring 365 carloads per year would be 10 waybills. See 2023 STB CWS Reference Guide at p. 53.

4.2.1 Customer facilities

107. The first analysis assesses the effect of the merger on direct access to customer facilities, including access under reciprocal switching arrangements. This analysis —after omitting customers that have been offered commitments to ensure that they will continue to have competitive options post-merger—flags one customer accounting for {{[REDACTED]}} carloads in 2023 as potentially at risk of harm from reduced access competition. I treat this as de minimis and do not consider these carloads further.
108. For my analysis of direct access to customer facilities, I use the Serving Carrier Reciprocal Switch (“SCRS”) data as of August 2025.⁹⁹ The database lists each customer facility (identified with a CIF number), the stations associated with each CIF number, and the railroads a customer facility can access through any of those stations. If one of the railroads other than UP and NS was a Class II or Class III, I consider whether that railroad could interchange with one or more Class I railroads other than UP or NS. For example, if a customer facility has access to Evansville Western Railway, which gives them access to BNSF and CSXT, then BNSF and CSXT are counted as separate individual access points.
109. This review provisionally identifies customer facilities where a combination of UP and NS would reduce the number of railroads accessible to the customer from 2-to-1 or from 3-to-2.

⁹⁹ See UPRR_SCRS_Full_Desc_20250815.txt. The SCRS data allow carriers to update or retrieve information on customer locations and access to carriers, including serving carriers at specific stations and reciprocal switching agreements. Carriers use these data to facilitate proper routing, to determine switch charges, and to reduce the associated research required in normal business operations. Each record in the SCRS data provides information on a customer location, a station, the primary owner/serving carrier of the station, and any reciprocal switching agreements granting access to other carriers for that customer. I prepared the SCRS data for further analysis by standardizing key fields as described in Appendix C. Railinc, “Serving Carrier & Reciprocal Switch (SCRC) Business Rules Guide,” June 2017, available at https://public.railinc.com/sites/default/files/documents/SCRS_BusinessRules.pdf (accessed April 16, 2026).

I refine the list using information in Appendix B of the Novak VS which provides comments about the provisional list, including information about errors or incomplete information in the SCRS data (e.g. facilities that are not open to switching and the existence of additional reciprocal switching agreements). I remove customer facilities where these comments supported the conclusion that there would be no reduction in access at a given location.

110. Further, I incorporate information from the Novak VS on common ownership and existing business relationships among customer facilities that provide access to additional carriers.¹⁰⁰
111. To analyze traffic for these customers, individual customer names in the SCRS data are mapped to customer names in traffic tapes provided by Class 1 railroads. See Appendix C for details.
112. Exhibit 11 shows the resulting customer facilities where the number of railroads with access falls from 2-to-1 or from 3-to-2 as a result of the merger, along with the carloads carried from and to each location in 2023.

¹⁰⁰ See Novak VS at ¶ 57.

**Exhibit 11: Combined Railroad’s 2-to-1 or 3-to-2 Customer Stations
(All Commodities, at the identified Origins and Destinations)**

Customer	Station(s)	UP/NS Carloads (2023)	Total Carloads (2023)	Notes
2-to-1				
AgRail LLC	Bloomington, IL			Remedy offered
Hillsboro Energy LLC	Hillsboro, IL			Remedy offered
Macoupin Energy LLC	Monterey Mine 1 / Carlinville, IL			Remedy offered, carloads since 2021 (inclusive)
Midwest Salt LLC	Chicago, IL			Remedy offered, carload between 2019-2024
US Glu-Lam INC	Chicago, IL			Remedy offered, carloads between 2019-2024
3-to-2				
Mighty River Recycling LLC/ Azcon Inc. (Former Owner of MRR LLC's Facility)	Alton / Federal, IL			
Edmund A Allen Lumber	Momence, IL			carloads between 2019-2024
Lebanon Chemical Corp	Danville, IL			Station owned by CSXT; unclear whether customer is 3-to-2 or 4-to-3
Viscofan USA INC	Danville, IL			Station owned by CSXT; unclear whether customer is 3-to-2 or 4-to-3

Sources: Combined Waybill Data, UPRR_SCRS_Full_Desc_20250815.txt, 1-A-
Raw_UPRR_AAR_Station_Master.txt

113. Exhibit 11 shows that there are five 2-to-1 customer facilities, but only two of these have {{ }} shipment volumes in 2023 at these specific points: AgRail LLC and Hillsboro Energy LLC. Together they accounted for a total of only {{ }} cars in 2023. The other three 2-to-1 customers in Exhibit 11 have {{ }}: US Glu-Lam INC had {{ }} carloads in 2019-2024 data, Midwest Salt LLC had only {{ }} altogether in 2019-2024, and Macoupin Energy LLC had carloads counts {{ }} in years 2019 and 2020.¹⁰¹ Macoupin Energy and Hillsboro Energy are both operated by Foresight Energy LLC.¹⁰²

¹⁰¹ See Exhibit 11 workpapers.

¹⁰² Foresight Energy, “Operations,” available at <https://www.foresight.com/operations/> (accessed April 27, 2026).

114. I understand that to preserve horizontal competition for the five customer facilities facing a potential reduction in access from 2-to-1, the Applicants have committed to entering into agreements that would allow another existing Class I railroad to serve the facilities.¹⁰³ As noted, the number of carloads affected across these five customer facilities is small: {{[REDACTED]}} in 2023 as shown in Exhibit 11. If these commitments are effective at preserving horizontal competition for these customers, the affected customers will not be harmed by the proposed merger, and I do not include these carloads in my counts of carloads that could be affected by a loss of competition. However, my conclusion that the merger does not harm horizontal competition would be unaffected even if I included them.
115. Exhibit 11 also shows four 3-to-2 customers with a total of {{[REDACTED]}} carloads in 2023. Mighty River Recycling LLC/Azcon Inc. had {{[REDACTED]}} carloads. Edmond A Allen Lumber had {{[REDACTED]}} carloads in 2023 and only {{[REDACTED]}} carloads between 2019-2024.¹⁰⁴ The remaining two customers, Lebanon Chemical Corp and Viscofan USA INC, both use the Danville, IL, station owned by CSXT. The available access information for these two customer facilities is unclear: both may face an access reduction from 4-to-3, rather than 3-to-2, which would exclude them from further analysis.¹⁰⁵ In any event, these two customers {{[REDACTED]}}. In fact, UP or NS moved only {{[REDACTED]}} carloads in 2023 for both customers combined, out of a total {{[REDACTED]}} carloads. While CSXT moved {{[REDACTED]}} carloads for Lebanon Chemical Corp between 2019-2024, UP and NS

¹⁰³ See Novak VS at ¶ 55-56.

¹⁰⁴ See Exhibit 11 workpapers.

¹⁰⁵ In addition, for these two customers, Kankakee, Beaverville & Southern Railroad (“KBSR”), could provide access to CN for customer locations in Danville, IL. However, it is unclear from the SCRS data whether those facilities are open to KBSR. See Novak VS at Appendix B.

combined moved {{[REDACTED]}} carloads for this customer in the same period.¹⁰⁶ Similarly, Viscofan used CSXT to move {{[REDACTED]}} carloads between 2019-2024 while UP and NS jointly moved only {{[REDACTED]}} carloads in the same period.¹⁰⁷

116. These are all 3-to-2 customers (and possibly 4-to-3 for two customers in Danville), which means they have access to another Class I railroad other than UP or NS, and will continue to have that other option after UP and NS merge.

4.2.2 BEAs

117. This analysis considers the effect of the merger on the number of railroads that serve individual BEAs. The Bureau of Economic Analysis designed Economic Areas (which are referred to as BEAs in this statement) as the basis for regional and economic analysis. It describes BEAs as consisting “of one or more economic nodes—metropolitan areas or similar areas that serve as centers of economic activity—and the surrounding counties that are economically related to the nodes.”¹⁰⁸ Analyzing access at the BEA level captures potential changes in the number of options available to customers that use truck to deliver freight to an access point, so that the geographic scope of competitive rail alternatives includes more than just the customer location. It can also capture some aspects of potential competition for customers that are expanding or relocating within an area and are choosing where to site their facility.

¹⁰⁶ See Exhibit 11 workpapers.

¹⁰⁷ See Exhibit 11 workpapers.

¹⁰⁸ BEA Survey of Current Business at p. 75.

118. For each BEA, the analysis uses the combined waybill data for 2019-2024 to identify the railroads that originate traffic of any commodity in that BEA and separately also the railroads that terminate traffic of any commodity in that BEA.
119. I find no BEAs for which the proposed merger would result in the number of railroads changing from 2-to-1 or from 3-to-2 when considering traffic originating at the BEA or terminating at the BEA.¹⁰⁹

4.3 *Analysis of Competition Within Corridors*

4.3.1 *Overview*

120. This section analyzes horizontal competition to transport freight along the same segment of specific corridors. The focus on the assessment is on the potential adverse competitive effects of the merger on linehaul services between different points. The analysis proceeds in two steps. The first step is an initial screen that flags a corridor based on the potential horizontal effect of the merger on the number of options available to customers on segments within that corridor that are observed in the combined waybill data. The second step is to conduct further analysis about competition on the flagged corridors to assess whether the

¹⁰⁹ See BEA access analysis workpapers. Note that one BEA, Columbia, MO, initially was identified as a 3-to-2 BEA based on the analysis of the combined waybill data, which identified service provided by UP, NS, and {{REDACTED}}. However, a closer review of the data identified {{REDACTED}} shipments to the {{REDACTED}} {{REDACTED}} station locator indicates that {{REDACTED}} is in {{REDACTED}} which would place the station in the Kansas City, MO-KS BEA. However, the Railinc Station Master indicates that the station is in {{REDACTED}} which is part of the Columbia, MO BEA. Regardless of its precise location, {{REDACTED}} is very close to the boundary of each BEA. In addition, {{REDACTED}} has other stations locations within the Columbia, MO BEA, though waybill records did not identify any shipments to them during the period I reviewed. Therefore, for the purposes of my competitive assessment, it is appropriate to consider {{REDACTED}} as a competitor in the Columbia, MO BEA. Because {{REDACTED}} has stations in the Columbia, MO BEA, it is a 4-to-3 BEA. {{REDACTED}}

corridor can be unflagged entirely, or whether at least some of the traffic on the corridor is protected from the risk of harm.

The analysis shows that there is limited scope for potential horizontal harm to competition within corridors as a result of the proposed merger. Among the over 1,000 corridors in my analysis where UP and NS both operate, I find that there are no corridors where there would be a loss of competition from a reduction from 2-to-1 in the number of railroads on a segment of the corridor.¹¹⁰ There are at most 15 corridors where there might be a loss of competition from a reduction from 3-to-2 in the number of railroads observed on a segment of the corridor, and only {{[REDACTED]}} carloads of freight in 2023 on these corridors that might be exposed to harm from horizontal competitive.

122. This analysis is not limited to competition within “major” corridors but rather considers all corridors with volumes over 365 cars per year.¹¹¹

4.3.2 Initial screen

123. Corridors are defined as BEA-BEA pairs. Analysis of within-corridor competition at the BEA level is an appropriate way to focus attention on horizontal competitive effects on the linehaul service along the corridor, rather than on competition to provide access to the customer.

¹¹⁰ See Exhibit 12 workpapers.

¹¹¹ Corridors with less than 365 average carloads a year are excluded as it is difficult to form reliable conclusions about competitive options with so few observations. See Section 4.1.

124. Corridors in this section are bidirectional, which means that the analysis considers options for moving freight between two BEAs regardless of the direction of travel.¹¹²
125. A corridor between two points can be traversed via different routes or routings. For example, one option for customers to move freight in the Kansas City, MO - Miami, FL corridor is an interline routing where UP serves the Kansas City end, CSXT serves the Miami end, with an interchange in St. Louis. Another option has NS at the Kansas City end, Florida East Coast Railway (FEC, a Class II railroad) serving the Miami end, with an interchange in Jacksonville, FL. These two alternatives can be discussed with information about the interchanges, in which case they are referred to as routings (UP-ESTL-CSXT and NS-JACVL-FEC), or without, in which case they are referred to routes (UP-CSXT and NS-FEC).
126. Movements that are entirely within the BEA are omitted from this analysis. For example, suppose there is a shipment between Little Rock, AR and Dallas-Fort Worth, TX on a “UP-FORTH-BNSF” routing. UP moves the railcars between Little Rock and Fort Worth, where it interchanges with BNSF. BNSF’s portion of the move is from the interchange point within the Dallas-Fort Worth BEA to the customer facility within the same Dallas-Fort Worth BEA. Since BNSF’s movement is entirely *within* the BEA, and the focus of my analysis here is on

¹¹² When analyzing competition between corridors in Section 4.4, on the other hand, the direction of travel is important because that analysis focuses specifically on the location of supply and demand of specific commodities. In that section a corridor is defined as an originating and terminating origin-destination pair. Note as well that the appendices provided pursuant to STB regulation 49 CFR § 1180.7(b)(3), and (4) refer to *directional* origin-destination pairs rather than *directionless* (or *bi-directional*) BEA-BEA pairs.

competition to provide linehaul service from one BEA to another BEA, the analysis considers this routing as equivalent to “UP.”¹¹³

127. The analysis uses freight movements observed in the 2019-2024 combined waybill data to identify customers’ options. A routing is counted as a competitive option if the combined waybill data contain records of shipments with that routing, in either direction, in any year between 2019 and 2024, and for any commodity.¹¹⁴ This approach efficiently uses information in the combined waybill data to analyze the options available to shippers to move freight between BEAs. For example, if a route is a viable option for one commodity, then it is a viable option for other commodities when the focus is linehaul service between BEAs. Using all commodities to assess competition within a corridor is consistent with analyses in prior transactions.¹¹⁵
128. These data are used to provisionally flag a corridor if UP and NS are the only two railroads that both operate at the same end of the corridor or are two of only three that do so. For example:
 - a. Both UP and NS provide single-line service in the Kansas City, MO - St. Louis, MO corridor, and so both operate at both the Kansas City and St. Louis ends of the

¹¹³ I analyzed separately whether the merger might limit customers’ options for within-BEA movements and find no examples where the number of options goes from 2-to-1 or from 3-to-2. In particular, using SPLC level information from the combined waybill data I identified SPLC-to-SPLC movements within the BEAs, either to a final point within the BEA, or to a point within the BEA where the shipment was interchanged with another railroad for onward travel. As an example of the second kind, if a shipment originates at one SPLC in the Chicago-Gary-Kenosha BEA, and gets interchanged with another railroad at another SPLC within the same Chicago-Gary-Kenosha BEA, I analyze the different options for this SPLC-to-SPLC journey that are observed in the combined waybill data. *See* Within-BEA analysis workpapers.

¹¹⁴ *See* exclusions and discussion on data quality screens in Section 4.1.4.

¹¹⁵ *See*, for example, Majure VS at ¶ 42 where he assesses within-corridor competition using independent routes with all commodities combined.

corridor. However, at least two other carriers also operate single-line service on the corridor, so Kansas City - St. Louis is not flagged for further review.

- b. CN, NS, and UP all participate in interline services in the Appleton, WI - St. Louis, MO corridor, with all of them operating at the St. Louis end. CN and Wisconsin and Southern Railroad (WSOR, a Class II railroad) both operate in Appleton BEA, with CN providing single-line service from Appleton to St. Louis and WSOR providing interline services. There are two railroads at the Appleton end of the corridor before and after the merger. However, this corridor is initially flagged for further review as a 3-to-2 because there are three railroads, CN, NS, and UP, at the St. Louis end before the merger, but only two afterwards.

129. The analysis also considers the possibility that there could be a horizontal effect on competition if UP and NS both operate as a bridge between the end segments of the same three-part route along the BEA-BEA corridor. For example, the Orlando, FL - Nuevo Leon, Mexico corridor contains one routing with UP serving the middle segment (CSXT-UP-FXE), and another routing with NS serving the middle segment (FEC-NS-CPKC). A review of the routings within the corridor indicates that there is not a competitive concern on this corridor or other similar corridors.¹¹⁶

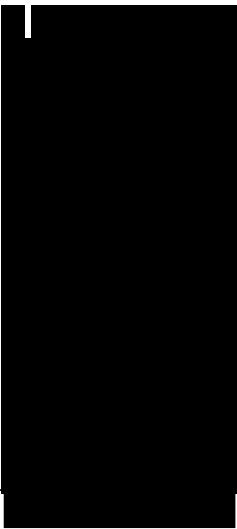
¹¹⁶ A review of the Orlando, FL - Nuevo Leon, Mexico corridor shows routings such as CSXT-UP-FXE and FEC-NS-CPKC where UP and NS appear as bridges between the originating and terminating railroads. Because on these routings UP handles traffic to the west of the Mississippi River, while NS handles traffic to the east of the Mississippi River, these are not segments that will experience a loss of horizontal competition as a result of the merger. A few other bridges are also unflagged for similar reasons. *See* Exhibit 12 workpapers.

4.3.3 Results

130. After applying the initial screen, further analysis of competitive effects within the flagged corridors shows that (1) some of the flagged corridors can be unflagged from the final list of affected corridors as there will be no material adverse horizontal competitive effects, and that (2) many of the carloads carried on the flagged corridors that remain can be excluded from the final count of affected carloads because there is little risk that they will face adverse competitive effects. The various further analyses are described in more detail in Section 4.3.4.
131. The final results, after both types of exclusion, are shown in Exhibit 12 below. Two different measures of carloads are shown. The difference between them is that the final carloads measure (“final carloads”) also unflags corridors based on whether additional interline options can be added based on traffic observed on segments in the combined waybill data.¹¹⁷

¹¹⁷ See section 4.3.4 (5).

Exhibit 12: Combined Railroad’s 3-to-2 Corridors

Corridors				Carloads	Final Carloads
BEA Name	BEA Number	BEA Name	BEA Number		
Appleton-Oshkosh-Neenah, WI	60	St. Louis, MO-IL	96		
Augusta-Aiken, GA-SC	27	St. Louis, MO-IL	96		
Beaumont-Port Arthur, TX	87	Houston-Galveston-Brazoria, TX	131		
Champaign-Urbana, IL	68	Jackson, MS-AL-LA	77		
Chattanooga, TN-GA	43	Kansas City, MO-KS	99		
Chattanooga, TN-GA	43	St. Louis, MO-IL	96		
Columbia, MO	98	Houston-Galveston-Brazoria, TX	131		
Harrisburg-Lebanon-Carlisle, PA	11	New Orleans, LA-MS	83		
Huntsville, AL-TN	74	Kansas City, MO-KS	99		
Jackson, MS-AL-LA	77	Springfield, IL-MO	97		
Johnson City-Kingsport-Bristol, TN-VA	45	New Orleans, LA-MS	83		
Savannah, GA-SC	28	St. Louis, MO-IL	96		
Shreveport-Bossier City, LA-AR	88	Columbia, MO	98		
Springfield, IL-MO	97	Cedar Rapids, IA	103		
State College, PA	9	Champaign-Urbana, IL	68		
Total					

Notes: The number of carloads reflect 2023 traffic.

Sources: Combined Waybill Data; Transearch Data.

132. I find that there are no corridors where horizontal competitive harm is likely to result from a reduction in customers’ options on a segment of the corridor where options observed in the combined waybill data are reduced from 2-to-1.¹¹⁸

133. I also find that there are only 15 corridors within which customers’ options—as observed in the combined waybill data—may be reduced from 3-to-2 on a segment of the corridor, and that remain flagged after conducting further analysis. Exhibit 12 shows there are only {{}} carloads in these corridors. This figure represents the carloads on those corridors in 2023 exclusive of intermodal and automotive shipments and commodities that primarily travel by truck or other non-rail methods.

¹¹⁸ See Section 4.3.4 for a discussion of the corridors that were initially flagged, but where further review showed that there was no competitive concern. See Exhibit 12 workpapers.

134. The results in Exhibit 12 already reflect the second step of the analysis, in which corridors that were initially flagged because of a reduction in the number of options on a segment within the corridor were further assessed. This further analysis is described in detail below.

4.3.4 Further analysis of horizontal within-corridor competition

135. The second step investigates corridors that were initially flagged to assess whether the corridor can be unflagged entirely, or whether some of the traffic on the corridor is protected from harm.

(1) COMPETITION WITH NON-RAIL MODES

136. Some customers within a flagged corridor are protected from potential horizontal anticompetitive harm because they have other competitive alternatives. Non-rail freight flows between BEAs show where customers have a viable non-rail option to move freight within a given corridor.
137. The most common non-rail option in the data is trucking, although water movements are important for some origins and destinations and pipelines are important for certain commodities.¹¹⁹ This analysis considers only trucking and water transport as competing non-rail alternatives, meaning pipeline, air and “other” are excluded.¹²⁰ Trucking is generally a fragmented industry, which means customers in corridors where trucks are a viable

¹¹⁹ See In-text calculation workpapers.

¹²⁰ Including these other modes does not alter the conclusions. See also Appendix E where all modes are reported.

alternative have numerous competing truck options in addition to rail.¹²¹ Customers in corridors where water transport is a viable alternative also have competitive waterway options in addition to rail.¹²²

138. These alternative non-rail options vary across commodities. In the combined waybill data, commodity information is available at a 7-digit STCC code. As described in Section 4.1, the non-rail freight data from Transearch contain information on freight flows at the 4-digit STCC code.¹²³
139. To capture competition with non-rail modes, traffic on a flagged corridor for a particular commodity is excluded from the final carloads reported in Exhibit 12 if non-rail (truck and water) freight volume (measured in tons) accounts for 50 percent or more of the combined freight tonnage by rail and non-rail for that commodity on that corridor.¹²⁴

¹²¹ According to the U.S. Department of Transportation, as of June 2025, nearly 580,000 active U.S. motor carriers were registered with the Federal Motor Carrier Safety Administration (“FMCSA”) that owned or leased at least one tractor. Among those carriers, 91.5 percent operate 10 or fewer trucks and 99.3 percent operate no more than 100 trucks. *See* American Trucking Associations, “Economics and Industry Data,” available at <https://www.trucking.org/economics-and-industry-data> (accessed April 15, 2026). *See also*, USDA Agricultural Marketing Service, “Study of Rural Transportation Issues, Chapter 13: Truck Transportation,” available at <https://www.ams.usda.gov/sites/default/files/media/RTIReportChapter13.pdf>, at p. 404. “[T]he average ratio of operating cost to operating revenue is a tight 95 percent in over-the-road long-haul truckloads, demonstrating that the sector is highly competitive.”

¹²² *See* USDA Agricultural Marketing Service, “Study of Rural Transportation Issues, Chapter 12: Barge Transportation,” available at <https://www.ams.usda.gov/sites/default/files/media/RTIReportChapter12.pdf>, at p. 377. “[T]he barge industry is generally considered to be highly competitive—perhaps not as competitive as the truck industry, but more competitive than rail. Rates are determined by market conditions and no one company dominates the market.”

¹²³ *See* Appendix C.

¹²⁴ The Interstate Commerce Commission (“ICC”) stated that effective competition can be created from alternative modes with shares as low as 28 percent. In addition, in one decision, the STB expanded an ICC decision that exempted the transportation of hydraulic cement from regulation in part because there is “effective competition” to railroads if alternative modes to railroad transport (including trucks) have a 57 percent share of freight. *See* Surface Transportation Board, “Rail General Exemption Authority—Exemption of Hydraulic Cement,” Ex Parte No. 346 (Sub-No. 34), STB Decided December 4, 1996 (“STB Exemption of Hydraulic Cement”), at pp. 3-4.

(2) AUTOMOTIVE AND INTERMODAL

140. In assessing the number of railroads operating within each corridor, all types of freight are included in order to capture the most complete information about viable options. However, the final carloads in Exhibit 12 exclude traffic that is carried in intermodal containers¹²⁵ and motor vehicles (commodity code STCC 3711) and motor vehicle parts (commodity code STCC 3714).¹²⁶ STB and Interstate Commerce Commission (“ICC”) decisions have stated that there is “effective competition” in the transport of these categories of traffic.¹²⁷

(3) THE SPRINGFIELD, IL-MO - EVANSVILLE-HENDERSON, IN-KY CORRIDOR

141. The Springfield, IL-MO - Evansville-Henderson, IN-KY corridor is initially flagged as a 2-to-1 corridor in the analysis because all routings in this corridor involve either UP or NS in

¹²⁵ Intermodal shipments are identified in the combined waybill data as shipments with AAR equipment codes starting with P, Q, S, U, or Z. For waybills that come from the CWS data, I rely on the service type code to identify intermodal.

¹²⁶ Corridors that have less than 365 carloads after excluding intermodal shipments, automotive shipments, and commodities for which truck and water non-rail volume accounts for 50 percent or more of the combined freight tonnage are excluded from Exhibit 12.

¹²⁷ The ICC exempted “from its regulation the rail transportation of motor vehicles (STCC 37-11) and motor vehicle parts or accessories (STCC 37-14)” since “such regulation is not needed to protect shippers from an abuse of market power.” The ICC stated that “[o]n account of motor carrier competition, geographic competition generally, and various shipper options and powers, there is, overall, effective competition for the rail transportation of motor vehicles and motor vehicle parts and accessories.” *See* Surface Transportation Board, “Rail General Exemption Authority—Transportation Equipment,” Ex Parte No. 346 (Sub-No. 27), ICC Decided December 30, 1992 (9 I.C.C. 2d), at pp. 1-2.

Trailer-on-flatcar (“TOFC”) and container-on-flatcar (“COFC”) transportation had “long been exempted from economic regulation” by the ICC. “The basis for the ICC’s exemption of TOFC/COFC traffic from economic regulation was the agency’s finding that transportation of these intermodal shipments is market-driven and subject to widespread and effective competition from both motor carriers and other railroads. Shippers can truck their freight to any railroad intermodal ramp, or move it entirely over the highways, enabling them to choose the most effective and commercially responsive service and price offerings.” *See* Surface Transportation Board, “WTL Rail Corporation Petition for Partial Revocation of Exemption,” Ex Parte No. 230 (Sub-No. 9), STB Decided February 15, 2006, at p. 1.

The ICC considers trucks to “compete effectively” over a distance of 200-250 miles and that other non-rail options can also compete effectively for longer hauls. *See* STB Exemption of Hydraulic Cement at pp. 2-3.

the Springfield segment. This corridor, however, {{ [REDACTED] [REDACTED] }}.¹²⁸ As described in section 4.2 above, Applicants have committed to entering into agreements that would allow another existing Class I railroad to serve this customer in that location.¹²⁹ Given the commitment, I exclude carloads from this corridor from my assessment of potential effects on competition within corridors.

(4) CORRIDORS TRAVERSING THE KANSAS CITY - ST. LOUIS SEGMENT

142. The initial screen flags some corridors that traverse the segment between Kansas City and St. Louis.¹³⁰ In each case the corridor is flagged because UP and NS are either the only two railroads that are observed on the Kansas City - St. Louis segment of the corridor in the combined waybill data or are two of only three railroads. However, further analysis of the combined waybill data confirms that customers on these corridors will likely retain at least three competing options on each of these corridors after the merger.
143. First, the BEA-BEA corridor of Kansas City, MO - St. Louis, MO itself is not flagged because there are four railroads that offer single-line service: BNSF, CPKC, NS, and UP, each with significant volumes. Exhibit 13 below shows carloads transported on these single-

¹²⁸ Between 2019 and 2024, {{ [REDACTED] [REDACTED] }}. See In-text calculation workpapers.

¹²⁹ See Novak VS at ¶¶ 55-56.

¹³⁰ For example, the Boise City, ID - St. Louis, MO corridor involves movements from Boise City to Kansas City (with an interchange in Kansas City for some shipments) and then the movement along Kansas City - St. Louis segment to St. Louis. Similarly, the Kansas City, MO - Richmond City, VA corridor also includes a similar two-part movement: from Kansas City to St. Louis (with an interchange in St. Louis) and then continued travel to Richmond City.

line services between these two BEAs by each respective railroad in 2023. After the merger, at least 3 direct single-line Class I railroads would continue serving this corridor.

Exhibit 13: Routings in the Kansas City, MO - St. Louis, MO BEA-BEA Corridor, 2023

Routing	Carloads in 2023
UP	
CPKC	
BNSF	
NS	
Total	

Source: Combined Waybill Data.

144. In addition to the end-to-end shipments between Kansas City - St. Louis shown in Exhibit 13 above, these four Class I railroads also carry thousands of carloads along this corridor that they interchange either at Kansas City or St. Louis.¹³¹
145. Moreover, I understand that there exist special arrangements to facilitate interchange between all Class I railroads present in those BEAs. In Kansas City, the Kansas City Terminal Railway Company (KCT), a Class III railroad, serves as a terminal railroad and provides linehaul access for its four Class I railroad owners: BNSF, CPKC, NS, and UP.¹³² I understand all four Class I railroads in Kansas City can interchange any type of traffic with each other through KCT.¹³³

¹³¹ See In-text calculation workpapers.

¹³² Kansas City Terminal Railway, “About Us,” available at <https://kctrailway.com/about> (accessed April 20, 2026).

¹³³ Amended Railroad Control Application, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873 (“Amended Application”), at § 1180.6(b)(6).

146. Similarly, the Terminal Railroad Association of St. Louis (“TRRA”), a Class III railroad, operates a switching terminal that interchanges with all six Class I railroads in St. Louis.¹³⁴ The TRRA is jointly owned by five out of six Class I railroads—all except CPKC—and services all five Class I owners and subsidiaries of CPKC as well.¹³⁵ Also in St. Louis, all six Class I railroads have access to the Alton & Southern Railway, a switching railway that is a wholly owned UP subsidiary.¹³⁶ The primary role of the Alton & Southern Railway is to provide switching and terminal services, including short-line railroad connections to all six Class I railroads.¹³⁷ I understand all six Class I railroads in St. Louis can interchange any type of traffic with each other through TRRA and Alton & Southern Railway.¹³⁸
147. In light of this evidence, customers on the flagged corridors that traverse this segment likely have other feasible interline options. These competing interline options are identified based on movements in the combined waybill data for interlined routes that include the Kansas City - St. Louis segment on routes to/from the additional origins or destinations. For example, the corridor between Philadelphia, PA - Kansas City, MO BEAs includes routings

¹³⁴ Terminal Railroad Association of St. Louis, “Switching Services,” available at <https://terminalrailroadstl.odoo.com/switching> (accessed April 17, 2026); Terminal Railroad Association of St. Louis, “FAQ,” available at <https://terminalrailroadstl.odoo.com/faq> (accessed April 20, 2026); Terminal Railroad Association of St. Louis, “TRRA History,” available at <https://terminalrailroadstl.odoo.com/history> (accessed April 20, 2026).

¹³⁵ Terminal Railroad Association of St. Louis, “Our Capabilities,” available at <https://terminalrailroadstl.odoo.com/> (accessed April 21, 2026).

¹³⁶ Alton & Southern Railway, “About Alton & Southern,” available at <https://www.altonsouthern.com/about/> (accessed April 20, 2026) (“Alton & Southern Railway”) (“the Alton & Southern is still an autonomous company with all its own board of directors, legally separate from the Union Pacific”).

¹³⁷ Alton & Southern Railway; Alton & Southern Railway, “What We Do,” available at <https://www.altonsouthern.com/services/> (accessed April 20, 2026); American Rails, “Alton and Southern Railway: A St. Louis Terminal Line,” September 2, 2024, available at <https://www.american-rails.com/als.html> (accessed April 17, 2025).

¹³⁸ Amended Application at § 1180.6(b)(6).

such as “NS-ESTL-UP”, “CSXT-ESTL-UP” and also “CSXT-ESTL-BNSF.” Review of the combined waybill data identifies shipments on routings from Philadelphia BEA to other BEAs where CSXT interchanges with CPKC “CSXT-ESTL-CPKC” even if these routings do not go to Kansas City. Because this is a viable interchange with actual traffic volumes on CSXT on the portion of the corridor from Philadelphia to St. Louis, which is interchanged with CPKS, the destination for such interchanged traffic may as well be Kansas City.

148. Such examination rules out some of the initially identified corridors that include the Kansas City-St. Louis segment on interlined routes.

(5) ADDITIONAL INTERLINE OPTIONS

149. The approach of identifying feasible interline routes via major interchanges used on routes that traverse the Kansas City - St. Louis segment is extended to all corridors as an additional analysis.
150. The combined waybill data might not include movements on all the feasible routes that customers can choose from within a corridor. Many corridors have relatively few customers and customers may prefer to consolidate all of their volume in a corridor using just one route.¹³⁹ To account for the possibility that alternative feasible routes exist on a corridor, traffic information in the combined waybill data on individual segments and traffic interchanges at the main gateways is used to add additional interline options that are

¹³⁹ For example, the Kansas City, MO – St. Louis, MO corridor has direct service by all four Class I railroads, but a customer may choose to consolidate their volume with only one of them.

available to customers, but which are not observed in the combined waybill data on a given route and so are not included when applying the initial screen.¹⁴⁰

151. For example, the Appleton, WI - St. Louis, MO corridor includes direct service on CN as well as interline service options, with one interline route {{[REDACTED]}} with an interchange in Chicago (routing {{[REDACTED]}}). These observed options are supplemented with {{[REDACTED]}}, even though this routing is not observed in the combined waybill data, because (1) Chicago is a chosen interchange on existing routing on this corridor, (2) {{[REDACTED]}} in Chicago on other interline routes and (2) {{[REDACTED]}} operates between Chicago and St. Louis on other interline routes.
152. The last column in Exhibit 12 shows zero carloads for corridors where this analysis identifies additional interline options sufficient to show that there will be no significant competitive harm.¹⁴¹

4.3.5 Loss of independent routes

153. The analysis of horizontal competition described above is a separate and distinct inquiry from an examination of the loss of independent options that was used in some prior railroad

¹⁴⁰ The main gateways correspond to the following Rule 260 junctions: “CHGO”, “ESTL”, “STLOU”, “NEWOR”, “MEMPH”, “KCITY”, and “KANCY”. See Exhibit 12 workpapers.

¹⁴¹ The analysis of whether there are additional interline options is not limited to the corridors that were initially flagged but is extended to cover all corridors observed in the waybill data. This extension does flag additional corridors as involving a change in the number of options on a segment that were not identified by the initial screen. However, none of these involve traffic volumes of more than 365 carloads per year on average. See Exhibit 12 workpapers.

mergers.¹⁴² For example, in the CPKC merger, two competing options were defined as “independent” if they do not have any carriers in common.¹⁴³

154. Note that an analysis that considers only the loss of independent routes will not capture all instances where there is a potential loss of horizontal competition. The analyses I describe in this report, by contrast, capture them all. For example, the Chattanooga, TN – Kansas City, MO corridor is initially flagged as 3-to-2 in the analysis of the loss of horizontal competition since there is a reduction in the number of options in Kansas City due to the merger.¹⁴⁴ However, there is no change in the number of independent options in this corridor.
155. Moreover, corridors in which there is the loss of an independent route will generally either (1) feature UP and NS operating on the same segment of the corridor, in which case they would be included in my analysis of within-corridor competition in this verified statement, or (2) feature UP and NS operating at different ends of the corridor, in which case I understand that analysis of the corridor would be included in Dr. Mark Israel’s verified statement.¹⁴⁵ A loss of an independent route that is also an instance of a potential loss of horizontal competition is included in my analysis of within-corridor competition.
156. For example, the observed routes in the Champaign-Urbana, IL - Jackson, MS corridor are {{ [REDACTED] }}. This corridor would be

¹⁴² See Majure VS at ¶ 12, § 4 and Verified Statement of Curtis M. Grimm, “Norfolk Southern Railway Company – Acquisition and Operation – Certain Rail Lines of the Delaware Hudson Railway,” November 5, 2014, Finance Docket No. 35873, at pp. 89-91.

¹⁴³ See Majure VS at ¶ 50.

¹⁴⁴ The observed routings in this corridor are {{ [REDACTED] }}. See Exhibit 12 workpapers.

¹⁴⁵ It is possible that the same corridor is reviewed in both.

flagged as a 3-to-2 by a horizontal screen, since only {{[REDACTED]}} NS, and UP are present in the Champaign end of the corridor. It would also be flagged as a loss of an independent route. In contrast, the observed routes in the Lexington, KY - Los Angeles, CA corridor are {{[REDACTED] [REDACTED]}}. There are two independent options on this corridor pre-merger, but after the merger the combined railroad would participate in all routes, reducing the number of independent options to one. However, because UP and NS operate on different ends of the corridor—NS operates in Lexington while UP operates in Los Angeles—this is not flagged as a loss of horizontal competition.

157. Note that the appendices provided pursuant to STB regulation 49 CFR § 1180.7(b)(3) provide shares for all major corridors and therefore include the required information for all major corridors on which there is a reduction in the number of independent routes.

4.4 Analysis of Competition Between Corridors

4.4.1 Overview

158. The ability of a customer to use alternative railroads to receive a particular product from different origins is commonly referred to as “source competition,” and the ability of a shipper to use alternative railroads to ship its product to different destinations is commonly referred to as “destination competition.”¹⁴⁶ An example of source competition would be printing

¹⁴⁶ United States General Accounting Office, “Freight Railroad Regulation, Surface Transportation Board’s Oversight Could Benefit From Evidence Better Identifying How Mergers Affect Rates,” July 2001, available at <https://www.gao.gov/assets/gao-01-689.pdf>, at p. 37; OECD Competition Committee, “Structural Reform in the Rail Industry, Series Roundtables on Competition Policy No 55,” 2005, available at https://www.oecd.org/content/dam/oecd/en/publications/reports/2005/12/structural-reform-in-the-rail-industry_94ae372c/6c4956ff-en.pdf, at p. 38.

paper that is delivered to Boston, MA from Portland, ME and from New York, NY. An example of destination competition would be printing paper that is delivered from Portland, ME to Boston, MA and also to Buffalo, NY. Such between-corridor competition is horizontal if two railroads operate on the same segment of routes within competing corridors, for example if one of the railroads terminates shipments of printing paper from Portland in Boston while the other terminates shipments from Portland in Buffalo.

159. Because the geographic pattern of supply and demand will vary by commodity, it is appropriate to analyze source competition and destination competition at the commodity level and analyses in this section focus on the extent to which a merger between UP and NS may affect source competition or destination competition for each origin-commodity and destination-commodity pair.¹⁴⁷

160. The methodology described below is similar to the analyses in prior railroad mergers.¹⁴⁸ There are two steps. In the first step, origin-commodity pairs and destination-commodity pairs are flagged for additional review using what is known as a 50/10 screen based on traffic shares. The second step involves further analysis of the options available to customers using tests based on critical loss analysis (“CLA”).

161. These analyses initially flag {{[REDACTED]}} carloads for additional review. All of these are unflagged by the further analyses.

¹⁴⁷ This analysis is not limited to major origin-commodity pairs or major destination-commodity pairs, as provided in the Appendix F.

¹⁴⁸ See, for example, *Majure VS* at § 5; *Vellturo 2007 VS* at § III.

4.4.2 Destination competition

4.4.2.1 The 50/10 screen

162. The analysis begins with an initial screen, the 50/10 screen, which flags a preliminary list of origin-commodity pairs.¹⁴⁹ These preliminary origin-commodity pairs are then reviewed to identify potential horizontal competitive concerns.
163. An origin-commodity pair is flagged for further review if (1) a combination of UP and NS would have a share of more than 50 percent of shipments of that commodity, aggregated over all the destinations served by that origin, and (2) each of UP and NS individually has a share of at least 10 percent of traffic of that commodity, aggregated over all destinations served by that origin.
164. The 50 percent and 10 percent thresholds are applied to (1) UP and NS shares of originating traffic at the origin, and (2) UP and NS shares of terminating traffic at the destinations. Both of these screens flag origin-commodity pairs where the merger might potentially have adverse horizontal effects from reduced competition on the same segment of competing routes.
165. The analysis of prior mergers has included a third 50/10 screen called the participating screen.¹⁵⁰ The screen is based on the share of traffic on which UP and NS participate at any point along the route. Unlike the origination and termination screens, the participation screen can flag origin-commodity pairs if UP originates (terminates) significant volumes and NS

¹⁴⁹ See, for example, *Majure VS* at § 5; *Vellturo 2007 VS* at § III.

¹⁵⁰ See *Majure VS* at ¶¶ 77-85; *Vellturo 2007 VS* at pp. 85-88.

terminates (originates) them, rather than because they operate on the same end of competing routes. While the focus in this statement is on horizontal competition, the participation screen is also included.

166. The analysis includes consideration of competition from non-rail options.¹⁵¹ I discuss the 50/10 screen in more detail in Appendix G.

4.4.2.2 Further analysis

167. The 50/10 screen flags origin-commodity pairs for further analysis. Analysts in prior railroad mergers have employed versions of Critical Loss Analysis (“CLA”) that assess the ability of shippers and receivers to avoid potential price increases in more detail.¹⁵² This section describes the version of the analysis used here.

(1) DEMAND AVAILABLE TO SHIPPERS (CLA 1)

168. If shippers at a flagged origin-commodity pair respond to changes in the transportation cost to one destination by reallocating shipments to other customers at different destinations, then the shipper’s ability to switch destinations can also protect them from the impact of changes by the combined railroad if (1) there are destinations that shippers can reach without relying on the combined railroad and (2) those destinations have sufficiently high demand for that commodity relative to the volume shipped from the origin-commodity pair in question. The ability of shippers to switch to alternative sources of demand in response to an attempted

¹⁵¹ This is similar to consideration of trucking in prior railroad mergers. *See*, for example, Velturo 2007 VS at pp. 127-128, 153.

¹⁵² *See* Majure VS at ¶¶ 92-94.

price increase has been investigated in prior railroad mergers in the framework of a critical loss analysis (“CLA 1” hereafter).¹⁵³

169. Note that competition from non-rail freight movements is explicitly included in this analysis.¹⁵⁴ See Appendix G for more details.

(2) SUPPLY AVAILABLE TO RECEIVERS (CLA 2)

170. The ability of customers to switch to alternative sources of supply has also been investigated in prior railroad mergers in the framework of a critical loss analysis (which I will refer to as “CLA 2”).¹⁵⁵ Receivers are protected from the impact of changes by the combined railroad if (1) there are alternative origins receivers can access without relying on the combined railroad and (2) those alternative origins have a sufficiently large supply of the commodity in question.

171. Note that competition from non-rail freight movements is explicitly included in this analysis.¹⁵⁶ See Appendix G for more details.

4.4.2.3 Implementation

172. The analysis of destination competition uses BEAs to identify origins and destinations and looks at each origin-commodity pair individually. The analysis considers whether customers

¹⁵³ See, for example, Majure VS at ¶¶ 92-94.

¹⁵⁴ See, for example, Vellturo 2007 VS at pp. 127-128, 153.

¹⁵⁵ See Majure VS at ¶¶ 92-94.

¹⁵⁶ See, for example, Vellturo 2007 VS at pp. 127-128, 153.

can substitute between different corridors connecting two BEAs. The corridors in this section are directional (one end is the origin and one is the destination).

173. Commodities are classified in the combined waybill data and the Transearch data using the Standard Transportation Commodity Classification Code (“STCC”).¹⁵⁷ My principal analysis uses the 4-digit STCC level of aggregation. Some commodities may be close substitutes at the 7-digit STCC level and therefore should be grouped together for competitive analysis, which is what 4-digit STCC codes do. In addition, analysis of competition between rail and non-rail options is also more reliable at the 4-digit level than 7-digit level because non-rail data are reported at the 4-digit STCC level. Nevertheless, in some cases the 4-digit STCC codes may combine products that consumers do not view as substitutes, and I also conduct analyses using the 7-digit level to see if my conclusions are sensitive to this choice. For the analyses at the 7-digit STCC level, non-rail volumes are allocated to 7-digit STCC categories using 7-digit STCC rail volumes for each corridor in the data.¹⁵⁸

¹⁵⁷ Each commodity is assigned a 7-digit code, which is the most granular classification. More aggregate groups of commodities are identified using the first digits in the code. For example, the 4-digit STCC code groups together all commodities with the same four digits at the start of their 7-digit codes. *See* Railinc, “Standard Transportation Commodity Code – History and Background,” available at <https://public.railinc.com/sites/default/files/documents/STCCHistory.pdf>.

¹⁵⁸ *See*, for example, Velturo 2007 VS at pp. 127-128, 153.

174. In addition, certain commodity codes group together many miscellaneous and potentially unrelated products that do not represent a distinct “product.”¹⁵⁹ These commodity groupings are excluded from the analysis.
175. The principal analysis uses information from the combined waybill data for the whole route, including any movements within the BEA at the start or end of the route, and so includes complete information about which railroads provide access to which customers. I also conducted analyses excluding movements within the BEA to see if my conclusions are sensitive to this choice.
176. Potential harm from the loss of destination competition must be persistent to be a concern. Therefore, only origin-commodity pairs that are associated with potential harm consistently through 2019 to 2024 are flagged in this analysis, consistent with analyses of prior mergers.¹⁶⁰
177. As in section 4.3, non-rail modes are also included as competitive freight transport alternatives. When assessing alternative destinations available to shippers and alternative origins available to receivers, non-rail modes are included.¹⁶¹ In addition, non-rail *volumes* for each commodity are included in the calculation of UP’s and NS’s shares for purposes of

¹⁵⁹ These commodity codes include 4611 Freight of All Kind, 0119 Miscellaneous Field Crops, 0129 Miscellaneous Fresh Fruits or Tree Nuts, 2818 Miscellaneous Industrial Organic Chemicals, 1092 Miscellaneous Metal Ores, 4711 Small Packaged Freight Shipments, among others. *See* 2023 STB CWS Reference Guide at pp. 118-161. *See* workpapers.

¹⁶⁰ *See*, for example, *Majure VS* at pp. 56-57, 86-87.

¹⁶¹ *See* Appendix G.

the 50/10 screens, as well as in the calculation of both the demand available to shippers (CLA 1) and the supply available to receivers (CLA 2).¹⁶²

178. Because non-rail volumes are available in tons, rather than carloads, the 50/10 screens and the CLA tests use tons as the measure of volume.¹⁶³ The carload counts shown in Exhibits 14 – 16 reflect the number of carloads from the combined waybill data for the flagged origin-commodity or destination-commodity pairs before and after applying the CLA tests.
179. Certain commodities are principally transported in intermodal containers. Commodities that have 50 percent or more movements in intermodal equipment are defined as “intermodal.”¹⁶⁴ This classification is performed separately at the 4-digit and 7-digit STCC levels. For example, STCC 3634, Electric Housewares or Fans, is nearly 100 percent intermodal. Similarly, STCC 2621365, Envelope Lining Paper, is nearly 100 percent intermodal.
180. Automotive products are also excluded from the analysis for the reasons described above.¹⁶⁵

4.4.2.4 Results

181. Exhibit 14 shows the results for the analysis of destination competition.

¹⁶² See Appendix G, Section 3.

¹⁶³ The combined waybill data contain both carloads and tons.

¹⁶⁴ These are shipments with the AAR equipment codes starting with P, Q, S, U, or Z. For waybills that come from the CWS, service type code identifies intermodal shipment. Sensitivity analyses of identifying intermodal shipments at origin-commodity/destination-commodity level or using solely car type yield very similar results. See In-text calculation workpapers.

¹⁶⁵ See Section 4.3.4(2).

Exhibit 14: Destination Competition

Commodity		Origin		Total Carloads	50/10 Screen			CLA		Final Carloads
STCC Category	STCC Number	BEA Name	BEA Number		Originating Screen	Terminating Screen	Participating Screen	Demand (CLA 1)	Supply (CLA 2)	
Nonmetal Minerals, Processed	3295	St. Louis, MO-IL	96	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	✓	✓	[REDACTED]
Flour or Other Grain Mill Products	2041	Wichita, KS-OK	122					✓	✓	
Plastic Matter or Synth Fibres	2821	St. Louis, MO-IL	96					✓	✓	
Canned or Pres. Food, Mixed	2039	San Francisco-Oakland, CA	163					✓	✓	
Plastic Matter or Synth Fibres	2821	Birmingham, AL	78					✓	✓	
Primary Iron or Steel Products	3312	Roanoke, VA-NC-WV	17					✓	✓	
Aluminum or Alloy Basic Shapes	3352	Quebec, Canada	177					✓	✓	
Primary Copper Smelter Products	3331	Salt Lake City-Ogden, UT-ID	152					—	✓	
Flour or Other Grain Mill Products	2041	Tulsa, OK-KS	124					✓	✓	
Primary Lead Smelter Products	3332	Los Angeles-Riverside, CA-AZ	160					—	✓	
Inorganic Pigments	2816	Lake Charles, LA	86					—	✓	
Total				[REDACTED]			[REDACTED]		[REDACTED]	

Notes: Critical Loss Analysis performed on all 2023 traffic using 4-digit STCC codes. Black checkmarks under the 50/10 screens columns indicate which of the screens triggered the origin-commodity pair for further review. Green checkmarks under the CLA columns indicate whether the origin-commodity pair was unflagged after the CLA tests. Final carloads correspond to the carloads that remain flagged after the CLA tests.

Sources: Combined Waybill Data, Transearch Data.

182. For each origin-commodity pair, the table shows the total carloads of the commodity shipped from the origin, which of the 50/10 screens flagged it for further review, and whether or not the origin-commodity is unflagged by CLA 1 or CLA 2. The final two columns show the carloads that remain flagged after the CLA tests. Although {{[REDACTED]}} carloads were initially flagged for further review, all of them were unflagged by the CLA tests.

4.4.3 Source competition

183. I analyze the scope for harm from the loss of source competition analogously to the way in which destination competition is analyzed. A destination-commodity pair is flagged for further review if (1) UP and NS have a combined share of more than 50 percent of that commodity's traffic that terminates at the destination, and (2) each individually has a share of at least 10 percent of that commodity's traffic that terminates at the destination. As with destination competition, these tests are applied using originating shares, terminating shares,

and participating shares.¹⁶⁶ The second step entails implementing CLA 1 and CLA 2, as discussed above and as discussed in more detail in Appendix G.

4.4.3.1 Results

184. Exhibit 15 shows the results of the source competition analysis.

Exhibit 15: Source Competition

Commodity		Destination		Total Carloads	50/10 Screen			CLA		Final Carloads
STCC Category	STCC Number	BEA Name	BEA Number		Originating Screen	Terminating Screen	Participating Screen	Demand (CLA 1)	Supply (CLA 2)	
Plastic Matter or Synth Fibres	2821	Cleveland-Akron, OH-PA	55	[REDACTED]	[REDACTED]	[REDACTED]	✓	✓	[REDACTED]	
Plastic Matter or Synth Fibres	2821	Indianapolis, IN-IL	67				✓	✓		
Potassium or Sodium Compound	2812	Toledo, OH	56				✓	✓		
Plastic Matter or Synth Fibres	2821	Louisville, KY-IN	70				✓	✓		
Potassium or Sodium Compound	2812	Kansas City, MO-KS	99				✓	✓		
Potassium or Sodium Compound	2812	Indianapolis, IN-IL	67				✓	✓		
Plastic Matter or Synth Fibres	2821	Columbus, OH	51				✓	✓		
Wet Corn Milling or Milo	2046	Chicago-Gary, IL-IN-WI	64				✓	✓		
Flour or Other Grain Mill Products	2041	St. Louis, MO-IL	96				✓	✓		
Oil Kernels, Nuts or Seeds	0114	Twin Falls, ID	149				✓	—		
Potassium or Sodium Compound	2812	Atlanta, GA-AL-NC	40				✓	✓		
Flour or Other Grain Mill Products	2041	Harrisburg-Lebanon, PA	11				✓	✓		
Plastic Matter or Synth Fibres	2821	Jackson, MS-AL-LA	77				✓	✓		
Plastic Matter or Synth Fibres	2821	Lexington, KY-TN-VA-WV	47				✓	✓		
Potassium or Sodium Compound	2812	Charlotte-Gastonia, NC-SC	23				✓	✓		
Potassium or Sodium Compound	2812	Augusta-Aiken, GA-SC	27				✓	✓		
Plastic Matter or Synth Fibres	2821	Albany, GA	37				✓	✓		
Potassium or Sodium Compound	2812	Norfolk-Virginia Beach, VA-NC	20				✓	✓		
Gum or Wood Chemicals	2861	New Orleans, LA-MS	83				✓	✓		
Cyclic Intermediates or Dyes	2815	Memphis, TN-AR-MS-KY	73				✓	✓		
Prepared or Canned Feed	2042	Queretaro, Mexico	205				✓	—		
Potassium or Sodium Compound	2812	Lexington, KY-TN-VA-WV	47				✓	✓		
Total				[REDACTED]						

Notes: Critical Loss Analysis performed on all 2023 traffic using 4-digit STCC codes. Black checkmarks under the 50/10 screens columns indicate which of the screens triggered the destination-commodity pair for further review. Green checkmarks under the CLA columns indicate whether the destination-commodity pair was unflagged after the CLA tests. Final carloads correspond to the carloads that remain flagged after CLA tests.

Sources: Combined Waybill Data, Transearch Data.

185. For each destination-commodity pair, the table shows the total carloads of the commodity shipped to the destination, which of the 50/10 screens flagged it for further review, and

¹⁶⁶ The 10 percent test for the participating screen is slightly different. *See* Appendix G.

whether or not the destination-commodity is unflagged by CLA 1 or CLA 2. The final column shows the carloads that remain flagged after the CLA tests.

4.4.4 Alternative specifications

186. To assess whether the conclusions about the scope for competitive harm depend on the choice of what STCC level to use for commodities, and on whether movements within the BEA are excluded, I used three other specifications for the analysis: (1) using 4-digit STCC and excluding within BEA movements, (2) using 7-digit STCC and retaining within BEA movements, and (3) using 7-digit STCC and excluding within BEA movements.
187. Exhibit 16 below reports the results, including the results from Exhibits 14 and 15 for comparison.

Exhibit 16: Destination Competition and Source Competition Alternative Specifications

Specification	Destination Competition		Source Competition	
	Before CLA Carloads	After CLA Carloads	Before CLA Carloads	After CLA Carloads
Exhibit 14 and 15 specification Excluding within-BEA movements, 4-digit STCC Including within-BEA movements, 7-digit STCC Excluding within-BEA movements, 7-digit STCC				

Notes: Critical Loss Analysis performed on all 2023 traffic. Final carloads correspond to the carloads that remain flagged after CLA tests.

Sources: Combined Waybill Data, Transearch Data.

188. Taken together, the results of these alternative specifications do not alter my overall conclusions about the competitive impact of the combination of UP and NS.

5 CONCLUSION

189. I have analyzed the scope for benefits and the potential for adverse horizontal competitive effects from the proposed merger by comparing the number of carloads that could be affected by either type of effect.
190. There is substantial scope for benefits from combining the complementary networks of UP and NS. The proposed combined railroad would replace existing UP-NS interline services with single-line service and would be more likely to make operating improvements, offer more competitive terms, and ensure reliable delivery on these services than would UP and NS today. The proposed merger's benefits could reach not only existing interline traffic (877,000 carloads in 2023), but also traffic attracted to the new interline services from truck and other rail operators (estimated at 1.954 million carloads), for a combined 2.831 million carloads.
191. On the other hand, the limited geographic overlap of the two networks means there is limited scope for adverse horizontal competitive effects. There are five directly served customer facilities, with {{[REDACTED]}} combined carloads, that currently have access to both UP and NS, but I understand they have been offered access to another Class I railroad to remedy any potential loss of competition. There are no BEAs where the number of serving railroads falls from 2-to-1 or from 3-to-2 when considering traffic originating at the BEA or terminating at the BEA. Traffic that is potentially subject to diminished competition within corridors adds up to only {{[REDACTED]}} carloads at most. Finally, my analysis of source and destination competition initially flags {{[REDACTED]}} total carloads for additional review. All of these are unflagged by further analysis that is similar to that used in prior mergers.

192. Based on these analyses, I find that the substantial competitive benefits and greater economic efficiency that are expected to result from the transaction outweigh the limited potential horizontal anticompetitive effects.

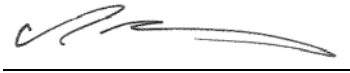
6 CERTAIN ANALYSES FOR 49 CFR § 1180.7 (B)

193. In addition to the analyses described above, Appendices D, E, and F provide certain data and analyses detailed in STB’s regulations 49 CFR § 1180.7(b)(2), (3), and (4), respectively. These responses are based on the same data and many of the same analytical steps as the analysis of the scope for potential harm from the loss of horizontal competition. In particular, the responses to 49 CFR § 1180.7(b)(2), (3), and (4) are related to the analysis in Sections 4.3, 4.4, and 4.5 respectively.
194. The main difference between the analysis of the scope for harm to horizontal competition on the one hand, and the responses to 49 CFR § 1180.7(b)(2), (3), and (4) on the other, is that the STB limits the scope of its requests to “major” groupings in three ways: by major points, major commodities, and major corridors. For the purpose of the Appendices, “major” is interpreted as a practical measure to focus the information reported to the STB to the set of points, corridors, and commodities that account for most, but not all, traffic volume. Importantly, the way “major” groupings are identified does not affect my analysis of the effects of the proposed merger on competition, since those analyses are not limited to “major” categories.
195. In general, the approach to identifying “major” points, corridors, and commodities is, for each type of group, to first rank them from highest to lowest based on UP and NS traffic and

then limit the results reported in Appendices D, E, and F to those for the points, corridors, or commodities that account for at least 80 percent of such traffic by volume.

196. See Appendices D, E, and F for details about the data and analyses to address STB's regulations 49 CFR § 1180.7(b)(2), (3), and (4). These tables include information about current shares for UP, NS, and about the combined shares of UP and NS. I understand that additional tables in the Hunt VS supplement these market shares by incorporating the projected impact of rail-to-rail and truck-to-rail diversions. These projected rail-to-rail and truck-to-rail diversions reflect a competitive benefit of the merger, as discussed earlier in my verified statement.

I declare under penalty of perjury that the foregoing is true and correct.

A handwritten signature in dark ink, consisting of a stylized 'C' followed by a series of loops and a long horizontal stroke.

April 27, 2026

VERIFICATION

I, Elizabeth M. Bailey, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed this 27 day of April, 2026.



APPENDIX A

Elizabeth M. Bailey

Vice President

PhD, Economics
Massachusetts Institute of Technology

BA, Economics and Mathematics,
Colgate University

Dr. Elizabeth Bailey is a vice president at Charles River Associates with over 20 years of experience in antitrust and competition matters. She is an expert on antitrust, competition policy, and intellectual property issues across a wide variety of industries.

She has advised clients on M&A proceedings before antitrust regulators in the US, Canada, and Europe. Her extensive industry expertise includes retail, packaged consumer goods, healthcare and medical devices, information and data technology, oil and gas, wholesale and retail electricity, among many others.

Dr. Bailey is recognized as a Global Elite Thought Leader by Who's Who Legal, described as "a market leader who 'can gain the trust of c-suite and board-level clients'," an economist that can "get deals over the line," and an "economist who sits among the best in the market." She is "an absolute go-to for retail mergers' thanks to her 'efficient econometric analysis and strong client-oriented approach.'"

Outside of her consulting practice, Dr. Bailey has taught advanced corporate finance to executives at The Wharton School. She has also been a lecturer in the Finance Group at the Haas School of Business at the University of California, Berkeley, and was an award-winning teacher at the W.P. Carey School of Business at Arizona State University.

Dr. Bailey is frequently invited to speak about issues relating to antitrust and has published many articles on the topic. She was the Editorial Board Economics Vice Chair of the *Antitrust Law Journal* and has edited other ABA antitrust publications, including the *Antitrust Magazine*, and *The Antitrust Source*. She has also published articles in the *American Economic Review*, *The Journal of Industrial Organization*, *Managing IP*, and *The Electricity Journal*, among others.

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Panelist, ABA Antitrust Section Spring Meetings, “Section 2: Law, Economics, and Remedies, Oh My,” 2026 (Washington DC).

Panelist, New York State Bar Association, “Taking Aim at Vertical Mergers - A Twin or King-Sized Problem?” 2025 (Virtual).

Panelist, ABA Antitrust Section Spring Meetings, “Has Competition in the U.S. Been Declining,” 2025 (Washington DC).

Panelist, GCR Law Leaders Global, “Mergers: Trend Towards Consolidation and Serial Acquisitions: When Are Many Acquisitions Too Many?,” 2025 (Miami).

Panelist, ABA Antitrust Section Women’s Roundtable, “One Year into the ‘New’ Merger Guidelines,” 2025 (New York City).

Panelist, ABA Antitrust Section Fall Forum, “Are Merger Efficiencies Over-Promised and Under-Delivered,” 2024 (Washington DC).

Panelist, GCR Women in Antitrust, “Expanding Merger Control Tools for Non-Traditional Deals and Non-Traditional Theories of Harm,” 2024 (Washington DC).

Plenary Session Speaker, ABA Antitrust Section Masters Course, Philadelphia, Pennsylvania, 2024.

Panelist, GCR Law Leaders Global, “Mergers: Evolution or Revolution in Evidentiary Trends,” 2024 (Miami).

Panelist, Association of General Counsel, “Antitrust in the Biden Administration,” Washington DC, 2023.

Speaker, ABA Antitrust Section Judicial Antitrust Law and Economics Institute for Federal Judges, “Antitrust and Intellectual Property,” University of Chicago Law School, Chicago, Illinois, 2023.

Panelist, GCR Law Leaders Global, “Mergers: The structural presumption: A path to predicted outcomes or to nowhere at all?” 2023 (Miami).

Panelist, Fourth Annual George Washington University Competition Law Center and Crowell & Moring Antitrust and Tech Conference, “Lessons Learned from Agency Merger Challenges and Policy Developments,” 2022 (Virtual Zoom).

Plenary Session Speaker, ABA Antitrust Section Masters Course, Philadelphia, Pennsylvania, 2022.

Panelist, GCR Live: Global Merger Control 2022, “Back to the Future: Does There Remain a Role for Economics in Merger Review” 2022 (Brussels, Belgium).

Panelist, “Economic Storytelling with NPR’s Planet Money,” 2022 ABA Antitrust Law Spring Meetings, April 2022 (Washington DC).

Panelist, Global Antitrust Institute: George Mason Law Review 25th Annual Antitrust Symposium, “Proposals to Change the Antitrust Laws,” 2022 (Virtual Zoom).

Panelist, GCR Law Leaders Global, “Mergers: Risk Allocation, Review Strategy and Deal Disputes,” 2022 (Virtual Zoom/Miami).

Panelist, Third Annual George Washington University Competition Law Center and Crowell & Moring Antitrust and Tech Conference, “Ignited by Tech: The Next Wave of Merger Guidelines,” 2021 (Virtual Zoom).

Panelist, GCR Live Women in Antitrust, “What Role Does Competition Policy Have in Achieving Sustainable Economic Development?,” Washington DC and Virtual Zoom, 2021.

Panelist, “Expert Depositions: Just the Facts Ma’am,” 2021 ABA Antitrust Law Section Mock Deposition Series, 2021.

Panelist, “Fundamentals—Economics,” 2021 ABA Antitrust Law Spring Meetings, 2021.

Panelist, “Dissecting the FTC v. Peabody/Arch Coal Merger Challenge,” ABA Antitrust Law Section (Transportation & Energy Industries Committee), 2020.

Panelist, “Vertical, Conglomerate, National Champion and Killer Acquisitions: Has Merger Review Abandoned the Chicago School?” Canadian Bar Association Competition Law Fall Conference, 2019.

Panelist, “Antitrust Lawyer and Economist Best Practices,” Women@CompetitionAmericas, 2019.

Speaker, “Mergers: Practical Considerations for In-house Counsel,” Antitrust Texas – KNet365, 2019.

Speaker, The Women’s Antitrust Forum, “Vertical Merger Enforcement Trends,” 2019, Washington DC.

Speaker, ABA Brown Bag, “Engaging an Economist on a Merger: Fundamentals of Antitrust Economics Series” (Economics Committee), 2019.

Speaker/Defendant Expert, 2019 ABA Antitrust Law Spring Meetings, “Mock No-Poach Trial” (Trial Practice Committee), 2019, Washington DC.

Panelist, GCR Live Second Annual Women in Antitrust, “Non-Horizontal Mergers,” Washington DC, 2018.

Faculty, ABA Antitrust Law Section Merger Practice Workshop in San Francisco, 2018.

Speaker, ABA Antitrust Section Judicial Antitrust Law and Economics Institute for Judges, “Antitrust and Intellectual Property,” Boalt Law School at UC Berkeley, Berkeley, California, 2018.

Plenary Session Speaker, ABA Antitrust Section Masters Course, Cambridge, Maryland, 2018.

Speaker, 2018 ABA Antitrust Law Spring Meetings, “Antitrust/Intellectual Property: The Basics,” Washington DC, 2018.

Speaker, 2017 Antitrust Judicial Law & Economics Institute for Judges, “Law and Economics of Horizontal Restraints,” Chicago, 2017.

Speaker, 2017 Antitrust Judicial Law & Economics Institute for Judges, “Market Definition, Market Power, and Competitive Effects,” Chicago, 2017.

Faculty, ABA Antitrust Law Section Merger Practice Workshop in Washington DC, 2017.

Panelist, Eighth Annual Federal Trade Commission Microeconomic Conference, Washington DC, 2015.

Speaker, “The Big Swap: Financial Derivatives Agreements and Alleged Anticompetitive Conduct in *US v. KeySpan*,” 10th Annual Harvard Law Seminar: Current Developments in EU and US Antitrust Law. Cambridge, Massachusetts, 2011.

Speaker, “Predatory Pricing Conduct,” Antitrust Law & Economics Institute for Judges sponsored by the American Bar Association Section of Antitrust Law and the George Mason Judicial Education Program, Arlington, Virginia, 2011.

Panelist, “The Proper Role of Economic Experts” Antitrust Law & Economics Institute for Judges sponsored by the American Bar Association Section of Antitrust Law and the George Mason Judicial Education Program, Arlington, Virginia, 2011.

Energy

Speaker, “California Greenhouse Gas Cap and Trade Program: The First Six Months,” Power Association of Northern California 2013 Annual Seminar. San Francisco, California, 2013.

Panelist, “Panel 2: Benefits of an Energy Data Center to Ratepayers and CA Energy Policy” as part of the Energy Data Access Workshop (Rulemaking 08-12-009), California Public Utility Commission, San Francisco, California, 2013.

Speaker, “The Big Swap: Using Financial Derivatives to Create Anticompetitive Conduct,” 2011. Energy Institute at Haas Energy Camp 2012, Berkeley, California, 2012.

Speaker, “The Big Swap: Financial Derivatives and Alleged Anticompetitive Conduct.” In “*U.S. v. KeySpan*, Current Developments in EU & US Antitrust Law,” Tenth Annual Harvard Law School Seminar, Cambridge, MA, 2011.

Intellectual property

Speaker, ABA Antitrust Section Judicial Antitrust Law and Economics Institute for Judges, “Antitrust and Intellectual Property,” Boalt Law School at UC Berkeley, Berkeley, California, 2018.

Speaker, 2018 ABA Antitrust Law Spring Meetings, “Antitrust/Intellectual Property: The Basics”, Washington DC, 2018.

Panelist, “Economic Damages Experts’ Panel,” Conference on Patent Damages (PatDam2) at the University of Texas School of Law. Austin, Texas, 2017.

Speaker, “Economic Lessons from the CAFC on Reasonable Royalty Damage Awards,” The Knowledge Group Congress Live Webcast Series on “Recent Developments in Patent Infringement Damage Awards,” 2010.

Moderator, “New Case Law of Patent Damages: Key Recent Federal Circuit Decisions,” Law Seminars International, 2010.

Professional activities

Board Member, W@CompetitionAmericas.

Editorial Board Economics Vice Chair, *Antitrust Law Journal*, a publication of the American Bar Association’s Section of Antitrust Law, 2023–2024.

Economic Editor, Senior Editor, Associate Editor, *Antitrust Law Journal*, a publication of the American Bar Association’s Section of Antitrust Law, 2018–2024.

Member, American Bar Association’s Section In-House Counsel Task Force, 2023-2024.

Advisory Board Member, American Bar Association’s Section of Antitrust Law Women.Connected Committee (formerly the Women’s Initiative).

Advisory Board Member, American Bar Association’s Section of Antitrust Law Diversity.Advanced Committee.

Associate Editor, *Antitrust Magazine*, a publication of the American Bar Association’s Section of Antitrust Law, 2010–2013.

Member, American Bar Association’s Section of Antitrust Law and Economic Task Force, 2010–2012.

Editor, *The Antitrust Source*, a publication of the American Bar Association’s Section of Antitrust Law, 2006–2010.

Editorial Board, *Issues in Competition Law and Policy*, American Bar Association’s Section of Antitrust Law, 2008.

Journal Referee: Cambridge University Press, *Energy Journal*, *Journal of Environmental Economics and Management*, *Journal of Public Economics*, *Journal of Resource and Environmental Economics*, *Land Economics*, *Review of Economics and Statistics*, and *Review of Industrial Organization*

Honors

GCR *Who’s Who Legal: Competition Economists Global Thought Leader* 2019-2025

GCR *Who's Who Legal: Competition Future Leader 2017, 2018*

John W. Teets, Outstanding Graduate Teaching Award, 2006/2007

Featured in *Global Competition Review's* "Young Economists: The Rising Star of Economics," August/September 2006

Fellowship, Massachusetts Institute for Technology CEEPR, 1997–1998

MIT President's Society Fellows in Environment and Sustainability, 1996–1998

National Science Foundation Graduate Fellowship, 1994–1997

Salutatorian, Colgate University, 1994

Summa Cum Laude, Colgate University, 1994

Phi Beta Kappa, Colgate University, 1994

J. Melbourne Shortliffe Prize for excellence in economics, 1994

Professional history

2021–Present	<i>Vice President Antitrust & Competition Economics Practice</i> , Charles River Associates, Oakland, CA
1998–2021	NERA Economic Consulting, Oakland, CA
	2013–2021 <i>Academic Affiliate</i>
	2009–2012 <i>Vice President</i>
	2006–2009 <i>Special Consultant</i>
	2003–2006 <i>Vice President</i>
	2000–2002 <i>Senior Consultant</i>
	1998–1999 <i>Consultant</i>
2015–2020	<i>Lecturer</i> , The Wharton School of the University of Pennsylvania, Philadelphia, PA
2012–2016	<i>Lecturer, Adjunct Professor</i> , Haas School of Business, University of California, Berkeley, CA
2012–2013	<i>Executive Director</i> , Energy Institute at Haas, University of California, Berkeley, CA
2006–2009	<i>Teacher</i> , W.P. Carey School of Business, Arizona State University, Tempe, AZ
	2009 <i>Clinical Associate Professor</i>, Department of Economics 2006–2009 <i>Clinical Assistant Professor</i>, Department of Economics

APPENDIX B

MATERIALS RELIED UPON

Regulatory Materials

Regulatory Materials

- United States, Code of Federal Regulations, 49 CFR § 1180.7
- Amended Railroad Control Application, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873

Surface Transportation Board Dockets

- Surface Transportation Board, “Rail General Exemption Authority—Exemption of Hydraulic Cement,” Ex Parte No. 346 (Sub-No. 34), STB Decided December 4, 1996
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- Verified Statement of David T. Hunt, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” STB Docket No. 36873
- Joint Verified Statement of Eric Gehringer and John F. Orr, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873
- Verified Statement of John W. Turner, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873
- Verified Statement of Katherine N. Novak, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873
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- Paul L. Joskow, “Asset Specificity and the Structure of Vertical Relationships: Empirical Evidence,” *Journal of Law, Economics, and Organization*, vol. 4, no. 1 (1988), pp. 95-117
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- Steven C. Salop, “The 2023 Merger Guidelines: A Post-Chicago and Neo-Brandeisian Integration,” *Review of Industrial Organization*, vol. 65 (2024), pp. 79-128

Data

Highly Confidential Data & Instructions

- 2-digit STCC code definitions [CRSR2-2023.xlsx]
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- BNSF Railway Data Dictionary [BNSF Traffic Tape Field Decoder.xlsx]
- BNSF Railway Traffic Tape Data [BNSF_2019_TrafficTapes_11122025.txt; BNSF_2020_TrafficTapes_11122025.txt; BNSF_2021_TrafficTapes_11122025.txt; BNSF_2022_TrafficTapes_11122025.txt; BNSF_2023_TrafficTapes_09242025_Highly Confidential.txt; BNSF_2024_TrafficTapes_11122025.txt]
- Canadian National Railway Data Dictionary [CN Traffic Tape Fields 2023.xlsx]
- CN Railway Traffic Tape Data [WB Exc Canada Domestic - 1H 2019.xlsx; WB Exc Canada Domestic - 1H 2020.xlsx; WB Exc Canada Domestic - 1H 2021.xlsx; WB Exc Canada Domestic - 1H 2022.xlsx; WB Exc Canada Domestic - 1H 2024.xlsx; WB Exc

Canada Domestic - 2H 2019.xlsx; WB Exc Canada Domestic - 2H 2020.xlsx; WB Exc Canada Domestic - 2H 2021.xlsx; WB Exc Canada Domestic - 2H 2022.xlsx; WB Exc Canada Domestic - 2H 2024.xlsx; WB Exc Canada Domestic 2023 Q1.xlsx; WB Exc Canada Domestic 2023 Q2.xlsx; WB Exc Canada Domestic 2023 Q3.xlsx; WB Exc Canada Domestic 2023 Q4.xlsx]

- CPKC Railway Data Dictionary [CONFIDENTIAL CPKC Data Dictionary.xlsx]
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- CSXT Railway Traffic Tape Data [2019 CSXT Traffic Tapes - Highly Confidential.csv; 2020 CSXT Traffic Tapes – Highly Confidential.csv; 2021 CSXT Traffic Tapes - Highly Confidential.csv; 2022 CSXT Traffic Tapes - Highly Confidential.csv; 2023 CSXT Traffic Tapes – Highly Confidential.csv; 2024 CSXT Traffic Tapes - Highly Confidential.csv]
- CPKC Railway Traffic Tape Data
[HIGHLY_CONFIDENTIAL_CPKC_2019_Traffic_Tapes.txt;
HIGHLY_CONFIDENTIAL_CPKC_2020_Traffic_Tapes.txt;
HIGHLY_CONFIDENTIAL_CPKC_2021_Traffic_Tapes.txt;
HIGHLY_CONFIDENTIAL_CPKC_2022_Traffic_Tapes.txt;
HIGHLY_CONFIDENTIAL_CPKC_2023_Traffic_Tapes.txt;
HIGHLY_CONFIDENTIAL_CPKC_2024_Traffic_Tapes.txt]
- Norfolk Southern ABC Nodes Route Traffic [ABC NODES ROUTE TRAFFIC.xlsx]
- Norfolk Southern Instructions for Deduplicating Traffic Tape Data [165-B-Data Dictionary - Duplicate Waybill Flags V2 9-25-25.docx]
- Norfolk Southern Junction Station Tables, 2019 – 2024 [2023 OS Skinny Table.csv; OS Skinny Table.csv]
- Norfolk Southern Market Analysis Common Mapping Files [93-A-stec_comm.xlsx]
- Norfolk Southern Net Tons for 2023 Traffic Tape Data [Loaded Railhighway Net Weights.csv]
- Norfolk Southern Railway Data Dictionary [180-A-NS Waybills Data Dictionary.xlsx]
- Norfolk Southern Railway Traffic Tape Data, 2019 – 2024 [2019 NS Waybills With Flags.csv; NS Waybills With Flags.csv; 2021 NS Waybills With Flags.csv; 2022 NS Waybills With Flags.csv; 2023 NS Waybills With Flags Final.csv; 2023 NS Waybills With Flags.csv; 2024 NS Waybills With Flags.csv]
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- Oliver Wyman Operating Plan workpapers [C-Traffic data processing_vS.pdf, 2.1 Source of NS Waybill Data]
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- Oliver Wyman STCC4 Mapping Table [transearch_commodity_lookup.csv]
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- Standard Transportation Commodity Code File Glossary of Terms [Standard Transportation Commodity Code File Glossary of Terms.pdf]
- Surface Transportation Board, Confidential Carload Waybill Sample, 2019 – 2023 [WB2019_913_Unmasked.txt; WB2020_913_Unmasked.txt; WB2021_913_Unmasked.txt; WB2022_913_Unmasked.txt; WB2023_913_Unmasked.txt]
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- Union Pacific Railroad Data Dictionary [UPRR_Linehaul_Dtls_2023_DataDef_20250825.xlsx]
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Transearch Data and Documentation

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- S&P Global Market Intelligence, “Transearch 2023 Modelling Methodology Documentation,” April 16, 2025
- S&P Global Market Intelligence, “Transearch Reference Guide 2023”
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APPENDIX C

DATA

1 Overview of Data Used in Analyses

1. This appendix describes the data prepared for the analyses in my statement and addresses 49 CFR § 1180.7 (b) (2), (3), and (4) of the STB regulations. In addition to describing the data used, this appendix also provides an overview of how the data were prepared and combined for the analyses.¹

2 Combined Waybill Data

2. A combined dataset of waybills was constructed from multiple sources. First, 100 percent traffic tapes for the six Class I railroads, i.e., BNSF, CN, CPKC, CSXT, NS, and UP, for the years of 2019 to 2024 were combined. Next, these were supplemented with the data from the Confidential Waybill Sample (“CWS”) provided by the STB for the years of 2019 to 2023.²

2.1 Waybill Data from 100 Percent Traffic Tapes

3. The analyses presented in this statement incorporate 100 percent traffic tape data from all six Class I railroads. Applicants first provided 100 percent traffic tapes for UP and NS for 2019 to 2024. Subsequently, 100 percent traffic tapes for the year 2023 for CN and 2019 to 2024 for BNSF were provided by the parties. CN later supplemented their submission with

¹ All detailed analytical steps and data-processing logic are set out in the programs referenced in the working paper index.

² The 2024 CWS data were made available by the STB on March 20, 2026, which did not allow sufficient time to incorporate the additional year of data into my analyses.

additional traffic tape data for 2019-2022 and 2024. CSXT and CPKC also provided their 100 percent traffic tapes for 2019 to 2024.

4. These traffic tape data represent carload-level records (for BNSF, CSXT, NS, and UP) or waybill-level records (for CN and CPKC) with origins and destinations provided at the station, denoted by freight station accounting code (“FSAC”), and Standard Point Location Code (“SPLC”) level.³ A crosswalk provided by Oliver Wyman maps these SPLCs to BEAs.⁴

2.2 *Merging the 2023 UP and NS data*

5. A merged version of the UP-NS waybills restricted to 2023 was shared with Oliver Wyman.⁵ In this version, some light cleaning of the UP and NS datasets was performed before merging.⁶
6. After removing duplicates and cleaning the fields in both datasets, a cascading series of merges was implemented where the UP and NS records merged in one step were not considered for merging in subsequent steps. In total, 22 rounds of merging between the two

³ BNSF provided Standard Carrier Alpha Codes (“SCAC”), the official 333 station spellings, and state information for origins and destinations, which were then mapped onto FSACs and SPLCs. CPKC provided SCACs and FSACs for origins and destinations, which were mapped to SPLCs. Traffic tapes from the other Class I railroads include native FSAC and SPLC fields.

⁴ The initial mapping provided by OW was “191-A-FSAC-SPLC-FIPS-BEA.xlsx.” (“Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table”). In April 2026, Oliver Wyman provided an additional file updating the BEAs to which certain SPLCs map, i.e., “SPLC_TO_FIPS_BEAV3.xlsx (r2r_2026.SPLC4_FIPS_BEAV)” (“Updated Oliver Wyman SPLC-FIPS-BEA Mapping Table”). These updates were incorporated into my analyses.

⁵ For the 2023 merge, the raw data files “UPRR_Waybills_2023_20250825.txt” and “2023 NS Waybills With Flags Final.csv” were used.

⁶ For UP data, duplicate records were removed using <dup_wb_ind> indicator and double dashes and spaces in <mvmt_rte_text> were removed. For NS, the route field (<full_route_information>) was parsed by delimiting every 4 or 5 alternating characters. Duplicate records in the NS data were removed using a series of filters provided by NS in the raw data. See Appendix C Section 2.3.3 for more details.

datasets were implemented, starting with the strictest set of merge keys in step 1 and gradually loosening the merge criteria with each subsequent step. Below are the keys used in each step:⁷

Table C.1: Cascading Merges – UP and NS Data

Step	Merge by the following fields that are in both the UP and NS data (Merge keys)
1	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, Origin FSAC, Destination FSAC, STCC Number, Route, first character of AAR car type
2	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, Origin FSAC, Destination FSAC, STCC Number, first character of AAR car type
3	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, STCC Number, Route, first character of AAR car type
4	Equipment Initial, Equipment Number, Waybill Number, BOL Number, Origin FSAC, Destination FSAC, STCC Number, Route, +/- 7 day Waybill Date difference, first character of AAR car type
5	Equipment Initial, Equipment Number, Waybill Date, BOL Number, Origin FSAC, Destination FSAC, STCC Number, Route, first character of AAR car type
6	Equipment Initial, Equipment Number, Waybill Date, Waybill Number, Origin FSAC, Destination FSAC, STCC Number, Route, first character of AAR car type
7	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, Origin FSAC, Destination FSAC, Route, first character of AAR car type
8	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, first character of AAR car type
9	Equipment Initial, Equipment Number, Waybill Number, Waybill Date, first character of AAR car type
10	Equipment Initial, Equipment Number, Waybill Number, Waybill Date
11	

⁷ After merging the UP and NS datasets, a <merge_type> field was created that identified in which step a set of records were merged. Neither the UP nor NS data were perfectly unique on the set of merge keys prior to merging. This resulted in some cases where a single UP record merged to multiple NS records, or vice versa. In a very small number of instances, multiple UP records merged to multiple NS records. To flag all sets of records that involved a duplicate, a decimal place was added to the <merge_type> using the following logic: “.1” for all one-to-one merges, “.2” for many NS records merging to one UP record, “.3” for one NS record merging to many UP records, “.4” for many NS records merging to many UP records.

Step	Merge by the following fields that are in both the UP and NS data (Merge keys)
	Equipment Initial, Equipment Number, Waybill Number, BOL Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
12	Equipment Initial, Equipment Number, Origin FSAC, Destination FSAC, STCC Number, Route, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
13	Equipment Initial, Equipment Number, Waybill Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
14	Equipment Initial, Equipment Number, Origin FSAC, Destination FSAC, STCC Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
15	Equipment Initial, Equipment Number, Route, STCC Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
16	Equipment Initial, Equipment Number, BOL Number, STCC Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
17	First three letters of Equipment Initial, Equipment Number, Waybill Number, Waybill Date, BOL Number, LE Code, first character of AAR car type
18	Equipment Initial, Equipment Number, BOL Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
19	Equipment Initial, Equipment Number, Waybill Date, STCC Number, LE Code, first character of AAR car type
20	Equipment Initial, Equipment Number, Waybill Date, LE Code, first character of AAR car type
21	Equipment Initial, Equipment Number, +/- 7 day Waybill Date difference, LE Code, first character of AAR car type
22	Equipment Initial, Equipment Number, +/- 7 day Waybill Date difference, LE Code

7. Merges that occurred after step 10 were assumed to be “fuzzy” matches and additional filters on these matched waybills were imposed. First, a flag indicating whether the route was explicitly interlined between UP and NS was created. To do this, UP’s route variable (<mvmt_rte_text>) from the matched record was parsed to identify the string for “NS.”⁸ For

⁸ Also, the parsed <mvmt_rte_text> was used to get information about the direction of the route (i.e., NS to UP or UP to NS) as well as to identify “bridge” movements, where an intermediate carrier falls in between the two merging carriers.

any matches that did not satisfy the first requirement, the fly-out distance⁹ between the UP and NS¹⁰ system locations was calculated.¹¹ Records within a 50 mile distance between the UP and NS waybill pair were retained.

8. For intermodal shipments, records include both the containers and the intermodal cars on which the containers are transported. In the UP-NS waybills merged data, matches associated with intermodal cars were dropped and containers were kept.¹²

2.3 *Waybill Data Processing*

2.3.1 *General data cleaning*

9. Prior to combining the six Class I railroads' data, several general data cleaning steps in each data source were applied.
10. The first step was to remove observations associated with empty shipments or non-revenue shipments. Railroads transport empty railcars back to shippers. However, the vast majority of revenues are earned on the movement of loaded railcars rather than empty cars.

⁹ The fly-out distance represents the shortest distance between two sets of geographic coordinates, calculated using the Haversine formula.

¹⁰ The relevant system location fields in UP were retrieved by using "1-A-Raw_UPRR_AAR_Station_Master.txt". ("Railinc Station Master"). The relevant system location fields in the NS data that needed to be adjusted are detailed in instructions provided by NS and Oliver Wyman. See "C-Traffic data processing_vS.pdf"; "OS Skinny Table.csv".

¹¹ For UP records, UP's originating/destination Circ 7 was used, and for NS, the NS on/off junction operating station was adjusted by using the NS-provided table ("2023 OS Skinny Table.csv") to identify on/off junction operating station locations. Station geo files provided by UP and NS ("2-A-Raw_UPRR_internal_location_master.xlsx" and "ABC NODES ROUTE TRAFFIC.xlsx") were used to look up the latitude/longitude values for the NS and UP locations. Using these pairs of coordinates two distances were computed: UP destination to NS origin and NS destination to UP origin. The assumption was that the shorter distance between the two is the correct routing and determines the direction of the record (i.e., NS to UP or UP to NS).

¹² Intermodal cars are records with an AAR equipment type (<aar_car_type>) initial of P, Q, or S.

Therefore, my analysis focuses on waybills for the revenue movement of loaded cars only. Specifically, the focus is on linehaul movements and linehaul revenues (e.g., excluding reciprocal switching moves when indicated in the data).¹³ Empty shipments were identified using any of the following criteria: a native loaded/empty indicator (if available), an STCC number that denotes empty shipments,¹⁴ or a net weight of 0. Non-revenue shipments were identified using indicators provided in the native data,¹⁵ if available. Records for locomotives and caboose were also removed.¹⁶ Finally, any remaining duplicate records, if applicable, were removed.

11. While the availability of certain data fields vary by data source, the fields in each data source were identified and standardized for key fields such as waybill number, waybill date, bill of lading number, origin and termination FSAC, origin and termination SPLC, route, equipment number/initial, STCC code, tonnage, number of units, system/shipment revenues, and Rule 11 shipment indicators. Table C.2 lists the relevant fields from each data source.

¹³ While UP records explicitly identify when a movement is a reciprocal switch movement, traffic tapes for the other railroads are far less comprehensive in that regard.

¹⁴ STCC numbers that typically denote empty shipments include values beginning with “42” (returned empty containers), “37421” (new railway cars), “37422” (used railway cars), “37424” (railway car parts and assemblies), and “3741” (railway cars and parts). See workpapers.

¹⁵ Records flagged as non-revenue shipments by the indicators provided in the native data but associated with positive revenue amounts are retained.

¹⁶ Locomotives are identified as records with an AAR equipment type starting with the value “D” and caboose as records with an AAR equipment type of “M930.” See Railinc, “2023 Surface Transportation Board Carload Waybill Sample Reference Guide,” March 5, 2025, available at <https://www.stb.gov/wp-content/uploads/2023-STB-Waybill-Reference-Guide.pdf> (“2023 Surface Transportation Board Carload Waybill Sample Reference Guide”), at p. 162.

Table C.2: Select Key Fields from each Waybill Data Source

	UP	NS	CN	BNSF	CPKC	CSXT	CWS ¹⁷
Waybill Number	wb_nbr	wb_nr	waybill_number	wb_numb	waybill_number	waybill_i	waybill_number
Waybill Date	wb_date	waybill_date	waybill_date	wb_dt	waybill_date	waybill_d	waybill_date
Equipment Initial (or Leading Equipment initial)	eqmt_init/ lead_eqmt_init	equip_initial	equipment_initial	eqp_init	mark_cd (tofc_cofc_car_i initial for inter- modal ship- ments)	car_initial_c	car_initial (tofc_initial for intermodal ship- ments)
Equipment Number (or Leading Equipment Number)	eqmt_nbr/ lead_eqmt_nbr	equip_nr	equipment_number	eqp_numb	eqpun_nbr (tofc_cofc_car_ number for in- termodal ship- ments)	car_number_i	car_number (tofc_number for intermodal shipments)
STCC (non-hazardous)	stcc_nbr	<i>Generated using stcc_wo_haz- mat_codes and stcc_with_haz- mat_codes</i>	alternate_ stcc_code	cmdty_stcc	<i>Generated using stcc_cd</i>	revenue_stcc_c	stcc_no_haz
Origin SPLC	shmt_orig_splc_ nbr	osplc	origin_splc	<i>Identified using ofcl_333_orig, carr_abbrev_orig and ofcl_state_orig</i>	<i>Identified using waybill_ulti- mate_origin_sca and waybill_ul- ti- mate_origin_fsa c</i>	orig_splc	origin_splc
Destination SPLC	shmt_dest_splc_ nbr	dsplc	destination_splc	<i>Identified using ofcl_dest_333, carr_abbrev_dest and ofcl_state_dest</i>	<i>Identified using waybill_ulti- mate_destina- tion_scac and waybill_ulti- mate_destina- tion_fsac</i>	dest_splc	destination_splc

¹⁷ The CWS data files do not include native field names. See workpapers for how the field names are assigned based on the number of positions and data descriptions in 2023 Surface Transportation Board Carload Waybill Sample Reference Guide, at p. 43.

	UP	NS	CN	BNSF	CPKC	CSXT	CWS ¹⁷
Origin FSAC	shmt orig fsac	orig fsac	origin_station fsac	N/A	waybill_ultimate_origin_fsac_c	<i>last five digits of orig fsac_c</i>	origin fsac
Destination FSAC	shmt dest fsac	term fsac	destination_station fsac	N/A	waybill_ultimate_destination fsac	<i>last five digits of dest fsac_c</i>	termination fsac
AAR Equipment Type	aar car type	car type	aar car kind	car kind aar	aar_car_type	aar_car_type_c	aar equip_type_code
Bill of Lading	bol nbr	bill of lading	N/A	bladg numb	N/A	bol_i	N/A
Route	<i>Generated using mvmt rte text</i>	full_route_information	waybill route text	<i>Generated using various native fields</i>	<i>Generated using various native fields.</i>	cms_route_x	<i>Generated using various native fields</i>
Carloads/ Container Count	<i>Calculated as the number of unique cars/containers</i>	<i>Calculated as the number of unique cars/containers</i>	calculated_carloads	units	number_of_carloads (number_of_tofc_cofc for intermodal shipments)	carload_originations_onnet_q	carloads (num_tofc_cofcs for intermodal shipments)
Tonnage	net wgt	net tons	actual tons	cst_car_ladg_ton	actual_weight	net_tons_decimal_q	billed_weight_tons
System Revenue	up_gross_rev_amt	acctg_ns_prop_tot amt	system_revenue in rate	bnsf_net_revenue	system_freight_amount	revenue_lh_a	N/A
Shipment Revenue	urrwin_totl_rev_amt	acctg_tot_rev_tot amt	waybill_revenue rate	tot revenue	freight_revenue	N/A	freight revenue
Rule 11 Indicator	rule 11 ind	rebill code	rule 11_code	rule 11_flg	rebill_code	rule_11_s	rebill code
Originating Railroad	shmt orig scac	orig rr	origin_carrier_abbreviation	carr abbr orig	waybill_ultimate_origin_scac_c	<i>first four letters of orig fsac_c</i>	origin rr alpha
Terminating Railroad	shmt dest scac	term rr	destination_carrier_abbreviation	carr abbr dest	waybill_ultimate_destination scac	<i>first four letters of dest fsac_c</i>	termination_rr alpha

12. To standardize railroad names in the route variables across the various data sources, Class I subsidiary firm names were replaced with the names of their parent railroad.¹⁸
13. Traffic volume was measured in carload counts and tons shipped. Loaded carloads include either carload counts or counts of individual intermodal container units. While all sources report some measure of tons shipped, there are some discrepancies in how tons are recorded among different sources.¹⁹ For a small number of observations, the net tons per car reported are higher than 157.5 tons, which is the legal gross weight limit for a rail car.²⁰ For these observations, net tons were set to 157.5 and these waybills were flagged as having censored tonnage.

2.3.2 *Processing the 2019 to 2024 UP data*

14. The UP data consist of carload-level traffic tape data for UP shipments covering 2019 through 2024.²¹
15. The UP data sometimes contain multiple observations for the same waybill and railcar. These duplicate records were identified and removed using the Duplicate Waybill Indicator (<dup_wb_ind>) native to the UP traffic data. Further identification and removal of empty

¹⁸ In particular, the replacements are: “CPRS,” “CPUS,” “KCS,” and “KCSM” are replaced with “CPKC;” “CNUS” and “IANR” with “CN;” and “ST” with “CSXT.”

¹⁹ For example, the BNSF data report lading weights, while the CWS data primarily report billing weight. There are some differences between billed and actual lading weights, which can be more significant for certain commodities. *See* 2023 Surface Transportation Board Carload Waybill Sample Reference Guide, at pp. 185, 190.

²⁰ *See*, for example, Union Pacific, “Allowable Gross Weight Shipments,” available at https://www.up.com/aboutup/reference/maps/allowable_gross_weight/ (accessed April 27, 2026). The gross weight limit for heavy axle rail cars is 315,000 lbs., which is 157.5 tons.

²¹ The following file from UP was used: “UPRR_Waybills_2019_to_2024_20250825.txt” .

shipments,²² non-revenue records,²³ as well as shipments reflecting non-line haul movements, such as yard movements or short, local transfers, were also performed.²⁴

16. While the native route field includes switching and haulage segments, UP also provides a separate field identifying the role of each carrier participating on the route. This field was used to construct a clean route field that excludes switching and haulage segments.²⁵
17. The UP data sometimes record a placeholder value (“0000000”) in the STCC number (<stcc_nbr>), while the hazardous STCC number field (<hzrd_stcc_nbr>) contains a valid STCC code. To address this, a mapping from hazardous STCC codes to the corresponding standard STCC codes was constructed and used to replace these placeholder values accordingly.
18. To standardize weight, net weight (<net_wgt>) was converted from pounds to tons using the conversion factor of 2,000 pounds per ton.

²² Shipments were identified as empty when the Load Empty Code is “E,” the Revenue Empty Flag equals “1”, Net Weight is “0”, or STCC number denotes empty shipments.

²³ Non-revenue records were identified as records where <rev_car_cnt> is not equal to 1.

²⁴ Non-line-haul freight movements within a local area were identified by <mvmt_type_code> values “A”, “T”, and “P.” See “UPRR_Linehaul_Dtls_2023_DataDef_20250825.xlsx”.

²⁵ Carriers associated with any of the following movement types were not considered as linehaul carriers and were removed from the route: I-Origin Switch, V-Intermediate Switch, D-Delivery Switch, JO-Junction Settlement Origin, JD-Junction Settlement Destination, H-Haulage Rights, HC-Handling Carrier, and M-Haulage Movement. See “UPRR_Linehaul_Dtls_2023_DataDef_20250825.xlsx”.

2.3.3 Processing the 2019 to 2024 NS data

19. The NS data consist of carload-level traffic tape data for NS shipments covering 2019 through 2024.²⁶
20. The NS traffic data often contain multiple observations for the same railcar and waybill. These duplicate records exist for a variety of reasons and represent entries such as “child” records²⁷ reflecting partial route information, temporary waybills, and reciprocal switch records, among others. Duplicate records were identified following the instructions provided by NS and Oliver Wyman.²⁸ In the process, empty shipments and non-revenue shipments were also identified.²⁹
21. A clean route was created by using the native route variable (<full_route_information>) and standardizing its format to better align with the data from other railroads. Additional variables were created, specifically <reporting_rr_on_junc_fixed> and <reporting_rr_off_junct_fixed>, which are intended to adjust the raw codes for on and off junctions where NS receives and delivers a shipment.³⁰

²⁶ The following files from NS were used: “2019 NS Waybills With Flags.csv”, “2020 NS Waybills With Flags.csv”, “2021 NS Waybills With Flags.csv”, “2022 NS Waybills With Flags.csv”, “2023 NS Waybills With Flags.csv”, “2024 NS Waybills With Flags.csv”.

²⁷ For example, a single interline shipment can appear in the data under multiple “child” records representing separate revenue waybills used for billing purposes, while the “parent” record for that waybill reflects the full route.

²⁸ A cascading filtering procedure was performed to identify duplicates in the NS raw data. This filtering procedure was implemented so that the result of the filtering procedure in step 1 is the input for the filtering procedure in step 2 and so on. *See* “C-Traffic data processing_vS.pdf”; “165-B-Data Dictionary - Duplicate Waybill Flags V2 9-25-25.docx”. *See also*, “180-A-NS Waybills Data Dictionary.xlsx”.

²⁹ Shipment records were identified as empty if one or more of the following holds: the variable <load_empty> equals “E”, the variable <net_tons> is equal to 0, or the STCC number starts with “42”, “37421”, “37422”, “37424”, or “3741.” Shipment records were identified as non-revenue if the variable <rev_non_rev_ind> is not “REVENUE” and <acctg_ns_prop_all_amt> is equal to 0.

³⁰ These adjustments followed instructions provided by NS and Oliver Wyman. *See* “C-Traffic data processing_vS.pdf”; “OS Skinny Table.csv”.

22. While the raw NS data include the non-hazardous STCC to indicate the commodity the shipment was classified into (<stcc_wo_hazmat_codes>), this field is sometimes populated with the hazardous STCC code instead (i.e., there are <stcc_wo_hazmat_codes> that begin with “49”, a prefix specific to hazardous STCC). A crosswalk between hazardous and non-hazardous STCC codes was constructed to create a new variable (<stcc_wo_hazmat_codes_fixed>) that corrected the native field.³¹ For waybills that still had an unassigned non-hazardous STCC after this step, the CWS data were searched for that waybill and CWS’s STCC code was used, if available.³² Finally, any non-hazardous STCC values that remained unassigned were populated using a crosswalk between hazardous and non-hazardous STCC codes from the CWS and UP data, this time keeping the most commonly reported non-hazardous STCC associated with a hazardous STCC.³³
23. From the NS data, the following types of records were eliminated: duplicated, intra/inter-terminal switch, empty waybill records, and non-revenue records without any revenue

³¹ To create the crosswalk, the CWS and UP data were used to create pairings of hazardous STCC codes and non-hazardous STCC codes, restricted to those where one or more hazardous STCC codes map(s) to one non-hazardous STCC code. Hazardous STCC codes are more granular than non-hazardous STCC codes. That is, for a given commodity, there are different ways to classify how that commodity is hazardous. For example, shipments with non-hazardous STCC code 1021210 (Copper Concentrates (RQ-5000/2270)) were classified with hazard STCC code 4966106 (Other Regulated Substances, Solid, N.O.S. Class 9 NA3077), or hazard STCC codes 4966326 and 4966334 (Environmentally Hazardous Substance, Solid, N.O.S. Class 9 U). *See* workpapers. Therefore, multiple hazardous STCCs can map to one non-hazardous STCC. However, it is not possible for multiple non-hazardous STCCs to map to one hazardous STCC.

³² CWS records were matched onto NS observations with <stcc_wo_hazmat_codes_fixed> that start with “49”, using waybill number <wb_nr>, waybill date <wb_date>, and the unassigned non-hazardous STCC code from NS <stcc_wo_hazmat_codes_fixed> to match to CWS’ waybill number <waybill_number>, waybill date <waybill_date> and hazardous STCC codes <commodity_stcc>. Then, for those that match to an observation in the CWS sample, a replacement was made for the <stcc_wo_hazmat_codes_fixed> with the non-hazardous <stcc_no_haz> from the CWS sample.

³³ In the event of ties in the number of non-hazardous STCC codes, the alphabetically last non-hazardous STCC code among the tied codes was selected.

recorded.³⁴ The data were further restricted by eliminating records whose routes encompass those of the other records for the same railcar and waybill.³⁵

24. Last, a check for observations in the same waybill that have different routes, FSACs, or origin/termination railroad was performed.³⁶ For these, reconciliation was performed within each waybill.³⁷

2.3.4 Processing the 2019 to 2024 CN data

25. The CN data consist of traffic tape data for CN shipments covering 2019 through 2024.³⁸

Unlike the BNSF, CSXT, NS, and UP traffic data, which are available at the carload-level, CN's data are aggregated at the waybill level, and lead-car equipment information is provided.

³⁴ Some of the duplicate observations flagged for exclusion contain information on revenue and tonnage that complement the observations that were not flagged for exclusion. To ensure that the observations kept had all the relevant information about the shipment, the effort was made to retain the maximum value of the revenue fields (<acctg_tot_rev_all_amt>, <acctg_ns_prop_all_amt>,) and net tons (<net_tons>) for the same waybill number, waybill date, and equipment identifiers prior to removing duplicates.

³⁵ For records with duplicated <waybill_date>, <wb_nr>, <equip_initial>, and <equip_nr>, the rule is to keep the records if it is the one with the longest route, or if all the routes are the same, only one record out of the group is kept.

³⁶ Records in the same waybill are those with common waybill number <wb_nr>, waybill date <waybill_date>, non-hazardous STCC code <stcc_wo_hazmat_codes_fixed>, origin SPLC <osplc>, and destination SPLC <dsplc>.

³⁷ See workpapers.

³⁸ The following files from CN traffic tapes were used: "WB Exc Canada Domestic - 1H 2019.xlsx", "WB Exc Canada Domestic - 2H 2019.xlsx", "WB Exc Canada Domestic - 1H 2020.xlsx", "WB Exc Canada Domestic - 2H 2020.xlsx", "WB Exc Canada Domestic - 1H 2021.xlsx", "WB Exc Canada Domestic - 2H 2021.xlsx", "WB Exc Canada Domestic - 1H 2022.xlsx", "WB Exc Canada Domestic - 2H 2022.xlsx", "WB Exc Canada Domestic 2023 Q1.xlsx", "WB Exc Canada Domestic 2023 Q2.xlsx", "WB Exc Canada Domestic 2023 Q3.xlsx", "WB Exc Canada Domestic 2023 Q4.xlsx", "WB Exc Canada Domestic - 1H 2024.xlsx", "WB Exc Canada Domestic - 2H 2024".

26. The CN data sometimes contain duplicate records for the same waybill. To avoid double-counting, these duplicates are removed from the data.³⁹ The CN data do not provide a native field indicating empty shipments. I identified empty shipments as records containing zero “actual tons” or with an STCC value denoting empty shipments and subsequently dropped these records.
27. CN’s native route field (<waybill_route_text>) appears to include delivery switches, which can be identified by searching for routes that end with “-DELY.” A clean route variable was then constructed that removed the segment in the route associated with these delivery switches.⁴⁰
28. Based on my review of the data provided, CN did not provide records for shipments that both originate and terminate outside of the United States.⁴¹

2.3.5 Processing the 2019 to 2024 BNSF data

29. The BNSF data consist of carload-level traffic tape data for BNSF shipments covering 2019 through 2024.⁴²

³⁹ Duplicates records were identified as records associated with one single unique waybill number <waybill_number>, waybill date <waybill_date>, equipment number <equipment_number>, and equipment initial <equipment_initial>.

⁴⁰ For example, the <waybill_route_text> entry “CN – CHGO – NS – STLOU – UP – DELY” was changed to “CN – CHGO – NS” in the new variable <waybill_route_text_updated>.

⁴¹ By comparison, shipments that both originate and terminate outside of the United States are present in the traffic tape data provided by other Class I railroads, including BNSF, CPKC, and UP.

⁴² The following files from BNSF traffic tapes were used: “BNSF_2019_TrafficTapes_11122025.txt”, “BNSF_2020_TrafficTapes_11122025.txt”, “BNSF_2021_TrafficTapes_11122025.txt”, “BNSF_2022_TrafficTapes_11122025.txt”, “BNSF_2023_TrafficTapes_09242025_Highly Confidential.txt”, “BNSF_2024_TrafficTapes_11122025.txt”. In addition, BNSF provided a data dictionary. See “BNSF Traffic Tape Field Decoder.xlsx”.

30. The BNSF data contain some duplicated records for the same waybill and railcar. To avoid double-counting, these duplicates were removed from the data.⁴³ In addition, empty shipments were also removed.⁴⁴
31. BNSF did not provide a native route field or complete information allowing me to identify all segments and carriers involved in the shipment. However, BNSF did provide information such as the railroad carrier that originates the shipment, the carrier that BNSF interchanges with or connects to, as well as information on the origin and termination stations and the interchange locations. Using this information, a route variable was constructed for use in my analysis.⁴⁵ For waybills with inconsistent route information across all railcars in the same waybill, the route across all railcars for that waybill was standardized.⁴⁶ Since BNSF did not provide SPLCs or FSACs for the origin station or destination station, the origin/destination SPLCs and FSACs were determined by using the initials of the originating/destination railroad carrier, the Official 333 spelling for the origin/destination

⁴³ The duplicates were identified when multiple records shared the same unique waybill number <wb_num>, waybill date <wb_dt>, equipment number <eqp_num>, and equipment initial <eqp_init>.

⁴⁴ Empty shipments are shipments where <ld_mty_ind> is “E”, with zero total lading weight (i.e., <cst_car_ladg_ton>), or STCC number (i.e., <cmdty_stcc>) denotes empty shipments.

⁴⁵ The following variables were relied upon to construct BNSF route (i.e., <route>) from the limited information provided by BNSF: initials of the railroad carrier originating the shipment <carr_abbr_orig>, railroad carrier that BNSF interchanges with to receive the car <carr_abbr_on>, abbreviation of the railroad carrier that BNSF connects with to make deliveries <offjct_road>, initials of the common carrier taking the shipment to its destination <carr_abbr_dest>, official 333 spelling for the origin station <ofcl_333_orig>, 333 spelling of the city where BNSF receives a shipment from a foreign carrier <icr_city_333>, 333 spelling of the city where BNSF delivers a shipment to a foreign carrier <icd_city_333>, and official 333 spelling of the destination <ofcl_dest_333>. See workpapers. In addition, I created a parent route variable by replacing subsidiaries of Class I railroads in the route with their parent railroad names.

⁴⁶ For records sharing the same <wb_num>, <wb_dt>, <origin_splc>, <destination_splc>, and <cmdty_stcc>, standardized route variables were created (i.e., <route> and <route_parent_abbr>) by selecting the longest route and, in the case of ties, choosing the one most frequently reported. Then I aligned <origin_rr_alpha> and <termination_rr_alpha> to match the first and last points in the chosen <route>.

station, and the state code associated with that station. Based on this information, the Railinc Station Master Data, the Oliver Wyman Unified Station Master, and the Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table were used to complete mapping BNSF records to SPLCs and FSACs for origins and destinations.⁴⁷

2.3.6 Processing the 2019 to 2023 STB CWS data

32. The CWS is a stratified sample of U.S. rail traffic waybills, containing detailed information on origin, destination, commodity, tonnage, and revenue, among others, for each waybill.⁴⁸

⁴⁹ Each record in the CWS represents a separate waybill and the sample is designed to be representative of the universe of rail freight waybills terminated by the reporting railroads.⁵⁰ Each railroad provides a sample of its waybills at specific rates varying with carloads per waybill (e.g., some are at a rate of 1 out of 40 waybills), as instructed by the STB.⁵¹ While the CWS contains only a sample of waybills, it also includes expansion factors provided by the STB to scale up the CWS so that the data are representative of the U.S. population of

⁴⁷ See workpapers. See also, Railinc Station Master; Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table; “20250902 Unified Station Access Master v1.1_StationMaster.csv” (“Oliver Wyman Unified Station Master”).

⁴⁸ See CSX, “Railroad dictionary,” available at <https://www.csx.com/index.cfm/about-us/company-overview/railroad-dictionary/?i=W> (accessed November 24, 2025); Linda Glauber, “Use the Waybill Sample Data to Grow Your Business,” RSI Logistics, April 11, 2023, available <https://www.rsilogistics.com/blog/use-the-waybill-sample-data-to-grow-your-business/> (accessed April 27, 2026).

⁴⁹ The CWS does not sample waybills from small railroads. The CWS is a stratified sample of carload waybills for all U.S. rail traffic submitted by those rail carriers terminating 4,500 or more revenue carloads annually. See Surface Transportation Board, “Carload Waybill Sample,” available at <https://www.stb.gov/reports-data/waybill/> (accessed November 24, 2025).

⁵⁰ See Surface Transportation Board, “Carload Waybill Sample,” available at <https://www.stb.gov/reports-data/waybill/> (accessed November 24, 2025).

⁵¹ See 2023 Surface Transportation Board Carload Waybill Sample Reference Guide, at p. 53.

waybills.⁵² While the CWS data exclude non-revenue records, the data include empty shipments. Empty shipment waybills were removed from the dataset used for analyses.⁵³

33. The variable for route <route> was created by concatenating several variables based on Accounting Rule 260 information in the CWS records. These include the alpha abbreviation for the origin railroad <origin_rr_alpha_fixed>, the alpha abbreviations for up to six bridge railroads (<first_interchange_rr_alpha_fixed> through <sixth_interchange_rr_alpha_fixed>), the alpha abbreviation for the termination railroad (<termination_rr_alpha_fixed>), and the Rule 260 alpha codes for the interchange stations where traffic is transferred to either the terminating carrier or a bridge railroad (<interchange_1_rule260> through <interchange_7_rule260>).⁵⁴

34. The STCC codes for records across different segments of the same shipment were standardized and the lead equipment information was replaced with the lead trailer or container information for intermodal shipments.⁵⁵ Second, duplicate waybills were removed.⁵⁶ Next, waybills for different segments of the same shipment were combined into

⁵² The STB provides two types of expansion factors – a theoretical expansion factor and an exact expansion factor, but only the theoretical one is available for all observations, so that is what I used.

⁵³ Shipments were removed in cases where the loaded or empty status is empty identified as waybills with zero total billed weight, i.e., <billed_weight> = 0, or STCC numbers <stcc_no_haz> denoting empty shipments.

⁵⁴ The fields <origin_rr_alpha_fixed>, <first_interchange_rr_alpha_fixed> through <sixth_interchange_rr_alpha_fixed>, and <termination_rr_alpha_fixed> were decoded by using <origin_railroad>, <first_bridge_rr> through <sixth_bridge_rr>, and <termination_rr> based on the guidelines on the CWS. *See* 2023 Surface Transportation Board Carload Waybill Sample Reference Guide.

⁵⁵ *See* workpapers.

⁵⁶ Records were considered duplicates if they matched on waybill date, lead equipment/container initial and number, STCC code, and rebill code. If reported by the same railroad, sorting of the records in descending order of accounting period and unique serial number was performed and the first record was kept. If reported by different railroads and their origin/destination SPLCs do not indicate a sequential order, the rule was then to keep the record with the more complete route whenever it exists; otherwise, sort the records in descending order of accounting period and unique serial number, and keep the first record.

a single record.⁵⁷ The routes were concatenated in sequence based on either the origin/destination SPLCs or the rebill codes, and the revenues were summed.⁵⁸

2.3.7 Processing the 2019 to 2024 CPKC data

35. The CPKC data consist of traffic tapes for the shipments handled by Canadian Pacific (“CPRS”) or Kansas City Southern (“KCS”), covering the period from 2019 through 2024.⁵⁹ Similar to CN’s data, CPKC’s data are aggregated at the waybill level and include lead-car equipment information.

36. The CPKC data report shipment revenue (field <freight_revenue>) in either Canadian Dollars (CAD) or U.S. Dollars (USD), with the corresponding currency indicated by the native currency variable (<currency>). I created a standardized shipment revenue field in U.S. Dollars (<freight_revenue_usd>) by using the average CAD/USD conversion rates observed in the CN data for each waybill date.⁶⁰

⁵⁷ Records were considered segments of the same shipment if they matched on waybill date, lead equipment/container initial and number, and STCC code, but had different waybill numbers. *See* workpapers.

⁵⁸ “The Rebill Code indicates where in the overall movement of the shipment the reporting railroad participated.” *See* 2023 Surface Transportation Board Carload Waybill Sample Reference Guide, at p. 110. Specifically, a value of 1 indicates an “originated-delivered Rule 11 shipment,” 2 indicates a “received-delivered Rule 11 shipment,” and 3 indicates a “received-terminated Rule 11 shipment.”

⁵⁹ The following files from CPKC traffic tapes were used:
 “HIGHLY_CONFIDENTIAL_CPKC_2019_Traffic_Tapes.txt”,
 “HIGHLY_CONFIDENTIAL_CPKC_2020_Traffic_Tapes.txt”,
 “HIGHLY_CONFIDENTIAL_CPKC_2021_Traffic_Tapes.txt”,
 “HIGHLY_CONFIDENTIAL_CPKC_2022_Traffic_Tapes.txt”,
 “HIGHLY_CONFIDENTIAL_CPKC_2023_Traffic_Tapes.txt”,
 “HIGHLY_CONFIDENTIAL_CPKC_2024_Traffic_Tapes.txt”.

⁶⁰ To create the CAD to USD currency conversion rate table using the CN data, for each waybill date, I divided CN’s system revenue number in USD (<system_revenue_in_rate>) by CN’s system revenue number in CAD (<system_revenue_in_canadian>), which CN explained as revenue converted to CAD for corporate accounting purposes. For any waybill dates that was not assigned a CAD to USD conversion rate, I filled it with the conversion rate that was closest to it in waybill date.

37. The CPKC data include an STCC variable (<stcc_cd>) that records the shipment's commodity type. However, this native STCC field contains a combination of hazardous STCC codes (beginning with the number "49") and non-hazardous codes. To replace hazardous STCC codes with the corresponding non-hazardous STCC code, I created a crosswalk between hazardous and non-hazardous STCC codes using the CWS and UP data.⁶¹ This crosswalk was merged back onto the CPKC raw data to create a new variable (<stcc_no_haz>) that corrected hazardous STCC codes in the native field.

38. CPKC did not provide a native route variable. Rather, CPKC provided the Rule 260 codes for the origin, bridge, and destination railroads (variables <origin_railroad>, <first_bridge_rr> through <eighth_bridge_rr>, and <termination_railroad>). I converted them into alpha codes per the Association of American Railroads' official guidelines⁶², and interlaced them with the alpha codes for the interchange stations where traffic was transferred to either the terminating railroad or a bridge railroad (<interchange1> through <interchange9>) to form the route variable (<route>). For the edge case where the first or last carrier in route disagreed with the native origin carrier variable (<waybill_ultimate_origin_scac>) or the native destination carrier variable (<waybill_ultimate_destination_scac>), I concatenated the route variable with the CPKC native origin and/or destination carrier variable.

⁶¹ In the event of ties in the number of non-hazardous STCC codes, the alphabetically last non-hazardous STCC code among the tied codes was selected.

⁶² See Association of American Railroads, "Circular No. OT-10," January 1, 2026, available at <https://public.railinc.com/sites/default/files/documents/OT-10.pdf>.

39. The CPKC traffic data do not contain raw variables for the shipment origin and destination SPLCs. To resolve this issue, a combined station master was created to map combinations of SCAC and FSAC to SPLCs.⁶³ Therefore, by using the CPKC native waybill ultimate SCAC and FSAC variables and the combined station master, the origin and destination SPLC variables were added to the CPKC traffic data.
40. The CPKC data occasionally contain multiple records for the same shipment. In some cases, these records correspond to different segments for the same shipment (for example, one record occurred before another), while in other cases they are duplicates. To address this issue, I identified records sharing the same car initial, car number, non-hazardous STCC code, and billed weight, with waybill dates no more than three days apart, and then consolidated those records to ensure that each shipment was counted only once and that the corresponding record reflected the full routing information.
41. To standardize weight, billed weight (<billed_weight>) and actual weight (<actual_weight>) were converted from hundredweight to tons using the conversion factor of 20 hundredweights per ton.
42. Empty shipment records were also identified and removed from the CPKC raw data.⁶⁴ Lead equipment information was replaced with the lead trailer or container information for intermodal shipments, if available. In addition, the number of carloads was replaced with the number of intermodal containers, if available.

⁶³ See Appendix C ¶ 77 for a discussion on the combined station master.

⁶⁴ Records were identified as empty shipment records in the CPKC traffic data if the Load Empty Code equals “E”, Actual Weight equals “0”, or the STCC number is one that denotes empty shipments.

2.3.8 *Processing the 2019 to 2024 CSXT data*

43. The CSXT data consist of carload-level traffic tape data for CSXT shipments covering the period from 2019 through 2024.⁶⁵
44. The raw CSXT traffic data contain records where the native route variable (<cms_route_x>) is missing. To fill in the missing route values, I constructed routes by concatenating one of two sets of variables, depending on which of the two sets of variables were available in the raw CSXT data.⁶⁶ The first set of variables I used to fill in missing routes include the alpha abbreviation for the origin railroad (<rail_raod_1_i>), the alpha abbreviations for up to five bridge railroads (<rail_raod_2_i> through <rail_raod_6_i>), the alpha abbreviation for the termination railroad (<rail_raod_7_i>), and the Rule 260 alpha codes for the interchange stations, where traffic is either transferred to a bridge carrier or the terminating carrier (<junction_1_c> through <junction_7_c>). The second set of variables I used to fill in missing routes include the alpha abbreviation for the carrier that delivers carloads to CSXT (<on_jct_scac_i>), the Rule 260 alpha code for the interchange where carloads are delivered to CSXT (<on_jct_city_c>), the alpha abbreviation for the carrier that CSXT delivers carloads to (<off_jct_scac_i>), and the Rule 260 alpha code for the interchange where CSXT delivers carloads to another carrier (<off_jct_city_c>).

⁶⁵ The following files from CSXT traffic tapes were used: “2019 CSXT Traffic Tapes – Highly Confidential.csv”, “2020 CSXT Traffic Tapes – Highly Confidential.csv”, “2021 CSXT Traffic Tapes – Highly Confidential.csv”, “2022 CSXT Traffic Tapes – Highly Confidential.csv”, “2023 CSXT Traffic Tapes – Highly Confidential.csv”, “2024 CSXT Traffic Tapes – Highly Confidential.csv”.

⁶⁶ In occasional cases where both sets of variables were available but indicated inconsistent routing information, the route was left missing.

45. Empty shipment records were identified and removed from the CSXT traffic data.⁶⁷

46. Lastly, a check for observations associated with the same waybill that have different routes, FSAC codes, or origin/termination railroad was performed.⁶⁸ For these records, I standardized the values of key variables within each waybill.⁶⁹

2.4 *Consolidating the Traffic Tape Waybill Data and the CWS Data*

2.4.1 *Merging the UP and NS waybill data*

47. After processing the UP and NS data using the steps outlined above, the UP and NS carload-level data were combined to identify waybills interlined between UP and NS. This merge was performed on data for 2019-2024.

48. Implementation involved a cascading series of merges where the records merged in one step were not considered for merging in subsequent steps. The NS data were merged with the UP data by the fields outlined in Table C.1. Records from each railroad that matched were combined as a single, joint record. Any NS observations that remained unmatched were then stacked onto the UP data as additional observations.⁷⁰

⁶⁷ Records were identified as empty shipment records in the CSXT traffic data if the Load Empty Code equals “E”, Net Tons equals “0”, or the STCC number is one that denotes empty shipments.

⁶⁸ Records associated with the same waybill were those with a common waybill number (<waybill_number>), waybill date (<waybill_date>), non-hazardous STCC code (<revenue_stcc_c>), hazardous STCC code (<hazmat_stcc_c>), origin SPLC code (<orig_splc>), destination SPLC code (<dest_splc>), and bill of lading number (<bol_i>).

⁶⁹ Variables that were standardized within each waybill in CSXT were route (<route>), route parent (<route_parent_abbr>), origin carrier (<origin_rr_alpha>), termination carrier (<termination_rr_alpha>), origin FSAC code (<origin_fsac>), and termination FSAC code (<termination_fsac>).

⁷⁰ There were instances of one record in NS data matching multiple records in UP data, or vice versa. I unlinked these records when processing the UP and NS merge to mitigate double-counting.

2.4.2 *Merging CSXT data to the UP/NS waybill data*

49. After combining the UP and NS data using the steps outlined above, the data were further merged with the CSXT data to identify waybills interlined between CSXT and UP and/or NS. This merge was performed for 2019-2024.

50. The CSXT data were merged with the combined UP/NS waybill data via a cascading series of merges where the records merged in one step were not considered for merging in subsequent steps. The CSXT data were merged onto the combined UP/NS data by the UP fields, if available, and then the NS fields, if available. Records from CSXT that matched the UP/NS data were consolidated into a single, joint record. Any CSXT observations that remained unmatched were then stacked onto the data as additional observations. The variables used to merge on the combined UP/NS data at each step are identified in Table C.3.

51. In round 9, I allowed fuzzy matching on equipment numbers and relaxed the requirement for matching equipment initials. Specifically, I required only the first six digits of the equipment number to match. This adjustment was motivated by differences across data sources: except for CPKC, equipment numbers in other data sources are predominantly at most six digits long, whereas CPKC occasionally appended an additional digit at the right end for COFC (container on flat car) and TOFC (trailer on flat car) equipment. Similarly,

equipment initials in CSXT were sometimes recorded differently from those in other sources.⁷¹

52. Results from round 9 indicate that the relaxed matching requirement for equipment initials and numbers produced very few additional matches for data pairs that do not involve CPKC or CSXT, confirming that the issues described above were specific to those two sources. To avoid false matches in rounds 10 and 11, which required a less stringent set of merge keys, the equipment initials were allowed to differ by at most one letter. In addition, fuzzy matching on equipment numbers and initials was applied only to data pairs involving CPKC or CSXT; all other data pairs continued to require exact matches.

⁷¹ A notable example is the equipment initial “TTXX”. CSXT records with the “TTXX” initial frequently share the same waybill identifier as records in other railroads’ data where the equipment initials appear as “TTAX”, “TTBX”, and so on, all of which are believed refer to railcars owned by TTX Company. *See* Robert S. McGonigal, “Railroad reporting marks 101,” February 7, 2024, available at <https://www.trains.com/trn/train-basics/abcs-of-railroading/railroad-reporting-marks-101/> (accessed April 27, 2026).

Table C.3: Cascading Merges – CSXT and UP/NS

Step	Equipment Initial	Equipment Number	Waybill Number	Waybill Date	Origin SPLC	Destination SPLC	STCC 4-digit	Bill of Lading
1	Exact	Exact	Y	Exact	N	N	Y	N
2	Exact	Exact	Y	Exact	Y	Y	N	N
3	Exact	Exact	N	Exact	N	N	Y	Y
4	Exact	Exact	N	Exact	N	N	N	Y
5	Exact	Exact	Y	+/- 7 Days	Y	N	Y	N
6	Exact	Exact	Y	+/- 7 Days	N	Y	Y	N
7	Exact	Exact	Y	+/- 7 Days	N	N	Y	N
8	Exact	Exact	N	+/- 7 Days	N	N	Y	Y
9	N	Fuzzy	Y	Exact	Y	Y	Y	N
10	Fuzzy	Fuzzy	N	Exact	N	N	Y	N
11	Fuzzy	Fuzzy	N	+/- 3 Days	N	N	Y	N

2.4.3 *Merging BNSF data to the UP/NS/CSXT waybill data*

53. After combining the UP, NS, and CSXT data using the steps outlined above, the data were further merged with the BNSF data to identify waybills interlined between BNSF and UP, NS, and/or CSXT. This merge was performed for 2019-2024.

54. The BNSF data were combined with the UP/NS/CSXT data via a cascading series of merges where the records merged in one step were not considered for merging in subsequent steps. The BNSF data were merged onto the combined UP/NS/CSXT data by the UP fields, if available, the NS fields, if available, and then the CSXT fields, if available. Records from BNSF that matched the UP/NS/CSXT data were consolidated into a single, joint record. Any BNSF observations that remained unmatched were then stacked onto the data as additional observations. The variables used to merge on the combined UP/NS/CSXT data at each step are identified in Table C.4.⁷²

⁷² See Appendix C ¶¶ 77-79 for a discussion on adjustments to SPLC.

Table C.4: Cascading Merges – BNSF and UP/NS/CSXT

Step	Equipment Initial	Equipment Number	Waybill Number	Waybill Date	Origin SPLC	Destination SPLC	STCC 4-digit	Bill of Lading
1	Exact	Exact	Y	Exact	N	N	Y	N
2	Exact	Exact	Y	Exact	Y	Y	N	N
3	Exact	Exact	N	Exact	N	N	Y	Y
4	Exact	Exact	N	Exact	N	N	N	Y
5	Exact	Exact	Y	+/- 7 Days	Y	N	Y	N
6	Exact	Exact	Y	+/- 7 Days	N	Y	Y	N
7	Exact	Exact	Y	+/- 7 Days	N	N	Y	N
8	Exact	Exact	N	+/- 7 Days	N	N	Y	Y
9	N	Fuzzy	Y	Exact	Y	Y	Y	N
10	Exact for UP/NS, Fuzzy for CSXT	Exact for UP/NS, Fuzzy for CSXT	N	Exact	N	N	Y	N
11	Exact for UP/NS, Fuzzy for CSXT	Exact for UP/NS, Fuzzy for CSXT	N	+/- 3 Days	N	N	Y	N

2.4.4 *Merging CN data to the UP/NS/CSXT/BNSF waybill data*

56. After combining the UP, NS, CSXT, and BNSF data using the steps outlined above, the data were further merged with the CN data to identify waybills interlined between CN and UP, NS, CSXT, and/or BNSF. This merge was performed for 2019-2024.
57. Implementation involved a cascading series of merges where the records merged in one step were not considered for merging in subsequent steps. The CN data were merged to the combined UP/NS/CSXT/BNSF data by the UP fields, if available, the NS fields, if available, the CSXT fields, if available, and then the BNSF fields, if available. Any CN waybills that remained unmatched were then stacked on to the data as additional observations. The variables used to merge on the combined UP/NS/CSXT/BNSF data at each step are identified in Table C.5.
58. Unlike the combined UP, NS, CSXT, and BNSF data, CN's traffic data were not provided at the carload level, but rather at the waybill level.

Table C.5: Cascading Merges - CN and UP/NS/CSXT/BNSF⁷³

Step	Equipment Initial	Equipment Number	Waybill Number	Waybill Date	Origin SPLC	Destination SPLC	STCC 4-digit	Bill of Lading
1	Exact	Exact	Y	Exact	N	N	Y	n/a
2	Exact	Exact	Y	Exact	Y	Y	N	n/a
3	Exact	Exact	Y	+/- 7 Days	Y	N	Y	n/a
4	Exact	Exact	Y	+/- 7 Days	N	Y	Y	n/a
5	Exact	Exact	Y	+/- 7 Days	N	N	Y	n/a
6	N	Fuzzy	Y	Exact	Y	Y	Y	n/a
7	Exact for UP/NS/BNSF, Fuzzy for CSXT	Exact for UP/NS/BNSF, Fuzzy for CSXT	N	Exact	N	N	Y	n/a
8	Exact for UP/NS/BNSF, Fuzzy for CSXT	Exact for UP/NS/BNSF, Fuzzy for CSXT	N	+/- 3 Days	N	N	Y	n/a

2.4.5 Merging CPKC to UP/NS/CSXT/BNSF/CN waybill data

59. After combining the UP, NS, CSXT, BNSF, and CN data using the steps outlined above, the data were further merged with the CPKC data to identify waybills interlined between CPKC and UP, NS, CSXT, BNSF, and/or CN. This merge was performed for 2019-2024.

⁷³ The CN data do not contain a field with the bill of lading. Therefore, bill of lading was dropped as a merge criterion.

60. Implementation involved a cascading series of merges where the records merged in one step were not considered for merging in subsequent steps. The CPKC data were merged to the combined UP/NS/CSXT/BNSF/CN data by the UP fields, if available, the NS fields, if available, the CSXT fields if available, the BNSF fields, if available, and then the CN fields, if available. Any CN waybills that remained unmatched were then stacked onto the data as additional observations. The variables used to merge on the combined UP/NS/CSXT/BNSF/CN data at each step are identified in Table C.6.
61. Same as CN's traffic data, CPKC's traffic data were provided at the waybill level.

Table C.6: Cascading Merges - CPKC and UP/NS/CSXT/BNSF/CN⁷⁴

Step	Equipment Initial	Equipment Number	Waybill Number	Waybill Date	Origin SPLC	Destination SPLC	STCC 4-digit	Bill of Lading
1	Exact	Exact	Y	Exact	N	N	Y	n/a
2	Exact	Exact	Y	Exact	Y	Y	N	n/a
3	Exact	Exact	Y	+/- 7 Days	Y	N	Y	n/a
4	Exact	Exact	Y	+/- 7 Days	N	Y	Y	n/a
5	Exact	Exact	Y	+/- 7 Days	N	N	Y	n/a
6	N	Fuzzy	Y	Exact	Y	Y	Y	n/a
7	Fuzzy	Fuzzy	N	Exact	N	N	Y	n/a
8	Fuzzy	Fuzzy	N	+/- 3 Days	N	N	Y	n/a

2.4.6 Merging CWS to the UP/NS/CSXT/BNSF/CN/CPKC waybill data

62. The combined UP/NS/CSXT/BNSF/CN/CPKC waybill data were further supplemented with the CWS to get waybill data for Class II and Class III railroads. The CWS data also allows to supplement the revenue information for waybills.

63. Implementation involved a cascading series of merges where the records merged in one step were not considered for merging in subsequent steps. The CWS data were merged with the combined UP/NS/CSXT/BNSF/CN/CPKC data, sequentially by the UP, NS, CSXT, BNSF, CN, and CPKC fields, where available. Any CWS waybills that remained unmatched were

⁷⁴ The CPKC data do not contain a field with the bill of lading. Therefore, bill of lading was dropped as a merge criterion.

then stacked onto the data as additional observations. The variables used to merge on the combined UP/NS/CSXT/BNSF/CN/CPKC data at each step are identified in Table C.7.

Table C.7: Cascading Merges - CWS and UP/NS/CSXT/BNSF/CN/CPKC⁷⁵

Step	Equipment Initial	Equipment Number	Waybill Number	Waybill Date	Origin SPLC	Destination SPLC	STCC 4-digit	Bill of Lading
1	Exact	Exact	Y	Exact	N	N	Y	n/a
2	Exact	Exact	Y	Exact	Y	Y	N	n/a
3	Exact	Exact	Y	+/- 7 Days	Y	N	Y	n/a
4	Exact	Exact	Y	+/- 7 Days	N	Y	Y	n/a
5	Exact	Exact	Y	+/- 7 Days	N	N	Y	n/a
6	N	Fuzzy	Y	Exact	Y	Y	Y	n/a
7	Exact for UP/NS/BNSF/CN, Fuzzy for CSXT/CPKC	Exact for UP/NS/BNSF/CN, Fuzzy for CSXT/CPKC	N	Exact	N	N	Y	n/a
8	Exact for UP/NS/BNSF/CN, Fuzzy for CSXT/CPKC	Exact for UP/NS/BNSF/CN, Fuzzy for CSXT/CPKC	N	+/- 3 Days	N	N	Y	n/a

⁷⁵ The CWS data do not contain bill of lading. Therefore, bill of lading was dropped as a merge criterion.

2.5 *Preparing the Combined Waybill Data for Analysis*

64. For the analysis, the combined waybill data⁷⁶ were aggregated to the shipment level by summing up the revenue, car count, and net tons for each waybill number, waybill date, lead equipment initial and number (bill of lading number for car-level data), origin SPLC, destination SPLC, and 7-digit STCC code. For shipments for which the waybill numbers, waybill dates, STCC codes, revenue, carloads, or net tons differed across data sources, the values from the first source available were kept in the following order: UP, NS, CSXT, BNSF, CN, CPKC, and CWS. When determining the route, origin/destination SPLCs, and other route-related fields for the shipment, priority was assigned to take the information reported by CSXT, CN, and CWS over the information in BNSF and CPKC, when available, given that the routes in BNSF and CPKC are often incomplete, as explained above. Specifically, as noted above, CPKC's data include records associated with two subsidiary railroads, CPRS and KCS. Diagnostic analyses showed that the KCS routes were typically more complete than the CPRS routes.⁷⁷ Accordingly, when comparing BNSF and CPKC, priority was assigned first to the KCS route, then to BNSF, and finally to CPRS. As a result,

⁷⁶ The UP, NS, BNSF, and CSXT data were provided at the car level, which can be aggregated to a waybill level, but the CN, CPKC, and CWS data were provided at the waybill level.

⁷⁷ As noted in Section 2.3.7, the CPKC data does not contain a native route variable. Routes were therefore constructed by concatenating railroad alpha codes and Rule 260 alpha codes for interchanges. Relative to KCS, CPRS more frequently exhibited cases in which the constructed route consisted solely of "CPRS," while the native origin railroad (<waybill_ultimate_origin_scac>) and/or native destination railroad (<waybill_ultimate_destination_scac>) indicated a different railroad (e.g., UP). In such cases, the native origin and destination railroads were appended to the constructed route. Even so, it remained unclear whether additional intermediate (bridge) railroads were present.

the overall priority order for route-related fields is: UP, NS, CSXT, CN, CWS, KCS, BNSF, and CPRS.⁷⁸

65. Given the sampling nature of the CWS, tonnage, carloads, and revenues for shipments coming exclusively from the CWS data were expanded using the corresponding theoretical expansion factor provided in the CWS.

2.5.1 Identifying related shipments that were not classified as Rule 11 in the traffic data

66. Certain waybills matched across two or more data sources appeared to represent different legs of the same shipment but were not identified as Rule 11 by any of the railroads. In these instances, records from different data sources were evaluated to determine whether the destination SPLCs reported in one railroad's data corresponded to the origin SPLCs in another railroad's data, indicating that the records reflected sequential segments of the same shipment.⁷⁹ If this was found to be the case, the origin SPLCs and destination SPLCs were adjusted to reflect the true shipment-level origin and destination, and the route was updated to reflect the various legs.

2.5.2 Unlinking unreliable fuzzy matches

67. As discussed above, a cascading series of merges was implemented to link interline shipments that appeared in more than one Class I railroad's traffic tape data. The cascading

⁷⁸ In the CWS data, the route information reported for Rule 11 records typically reflects only the leg of the reporting railroad. Therefore, BNSF's and CPKC's information were prioritized over information in the CWS for any Rule 11 shipment.

⁷⁹ For connecting different legs of a shipment together, an attempt to match was made using the finalized 6-digit station SPLCs for each railroad, the rate-based SPLCs to each other and the station SPLCs, and the switch SPLCs to each other and the station SPLCs. See Appendix C ¶¶ 77–79 for a discussion on adjustments and additions to SPLCs.

approach began with the most stringent merge keys and progressively relaxed them in subsequent rounds. To mitigate the risk of false matches in later rounds, shipments that did not appear to represent different legs of a single movement based on origin and destination SPLCs were subjected to an additional validation step. Specifically, routes from different data sources were checked to ensure they referenced at least one common railroad. Matches that failed this validation were unlinked and retained in the dataset as separate shipments.

2.5.3 *Calculating railroad revenue for each waybill*

68. Section 4 of the statement discusses challenges with revenue data for waybills due to the sampling process of the CWS and the limited information for Rule 11 shipments. Here, further details on the steps undertaken to calculate revenue for each shipment are provided. The tape data of the five Class I railroads discussed above (i.e., BNSF, CN, CPKC, NS, and UP) have columns representing the revenue attributable to their own segment (“system revenue”) and the total waybill revenue, while CSXT only has a column representing its system revenue.⁸⁰ The CWS reports the total waybill revenue without a breakdown by participating railroad.⁸¹ Class II and Class III railroads’ segment revenue can be obtained

⁸⁰ One caveat is that revenue fields from different data sources may include varying components, and the provided data dictionaries do not always make these components clear. For instance, <up_gross_rev_amt> is used to represent UP’s system revenue, which, according to UP’s data dictionary, includes total freight, fuel, and other revenue that make up total gross revenue. See “UPRR_Linehaul_Dtls_2023_DataDef_20250825.xlsx”. However, the system revenue field available in the CN traffic tape data <system_revenue_in_rate> is broadly described as “CN’s revenue in USD” in CN’s data dictionary. See “CN Traffic Tape Fields 2023.xlsx”.

⁸¹ In the CWS, the total waybill revenue is stored in the <freight_revenue> field. The CWS also includes split revenue fields—such as <origin_railroad_split_revenue>, <first_interchange_rr_split_revenue>, ..., <termination_rr_split_revenue>—which represent freight revenue expanded by the theoretical expansion factor and allocated based on the number of 100-mile blocks traveled by each participating railroad. These values do not reflect the actual revenue earned by each participating railroad, so I did not rely on them for revenue calculation. See 2023 Surface Transportation Board Carload Waybill Sample Reference Guide, at pp. 51, 64-65.

from the CWS when the waybill is reported as a single-line movement, and therefore, the total waybill revenue and the railroad's system revenue are identical.

69. The total waybill revenue represents revenue generated by the entire movement for non-Rule 11 shipments. However, Rule 11 allows each participating railroad to issue its own waybill; therefore, the total waybill revenue reported in the tape data from UP, NS, BNSF, CN, and CPKC represents only the revenue attributable to their respective segments. Similarly, the total waybill revenue for Rule 11 shipments in the CWS reflects only the reporting railroad's revenue, not the total revenue across the entire route from all participating railroads. When a Rule 11 shipment involves only Class I railroads, it is possible to construct the revenue for the entire movement from the data each railroad provides for its respective segments. When part of a Rule 11 shipment is handled by Class II and/or Class III railroads, it is possible to identify total shipment revenues if the Rule 11 record for these railroads happens to be sampled in the CWS.⁸² For example, for an interline route involving UP and a Class II railroad, the Class II railroad's revenues are not observed when Rule 11 pricing is used unless the Class II's segment is sampled in the CWS.

70. Additionally, even for non-Rule 11 shipments, total shipment revenue is not always fully observed. In cases where CSXT is the only Class I railroad involved, whose traffic tape data do not include a total shipment revenue field, or where all of the involved Class I railroads have missing values for their total shipment revenue fields, the system revenues of each participating railroad were summed to approximate the total shipment revenue. As a result,

⁸² Similarly, when part of a Rule 11 shipment is handled by a Class I railroad but the revenue attributable to that Class I railroad is not populated in its own traffic tape, it is filled in with the total waybill revenue from the CWS if the Class I railroad's segment is sampled.

the same limitation described above for Rule 11 shipments also applies. For example, for an interline route involving CSXT and a Class II railroad, the Class II railroad's revenues are not observed even under interline pricing unless the Class II's segment is sampled in the CWS.

71. To summarize, because the total shipment revenue is either not available for Rule 11 shipments or not always populated in the data for non-Rule 11 shipments, and there is limited visibility into the revenue collected for all segments of a shipment, the total shipment revenue is underreported in many cases.

72. For non-Rule 11 interline shipments that appeared in multiple data sources, total waybill revenue was used as reported from the first source in the following priority order: UP, NS, BNSF, CN, CPKC, and CWS. For example, an interlined shipment involving UP and NS would appear in both parties' traffic tape data, and each source would report the total revenue between UP and NS under interline pricing. When there was any inconsistency, priority was assigned to UP's total waybill revenue. When there was a discrepancy between the sum of each involved railroad's system revenues and the total shipment revenue reported in the prioritized data source, priority was assigned to the sum of system revenues.⁸³

73. Then, UP and NS's revenue shares were calculated by dividing the system revenue for each carrier's respective segment (as reported in their tape data) by the total shipment revenue. However, because the total shipment revenue is often underreported for the reasons described above, UP and NS's revenue shares are likely overestimated.

⁸³ Certain additional assumptions were made to reconcile inconsistencies in the revenue fields inter- or intra-data sources. *See* workpapers.

2.6 *Data Quality Controls and Reconciling Discrepancies in These Data*

74. The data provided by the six Class I railroads, as well as the CWS, are subject to recording errors and inconsistencies. In particular, when the same shipment appears in the traffic tape data of multiple railroads, certain shipment attributes (e.g., routing, commodity codes, tonnage, or revenue) may differ across sources. In addition, the data dictionaries provided for the 100 percent traffic tape data from the six Class I railroads are limited, requiring the exercise of judgment in interpreting and processing certain fields.
75. To address these issues, extensive quality checks were performed, including comparisons of waybill identifiers, route information, revenue fields, and other shipment attributes across sources, as well as internal consistency checks within each railroad's own traffic tape data. Despite these data quality checks, it is possible that some data issues remain. If material issues are identified in the future, I reserve the right to supplement or update the analyses in my report.
76. Indicator variables, or flags, were created throughout the data construction process to identify records subject to potential limitations, such as incomplete revenue information, censored tonnage, or partial observability due to sampling or Rule 11 treatment. These flags allow the analyses to be restricted, sensitivity-tested, or interpreted appropriately depending on the requirements of each analytical exercise.

77. For instance, the origin and destination SPLCs were validated using two station master files.⁸⁴ Both station master files map SCAC and FSAC to SPLCs. A combined station master was created by merging the two sources on SCAC and FSAC and then verifying that the SPLCs matched when a SCAC-FSAC pair appeared in both. Additionally, the Railinc Station Master provided switch SPLC and rate base SPLC.⁸⁵
78. Traffic tape data from all six Class I railroads, except BNSF, as well as the CWS, report the origin and termination FSACs for each waybill. From the routing information, the records identifying the first and last railroads were chosen and treated as the origin and termination railroads. Next, the data were cross-referenced with the combined station master on FSAC and origin/termination railroad. If either the FSAC-origin railroad or the FSAC-termination railroad were missing from the combined station master, the record was then flagged as unreliable. When SPLCs reported by the sources differed from those associated with the FSAC-railroad pair in the combined station master, the reported SPLCs were replaced with those from the combined station master.
79. As stated above, BNSF’s traffic tape data did not provide origin or termination FSACs or SPLCs, but allowed one to infer them using the originating/destination railroad, the Official

⁸⁴ Specifically, two sources were integrated: Railinc Station Master and Oliver Wyman Unified Station Master. Certain SCACs that did not appear on the U.S. Department of Transportation’s freight station list on the data portal were omitted. *See* U.S. Department of Transportation Freight Stations Data, available at https://data.transportation.gov/Railroads/Freight-Stations/gag3-mgv7/about_data (accessed December 14, 2025).

⁸⁵ Switch SPLC, or revenue switch SPLC, refers to a SPLC assigned to a reciprocal revenue switching area, which may include multiple stations. While most stations have their own unique revenue switch area, some, such as Wood Street Yard, fall within the Chicago reciprocal switching limits. Rate base SPLC is the SPLC that identifies the National Rate Base (NRB), a geographic grouping of all rail stations in the United States and Canada used for rating purposes. *See* Railinc, “Centralized Station Master (CSM) User Guide,” January 2024, at https://public.railinc.com/sites/default/files/documents/UG_CSM.pdf, at p. 14.

333 spelling for the origin/destination station, and the state code associated with that station. This inference relied on the Railinc Station Master, the Oliver Wyman Unified Station Master, and the Oliver Wyman FSAC-SPLC-FIPS-BEA Mapping Table. Additional research was subsequently conducted to infill SPLCs not resolved through this initial process. For identifying SPLCs, the Official 333 spelling was sufficient; however, FSACs needed to be identified by both the Official 333 spelling and the railroad operating the station. For many stations, the railroad-Official 333 spelling pair did not map to a valid FSAC using the references mentioned above, and only the SPLC was identified based on the Official 333 spelling. Due to this reason, the BNSF data were cross-referenced with the combined station master at the SPLC level, i.e., if either the SPLC–origin railroad or the SPLC-termination railroad were missing from the combined station master, the record was flagged as unreliable.

80. Further, switch SPLCs and rate base SPLCs associated with each FSAC/SPLC-railroad pair were retained when merging data sources with the combined station master. A shipment appearing in multiple data sources was flagged as having inconsistent origin or termination station information of those sources reported different SPLCs and the discrepancies could not be resolved by generalizing to switch SPLCs or rate base SPLCs.

81. The following types of records were also flagged as unreliable and therefore removed from analyses:

- Records with missing, invalid, or indeterminate commodity codes.
- Records with missing or “000000” origin or destination SPLCs, or identical origin and destination SPLCs.

- Records with missing routing information or invalid railroad abbreviations in the route.
- Records from a lower-priority source that referenced a higher-priority source in their route, but the corresponding record could not be found in that higher-priority source^{86, 87}.
- STB records reported by Class I railroads in the CWS but missing from the Class I railroads' 100% traffic tape data.
- Records for which either FSAC-origin railroad or FSAC-termination railroad were missing from the combined station master.⁸⁸
- Records for interlined shipments matched among multiple data sources without a matching waybill number or bill of lading number.

82. Intra-Canada and intra-Mexico shipments were excluded as they fell outside the scope of this report.

2.7 *Implications of CWS Sampling for Disaggregated Market Analysis*

83. As discussed in the statement, there is a limitation in the combined waybill data to support reliable statistical conclusions. This is due to the nature of the CWS being a stratified sample

⁸⁶ This exclusion was intended to prevent double-counting. For example, if a NS record referenced UP in its route but no corresponding UP record could be linked, the NS record was excluded under the assumption that the UP movement was already captured in the UP data. This rule was not applied when the high-priority source was CN and both the origin and destination were outside of the United States.

⁸⁷ The priority order for route-related fields was applied here, i.e., UP, NS, CSXT, CN, CWS, KCS, BNSF, and CPRS for non-Rule 11 records, and UP, NS, CSXT, CN, KCS, BNSF, CPRS, and CWS for Rule 11 records.

⁸⁸ For BNSF, records for which either SPLC-origin railroad or SPLC-termination railroad were missing from the combined station master were removed. See Appendix C ¶ 79.

with some sampling rates as low as 1 out of 40 waybills.⁸⁹ Although the STB provides expansion factors intended to create a dataset with representative shipment volumes, the CWS remains a sample and therefore limits the number of observed waybills available for analysis within narrowly defined markets.

84. This sampling structure has important implications when traffic is disaggregated to analyze commodities at the 4-digit STCC level. Partitioning traffic simultaneously by origin BEA, destination BEA, and 4-digit commodity code substantially reduces the expected number of sampled observations within many corridor-commodity pairs. As a result, even where underlying freight activity exists, a given corridor-commodity market may be represented by only a small number of sampled waybills—or none at all—in a particular year. Expansion factors do not mitigate this limitation because they do not increase the underlying number of observations used to measure competitive outcomes or railroad shares.
85. For this reason, analyses that rely on very small numbers of sampled waybills at the corridor-commodity level may yield misleading measures of competition, particularly where market shares can be mechanically driven by only a few observed shipments. This concern has been recognized in prior railroad transactions, and prior analyses thereof (e.g., Vellturo 2001 VS, Vellturo 2007 VS, Majure VS) have imposed minimum traffic thresholds to ensure that competitive screens are applied only to markets with sufficient underlying

⁸⁹ See 2023 Surface Transportation Board Carload Waybill Sample Reference Guide, at p. 53.

activity to support reliable inference.⁹⁰ Consistent with this, limits of at least 365 carload shipments per year (corresponding to an average of one carload per day) and at least 10 observed waybills per year are used. These thresholds are intended to account for the sampling limitations of the CWS and ensure that market-level measures are not driven by lower observation counts.

86. Accordingly, even when using 4-digit commodity definitions, there remain many instances in which corridor-commodity flows are too limited (either in underlying volume or sampled observations) to support reliable statistical conclusions about competition. Results for markets falling below these thresholds should therefore be interpreted with caution and are excluded from formal competitive screening in my analysis.

87. Moreover, because the CWS contains information on UP's and NS's competitors (i.e., Class II and III railroads; recall I have 100 percent traffic tape data for all six Class I railroads, it is more likely that the analysis of these data would lead to overstating, rather than understating, UP's and NS's involvement in a market.

⁹⁰ See Majure VS at ¶ 90. “[Measurement] of shares as a reliable description of choices, has been recognized in the Board’s recent decision to adjust the Waybill sampling methodology to better capture smaller shipments. With the thin observation of these shipments that was still used in the 2019 Waybill Sample, the initial screen can be triggered by shares based on as few as 2 observed shipments which mathematically has to give one carrier at least 50 percent even if that is not an accurate representation of competition. This issue was indirectly addressed in past implementations of this test by imposing a minimum of one carload per day on candidate BEA area-commodity pairs. I will use an equivalent threshold for reliability of the screen.” See also, Velturo 2001 VS at pp. 11-12. “For example, there are only 21 product/DBEA pairs where the combined volumes of the two railroads amount to more than a carload a day... I understand that the Board has stated that it must approve a transaction of this type ‘unless there will be adverse competitive impacts that are both ‘likely’ and ‘substantial.’ The small CN/EJ&E volumes within the 50/10 product/DBEA pairs indicate that this Transaction will not entail any such anticompetitive effects.” See also, Velturo 2007 VS at p. 88.

3 Serving Carrier Reciprocal Switch (SCRS) data

88. The Serving Carrier Reciprocal Switch (“SCRS”) file is used by the railroad industry in the normal course of business to establish “whether a railroad may serve, or under what conditions a railroad may serve, a specific customer at common service points.”⁹¹ To this end, Railinc maintains the SCRS data as a web-based application that allows carriers to update or retrieve information on customer locations and access to carriers, including serving carriers at specific stations and reciprocal switching agreements. In this system, Railinc operates and maintains the SCRS application, while Class I railroads and some Class II and III railroads populate and maintain SCRS records for their rail-served customers.⁹² Each record in the SCRS data captures information on dozens of fields describing the customer location, a station, the primary owner/serving carrier of the station, and information reflecting reciprocal switching agreements granting access to other carriers for that customer, and applicable conditions.⁹³

89. The SCRS data used for my analysis were extracted from the SCRS system by UP in August 2025.⁹⁴ These data were supplemented using the Railinc Station Master data for additional information on the stations serving each customer location.

⁹¹ See Railinc, “Serving Carrier/Reciprocal Switch,” available at <https://public.railinc.com/products-services/serving-carrierreciprocal-switch> (accessed April 27, 2026).

⁹² See Railinc, “Serving Carrier Reciprocal Switch (SCRS) User Guide,” September 2022, available at https://public.railinc.com/sites/default/files/documents/SCRS_UserGuide.pdf, at pp. 1-3. See also, Railinc, “Serving Carrier & Reciprocal Switch (SCRS) Business Rules Guide,” June 2017, available at https://public.railinc.com/sites/default/files/documents/SCRS_BusinessRules.pdf, at p. 1.

⁹³ See Railinc, “Serving Carrier Reciprocal Switch (SCRS) File Tape Layout,” September 2010, available at <https://public.railinc.com/sites/default/files/documents/SCRSFileTapeLayout.pdf>, at pp. 1-2.

⁹⁴ See UPRR_SCRS_Full_Desc_20250815.txt (“SCRS Data Extract”).

3.1 *Creation of SCRS Data Build and Identification of 2-to-1 or 3-to-2 Customer Locations*

90. The SCRS Data Extract was first modified to define all carriers as carriers that had *any* type of access to a customer through unique stations, including both carriers that owned the serving stations and carriers that had access through reciprocal switching arrangements with those owning carriers. Then, carrier counts were aggregated by customer location to identify the effects of the combined railroad.⁹⁵ This aggregation was done across *all* railroads, including Class I, Class II, and Class III railroads, as competitors in the service of a customer.

91. Next, the effect of the combined railroad was simulated on the aggregated carrier counts. The results were used to create a list of customers who could potentially experience a reduction in access from 2-to-1 or from 3-to-2 due to the combined railroad (“Reduction List”). At this point, information from the Novak VS was incorporated into the Reduction List.⁹⁶

3.2 *Merging Carloads onto the Reductions List*

92. Proper evaluation of each customer location on the Reduction List requires information on the number of carloads associated with each customer location. However, not all Class I railroads’ traffic tape data contain CIF numbers, e.g., CXST and BNSF. A crosswalk

⁹⁵ Customers were defined by field < cif_nbr >, which was the customer identification file number. This number was chosen as opposed to the customer’s name (< cif_cust_name >), because the same customer name may be associated with multiple locations that are geographically dispersed, like “THE QUAKER OATS CO”, with CIF numbers 0627330680000 and 0696116550000, which indicate customer locations in Kansas and Iowa, respectively.

⁹⁶ See Exhibit 11 Workpapers.

between the customer names in the Reduction List and customer names in Class I railroads' traffic tape data was created to serve as the basis for attributing observed carloads in the combined waybill data to the relevant customer locations identified in the Reduction List.

93. The combined waybill data did not retain information on customer names. Instead, the crosswalk was derived from customer name information in the individual Class I railroad's traffic tape data.

94. Customers identified in the Reduction List were assigned keyword identifiers. These identifiers were used to match SCRS customer names to customer names in the individual Class I Railroads' traffic tape data through a standardized term search. For instance, the keywords "LEBANONCHEMICAL" and "LEBANONSEABOARD"⁹⁷ were used in conjunction to search for customer names in the traffic tapes in reference to the Reduction List customer "LEBANON CHEMICAL CORP".

95. Below is a table that shows the fields in each Class I railroad's traffic tape data that were searched to identify Reduction List customers in traffic tape waybills:

⁹⁷ Lebanon Chemicals Corporation was renamed Lebanon Seaboard Corporation when it acquired the seed supplier the Seaboard Seed Company in 1990. *See* Lebanon Seaboard Corporation, "History," available at <https://lebsea.com/about-us/history/> (accessed April 27, 2026). *See* Exhibit 11 workpapers for the keyword identifiers used for each customer location on the Reduction List and how the search was performed.

Table C.8: Field Names for Shipper and Consignee in Traffic Tape Data

Traffic Data	Shipper Field Name	Consignee Field Name
UP	shpr_name	cense
NS	shipper	consignee
CSXT	shipper_name	consignee_name
CPKC	shipper	consignee
CN	parent_customer_shipper_name	parent_customer_consignee_name
BNSF	shipper_name	receiver_name

96. This crosswalk was then used to identify specific waybills in the traffic tape data associated with the customers in the Reduction List. The crosswalk was applied to each Class I railroad’s traffic tape data individually, incorporating information on the station using the Freight Station Accounting Code (“FSAC”) and Standard Carrier Alpha Code (“SCAC”) for the associated customer location in the Reduction List. The results were mapped to the combined waybill data to account for movements that were reported by multiple Class I railroads, movements that were stitched together, and other processing steps and data quality screens. This set of waybills was aggregated to produce counts of traffic shipped and received by the customers on the Reduction List. Select customers were consolidated due to their reference to the same company.⁹⁸

⁹⁸ For instance, customers “MIGHTY RIVER RECYCLING LLC” (0394868040000) and “AZCON INC” (8270989680000) were combined into “MIGHTY RIVER RECYCLING LLC/AZCON INC”. *See* Novak VS at Appendix B.

3.3 *Verifications on the Crosswalk*

97. A series of verification checks was performed on the customer-name crosswalk. The crosswalk was intentionally inclusive to reduce the risk of omitted observations. Validation of name pairs proceeded in two steps. First, carloads were aggregated not only on the identified name pairs but also on the associated origin/destination stations with access to the customer location in the Reduction List.⁹⁹ Second, all matched tape names were extracted from the waybill data and reviewed. This procedure mitigates both false exclusions and false inclusions, thereby improving the reliability of the resulting carload counts.

4 **2023 Transearch Data**

98. S&P Global Market Intelligence – Transearch Insights freight flows data provide information on non-rail movements. These data contain information on annual freight movement. Each record reports freight flows by origin and destination, 4-digit STCC, transportation mode (e.g., air, pipeline, rail, truck, water, or other), and trade type (e.g., domestic, import, or NAFTA). While the Transearch data typically report freight movements at the 4-digit STCC level, in some cases Transearch is unable to establish the commodity code with that level of precision. In these instances, Transearch reports the freight movement using the first three or first two digits of the commodity code, whichever is available. When I joined the non-rail tons from Transearch with the railroads' traffic data, non-rail flows with the STCC specified to fewer than four digits did not match any records in the railroads' traffic data. This approach is conservative: it underestimates the level of

⁹⁹ For instance, if the waybill data indicate that "THE QUAKER OATS CO" shipped by NS via its station in Kansas, but the identified customer location in the Reduction List is the Illinois location of the same company and therefore the associated SCAC-FSACs are also located in Illinois, these Kansas carloads would not be counted.

non-rail freight movement and reduces the likelihood of inferring adequate competition from non-rail modes of freight.

99. For the analyses in this statement, a 2023 Transearch extract was provided by Oliver Wyman that reports corridor-level freight flows of STCC4-level commodities from origin to destination BEA pairs. Oliver Wyman supplemented Transearch records with estimated revenues for non-rail modes.

100. The Transearch data were merged onto the combined waybill dataset after aggregating the combined waybill data at a consistent unit of observation (i.e., STCC4 and origin and destination BEAs). Specifically, each record in the combined waybill data was assigned an origin BEA and destination BEA using the SPLC-to-BEA crosswalk described above, and shipment volumes were aggregated by 4-digit STCC codes. Then the Transearch data were subsequently merged with the combined waybill data using these common fields. This merge augmented the combined waybill data with measures of non-rail freight activity for the same commodity and origin-destination BEA pairs for my analyses.

5 Geographic Data

101. For the maps presented in Section 2 of the statement (Exhibits 1, 2, 4, 5, and 7 to 10), I relied on two primary sources of data.

102. For the maps illustrating railroad networks (Exhibits 1, 2, 4, and 7 to 10), data from the STB Railroad Map Depot were used. These datasets provide the information necessary to map each route for Class I railroads, identify the railroad that owns the tracks along the route, and indicate whether other railroads have trackage rights. To improve readability, label for both the states and several major cities across the United States were added.

103. For the map illustrating the BEAs served by UP and NS (Exhibit 5), data from the Railinc Station Master were used to identify which SPLCs were served by UP and/or by NS. To map each SPLC to a BEA, the SPLC-BEA mapping from the Updated Oliver Wyman SPLC-FIPS-BEA Mapping Table was used.

104. Finally, a review of instances where the data suggested UP or NS served SPLCs beyond the states in which they are known to operate was performed.¹⁰⁰ These appeared to be recording errors and were therefore excluded from the analysis.

¹⁰⁰ See Amended Railroad Control Application, “Union Pacific Corporation and Union Pacific Railroad Company – Control – Norfolk Southern Corporation and Norfolk Southern Railway Company,” Docket No. FD 36873, at § 1180.6(a)(5) for the list of states in which UP and NS operate.

APPENDIX D

MAJOR ORIGINS AND DESTINATIONS

1. To address 49 CFR § 1180.7(b)(2) of the STB regulations, this appendix reports, by railroad, and for each major origin or destination point on the parties' combined system, actual and projected shares based on traffic (measured in carloads) originated or terminated at each such point. It also identifies each such point where the number of serving Class I railroads would drop from 2-to-1 or from 3-to-2 as a result of the proposed transaction.
2. Carloads originated or terminated are reported for each major origin and destination point for the year 2023 using combined waybill data from 2023. Major origin points are identified by calculating the combined origination volume for UP and NS in carloads, across all commodity groups, shipped for each origin and summing them from highest to lowest volume until 80 percent of the combined UP and NS origination volume is captured.¹ An analogous approach is used to identify the major destination points using the combined UP and NS termination volume.
3. This appendix relies on the combined waybill data as described in Appendix C.² Origin and destination points are defined by BEA and all commodities are combined into one for these calculations.³

¹ The STB's regulations do not define "major point." I therefore define "major" in response to STB regulations and this definition only affects which information is presented in Appendix Tables D-F. This definition is not used in my competitive assessment of the merger.

² See Section 4.1 of my statement for a description of how the combined waybill data were created.

³ See Section 4.2 of my statement for more information on BEAs.

1 Share of all traffic across all commodities that is originated by each railroad and projected share of the combined railroad

4. Table D1 shows, for each major origin BEA, the total originated traffic volume in carloads across all commodities and the share of originated traffic by railroad (separately for each Class I railroad and all other railroads grouped together).⁴ The table also shows the projected share of the combined railroad, which is estimated as the combined share of UP and NS before the proposed merger.

2 Share of all traffic across all commodities that is terminated by each railroad and projected share of the combined railroad

5. Table D2 shows, for each major destination BEA, the total terminated traffic volume in carloads across all commodities and the share of terminated traffic by railroad (separately for each Class I railroad and all other railroads grouped together). The table also shows the projected share of the combined railroad, which is estimated as the combined share of UP and NS before the proposed merger.

3 Origins and Destinations where the number of Class I railroads serving the origin or destination changes from 2-to-1 or 3-to-2 as a result of the proposed merger

6. There are no major points where the number of Class I railroads serving the point changes from 2-to-1 or from 3-to-2 as a result of the proposed merger.

⁴ All other railroads include all non-Class I railroads.

APPENDIX E

WITHIN CORRIDOR

1. To address 49 CFR § 1180.7(b)(3) of the STB regulations, this appendix reports actual and projected shares of revenues and traffic volumes (measured in tons) for major interregional corridor flows by major commodity group. The data are broken down by mode and, for the railroad portion, by single-line and interline routings showing gateways used.
2. Tons and revenues are reported by major corridor-commodity combination using the combined waybill data from 2023. Major corridor-commodity combinations are identified by calculating the combined total volume for UP and NS in tons shipped for each corridor-commodity combination and summing them from highest to lowest volume until 80 percent of the combined UP and NS volume is captured.¹ Revenue shares are then reported for these same major corridor-commodity combinations.
3. This appendix relies on the combined waybill data for 2023, described in Appendix C.² Corridors are identified by the origin BEA and destination BEA and commodities are identified by the 4-digit STCC.³ As described in Appendix C, revenues are not always observed for certain records. Revenue calculations should be interpreted with these limitations in mind.

¹ The STB’s regulations do not define “major commodity group” or “major interregional or corridor flows.” I therefore define “major” in response to STB regulations and this definition only affects which information is presented in Appendix Tables D-F. This definition is not used in my competitive assessment of the merger.

² See Section 4.1 of my statement for a description of how the combined waybill data were created.

³ See Section 4.2 of my statement for more information on BEAs and Section 4.4 for information on 4-digit STCCs.

1 Actual share of all traffic volume by mode for major corridor-commodity combinations

4. Table E1 shows, for each major corridor-commodity combination, the total traffic volume in tons and the share of traffic volume by mode, specifically by rail, truck, water, pipeline, air, and other. Non-rail traffic volumes come from the Transearch data described in Appendix C.

2 Actual and projected shares of rail traffic volume by route for major corridor-commodity combinations

5. Table E2 shows, for each major corridor-commodity combination included in E1, rail traffic volume by single-line and interline routings, where for interline routings, I also include gateways. Traffic volumes are reported in tons and shares, and for share calculations, I include non-rail total traffic and shares as well. Projected shares reflect that NS-UP or UP-NS interline routings will become single-line with the combined railroad.

3 Actual shares of all revenues by mode for major corridor-commodity combinations

6. Table E3 shows, for each major corridor-commodity combination included in Table E1, the total revenues and the share of revenues by mode, specifically by rail, truck, water, pipeline, air, and other. Non-rail traffic volumes come from the Transearch data and revenues were augmented as described in Appendix C.

4 Actual and projected shares of revenues for rail by route for major corridor-commodity combinations

7. Table E4 shows, for each major corridor-commodity combination included in E1, rail revenues by single-line and interline routings, where for interline routings, gateways are

included. Revenues are reported in current (2023) dollars, and for share calculations, non-rail revenues are included in share calculations. Projected shares reflect that interlined NS-UP or UP-NS interline routings will become single-line with the combined railroad.

APPENDIX F

BETWEEN CORRIDORS

1. To address 49 CFR § 1180.7(b)(4) of the STB regulations, this appendix reports, by railroad, actual and projected shares based on originating and terminating traffic (measured in carloads) and revenue for major origins and destinations by major commodity group.
2. Carloads and revenues for origins and destinations by major commodity group¹ are reported by commodity-origin and commodity-destination combinations for the year 2023. Major commodity-origin combinations are identified by calculating the combined origination volume for UP and NS in carloads shipped for each commodity-origin combination and summing them from highest to lowest volume until 80 percent of combined UP and NS origination volume is captured.² An analogous approach is used to identify major commodity-destination combinations using combined UP and NS termination volume. Revenues are then reported for these same commodity-origin and commodity-destination combinations.

¹ Major commodity groups are identified separately for UP and NS based on their combined volume for each 4-digit STCC commodity, calculated separately for originated and terminated volume. From a ranked list of total originated or terminated volume by 4-digit STCC categories those that account for 80 percent of combined volume are treated as major. In constructing this ranked list, the 4-digit STCC codes that do not represent a distinct commodity such as 4611 Freight of all kinds or 0119 Miscellaneous field crops are not counted towards the 80 percent calculations but are included in the reported list of major commodities. This results in a list that accounts for more than 80 percent by origination or termination volume to ensure that distinct individual 4-digit commodities are represented.

² I define “major” in response to STB regulations and this definition only affects which information is presented in Appendix Tables D-F. This definition is not used in my competitive assessment of the merger.

3. This appendix relies on the combined waybill data.³ Origins and destinations are defined by BEA and commodities are identified by the 4-digit STCC.⁴ As described in Appendix C, revenues are not always observed for certain records. Revenue calculations should be interpreted with these limitations in mind.

1 Major commodities' traffic volume by origin that is originated or terminated by each of the railroads and the projected share of the combined railroad

4. Table F1 shows, for each major commodity group and origin BEA, the originating and terminating traffic volume in carloads by destination BEA and railroad (separately by each Class I railroad and all other railroads grouped together).⁵ The projected volume of the combined railroad is also shown, which is estimated as the combined volume of UP and NS before the proposed merger.

2 Major commodities' traffic volume by destination that is originated or terminated by each of the railroads and the projected share of the combined railroad

5. Table F2 shows, for each major commodity group and destination BEA, the originating and terminating traffic volume in carloads by origin BEA and railroad (separately by each Class I railroad and all other railroads grouped together). The projected volume of the combined railroad is also shown, which is estimated as the combined volume of UP and NS before the proposed merger.

³ See Section 4.1 of my statement for a description of how the combined waybill data were created.

⁴ See Section 4.2 of my statement for more information on BEAs and Section 4.4 for information on 4-digit STCCs.

⁵ All other railroads include railroads other than Class I.

3 Major commodities' revenue by origin that is originated or terminated by each of the railroads and the projected share of the combined railroad

6. Table F3 shows, for each major commodity group and origin BEA shown in Table F1, the originating and terminating revenue by destination BEA and railroad (separately for UP, NS, and all other railroads grouped together). The projected revenue of the combined railroad is also shown, which is estimated as the combined revenue of UP and NS before the proposed merger.

4 Major commodities' revenue by destination that is originated or terminated by each of the railroads and the projected share of the combined railroad

7. Table F4 shows, for each major commodity group and destination BEA shown in Table F3, the originating and terminating revenue by origin BEA and railroad (separately for UP, NS, and all other railroads grouped together). The projected revenue of the combined railroad is also shown, which is estimated as the combined revenue of UP and NS before the proposed merger.

APPENDIX G

ANALYSIS OF SOURCE COMPETITION AND DESTINATION COMPETITION

1 Background

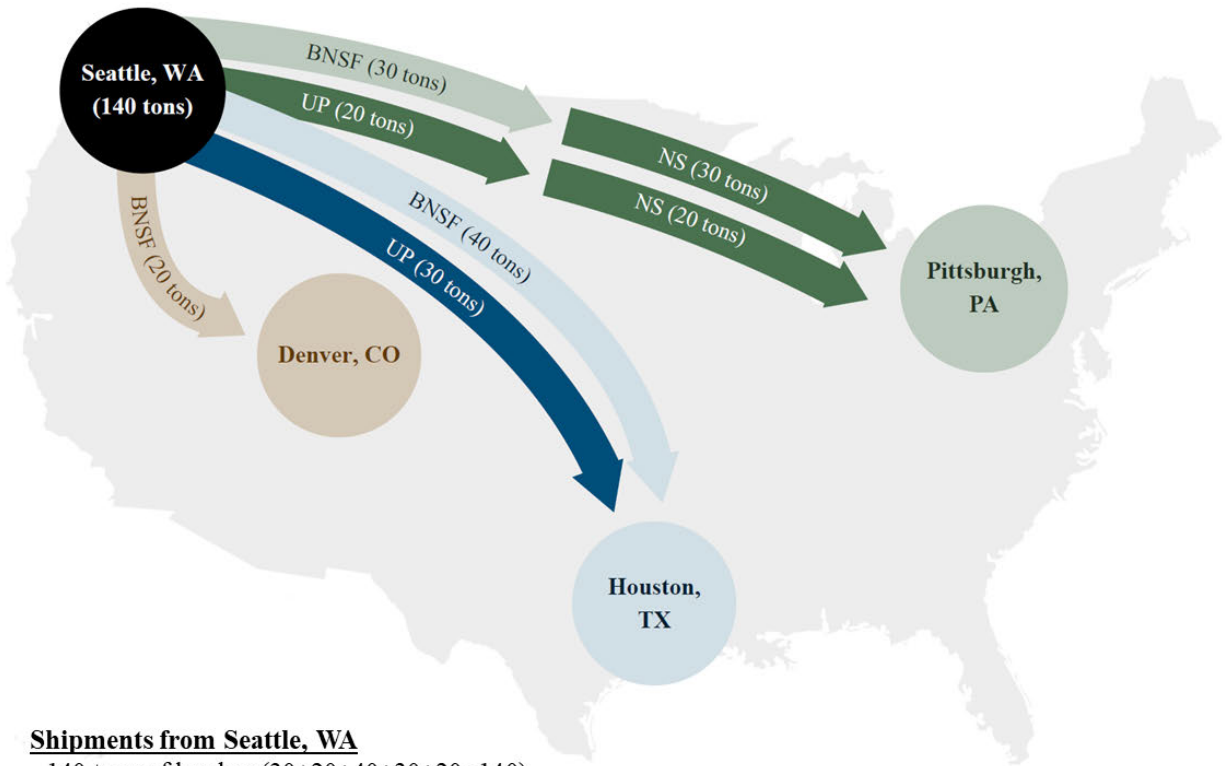
1. The scope for harm from the loss of destination competition or source competition is analyzed using a two-step process. The first step utilizes a set of 50/10 screens to identify origin-commodity pairs that warrant further review (when analyzing destination competition) or destination-commodity pairs that warrant further review (when analyzing source competition). For origin-commodity or destination-commodity pairs flagged in these initial screens, a second step is implemented to assess the scope for harm at flagged origin-commodity/destination-commodity pairs. This second step includes a more detailed analysis of the options available to shippers and receivers, which has been implemented as a version of Critical Loss Analysis (“CLA”) in prior mergers.

2. First, the method is described using two hypothetical examples of the assessment of destination competition for one origin-commodity pair (lumber shipped *from* Seattle) and source competition for one destination-commodity pair (plastic shipped *to* Seattle). Next, measures are constructed that capture demand available to shippers and supply available to receivers for destination competition. A similar exercise is performed for source competition, again constructing measures that capture demand available to shippers and supply available to receivers.

2 Illustrative Example Of 50/10 Screen Calculation

3. A stylized example shown in Figure G.1 shows how the shares for an origin-commodity pair are calculated for origination, termination, and participation screens. While competition from non-rail freight transportation is included in my analyses, the illustrative example in Figure G.1 only discusses rail. Inclusion of non-rail freight transportation is further discussed in this Appendix.
4. In the example in Figure G.1, 140 tons of lumber are shipped from Seattle, WA to three destinations – Denver, CO (20 tons), Houston, TX (70 tons), and Pittsburgh, PA (50 tons) – along three distinct corridors, for example the Seattle – Pittsburgh corridor. Note that within each corridor there can be multiple routes from the origin to the destination and each route can be served by more than one railroad. In this example, lumber is moved along the Seattle – Pittsburgh corridor by two routes: BNSF-NS and UP-NS.

Figure G.1: Illustrative Example of Origin Focus 50/10 Screens



Shipments from Seattle, WA

- 140 tons of lumber (30+20+40+30+20=140)

Origination Screen Shares:

- NS originates 0 tons of lumber
 - $0 / 140 = 0\%$ share
- UP originates 50 tons of lumber
 - $20 + 30 = 50$ tons
 - $50 / 140 = 35.7\%$ share
- UP & NS originate 50 tons of lumber
 - $0 + 50 = 50$ tons
 - $50 / 140 = 35.7\%$ share

Termination Screen Shares:

- NS terminates 50 tons of lumber
 - $30 + 20 = 50$ tons
 - $50 / 140 = 35.7\%$ share
- UP terminates 30 tons of lumber
 - $30 / 140 = 21.4\%$ share
- UP & NS terminate 80 tons of lumber
 - $30 + 50 = 80$ tons
 - $80 / 140 = 57.1\%$ share

Participation Screen Shares:

- NS participates in 50 tons of lumber
 - $30 + 20 = 50$ tons
 - $50 / 140 = 35.7\%$ share
- UP participates in 50 tons of lumber
 - $20 + 30 = 50$ tons
 - $50 / 140 = 35.7\%$ share
- UP & NS participate in 80 tons of lumber
 - $30 + 20 + 30 = 80$ tons
 - $80 / 140 = 57.1\%$ share

A UP-NS combination does not trigger the origination screen

A UP-NS combination triggers the termination screen

A UP-NS combination triggers the participation screen

5. The 50/10 screen for each origin-commodity pair requires calculation of three distinct shares of the total volume of the commodity shipped from that origin. In the example shown in Figure G.1, the total volume of lumber shipped from Seattle is 140 tons. Three sets of shares are calculated as shown in the different boxes in Figure G.1: originating shares, terminating shares, and participating shares. These are described below.
6. **Originating screen shares.** The blue box in Figure G.1 shows originating share calculations. There are two originating carriers in Seattle: BNSF originates 90 tons (30, 40, and 20 tons) and UP originates 50 tons (20 and 30 tons), giving UP a share of all originating traffic of 35.7 percent (50/140). NS does not originate any traffic. The combined UP+NS originating share is thus 37.5%, which is less than 50%, so the originating screen is not triggered.
7. **Terminating screen shares.** The gray box in Figure G.1 shows the terminating share calculations. For lumber originating in Seattle, three railroads terminate traffic: UP terminates 30 tons in Houston and NS terminates 50 tons in Pittsburgh, while BNSF terminates the remaining volume. Given the total volume of 140 tons, this means that UP's terminating share is 21.4 percent (30/140) and NS's terminating share is 35.7 percent (50/140). The combined railroad's termination share is the sum of these two at 57.1 percent. In the stylized example the merger would trigger the 50/10 terminating share screen on this origin-commodity pair because the combined terminating share is greater than 50 percent and both UP and NS have shares greater than 10 percent.
8. **Participating screen shares.** The orange box in Figure G.1 shows the participating screen calculations for the origin-commodity pair. The screen is based on whether railroads are a participating carrier at any point along the routes departing from Seattle and carrying

lumber. For example, NS participates in both routes terminating in Pittsburgh while UP only participates in one of them. UP's participation volume across all the destinations is 50 tons (20 to Pittsburgh and 30 to Houston) and NS's participating volume is also 50 tons (all in Pittsburgh). As a result, both UP's and NS's participation shares are 35.7 percent (50/140).

9. The participating screen differs from the other two screens because, unlike origination and termination, UP and NS can *both* participate on the *same* route. This has two notable consequences. First, the participating share of the combined railroad can be less than the sum of the participating shares of UP and NS. In this example the combined railroad would participate in all the routes to Pittsburgh, as well as one of the routes to Houston, with a total volume of 80 tons (50 to Pittsburgh and 30 to Houston) and a participating share for the combined railroad of 57.1 percent (80/140). Note that the participating share of the combined railroad is smaller than the sum of each individual railroad's participation shares, which equals 71.4 percent (35.7 + 35.7). In this stylized example the combined share is above 50 percent.
10. The second consequence concerns the way the 10 percent share check is applied for the participating screen. It checks whether the combined participating share of UP and NS is more than 10 percentage points higher than the share of either UP or NS individually. In the example above, the combined participating share would be 21.4 percentage points higher than the participating shares of either UP or NS (57.1% - 35.7%), so the 50/10 participating screen would flag this origin-commodity pair as requiring further examination.

11. This analysis incorporates competition from non-rail freight transportation, specifically freight movements by truck and water.¹ For example, for an origin-commodity pair, the total volume of the commodity on any corridor includes the total amount transported by truck or water in addition to rail when calculating the shares of UP and NS. I rely on non-rail BEA-to-BEA freight volumes measured in tons that are provided by Transearch.²
12. The destination-commodity 50/10 screen is performed in a similar manner but looking at all corridors that deliver a particular commodity to a specific destination from any origin. The calculations for the 50/10 screen for destination-commodity pairs are conducted in an analogous way.

3 **Critical Loss Analysis for Destination Competition**

13. The Critical Loss Analysis (CLA) is similar to the methodology used by Dr. Majure in the context of the CP-KCS merger proceedings.³ Origin-commodity pairs that are flagged by the 50/10 screen are further analyzed by computing the demand available to shippers (CLA 1) and the supply available to receivers (CLA 2) and comparing these *available volumes* to the existing, reference traffic volume (the *affected volume*) for each origin-commodity pair. If either of the available volumes are larger than the affected volume for a given origin-commodity pair then the pair is unflagged.
14. Non-rail volumes are incorporated into CLA in two ways. First, BEA-to-BEA volumes that move by truck or water are treated as an independent shipping option if those volumes exceed 1,000 tons. Second, shipping volumes that move by truck or water are included in

¹ Non-rail shipments that remain within a single BEA are excluded from the 50/10 screen calculations and from the Critical Loss Analysis.

² See Appendix C for description of the non-rail freight data.

³ See Majure VS at pp. 77-80.

calculating the Demand Available to Shippers and the Supply Available to Receivers which are described below.

15. **Reference traffic:** Suppose an origin-commodity pair is flagged by the 50/10 screen such as lumber shipped from Seattle as in Figure G.1. The reference traffic is calculated as the volume of the commodity originating at the origin-commodity pair and traveling via rail. In the example in Figure G.1, the reference traffic is 140 tons of lumber shipped from Seattle. This is the *affected volume*.

16. **Demand Available to Shippers (CLA 1):** The demand available to shippers for an origin-commodity pair is calculated as follows. The first step involves identifying *all* the destinations to which the commodity is shipped from the flagged origin on routes that do not involve UP or NS.⁴ In the case of lumber shipped from Seattle, these destinations are Houston and Denver, since there is a BNSF route independent of UP or NS. Next, a measure is computed totaling the amount of this commodity shipped to each of these identified destinations (i.e. reachable from the flagged origin without UP or NS) from any origin other than the flagged origin, on any route or mode of transportation. For the example of lumber from Seattle, this includes all lumber volumes delivered to Houston and Denver, excluding volumes from the flagged origin (Seattle) but including shipments from other origins not shown in Figure G.1. The volumes are calculated regardless of their route or mode of transportation and may include volumes delivered by UP or NS.⁵ This is an *available volume*.

⁴ This includes destinations with at least 1,000 tons of the commodity shipped via truck or water from the flagged origin.

⁵ This includes volumes transported by non-rail. Non-rail volumes that originate and terminate in the same BEA economic area are not included.

17. Supply Available to Receivers (CLA 2): The supply available to receivers for an origin-commodity pair is calculated as follows. First, identify each of the destinations where this commodity is delivered from this origin via rail. Then, identify alternative origins that ship the commodity to these destinations using a route that does not involve UP or NS.⁶ Next, compute the total volume of this commodity shipped from these alternative origins, regardless of its destination, route, or mode of transportation.⁷ This is an *available volume*. In the lumber in Seattle example, Houston, Denver, and Pittsburgh are the destinations reached by Seattle via rail. Alternative origins might include lumber from Shreveport to Houston via CPKC. The total amount of lumber shipped from Shreveport going to any destination on any route and mode is then added to the supply available to receivers. This process is repeated for all other alternative origins to calculate the total supply available to receivers.

4 Critical Loss Analysis for Source Competition

18. Analysis for source competition is similar to the analysis of destination competition described above. The reference traffic is compared to two measures: the Supply Available to Receivers and the Demand Available to Shippers.⁸ If either of the available volumes are larger than the affected volume for a given destination-commodity pair then the pair is unflagged.

19. As with CLA for destination competition, non-rail volumes are incorporated in two ways. First, BEA-to-BEA volumes that move by truck or water are treated as an independent

⁶ This includes origins with at least 1,000 tons of the commodity shipped via non-rail to the destination.

⁷ This includes volumes transported by non-rail. Non-rail volumes that originate and terminate in the same BEA economic area are not included.

⁸ This approach is similar to the methodology used by Dr. Majure. *See* Majure VS at pp. 77-80.

shipping option if those volumes exceed 1,000 tons. Second, shipping volumes that move by truck or water are included in calculating the Demand Available to Shippers and the Supply Available to Receivers which are described below.

20. **Reference traffic:** Suppose a destination-commodity pair is flagged by the 50/10 screen such as plastic delivered to Seattle. The reference traffic is calculated as the volume of the commodity terminating at the destination-commodity pair and traveling via rail. Analogously to the reference traffic for a flagged origin-commodity pair, all plastic delivered to Seattle via rail would be characterized as *affected volume*.

21. **Demand Available to Shippers (CLA 1):** The demand available to shippers for a destination-commodity pair is calculated as follows. For each of the origins that deliver this commodity to the flagged destination via rail, identify alternative destinations for shippers at those origins that can be reached without using UP or NS.⁹ Next compute the total volume of this commodity shipped to these alternative destinations regardless of origin, route, or mode of transportation.¹⁰ This is an *available volume*.

22. **Supply Available to Receivers (CLA 2):** The supply available to receivers for a destination-commodity pair is calculated as follows. The first step involves identifying *all* the origins from which the commodity is shipped to the flagged destination on routes that do not involve UP or NS.¹¹ Next, a measure is computed totaling the amount of this commodity shipped from each of these identified origins (i.e. reaching the flagged destination without UP or NS) to any destination other than the flagged destination, on any

⁹ This includes destinations with at least 1,000 tons of the commodity shipped via non-rail from the origin.

¹⁰ This includes volumes transported by non-rail. Non-rail volumes that originate and terminate in the same BEA economic area are not included.

¹¹ This includes origins with at least 1,000 tons of commodity shipped via non-rail to the flagged destination.

route or mode of transportation. The volumes are calculated regardless of their route or mode of transportation and may include volumes delivered by UP or NS.¹² This is an *available volume*.

¹² This includes volumes transported by non-rail. Non-rail volumes that originate and terminate in the same BEA economic area are not included.