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**BEFORE THE
SURFACE TRANSPORTATION BOARD**

RECIPROCAL SWITCHING

Docket No. EP 711 (Sub-No. 1)

POST-HEARING SUPPLEMENTAL COMMENTS OF CN

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Dated: April 4, 2022

The U.S. rail operating subsidiaries of Canadian National Railway Company (hereafter “CN”) respectfully submit these post-hearing supplemental comments pursuant to the Board’s decision served on March 23, 2022, in this proceeding.

I. INTRODUCTION

In 2016, the Surface Transportation Board (“Board” or “STB”) issued a decision proposing to revise its regulations relating to reciprocal switching.¹ In the initial round of comments and replies, substantial evidence and argument were submitted explaining the deficiencies in and adverse consequences associated with the 2016 Proposal.

On December 28, 2021, the Board permitted additional written comments and announced a public hearing,² which was held on March 15 and 16, 2022. CN filed comments on February 14, 2022, and participated in the hearing.

The Board has now provided an opportunity for supplemental comments limited to issues raised at the hearing or in written materials submitted in response to the December 28, 2021 notice.³

In these supplemental comments, CN briefly responds to the testimony of Dr. James Nolan regarding Canadian interswitching and provides a verified statement explaining the flaws in Dr. Nolan’s testimony presented at the hearing. CN also

¹ Notice of Proposed Rulemaking, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1) (STB served July 27, 2016) (“2016 Proposal”).

² Notice of Public Hearing, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1) (STB served Dec. 28, 2021).

³ Decision, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1) (STB served March 23, 2022).

provides the presentation and hearing exhibits that Andreas Aepli of Cambridge Systematics would have provided at the hearing. The hearing exhibits and a summary of Mr. Aepli's testimony were provided in advance of the hearing, as required by the Board, and CN is providing the combined presentation for the convenience of the Board.⁴ Finally, CN reiterates its willingness to engage in collaborative discussions with other stakeholders on the important issues raised in this proceeding to explore whether there is an alternative to the 2016 Proposal that could avoid the adverse consequences of that proposal.

II. THERE IS NO BASIS TO CONCLUDE THAT EXTENDED INTERSWITCHING WAS RESPONSIBLE FOR IMPROVED RAIL TRANSIT TIMES IN CANADA

In its comments filed on February 14, 2022, CN explained why Canadian interswitching is not an appropriate model to consider in the United States and also explained that, in its experience, regulated interswitching can lead to or exacerbate operational issues.⁵

At the hearing, Dr. James Nolan explained his analysis of certain rail performance data, and presented his conclusions regarding "extended interswitching," which is no longer in place. The Fair Rail for Grain Farmers Act, among other things, authorized the Canadian Transportation Agency to prescribe

⁴ Mr. Aepli was scheduled to testify on the last panel of the last day of the hearing but, due to time constraints, CN had to abridge its planned testimony and Mr. Aepli was unable to present. To the extent that Mr. Aepli's presentation does not fall within the parameters of the March 23, 2022 order, CN seeks leave to include it in the record.

⁵ Comments and Written Testimony of CN, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1), at 8-10, 12 (filed Feb. 14, 2022).

different interswitching distances, which resulted in an extension of the interswitching limit from 30 km to 160 km from 2014 through 2017.⁶ While it was in place, extended interswitching accounted for less than 2% of CN interswitching. In his testimony, Dr. Nolan concluded that extended interswitching was responsible for improved rail performance—specifically, a decrease in car cycle times and a decrease in total time that grain spent in the grain handling system.⁷

Dr. Nolan’s testimony reflects certain basic misunderstandings regarding extended interswitching. For example, Dr. Nolan stated in response to a question that extended interswitching was only available for grain and implied that extended interswitching was “turned over” in part because it was not available for all commodities.⁸ While it is true that FRGFA was passed to address rail capacity challenges following a record grain crop and included provisions specifically targeted to grain transport, the provision allowing the Canadian Transportation Agency to extend interswitching distances in certain provinces was not limited to grain but rather available for all commodities. Nothing in the regulations at the

⁶ An Act to amend the Canada Grain Act and the Canada Transportation Act and to provide for other measures, Fair Rail for Grain Farmers Act, Bill C-30, Sections 7, 15 (Can.) (“FRGFA”). FRGFA was set to expire on August 1, 2016, but was extended for one year by the House of Commons. See Debates of the Senate, Official Report (Hansard) (42-1), Vol. 150 No. 45 (June 8, 2016) (Can.).

⁷ See Nolan Exhibit, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1), at 8-10 (filed March 21, 2022); STB Hearing Mar. 15-16, 2022 (Day 2), *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1), Dr. James Nolan Testimony (starting at 4:23:05 (Mar. 16, 2022)) (“Nolan Testimony”), available at <https://www.youtube.com/watch?v=VWwUIRf0hGo>.

⁸ See Nolan Testimony, at 4:37:52.

time excluded commodities other than grain,⁹ and in fact CN data indicates that while the majority of extended interswitching in the relevant provinces¹⁰ was for grains and fertilizers, it was also used for other commodities as well. Further, and as explained in the attached verified statement of David T. Hunt of Oliver Wyman, there are significant flaws in Dr. Nolan's testimony. Dr. Nolan did not provide the data that would be required to fully evaluate his conclusions and, within his presentation, there are more questions than answers. Why did Dr. Nolan consider just 14 months after the expiration of the policy, when he considered 26 months of data during extended interswitching? What type of data was collected, and what was the sample size? Dr. Nolan stated that his graduate student collected the data from a variety of sources, but provides virtually no insight into the data.

In addition to describing why Dr. Nolan's description of his work is insufficient to support his findings, Mr. Hunt explains that Dr. Nolan's findings are more likely due to rail traffic changes, including rapid increased traffic volumes and increased length of haul, than changes in extended interswitching policy.

Indeed, after the extended interswitching period expired, there was an unexpected increase in average monthly carloads and tons, as well as an increase in length of haul. As Mr. Hunt points out, there was a 7% increase for all carloads for the fourth quarter of 2017 compared to the fourth quarter of 2016. With respect to

⁹ See *generally* Railway Interswitching Regulations (Canada Transportation Act), SOR/88-41 (Can.) (2014-2017).

¹⁰ Although Dr. Nolan's testimony suggested otherwise, see Nolan Testimony, at 4:37:37, extended interswitching was only available in Saskatchewan, Alberta, and Manitoba.

the average length of haul for CN traffic originating in Canada, during 2017 it grew by almost 6% year-over-year.

Figure 1: Average change in CN's system average length of haul June 2015-September 2018

	Average system length of haul (miles)	Year-over-year change
2015	1,455.8	-
2016	1,455.1	0.0%
2017	1,537.9	5.7%
2018	1,521.7	-1.0%

Increased length of haul and increased traffic affect average cycle times, and it is not surprising that these increases would result in increased average car cycle times. This is especially true when coupled with the service disruptions encountered in the fourth quarter of 2017, which are detailed in Mr. Hunt's statement. Mr. Hunt explains that Dr. Nolan's regression model overlooks significant service outages and structural locomotive and staff shortages that occurred as a result of the rapid increase in traffic after extended interswitching expired.

Mr. Hunt also points out that Dr. Nolan's analysis fails to consider the likelihood that, during the period of extended interswitching, Canadian railroads were responding to increased oversight and steep monetary penalties through FRGFA.

None of these additional factors were accounted for by Dr. Nolan and, taken together, these factors make it difficult to attribute changes in grain car cycle times and total grain shipment time to any single cause.

Finally, it is worth noting that during high-volume periods CN consistently experiences less interest in regulated interswitching from shippers. In Canada, grain shippers recognize that utilizing interswitching adds additional complexity and often delay during periods of increasing volumes. In fact, customers reacted to CN's service issues that happened to occur after the expiry of extended interswitching by using less regulated interswitching, not more.

In sum, there is simply no basis to conclude that extended interswitching contributed or was any way correlated with improved car cycle times or performance.

III. CONCLUSION

At the hearing, CN supported the suggestion of stakeholder engagement to explore whether there is an alternative to the 2016 Proposal that could avoid the adverse consequences of that proposal that have been thoroughly detailed in the record. In its March 23, 2022 decision, the Board also strongly encouraged interested parties to continue discussing these issues and to pursue collaborative solutions.¹¹

¹¹ Decision, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1) (STB served March 23, 2022).

Like CN did with the voluntary alternative dispute resolution process, CN is willing and interested in engaging in stakeholder conversations that could include larger and smaller railroads, shippers, and shipper associations. From CN's perspective, the goal of such a conversation would be to collaborate to address the concerns that prompted the 2016 proposal while avoiding its negative consequences for network operations and investment incentives. CN looks forward to engaging on these important issues.

Respectfully submitted,

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/s/ Matthew J. Warren
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Counsel for CN

Dated: April 4, 2022

VERIFICATION

I, Hani Bazerghi, declare under penalty of perjury under the laws of the United States that the factual statements in Part II of the foregoing Supplemental Comments on behalf of CN are true and correct to the best of my knowledge and belief.

A handwritten signature in black ink, reading "Hani Bazerghi", written over a horizontal line.

Hani Bazerghi
Senior Manager, Regulatory Costing

Exhibit A

Verified Statement of David T. Hunt

BEFORE THE SURFACE TRANSPORTATION BOARD

Docket No. EP 711 (Sub-No. 1)

RECIPROCAL SWITCHING

Verified Statement of David T. Hunt

April 4, 2022

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1. Qualifications

My name is David T. Hunt, and I submit this verified statement on behalf of CN in the Surface Transportation Board's Docket No. EP 711 (Sub-No. 1) proceeding. I am a Vice President with Oliver Wyman, a global general management consulting firm with more than 60 offices in 31 countries. My office address is One University Square Drive, Suite 100, Princeton, NJ 08540-6455.

Oliver Wyman is a global general management consulting firm. It maintains one of the largest practices in the world dedicated to serving the transportation and logistics sectors. This practice provides a comprehensive set of services and capabilities to transportation carriers across all modes and the users and regulators of transportation services. Oliver Wyman's transportation clients include national and regional governments on six continents, as well as many of the world's largest users of rail services, railroads, motor carriers, leasing companies, and industrial and consumer manufacturing firms.

I have been a consultant in the transportation area for over 35 years. I joined Oliver Wyman in 2008, specializing in strategic planning, regulatory issues, and operations for freight railroads and other freight transportation providers. Prior to Oliver Wyman, I was a consultant at Cambridge Systematics, Wilbur Smith Associates, and ALK Associates. While at Cambridge Systematics, I designed and managed the first ever nationwide freight rail capacity study. While at ALK from 1983 through 2000, I specialized in rail traffic diversion analysis and participated in all Class I railroad mergers during that time. I hold a bachelor's degree in civil engineering from West Virginia University and a master's degree in civil engineering and operations research from Princeton University. My resume is included in Appendix A.

2. Assignment and Summary of Findings

I was asked to review testimony submitted on March 16, 2022 by Dr. James Nolan in *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1). Specifically, my analysis focused on the methodology employed by Dr. Nolan in preparing his findings concerning Canadian extended interswitching that he presented to the Board.¹ I also viewed the recording of Dr. Nolan's presentation of his findings before the Board.²

Unfortunately, Dr. Nolan has not provided the Board with the data that would be required to replicate his analysis nor sufficient details to fully evaluate his conclusions. Nonetheless, my review of his testimony reveals significant flaws in his approach that render the results he presented to the Board essentially meaningless. In particular, I find that:

- Dr. Nolan's findings are more likely due to rail traffic changes than changes in interswitching policy
- Dr. Nolan's regression model overlooks service outages that occurred during the standard interswitching period
- Dr. Nolan's description of his work is insufficient to support his findings
- Dr. Nolan's analysis fails to consider the "Hawthorne effect".

3. Analysis of Dr. Nolan's claims

The Fair Rail for Grain Farmers Act was passed in May 2014. That act obligated the Canadian Class I carriers to move minimum amounts of grain and created penalties of up to \$100,000 per day in the event that the railroads violated their obligation to transport minimum volumes of grain. It also authorized the Canadian Transportation Agency to prescribe different interswitching distances, which resulted in an extension of the interswitching limit from 30 km to

¹ Interswitching: The Recent Canadian Experience, James Dr. Nolan, University of Saskatchewan, Department of Agricultural and Resource Analysis.

² STB Hearing – March 15-16, 2022, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1). Dr. Nolan's presentation was on Day 2 starting at 4:23:05, <https://www.youtube.com/watch?v=VWwUIRf0hGo>.

160 km. Interswitching with this extended limit (sometimes referred to as “extended interswitching”) was in place starting August 1, 2014 and expired on August 1, 2017.³

In this proceeding, Dr. Nolan presented an assessment of rail performance during and after extended interswitching. Dr. Nolan compared car cycle times in “various corridors.”⁴ Dr. Nolan’s exhibit states that data was analyzed “from July 2015 up to September 2018,” which he states includes 26 months of data when extended interswitching was in effect and 14 months of data after extended interswitching expired.⁵ He does not explain why he considered just 14 months after the policy expired in his statement. In his oral testimony, Dr. Nolan describes the data as “a little bit sporadic” and said that a graduate student had collected it from “a variety of sources.”⁶

Based on a limited and potentially non-representative sample, Dr. Nolan claims that car cycle times to western destinations was 1.5 days shorter during the time that extended switching and the penalties related to grain cars were in effect compared with the time that normal interswitching resumed and the penalties were discontinued. He found no significant change in cycle times in the other corridors, and he fails to provide these results. Dr. Nolan attributes the change in car cycle times in the western corridor to extended interswitching but does not explain why he disregards the role the increased oversight and penalties related to grain car movement may have played. He also does not explain why extended interswitching did not reduce cycle times in the eastern or United States corridors. Dr. Nolan also reported that total time in the grain handling system was 5.2 days shorter when extended interswitching was in effect, although he does not explain how he measured time in the grain handling system, demonstrate that extended interswitching was responsible for the reduction, demonstrate that the penalties related to

³ Although the Fair Rail for Grain Farmers Act was set to expire on August 1, 2016, it was extended for one year.

⁴ The corridors are not defined. On slide 8 of the hearing exhibits, it states that regressions were performed for shipments to “western destinations,” “eastern destinations,” “American destinations,” and “Western domestic destinations.” Later on that same slide, it lists only west, east, and U.S.

⁵ The date range provided by Dr. Nolan does not align with his stated 40 months of data. Even if September 2018 data were included (which is not apparent, given the phrase “up to September 2018”), the range would indicate 39 months of data.

⁶ STB Hearing – March 15-16, 2022, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1), Day 2 starting at approximately 4:29:45, <https://www.youtube.com/watch?v=VWwUIRf0hGo>.

movement of grain cars was not responsible for the reduction, consider other changes in the rail system during that time, or provide the underlying data.⁷

3.1 Dr. Nolan's findings are more likely due to rail traffic changes than changes in interswitching policy

Cycle time is affected by many factors among which two of the most important are traffic volume, which affects system velocity, and average length of haul. For reasons that had little or nothing to do with interswitching, both traffic volumes and length of haul began to grow as the extended interswitching mandate came to an end and continued to grow through at least the end of 2018. Growing traffic volume typically leads to slower network velocity, while an increased length of haul directly extends the car cycle. Moreover, the car cycle increase observed by Dr. Nolan when extended interswitching expired was compounded by unexpected service outages, congestion, and locomotive and staff shortages given growing traffic.

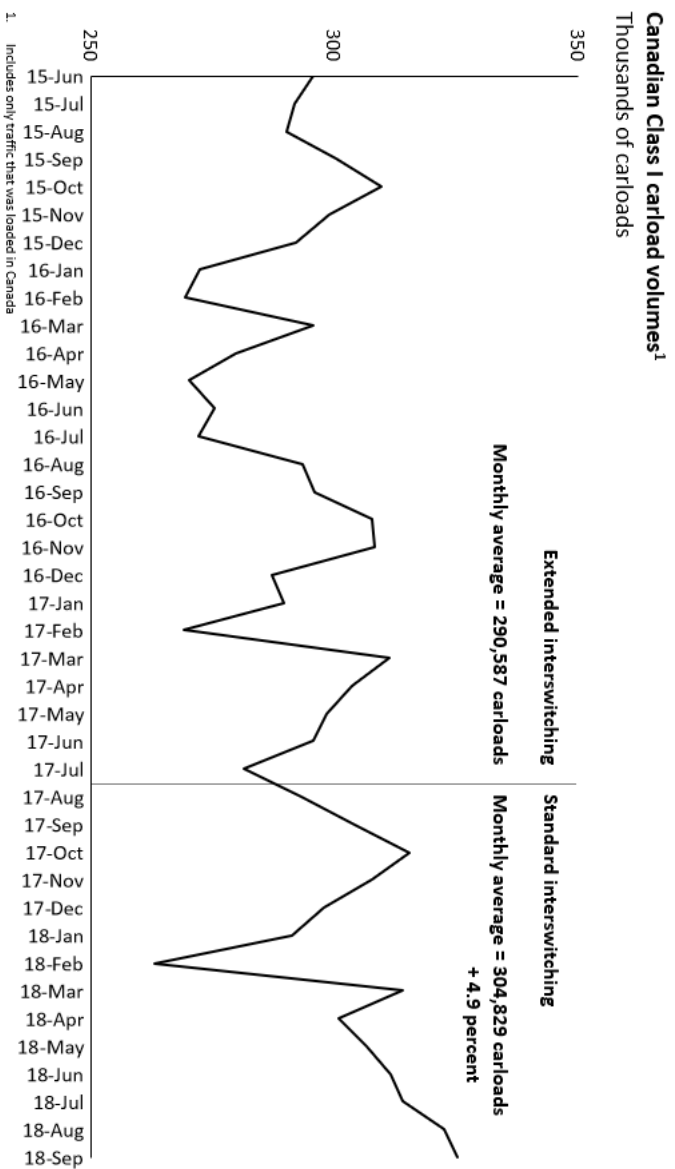
What Dr. Nolan's regressions erroneously tabulate, but fail to capture, was not a decrease in cycle time when extended interswitching was introduced, but rather an increase in cycle time after extended interswitching ended due to growing traffic, extended length of haul, and unexpected catastrophic network operations issues.

Nationwide, Canadian rail traffic volumes averaged almost 291,000 carloads per month over the initial 26 months of Dr. Nolan's analysis, from June 2015 to July 2017.⁸ Between August 2017 and September 2018, monthly carload traffic averaged almost 305,000, a 4.9 percent increase (see Exhibit 1).

⁷ Exhibit, slide 11.

⁸ As noted above, the date range provided by Dr. Nolan does not align with his stated 40 months of data. To match Dr. Nolan's 26 months of new extended interswitching rules timeframe, June 2015 rather than July 2015 would need to be the starting month. Accordingly, I include June 2015.

Exhibit 1: Change in Canadian Rail Volumes Between June 2015 and September 2018⁹



CN's Earnings Release for the fourth quarter of 2017, the first full quarter after the return to standard interswitching distances, shows a 7 percent increase for all carloads compared to the fourth quarter of 2016.¹⁰ CP similarly reported a 6 percent increase in all carloads in the fourth quarter of 2017 versus the fourth quarter of 2016.¹¹ Railcar velocity tends to decrease when traffic volume increases, similar to reduced speeds on roadways as the number of cars increases.

Contrary to Dr. Nolan's claim, car cycle time is unlikely to have been driven by changes in interswitching policy. It is more likely correlated with and influenced by swings in traffic levels and length of haul. As is commonly seen throughout the North American rail system, when traffic volumes rise, system train velocity generally decreases, leading to an increase in railcar cycle times.

For the time period that Dr. Nolan states he used (July 2015 to September 2018), the correlation between changes in Canadian rail carload volumes and average train velocity

⁹ Statistics Canada, Table 23-10-0216-01, Railway carloadings statistics, by total tonnage transported, monthly and Oliver Wyman analysis

¹⁰ Canadian National, Fourth Quarter 2017 Earnings Release, 23 January 2018.

¹¹ Canadian Pacific, Fourth Quarter 2017 Earnings Release, 18 January 2018.

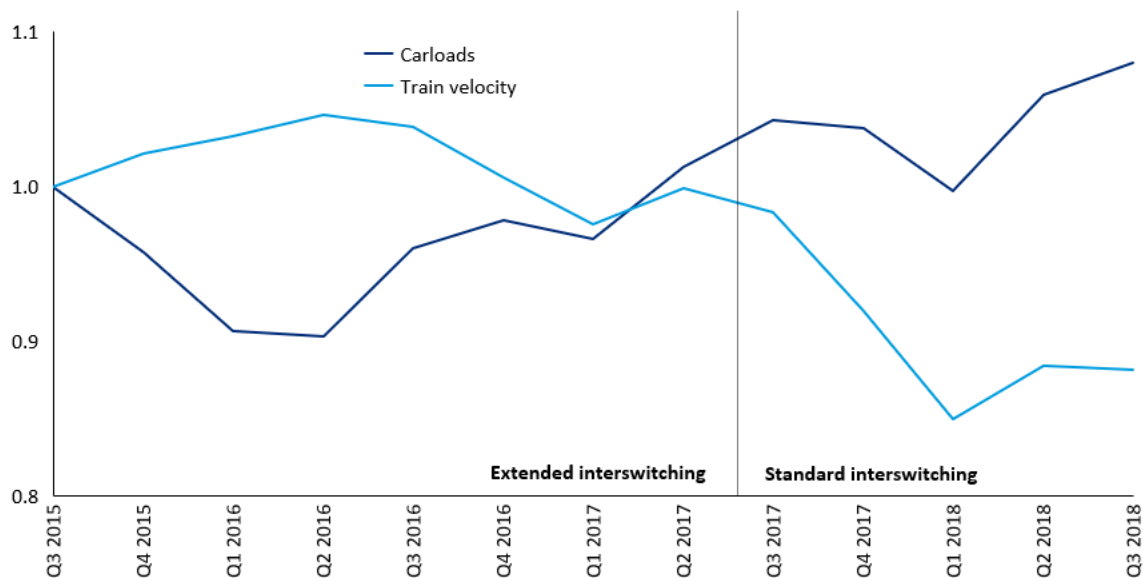
was -0.73. Correlations range from -1.0 to +1.0, where -1.0 is a perfect negative correlation (as one variable increases the other variable decreases), zero is no correlation, and +1.0 is a perfect positive correlation. A correlation of -0.73 does not prove that an increase in carload volumes causes a decrease in train velocity, but it provides evidence that the two variables were strongly connected during the time period used by Dr. Nolan.

Length of haul, the distance a freight shipment travels, also influences railcar cycle time. As length of haul increases, railcar cycle time likewise increases, all else being equal. I am aware that CN is presenting information indicating that, during 2017 (which saw the end of extended interswitching), the average length of haul for CN traffic grew by almost 6 percent year-over-year.

Overall, as volumes and lengths of haul increased after the end of extended interswitching, CN's through train speed declined and through dwell at yards increased. The combined through train speed for CN and CP together likewise declined (see Exhibit 2).

Exhibit 2: Canadian rail car volume and train velocity Q3 2015-Q3 2018¹²

Canadian rail traffic volumes and network performance, indexed
Q3 2015 = 1.00; Correlation = -0.73.



¹² Canadian National, Earnings Release, Q4 2016 through Q4 2018; Canadian National, Quarterly Review, Q2 2016 through Q3 2019; Canadian Pacific, Earnings Release, Q2 2016 through Q3 2019; and Oliver Wyman analysis. Correlation based on the “correl” function in Microsoft Excel.

3.2 Dr. Nolan’s regression model overlooks service outages that occurred during the standard interswitching period

Dr. Nolan’s analysis also fails to recognize the effect that significant service outages that occurred during the period after extended interswitching expired and standard interswitching was in effect had on car cycle times. These service outages are not considered in Dr. Nolan’s regression analysis. The outages included:

- On October 17, 2017, high winds caused a mainline derailment at Wainwright, Alberta, closing CN’s mainline between Edmonton and Saskatoon.¹³
- The same day, high winds caused another derailment at Huxley, Alberta, which involved 28 railcars.¹⁴
- In late November 2017, mudslides knocked out the mainline running into Vancouver.¹⁵
- On the evening of December 1, 2017, there was a derailment on the mainline leading into Vancouver, putting that section of track out of service until the morning of December 3, 2017.¹⁶
- On the morning of December 8, 2017, an empty eastbound coal train derailed on the Prince Rupert mainline, and the track was only made passable the morning of December 10, 2017.¹⁷

Dr. Nolan’s narrowly focused regression analysis also overlooks structural locomotive and staff shortages after the rapid volume growth that occurred during the period when standard interswitching resumed and which are not connected to any of the factors he examined. They do, however, affect rail services:

¹³ Global News, “13 train cars derail off historic CN trestle bridge near Wainwright in central Alberta” (Oct. 18, 2017), available at <https://globalnews.ca/news/3810003/train-cars-derail-off-trestle-bridge-in-central-alberta-witness/>.

¹⁴ Global News, “Extreme winds cause train derailment near Huxley in central Alberta” (Oct. 17, 2017), available at <https://globalnews.ca/news/3809965/fire-crews-respond-to-central-alberta-train-derailment/>.

¹⁵ Canadian National, Grain Insights Podcast: November Results and General Update (Dec. 18, 2017). The Grain Insights Podcast is available at <https://www.cn.ca/en/your-industry/grain/grain-podcasts/>.

¹⁶ Id.

¹⁷ Id.

- “The overall CN network was challenged by rapid and significant volume growth, especially in western Canada... The speed and scale of that increase has put a strain on the crews and locomotives that we need to meet our customers’ current expectations, no matter what commodity it is.”¹⁸
- “Besides the 22 new AC locomotives CN acquired earlier this year coming on-line by the end of the month, CN is also in the process of adding add another 100 locomotives to our active fleet that represents a 6%+ increase in horsepower.”¹⁹
- “To help with the immediate need for train crews, we’re providing financial incentives for current employees in high demand areas to postpone their retirement, or to come back to work after recently retiring. We’re also buying out employees’ vacation time and we’re doing everything we can to bring new employees on as quickly as we can. By year’s end we will have hired 3,500 people to meet the needs of an expanding North American economy and new growth opportunities.”²⁰

3.3 Dr. Nolan’s description of his work is insufficient to support his findings

Dr. Nolan fails to provide access to the data upon which he based his calculations. Without access to the underlying data, it is not possible to assess the accuracy of his calculations and their relevance to extended interswitching.

Dr. Nolan also fails to provide any description of his underlying assumptions, which makes it impossible to validate his work and to assess if there are any data biases that would affect the results. Since the data was “sporadic” and collected from “a variety of sources,” including “some rail shippers,” according to Dr. Nolan’s oral testimony,²¹ without more details it is impossible to determine if the data is a representative sample of train movements.²² It is also not

¹⁸ Canadian National, Grain Insights Podcast: October Results, Terminal Efficiency, and Manitoba Results (Nov. 13, 2017).

¹⁹ Id.

²⁰ Id.

²¹ STB Hearing – March 15-16, 2022, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1), Day 2 starting at approximately 4:29:45, <https://www.youtube.com/watch?v=VWwUIRf0hGo>.

²² STB Hearing – March 15-16, 2022, *Reciprocal Switching*, Docket No. EP 711 (Sub-No. 1), Day 2 at approximately 4:30:29, <https://www.youtube.com/watch?v=VWwUIRf0hGo>.

possible to determine the sample size used in the regression and what percentage of grains trains the data represented.

Extended interswitching was in place beginning August 1, 2014. By starting his analysis in June or July 2015 (as noted above, there is a discrepancy in the stated range), Dr. Nolan excluded almost a year of extended interswitching from his analysis. Similarly, Dr. Nolan's data appears to end in September 2018. This range appears arbitrary and creates an analysis with 26 months of "before" data (extended interswitching in place) and only 14 months of "after" data (return to standard interswitching).

In addition, Dr. Nolan does not indicate what data was included in his analysis. Were these unit trains of grain or carload shipments? Were they predominately moved by one railroad or were multiple railroads part of the sample? Dr. Nolan claims to use data from "various corridors," which appears to refer to regressions performed by his graduate student to western, eastern, U.S., and Western domestic destinations, though those are not explained or defined.²³ Were they randomly selected and independent of each other? Moreover, Dr. Nolan provides no information concerning the sample sizes for data used in the analysis.

Given these deficiencies, it is not possible to determine if the corridors and commodities Dr. Nolan employed were consistent in the extended interswitching and standard interswitching analyses and whether they represented a fair and unbiased sample.

3.4 Dr. Nolan's analysis fails to consider the "Hawthorne effect"

During the period of extended interswitching, Canadian railroads were facing increased oversight and steep monetary penalties through the Fair Rail for Grain Farmers Act, an effort by the Canadian government to alter railroad behavior and to improve service to grain shippers. Customers also were pressuring the railroads to improve performance. Subsequently, service improved. Dr. Nolan attributes this improvement solely to the presence of extended interswitching.

It is well known that people who are aware of being observed will alter their behavior, often leading to performance increases. This phenomenon even has a name – the Hawthorne

²³ Exhibit, slides 6 & 7.

effect.²⁴ In the 1920s, at the Western Electric telephone manufacturing plant in Hawthorne, IL, workers were under intensive supervision from managers as changes were made to the lighting. The surprising results were that as the lighting increased, productivity increased, and as the lighting decreased, productivity still increased. It was the managerial oversight that prompted change, not the changes to lighting.

Dr. Nolan tries to attribute to a single change, the extended interswitching distance, the changes in railcar cycle times and time through the grain handling transportation system. A more likely and logical interpretation is that the oversight and fines in the Fair Rail for Grain Farmers Act prompted improvements in railroad employee and organizational behavior, leading to improvements in rail service and car cycle times.

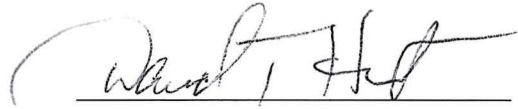
In summary, the Hawthorne effect during the period of extended interswitching, combined with increased traffic volumes, increased length-of-haul, and significant service outages during the return to standard interswitching, make it difficult to attribute changes in car cycle times and total shipment time to any single cause. Yet Dr. Nolan claims that extended interswitching was the sole cause of a 1.5 day decrease in car cycle time and a 5.2 day decrease in total time in the grain handling transportation system for one of the four corridors he studied.²⁵

²⁴ See, for example, “[What is the Hawthorne Effect](#),” Ayesh Perera, Simply Psychology, May 28, 2021.

²⁵ Exhibit, slide 11.

VERIFICATION

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

A handwritten signature in black ink, appearing to read "David Hunt", is written over a horizontal line.

David Hunt

Executed on: April 4, 2022

Appendix A. Resume of David Hunt

Mr. Hunt, a Vice President in Oliver Wyman's Transportation & Service practice, has over 35 years of experience in the areas of transportation operations and strategic planning, national and regional transportation policy, and network modeling and operations research. Mr. Hunt focuses on projects involving regulatory and policy analysis, strategic planning, and operational improvements. His projects include:

- Developed a market share model that predicted truck/rail shares and volumes under various scenarios, including autonomous truck technologies and the potential responses by the rail industry.
- Worked with a Class I railroad to explore opportunities and the value of adopting predictive maintenance practices for their railcar fleet.
- Prepared several policy white papers filed with the US Department of Transportation, addressing issues such as positive train control and the use of electronically controlled pneumatic brakes.
- Called as an expert witness in rail capacity modeling as part of an international arbitration case in South America.
- Participated in discussions with the Mexican government that led to a favorable ruling for the rail industry regarding proposed regulatory action to promote competition through expanded interconnection of rail services.
- Managed the design and development of BlueNet, a facility location model used in network design.
- Developed a simulation model that showed the benefits of operating a nationwide railcar pool, the results of which were used in a Surface Transportation Board proceeding to reauthorize the operation of the pool.
- Worked with a rail industry supplier to restructure their support services, incorporating predictive maintenance tools for safer and more reliable operations.

Prior to joining Oliver Wyman, Mr. Hunt was a Senior Associate at Cambridge Systematics. Mr. Hunt also was a Vice President at ALK Associates. Mr. Hunt is active in the Institute for Operations Research and the Management Sciences (INFORMS), where he was the recipient of the 2017 INFORMS President's Award. He currently serves on the INFORMS Board of Directors as Treasurer and is a member of the Transportation Research Board's Railroad Operating Technologies Committee.

Mr. Hunt earned a BS in civil engineering from West Virginia University and a MSE from the Civil Engineering and Operations Research Department at Princeton University.

Exhibit B

Presentation of Andreas Aeppli

Reciprocal Switching

Docket No. EP 711 (Sub-No. 1)

Presentation of Andreas Aeppli



EP 711 (Sub-No. 1) Hearing

presented to
US Surface Transportation Board

presented by
Cambridge Systematics, Inc.
Andreas Aeppli
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March 16, 2022

3.10.22

CAMBRIDGE SYSTEMATICS 

I have been asked by CN to provide a high-level analysis on the general competitive market conditions in which the rail industry operates in the United States, and the degree to which such competition is intermodal in nature. Our firm, Cambridge Systematics, and I frequently conduct analyses of goods movement across all modes for public and private clients.

Purpose & Approach

High level examination of the freight marketplace, and the degree to which competition is inter- vs. intra-modal, and how this may affect consideration of the reciprocal switching scheme that is being debated in EP 711 (Sub-No. 1).

We examined modal market share across major commodities and by length of haul to assess the level of modal competition across the primary modes – highway, rail, and water – for freight shipments handled within the US.

Focus on originated tonnage, since shippers and markets are concerned with volumes shipped, not transportation system production that is most commonly measured through ton-miles.

Analysis utilized S & P Global Market Intelligence Transearch for the year 2019, an industry standard freight flow database that reports commodities consistent with STB and rail industry usage.

Using available data, I analyzed US domestic traffic at the 2-digit level of commodity classification as specified by the Standard Transportation Commodity Codes (typically referred to as STCC), which categorizes commodities into 50 groupings.

The data used was S & P Global Market Intelligence (formerly IHS Markit) Transearch for the year 2019, which was the last “normal” year prior to the pandemic. Commonly used by public and private decisionmakers who are seeking to understand freight markets and modal performance, Transearch provides information on the flow of goods moving by all common modes of transportation between various geographies. This database contains over 28 million commodity flow records and includes routed mileage for highway and rail. We augmented Transearch to include water mileage using a public source. Using this information, we were able calculate tons, ton-miles, share of tons; or share of ton-miles by mode, for individual commodities or groups of commodities, for all miles combined, or within certain distance ranges.

US Domestic Shipments Originated Tonnage by Mode, All Commodities, 2019

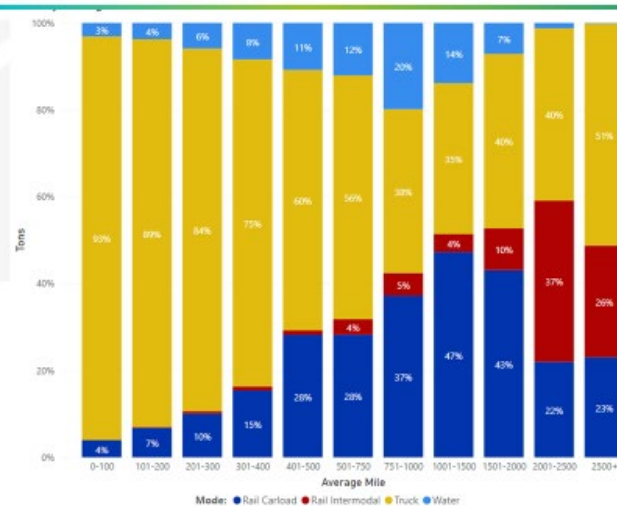
Mode ^a	Tons		Ton-Miles		Average Length of Haul (miles)
	Amount (billions)	% of modal total	Amount (trillions)	% of modal total	
Truck	8.8	78.5%	1.86	53%	211
Rail	1.63	14.5%	1.27	36%	784
Carload	1.45	13%	1.03	30%	712
Intermodal	0.18	1.5%	0.24	7%	1,380
Water	0.8	7%	0.35	10%	449
Total	11.0	100%	3.48	100%	311

^aExcludes air and pipeline. Air constitutes a negligible portion of domestic freight tonnage, and pipeline volumes are only partially reported in Transearch, and thus were not included in analysis.
Source: S & P Global Transearch

On a ton-mile basis, carload rail reaches a mode share of 30%, versus 13% on an originated tonnage basis. This is an important distinction, in that shippers and markets are concerned with volumes of freight shipped. Ton-miles, as measures of transportation system production, are primarily of concern to carriers.

- Modal share for rail carload service exceeds highway only in the 1,001-1,500 and 1,501-2,000 mile bands.
- Rail carload and highway share are roughly equal for the 751-1,000 mile bands.
- This is directly related to the high volumes of coal coming out of the Powder River Basin headed to destinations in the south and east.
- For all other distance bands, highway mode share exceeds carload rail significantly.

Domestic Tonnage by Distance All Commodities, 2019

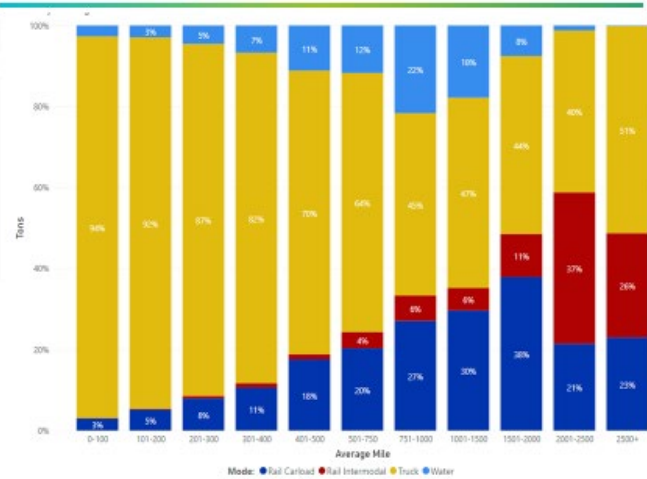


Note: Excludes crude petroleum, shipping containers and hazmat products due to incomplete reporting
Source: S&P Global Transearch

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- A clearer picture of modal competitiveness across distance emerges when coal, with its particular characteristics that are not representative of most rail-competitive markets, is excluded.
- Excluding coal, there are no distance ranges where mode share for carload rail exceeds highway. The closest is in the 1,501-2,000 mile range, where carload rail tonnage accounted for 38% vs. 44% for highway.
- Even in distances exceeding 750 miles where carload rail tends to be most competitive, highway still outperforms rail.

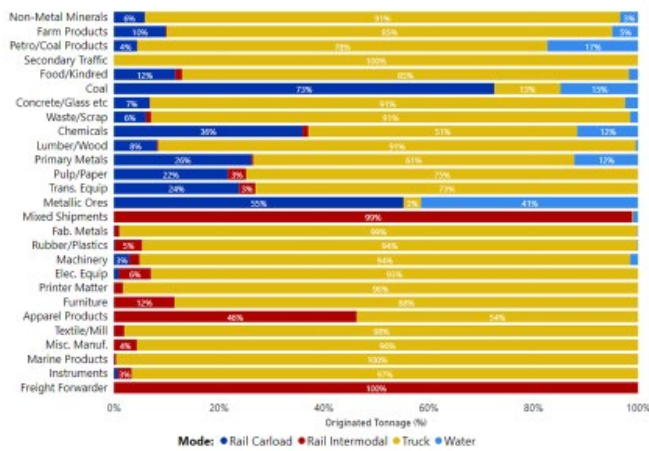
Domestic Tonnage by Distance Excluding Coal, 2019



Note: Excludes crude petroleum, shipping containers and hazmat products due to incomplete reporting
Source: S&P Global Transearch

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Domestic Originated Tonnage by Mode



Note: Excludes crude petroleum, shipping containers and hazmat products due to incomplete reporting
Source: S&P Global Transearch
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- Commodities with carload rail mode share exceeding 25%: coal, chemicals, primary metals, and metallic ores.
- Commodities with carload rail mode share exceeding 50%: coal and metallic ores.

On the basis of the analysis conducted using Transearch, transport by highway is clearly the most commonly used mode in the United States, except for very few commodities. This trend applies consistently at distances under 750 miles or so. Even at longer distances, where railroad efficiencies are most evident, highway transport nevertheless handles the majority of traffic. These results clearly demonstrate the generally highly competitive nature of the freight transportation marketplace in the US, and that modal alternatives – principally highway - provide shippers with competitive choices in many instances. It is critical to consider that shippers will select a mode not just on the basis of price, but rather on a range of attributes of which price is only one component.