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October 11, 2016

Ms. Cynthia T. Brown
Chief, Section of Administration
Office of Proceedings
Surface Transportation Board
395 E Street, S.W.
Washington, DC 20423

Re: STB Docket No. EP 431 (Sub-No. 4), *Review of the General Purpose Costing System*

Dear Ms. Brown:

Pursuant to the Supplemental Notice of Proposed Rulemaking served on August 4, 2016 in this proceeding, attached please find the Association of American Railroads' comments for filing.

In addition, we will separately hand deliver a compact disc containing confidential workpapers for filing under seal. These workpapers contain confidential waybill information.

Respectfully submitted,

Timothy J. Strafford
Counsel for the Association of
American Railroads

BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Ex Parte No. 431 (Sub-No. 4)

REVIEW OF THE GENERAL PURPOSE COSTING SYSTEM

COMMENTS OF THE ASSOCIATION
OF AMERICAN RAILROADS

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COMMENTS OF THE ASSOCIATION
OF AMERICAN RAILROADS

In a Supplemental Notice of Proposed Rulemaking (“SNPRM”) served on August 4, 2016, the Surface Transportation Board (“Board”) proposed to modify its general purpose costing system, the Uniform Railroad Costing System (“URCS”). Specifically, the SNPRM modifies a 2013 proposal to eliminate the so-called “make-whole” adjustment that accounts for the economies of scale realized from larger shipment sizes in the URCS Phase III calculation. The Association of American Railroads (“AAR”) respectfully submits these comments as a party of record in accordance with the Board’s SNPRM. In support of these comments, the AAR also submits the verified statement of Michael R. Baranowski and Benton V. Fisher, Senior Managing Directors of FTI Consulting (“Baranowski/Fisher V.S.”) attached as Appendix A.

The AAR is a trade association representing the interests of North America’s major freight railroads, and often presents comments and testimony in STB proceedings, including opening and reply comments to the original Notice of Proposed Rulemaking (“NPRM”) in this proceeding. The AAR and its freight member railroads have a strong interest in this proceeding

and in ensuring that the Board utilizes the most accurate costing procedures for its regulatory functions.

Background

It is uncontroversial that higher volume shipments generally have certain efficiencies and therefore generate lower costs per unit than other shipments. The agency has long adjusted variable costs to reflect the efficiencies associated with higher volume shipments, even prior to the adoption of URCS.¹ From its adoption in 1989, URCS has applied the make-whole adjustment to recognize the efficiency savings that a carrier obtains in its higher-volume shipments by allocating more of a carrier's total costs to its lower-volume traffic.² The Board mechanically calculates the make-whole adjustments for each Class I rail carrier each year by using URCS and the Board's Carload Waybill Sample through a three-step process. First, URCS costs every movement in the Waybill Sample as a single-car movement. Next, URCS applies efficiency adjustments derived from empirical data and special studies underlying URCS to all of the higher-volume movements (multi-car and trainload)³ in the Waybill Sample, thereby reducing the system-average unit costs assigned to such movements. This aggregate amount, sometimes referred to by the Board as the "shortfall," is then redistributed across all of the lower-volume shipments (single-car and multi-car), so that the sum of variable costs across all of the carrier's movements remains the same. These make-whole adjustments are then included in URCS Phase III for each carrier released to the public by the Board. The Board uses those Phase

¹ See *Investigation of Railroad Frt. Rate Structure—Coal*, 345 I.C.C. 71, 227 (1974).

² *Adoption of the Uniform R.R. Costing Sys. as a Gen. Purpose Costing Sys. for all Regulatory Costing Purposes*, 5 I.C.C.2d 894 (1989) (*Adoption of URCS*).

³ URCS defines single-car shipments as 1 to 5 cars, multi-car shipments as 6 to 49 cars, and trainload shipments as 50 or more cars.

III calculations to assign costs to the each movement contained in the Carload Waybill Sample (“CWS”).

The Board issued a proposal to eliminate the make-whole adjustment and make other changes to URCS in its NPRM served on February 4, 2013, because of two articulated concerns with the make-whole adjustment. First, the NPRM stated that efficiency adjustments generally reduce the system-average unit costs by set percentages depending on whether the movement is classified as trainload, multi-car, or single-car. The resulting step-function has differing costs on either side of break points at the demarcation lines between single-car and multicar shipments and between multi-car and trainload shipments. The NPRM also noted a second concern with how the make-whole adjustment is distributed across lower volume movements on a per-car basis. The NPRM asserted that a second step function exists because the shortfall redistribution of some cost categories is added on per-car basis. In addition to eliminating the make-whole adjustment, the NPRM also proposed to eliminate what it referred to as a related step function in locomotive unit miles (“LUM”).

In opening and reply comments to the NPRM, the AAR supported improvements to URCS, but opposed changes to URCS that would alter long-standing cost relationships without support from empirical data. The AAR noted the increased importance that URCS be grounded in real world, empirical data, as the Board has dramatically increased the use and impact of unadjusted URCS system-average costs in a variety of regulatory contexts. The AAR was joined by railroad and shipper stakeholder comments expressing concern over the lack of empirical support for the NPRM’s proposals.⁴ The AAR also pointed out areas where URCS could be improved by correcting technical errors and suggested that the Board take this opportunity to

⁴ SNRPM at 5.

consider the unique costs associated with toxic-by-inhalation hazards (“TIH”) and other hazardous materials.

The SNPRM now proposes to modify the NRPM proposals, utilizing the efficiency adjustments and cost relationships in Phase III as the starting point for cost allocations.⁵ The AAR commends the Board for seeking to improve its general purpose costing system and attempting to be responsive to the comments filed by stakeholders. As discussed in the comments below, while the AAR continues to support the Board’s general goal of improving URCS by more accurately reflecting the variable costs of specific rail movements, the AAR also continues to be concerned that the SNPRM improperly relies on subjective judgments and estimates in the place of empirical data to allocate costs. In addition, the AAR questions why the Board is expending so much effort to eliminate step-function effects within URCS, even where those effects are driven by empirical data, while it is unwilling to consider other important improvements to URCS.

With regard to the specific proposals in the SNPRM, the AAR rejects the notion that the Board’s proposals regarding LUM and train miles are actually related to the make-whole adjustment and that those proposals would make URCS more accurate. The AAR does not object to eliminating the step-function effect of the make-whole adjustment, but cannot support changes to URCS that change cost relationships without empirical support.⁶ The AAR also points out an area where URCS could be corrected in this proceeding. Finally, the AAR asks the Board to consider the full implications of the changes the SNPRM has proposed and to properly

⁵ SNPRM at 7.

⁶ The AAR does not object to the Board’s proposals to define a unit train in URCS as 75 cars or more, to change the intervals used for calculating and assigning costs associated with intertrain and intratrain (“I&I”) switching from 200 to 268 miles, or to the proposal regarding car-mile costs.

phase-in those changes or otherwise account for aspects of URCS or variable costs produced by URCS that have multi-year components.

Comments

I. Improvements to URCS Should Be Based on Empirical Data and Should Not be Limited to the Make-Whole Adjustment

A. The Need For Accurate System-Average Costing Has Only Grown Since the Adoption of URCS

The National Rail Transportation Policy (“RTP”) directs the Board to “ensure the availability of accurate cost information in regulatory proceedings, while minimizing the burden on rail carriers of developing and maintaining the capability of providing such information.”

49 U.S.C. § 10101(13). In its opening comments, the AAR noted that the foundation of accurate cost information is causality. The Railroad Accounting Principles Board (“RAPB”)⁷ defined the causality principle as:

Costs shall only be attributed to cost objectives when a causal relationship exists (the cost would not have been incurred but for the requirements of the cost objective). A cost objective is the result of the use of resources.

That is, costs must be accurately and causally connected to the activities to which they are allocated. The RAPB called on the agency to look for causal relationships “through direct observation, engineering analysis, and/or statistical techniques.”⁸ Since URCS was adopted in 1989, the AAR has consistently stated that efforts to reform the costing system should seek to improve the accuracy of URCS's application to specific movements and cause its results to more accurately reflect the full costs incurred by rail carriers in their provision of service to

⁷ The RAPB was created in the Staggers Rail Act of 1980, Pub. L. No. 96-448, Sec. 302, 94 Stat. 1985 (1980), to “evaluate the issues surrounding rail costing and to propose economically accurate principles to govern the estimation of such costs.” *Adoption of URCS*, at 895 & n. 3.

⁸ RAPB, Final Report (1987) at 10.

customers.⁹ In the past, the Board has recognized that it should not embark on changes to the costing model without reasoned analysis of empirical data that would support those changes.¹⁰

The need for sound costing has only grown since URCS was adopted. In 1989, regulatory reliance on URCS was largely confined to quantitative market dominance determinations in rate reasonableness complaints.¹¹ The only specific statutory mandate for the agency to use URCS is in determining whether the variable costs of movements exceeds the 180% revenue-to-variable cost (“R/VC”) threshold for the Board’s authority to judge the reasonableness of a railroad’s rate.¹² At the time URCS was adopted, the task of establishing a specific rail movement’s variable cost was supplemented by the parties’ ability to advocate movement-specific adjustments to UCRS system-average variable costs.

However, in the last 10 years, the use of URCS system average costs and data from the CWS for a variety of regulatory functions has exploded. In rate cases, the Board has prohibited movement-specific adjustments to URCS in the market dominance determination, established an URCS-based methodology for allocating revenues for cross-over traffic, and has moved from prescribing rates on a dollar-per-car basis to an URCS-based R/VC methodology.¹³ The Board has established an R/VC ratio comparison Three-Benchmark test for rate reasonableness which

⁹ See, e.g., AAR Public Hearing Testimony, EP 431 (Sub-No. 3) (filed April 23, 2009) at 3-4.

¹⁰ *Review of the General Costing System*, 2 S.T.B. 659, 665 (1997).

¹¹ URCS was also used to determine a carrier’s avoidable costs in abandonment cases and, more rarely, played a role in determining compensation for access onto another railroad’s property or offers of financial assistance to purchase or subsidize a line authorized for abandonment.

¹² 49 U.S.C. § 10707 (d)(1)(B).

¹³ *Major Issues in Rail Rate Cases*, EP 657 (Sub-No. 1) (STB served Oct. 30, 2006).

relies heavily on URCS and the CWS.¹⁴ Over carrier objections,¹⁵ the Board has applied an URCS-based “limit price test” for qualitative market dominance analysis.¹⁶ The Board has also utilized URCS in evaluating the efficiency of routes under 49 U.S.C. § 10705.¹⁷ Recently, the Board relied on changes to R/VC ratios in the CWS over long time periods, and little else, to justify proposing to revoke certain commodity exemptions.¹⁸ In that proceeding, the Board has thus far ignored changes to railroad operations and changes to URCS in using R/VC ratios to justify expanded regulatory intervention into the marketplace. The Board has now also proposed a new R/VC-based rate reasonableness analysis for very small cases.¹⁹ The Board has proposed to force railroads to switch traffic where a complainant shows market dominance and sought comment on applying the methodology developed in *Arkansas & Missouri Railroad v. Missouri Pacific Railroad*, 6 I.C.C.2d 619 (1990) for pricing that access, further expanding the potential uses of URCS.²⁰

B. Empirical Data Best Assures Reasonable Accuracy in URCS

Given the increasing importance and proliferating use of URCS costing, the AAR comments submitted in the earlier rounds of this proceeding urged the Board to undertake special

¹⁴ *Simplified Standards for Rail Rate Cases*, EP 646 (Sub-No. 1) (STB served Sept. 7, 2007).

¹⁵ As made clear in the AAR’s *amicus curiae* comments filed in *M&G Polymers v. CSX Transportation*, NOR 42133, the limit price test does not comport with 49 U.S.C. § 10707 and is not based in sound economics or regulatory policy. See AAR Comments, NOR 42123 (filed Nov. 28, 2012).

¹⁶ See, e.g., *Total Petrochemicals & Refining USA, Inc. v. CSX Transportation, Inc.*, NOR 42121 (STB served July 19, 2011).

¹⁷ *Entergy Ark. Inc. and Entergy Serv. Inc. v. Union Pac. R.R. and Mo. & N. Ark. R.R.*, NOR 42104, slip op at 12-14 (STB served Mar. 15, 2011), *recon. denied*, *Entergy Ark. Inc. and Entergy Serv. Inc. v. Union Pac. R.R. and Mo. & N. Ark. R.R.*, slip op. at 11-13 (STB served Nov. 26, 2012).

¹⁸ *Review of Commodity, Boxcar, and TOFC/COFC Exemptions*, EP 704 (Sub-No. 1) (STB served July 29, 2016).

¹⁹ *Expanding Access to Rate Relief*, EP 665 (Sub-No. 2) (STB served Aug. 31, 2016).

²⁰ *Reciprocal Switching*, EP 711 (Sub-No. 1), slip op. at 25 (STB served July 27, 2016).

studies to develop the data necessary to accurately reflect the costs of different volume shipments.²¹ Recognizing that the Board may not believe it has the resources to do such studies, and further recognizing the Board's desire to eliminate the step-function effect of the make-whole adjustment, the AAR comments focused on retaining the original engineering and special study relationships built into URCS wherever practical, while eliminating the step-function effect associated with the make-whole adjustment.²²

The SNPRM declined to conduct empirical studies and concluded without explanation or analysis that special studies "could place an undue burden on 'the railroad industry, the shipping public, or the agency.'"²³ While the Board did not adopt the specific proposals AAR advocated, the SNPRM does recognize that "the existing efficiency adjustments and cost relationships in Phase III can form the basis for changes that remedy the problems in the current make-whole adjustment and related Phase III outputs."²⁴ However, the AAR remains concerned that the Board is replacing data-driven cost allocations with subjective judgments.

Certainly, the AAR agrees that the practicality principle should also inform the Board's treatment of URCS and what burdens the Board places on the railroad industry to account for costs. As the ICC recognized, the practicality principle originated in Congress's directive to the RAPB that "it take into account the capability of carriers to provide information, the relative benefits and costs of its provision, and the means by which required economic accuracy can be achieved with the least information and the least expense."²⁵ But the practicality principle never

²¹ Similarly, the AAR suggested that the Board should conduct a special study to develop an accurate I&I switching interval. See *Baranowski/Fisher V.S.* at 18.

²² AAR Opening Comments, *Baranowski/Fisher V.S.* at 4.

²³ SNPRM at 6 (quoting *Review of Gen. Purpose Costing Sys.*, 2 S.T.B. 659, 660-61 (1997)).

²⁴ SNPRM at 7.

²⁵ *Adoption of URCS*, 5 I.C.C.2d at 909 (citing former 49 U.S.C. 11162(b)(3) and (4)).

contemplated substituting the agency’s “reasoned economic judgments” for actual direct observation in the causality principle that requires an empirical basis for the costing model and the ICA’s requirement for accurate costing information.²⁶

The SNPRM focuses on eliminating the step-function effects in URCS while at the same time the Board has declined to take other steps it has outlined as “basic” fixes to URCS.²⁷ In its Report to Congress six years ago, the Board identified a number of other potentially meaningful modifications to URCS to update and refine the cost allocation assumptions and algorithms within the URCS model. Recognizing that a complete overhaul of the costing model would be a lengthy and expensive endeavor, the Board outlined four fixes that could be addressed in relatively straightforward manner. As summarized by Messrs. Baranowski and Fisher, those proposed fixes were to:

- Revisit (not eliminate) the make-whole adjustments to better align with current railroad operations.
- Modify URCS to more appropriately assign relevant costs to hazardous materials shipments.
- Update and expand certain of the railroad Annual Report R-1 reporting requirements to allow for improved cost allocations within URCS.
- Examine the current URCS regressions with the possibility of using a more recent dataset or conducting a more in-depth evaluation of the expense account groupings within each regression equation.

Each of the items listed above would, if properly implemented, improve the ability of URCS to accurately allocate costs to individual shipments.²⁸ The comments that follow focus on how the

²⁶ General pronouncements regarding efficiencies do not constitute direct observation as contemplated by the RAPB. “Direct Observation involves specifically identifying and quantifying the incurrence of cost resulting from the performance of a specific activity.” RAPB at 10.

²⁷ *Class I Railroad Accounting and Financial Reporting—Transportation of Hazardous Materials*, EP 681 (Sept. 22, 2016).

²⁸ Baranowski/Fisher V.S. at 7.

SNPRM's proposals could better preserve the cost relationships in URCS that are based on empirical data.

II. The Board Should Not Adopt The Proposed Changes to LUM and Train Mile Cost

The SNPRM's proposed changes to LUM costs²⁹ and train miles are unrelated to the make-whole adjustment, would make URCS less accurate and less refined, and should not be adopted. Both proposals reflect the Board's hostility to the presence of step-functions in the costing model, but neither proposal has anything to do with the efficiencies of larger shipment sizes addressed by the make-whole adjustment. Instead, both the step-functions associated with LUM and train miles reflect cost differences established by real world data and are the product of URCS drawing a distinction between unit trains and non-unit trains.

Besides distinguishing among single car, multi-car, and trainload shipments, URCS also draws distinctions based on whether shipments move by unit, way, or through trains. The step functions for both LUM and train miles accurately reflect the data-driven studies underlying URCS and the fact that URCS treats unit and non-unit trains as different things. The SNPRM does not explain why the Board believes that URCS should not reflect the empirical data that show that costs differ between unit and non-unit trains. For example, as demonstrated by Messrs. Baranowski and Fisher, locomotives used in unit train service move, on average, considerably more gross tons and cars per locomotive than those used in way or through train service. As shown in Table 1 of the Baranowski/Fisher V.S., unit trains are, on average, more than 60% longer and heavier than through trains, but require less than 60% more locomotives to do so. Thus, locomotives used in unit trains move proportionally more tons and cars than

²⁹ LUM costs consist primarily of locomotive ownership, maintenance, and fuel costs.

locomotives used in way or through train service.³⁰ Messrs. Baranowski and Fisher conclude that it is natural to observe differences between unit-train costs and through-train costs assigned by URCS. Those differences, in turn, drive differences in the allocation of LUM costs to shipments.³¹

Moreover, both proposals artificially cap certain costs, thereby leaving actual reported costs unallocated in Phase III.³² The proposals thus would actually make URCS less refined and less accurate than it is today. The proposals for LUM and train miles are solutions in search of problems. The Board should withdraw the proposals.

III. The SNPRM Proposal to Eliminate the Make-Whole Adjustment Would Alter Costing Relationships and Resulting Variable Costs

The AAR continues to support the Board's efforts to accurately reflect the efficiencies of larger shipments. However, the AAR is concerned that in seeking to eliminate the step-function effect of the make-whole adjustment, the SNPRM proposes changes to URCS that will change the cost relationships that were established by empirical data and produce significant changes to the resulting variable costs without improving accuracy.

A. Switching Costs Related to Switch Engine Minutes

1. *Carload Weighted Block Adjustment*

In order to preserve the existing cost relationships in URCS, which were derived from special studies, the AAR contended in its opening comments to the NPRM that the calculation of SEM costs and station clerical costs should have used the number of shipments as an "event" component and the number of cars as the time component. The AAR noted that the best way to

³⁰ Baranowski/Fisher V.S. at 5.

³¹ Baranowski/Fisher V.S. at 4.

³² Baranowski/Fisher V.S. at 14-16.

establish the exact split ratio would be based on the results of special studies, but provided that if the Board believed such studies to be impractical, the Board should seek to preserve the existing cost relationships in URCS. Based on some preliminary analyses of the CWS, the AAR submitted that a split for SEM costs that assigns 70 percent of the switching costs on a shipment basis and 30 percent on a car basis will preserve the intent of the current URCS switch cost allocation process, which itself was based on special studies, and will also achieve the Board's stated goal of eliminating the current step function in costs that involves the separate make-whole additives. The AAR advocated for a similar allocation to be used for station clerical costs.³³

Instead, the SNPRM proposes now to adjust how Phase III allocates SEMs to account for economies of scale and recognize the fact that switching costs include both a time component and an event component. The Board would allocate SEM costs by establishing an asymptotic curve that would be calculated using a new concept called the Carload Weighted Block ("CWB") Adjustment that applies a weighting to a block of cars based on a percentage of the number of cars in that block.

Despite attempting to align the proposals' outcome with the current URCS switching efficiency adjustments, the SNPRM proposal for SEMs actually produces significant shifts in variable costs among shipment sizes for all switching types. As demonstrated by Messrs. Baranowski and Fisher, average SEM-related variable costs for single-car shipments would increase approximately 2% overall, multi-car shipment switching costs would decrease by approximately by 27%, and unit train shipment switching costs would decline approximately

³³ AAR Opening Comments, Baranowski/Fisher V.S. at 15.

4%.³⁴ In part, these changes are a result of the SNPRM's unexplained use of a 75% unit train efficiency adjustment tied to the proposed definition of a unit train as 75 or more cars. In particular, the SNPRM fails to explain why the 75% unit train efficiency is better aligned with the minimum unit train size than with the average actual unit train length.³⁵

The CWB approach would also create a substantial new step function between the URCS costs of a one-car and two-car shipment with no empirical evidence that this change aligns with how railroads actually perform switching for smaller shipments. Specifically, under the Board's proposal for industry switching, because of changes to both the allocation of SEMs by shipment size and recalculation of the cost per SEM itself, the URCS variable costs of a one-car shipment rises 7% compared to existing levels and the cost for a two-car shipment falls 42%. This produces a "step function" of 46% between one-car and two-car shipments – a greater step than the 25% difference between multiple-car and unit-train shipments that appears to drive the SNPRM proposals.³⁶ This cost differential is purely the result of relying on a mathematical formula to allocate costs in place of empirical data.

In addition, reliance on an asymptotic curve causes costs for inter-train and intra-train ("I&I") switching to *decrease* as shipment size increases.³⁷ Because the current URCS efficiency adjustments assume that unit trains receive no I&I switching, the SNPRM proposal causes I&I switching costs for 1-car shipments to increase by about 17% and all other non-unit shipments to decrease from 40% to 100%. This arbitrary redistribution of I&I-related costs

³⁴ Baranowski/Fisher V.S. at 9.

³⁵ Baranowski/Fisher V.S. at 9-10.

³⁶ Baranowski/Fisher V.S. at 10-11.

³⁷ SNPRM at 11 ("Although this negative slope for I&I switching may not be perfectly reflective of costs for actual railroad operations . . .").

should be rejected. To correct this flaw, Messrs. Baranowski and Fisher suggest that in the absence of new empirical data the Board should leave the cost curve for I&I switching for single-car and multi-car shipments flat to preserve the current cost relationships in URCS.³⁸

2. Intermodal Shipment Size

The AAR opening comments to the NPRM expressed concern with the URCS allocation of switch engine minutes to intermodal shipments. In the context of moving to an allocation of switching costs on a shipment rather than car basis, the AAR noted that the original NPRM proposal did not address how to determine the shipment size for the purpose of allocating switch costs to intermodal shipments. The AAR suggested that the Board conduct a special study to develop accurately the actual number of intermodal units per shipment and therefore calculate the average shipment size. The AAR used an assumed intermodal shipment size of ten intermodal flat cars in our calculations, a figure that was buttressed by evidence submitted by BNSF that identified an average intermodal shipment size of 12 intermodal flat cars.³⁹

The SNPRM did not address the undisputed notion that for switching-related activities intermodal cars are connected into larger blocks of cars. Instead, the SNPRM changed its definition of a shipment to be a block of one or more cars or trailer container units (“TCUs”) moving under the same waybill from origin to destination. At the same time, the SNPRM eliminates the Board’s previously-proposed changes to the carriers’ reporting that would make an accurate determination of intermodal shipment sizes possible.

The Board should revise its proposal to reflect actual railroad operations. Unlike carload shipments, which are switched into specific blocks with other comparable carloads as trains are

³⁸ Baranowski/Fisher V.S. at 23-25.

³⁹ AAR Opening Comments, Baranowski/Fisher V.S. at 4; BNSF Opening Comments at 9.

built, intermodal TCUs are grouped with other comparable TCUs when they are lifted and placed on intermodal flat cars. The flat cars themselves, which are coupled into long strings limited only by the length of the track, are then pulled intact by road or switching locomotives to build the intermodal train. The “switching” of the TCUs themselves is largely accomplished by the intermodal lift cranes, not locomotives. The SNPRM thus fails to accurately account for how switch engine minutes should be allocated to intermodal shipments in light of this difference.⁴⁰ The Board should collect data to accurately determine the number of switch engine minutes that should be ascribed to intermodal flat cars.

B. Station Clerical Costs

Similarly, the SNPRM proposal for station clerical costs would cause shifts in variable costs among single-car shipments without justification. The SNPRM proposes to continue calculating station clerical costs on a per-car basis in Phase II and, for multi-car and unit train shipments, continue applying the same efficiency adjustments that URCS applies now in Phase III. Unlike SEM costs, the current efficiency adjustment for station clerical costs is based on a function where 75% of costs are based on the carloads and 25% of costs are based on the shipment, resulting in an asymptotic curve. To eliminate the break point between single-car and multi-car shipments, the SNPRM would adjust Phase III by applying the concept of the CWB Adjustment developed for switching costs. To determine the appropriate percentage split between carload and block in the CWB value for single-car shipments only, the SNPRM proposes to solve for the values that cause station clerical costs to be reduced at the six-car level by the same amount as is currently done by URCS. As with SEMs, this determination would be

⁴⁰ Baranowski/Fisher V.S. at 25.

done annually, by railroad, using data in the Waybill Sample.⁴¹ Roughly speaking, station clerical costs for one-car shipments go up by 3% while costs for two- to five- car shipments go down by 25% to 40%. The costs for all shipments above five cars would remain unchanged.⁴² The SNPRM provides no justification for shifting these costs among shipments.

C. Equipment Costs for the Use of Railroad-Owned Cars During Switching

Though the SNPRM characterizes the current proposals as incorporating the current URCS efficiency adjustments to the extent practicable, the proposal regarding the efficiency adjustments for railroad-owned equipment used during switching effectively eliminates the relative efficiencies among various shipment sizes and allocates the same costs per carload to larger shipments as it does to smaller shipments. The SNPRM proposes to modify the Phase II inputs for car-days and car-miles to reflect the current efficiency-adjusted values for the predominant shipment size of each particular car type. Specifically, the SNPRM proposes that: (1) if a majority of shipments for one car type (greater than 50%) move by unit train, then the URCS would use the efficiency-adjusted inputs for even those car-days and car-miles incurred for single-car shipments; (2) if the predominant shipment size for that car type is single-car, then URCS would use the unadjusted inputs for car-days and car-miles incurred for unit train shipments; and (3) if there is no majority of shipments moving by a particular shipment size, URCS would apply the efficiency adjustments depending on whether the particular adjustment reduces costs for multicar shipments or not.

⁴¹ For intermodal shipments, URCS currently applies a station clerical efficiency adjustment starting at six flatcars. For intermodal shipments with fewer than six flatcars, the SNPRM proposes to apply the CWB Adjustment and solve for the smallest multi-car shipment in order to match the current efficiency adjustment at six cars.

⁴² Baranowski/Fisher V.S. at 12.

The proposal would eliminate a flaw that the AAR pointed out in the current make-whole process that incorrectly assigns efficiency-related cost savings associated with certain types of equipment to others. But because the SNPRM proposal is, in most instances, an all-or-nothing application of the efficiency adjustments in the Phase II calculations of unit costs by car type, the proposal creates an avoidable mismatch between the Phase II inputs and its allocation of SEMs by shipment size, which as discussed above attempts to retain the current efficiency adjustments and associated cost differential between larger and smaller shipment sizes. As a result of the proposal, car types that move predominately in unit trains would have relatively more costs assigned to line haul operations, resulting in larger cost increases for longer movements.⁴³ The SNPRM has no empirical support for this change. Moreover, the SNPRM proposal does not retain all of those refinements and does not maintain the current cost relationships within URCS that resulted from the special studies.

The same CWB Adjustment approach for equipment costs that the SNPRM proposes to introduce for SEM costs could be employed for equipment costs in railroad-owned cars. If the Board concluded that it would not be administratively practical to generate unique asymptotic curves for every car type for each individual carrier, Messrs. Baranowski and Fisher describe an alternative way the Board could continue to reflect the relative efficiencies by car type and eliminate the make-whole adjustment. The Board could use the average number of car days to calculate the unit cost instead of the all-or-nothing approach proposed in the SNPRM. Then in the Phase III allocation of costs to shipments, the service units that correspond to the appropriate shipment size could be used. That is, the unit cost that was calculated from the average number of car days or car miles would be assigned to each shipment's specific number of car days or car

⁴³ Baranowski/Fisher V.S. at 13-14.

miles. This alternative would allow the URCS costs to continue to reflect the relative efficiencies of larger shipment sizes, and would do so without requiring a make-whole adjustment.⁴⁴

IV. The Board Should Correct URCS Current Misallocation of Switch Engine Minutes to Interterminal and Intraterminal Switching

The SNPRM declined to fix a flaw in URCS identified by the AAR related to interterminal and intraterminal switching. Railroads do not report interterminal and intraterminal switching activity,⁴⁵ yet the URCS model currently assigns a portion of total switching time - and, as a result, switching costs - to this type of switching. In addition, only a small fraction of these costs is actually assigned to shipments in the waybill sample meeting special criteria. The AAR showed that URCS allocated nearly one million hours representing more than \$422 million in variable costs to interterminal and intraterminal switching for the railroad industry in 2011 and that only \$12 million of that total is actually assigned to shipments in the carload waybill sample. The AAR asked that the Board address the imbalance between the service units and costs allocated to interterminal and intraterminal switching within Phase II and the small portion of those costs that is actually assigned to shipments in the CWS.

The SNPRM rejected this fix and other proposed changes to URCS, stating that they would greatly expand the scope of this proceeding, they are not related to make-whole adjustments or step functions and they are not necessary to appropriately calculate costs in

⁴⁴ *Id.*

⁴⁵ Intraterminal Switching includes the switch from one industry or team track to another industry or team track, both being located on the same carrier within the same terminal. Interterminal Switching includes the switching from an industry or team track of one carrier to the point of interchange (i.e., interchange track) of another carrier for delivery to a team or industry track located on the lines of other carriers within the same terminal.

URCS.⁴⁶ The decision not to eliminate the under assignment of switching costs is inconsistent with its professed rationale, particularly in light of the SNPRM proposals to correct other flaws in URCS unrelated to make-wholes or step functions.

There is a direct and simple way to fix this flaw. Based on studies reaching back as far as the early 1950s, URCS includes input values for the ratio of intraterminal and interterminal switches to originating and terminating switches. As shown in the Baranowski/Fisher V.S., only a small fraction of the switch engine minutes, and therefore switching costs, distributed in URCS Phase II to intraterminal and interterminal switching are actually allocated to shipments in the carload waybill sample. Messrs. Baranowski and Fisher show that the disconnect between the Phase II input assumptions and the actual occurrences of intraterminal and interterminal switches means that URCS Phase II is improperly allocating costs to intraterminal and interterminal switches that should be allocated to other types of switches in URCS. Messrs. Baranowski and Fisher show that the Board can correct this flaw without unduly expanding the scope of this proceeding by simply replacing the intraterminal and interterminal switch ratios with actual calculated values from the CWS.⁴⁷

V. The SNPRM Does Not Adequately Consider the Implementation of Changes to URCS

The AAR expressed concern in its opening comments to the NPRM regarding how changes would be implemented. The AAR noted that because of the Board's heavy reliance on URCS-based R/VC ratios, it would be imperative that the Board consider the transition to

⁴⁶ SNPRM at 29.

⁴⁷ Baranowski/Fisher V.S. at 23.

incorporate the proposed changes.⁴⁸ Two important uses of URCS calculations are the Board's calculation of RSAM and $R/VC_{>180}$ both of which use a four-year average. The SNPRM's proposed changes will certainly change the calculation of variable costs of movements in the CWS and the distribution of R/VC movements falling above and below the 180% threshold. The inevitable result will be to change the calculation of RSAM and $R/VC_{>180}$.

The SNPRM dismisses the necessity for a transition in multi-year applications of URCS because "there would be [only] a brief period where the averages included data calculated under URCS current methodology and under the proposed methodology."⁴⁹ To be clear, that "brief period" when URCS will be averaging different costing allocations is four years. If the Board were to adopt the SNPRM proposals and apply them prospectively to the 2017 CWS, the RSAM and R/VC_{180} calculations would be based on disparate URCS calculations through the 2019 values for those figures.⁵⁰ Further, the implications of the change drag on longer than 2019, due to regulatory lag issues in costing the CWS and generating RSAM and R/VC_{180} . Thus, Three Benchmark cases in 2021 if not 2022 could still be using R/VC ratios derived from mix and match URCS calculations.⁵¹

Conclusion

The Board should not alter the existing cost relationships in URCS without establishing an empirical basis for the changes. Accordingly, the Board should reconsider its proposal for

⁴⁸ The AAR's other stated concern regarding how the changes would be incorporated in the annual development of URCS applications was ameliorated by the withdrawal of changes to reporting requirements in the SNPRM.

⁴⁹ SNPRM at 30.

⁵⁰ With the rolling four year average for RSAM and R/VC_{180} calculations, each of the first three years after the revised URCS is used for the CWS will rely on a mixture of current and revised URCS CWS data.

⁵¹ Baranowski/Fisher V.S. at 25.

removing the step-function effect of the make-whole adjustment, and it should withdraw its proposal with regard to LUM and train miles. The Board should also address the current misallocation of SEM to interterminal and intraterminal switching. Finally, the Board should carefully and prudently consider how it will deal with implementation of any changes to URCS, which will make comparisons of R/VC ratios over time incoherent and unreliable.

Respectfully submitted,



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Appendix A

BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Ex Parte No. 431 (Sub-No. 4)

REVIEW OF THE GENERAL PURPOSE COSTING SYSTEM

VERIFIED STATEMENT OF

Michael R. Baranowski
and
Benton V. Fisher

October 11, 2016

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I. INTRODUCTION

We are Michael R. Baranowski and Benton V. Fisher, Senior Managing Directors at FTI Consulting. Details of our background and experience are set forth in Exhibits No. FTI-1 and 2 to this verified statement. As set forth in those Exhibits, much of our work involves analyses that utilize the Surface Transportation Board's (Board or STB) Uniform Railroad Costing System (URCS). We previously submitted verified statements in this proceeding – STB Ex Parte No. 431 (Sub-No. 4), *Review of the General Purpose Costing System* – (NPR) in support of the opening and reply comments of the Association of American Railroads (AAR) in June and September 2013. In those statements we explained that many of the Board's proposed adjustments were unsupported, did not appear to be based on empirical analysis or study of actual data, and would dramatically change long-standing cost relationships that had previously and continually been embraced by the Board. We explained that the Board's goal to eliminate cost-related step functions driven by the URCS efficiency adjustments and corresponding make-whole adjustments could be accomplished in a manner that preserves the long-standing cost relationships, which themselves are based on detailed studies. We also expressed concerns about the lack of a foundational basis for the Board's proposed changes and in the end, did not support the modifications set forth in the NPR.

Based on comments related to its NPR from interested parties, the Board is revising its proposals. We have been asked by the AAR to comment on the Board's new proposals, set forth in its August 4, 2016 Supplemental Notice of Proposed Rulemaking (Supplemental NPR), to eliminate the make-whole adjustment and to make other related modifications. Specifically, the Board's revised modification proposals fall under five general areas:

1. Switching Costs Related to Switch Engine Minutes (SEM)
2. Equipment Costs for the Use of Railroad-Owned Cars During Switching

3. Station Clerical Costs
4. Car-Mile Costs
5. Other Related Changes that involve a) intertrain and intratrain (I&I) switching, b) the definition of a unit train, and c) the allocation of locomotive unit miles and train miles to multi-car shipments and unit trains

With the exception of the proposed treatment of train miles in costing single- and multi-car shipments and unit trains, all of the general areas for which changes are proposed were raised in some fashion in the NPR.

At a high level, the Board in its Supplemental NPR is not proposing any meaningful evaluation or changes to ensure that the URCS model is producing and will continue to produce variable costs that are as accurate and reflective of the current railroad industry as practical. Instead it remains fixated on its stated goal of eliminating the URCS make-whole adjustments. In its endeavor it chooses again to not consult any new empirical data or undertake any studies and has opted instead to focus only on maintaining existing cost relationships. Specifically the Board is proposing a variety of tweaks to aspects of the URCS Phase II unit cost calculations based on observed patterns within its annual carload waybill sample (CWS). Using basic arithmetic it largely achieves its goal of removing the make-whole related step functions and maintaining generally the existing cost relationships. However, because URCS was designed and developed as an integrated costing system, the Board's changes have introduced other unintended inconsistencies in the URCS costing relationships that require resolution. The Board also failed in this round to address two changes to URCS that are necessary to align its variable costs with modern railroad operating practice and failed to adequate plan for phasing revised URCS outputs – should any changes be implemented – in regulatory proceedings.

We address these and other related issues in this verified statement. Specifically, in Section II, we explain again that the Board's narrow focus on eliminating the step functions

created by the current make-whole adjustments is misplaced. In Section III we explain that the Board's new "reasonable economic judgment" standard derived from the Railroad Accounting Principle Board's (RAPB) practicality principle is flawed. In Section IV we address each of the Board's proposed changes. In Section V we identify two additional changes that the Board needs to make URCS more aligned with current railroad operating practices. In Section VI we identify shortcomings in the Board's implementation of its changes.

II. THE BOARD'S FOCUS ON ELIMINATING URCS MAKE-WHOLES AND OTHER STEP FUNCTIONS WITHIN URCS IS MISPLACED

The Board's 2013 NPR and the current Supplemental NPR target the application within URCS of Ex Parte 270 efficiency adjustments to multi-car and unit train shipments and, more specifically, the variable-cost step functions produced by the redistribution of those efficiency-related costs through make-whole adjustments. This narrow focus represents a significant departure from the proposals outlined in its May 27, 2010 Report to Congress regarding URCS.¹ Although the Board raised the issue of make-whole adjustments in that Report, it was in the context of improving the make-whole adjustments to reflect more accurately the shifts that had occurred in railroad operations to longer trains serving the coal, grain and intermodal markets. The Board there expressed concern that as more shipments moved to longer trains and realized the associated efficiencies, there would be ever-fewer single-car shipments to absorb the redistribution of those efficiency cost savings via the make-whole adjustments. Here, however, the Board has changed course, and rather than reevaluate and refine the make-wholes to more accurately reflect current railroad operations and relative costs, decided to simply eliminate the make-whole adjustment.

¹ We include the "Surface Transportation Board Report to Congress Regarding the Uniform Rail Costing System" as Exhibit FTI-3 to this statement.

As the Board explains further in its 2010 Report to Congress, the concept of make-whole adjustments in URCS was one of the fundamentals of the URCS conceptual design developed by Dr. Daniel Westbrook and the RAPB during the initial development of URCS. Specifically, the Report summarizes the concept as:

URCS should account for the added efficiencies of unit train, trainload and multi-car movements, over those of single car movements, and use a **“make-whole” adjustment** to redistribute the efficiency savings that a railroad obtains in higher-volume shipments across all of that carrier’s lower-volume shipments. The make-whole adjustment maintains the same total sum of variable costs across all of the carrier’s shipments, while recognizing the efficiency in the carrier’s higher-volume movements.

Nowhere has the Board explained why this conceptual underpinning of URCS design and development is no longer valid. The Board also expands its reach beyond the make-wholes and addresses in the Supplemental NPR what it describes as a step function relative to the URCS allocations of locomotive unit mile and train mile costs among single-car, multiple-car and unit-train shipments.

Unlike the Ex Parte 270 adjustments themselves, which were determined through extensive empirical analyses, the Board’s proposed remedies to eliminate the make-whole-related and other step functions are based only on what it describes as “reasonable economic judgments” that emphasize maintaining the same inherent cost relationships to the extent practicable while smoothing out the existing step functions. This approach does nothing improve the accuracy of the assignment of variable costs and, despite its goal to maintain the same cost relationships, produces in some instances an arbitrary shuffling of cost allocations within URCS.

Further, the Board’s discomfort with the “step functions” in the current URCS assignment of certain locomotive unit-mile and train-mile costs is unfounded. The cost differences that exist between multiple-car shipments and unit trains are a direct result of the

aggregated level of train and locomotive consist reportings in the R-1 that serve as the input to URCS. While the Board finds these differences problematic and appears to lump them in with the make-whole adjustment it seeks to eliminate, the differences are in fact logical and necessary. Unit trains are indisputably more efficient than through trains in a number of different operational aspects that justify the different cost allocations they receive. Unit trains are typically longer and heavier than through trains, they spend much less time in terminals and intermediate yards, and they are often powered by a locomotive configuration that is better optimized for their trailing weight (as the dedicated trainsets in unit-train service provide constant train sizes that facilitate more efficient motive power assignments). A costing system should, as URCS currently does, reflect the greater efficiencies of unit trains, and accordingly assign them lower average costs. The table below compares relative operating statistics as reported in the carriers' Annual Report R-1 for unit, way, and through trains.

Table 1
Comparison of Relative Efficiencies by Train Type
2014 BNSF, CSXT, NS and UP Combined²

Train Type	Gross Tons Per Train	Cars Per Train	Locomotives per Train	Gross Tons per Locomotive	Cars Per Locomotive
Unit Train	9,031	106.4	2.93	3,085	36.4
Way Train	1,761	23.0	1.75	1,007	13.2
Through Train	5,592	59.7	2.78	2,009	21.4

As Table 1 shows, on average unit trains are more than 60% longer and heavier than through trains, but use far less than 60% more locomotives. Consequently, their locomotives move proportionally more tons and cars than locomotives used in way or through train service. As such, it is natural to observe differences between unit-train costs and through-train costs assigned by URCS.

² See Baranowski/Fisher WP "Comparison of Relative Efficiencies by Train Type.xlsx"

III. THE BOARD’S RELIANCE ON RAPB PRINCIPLES IN SUPPORT OF ITS ‘REASONABLE JUDGMENT’ STANDARD IS WRONG

The Board acknowledges in the Supplemental NPR that a number of commenters to the NPR expressed the concern that the proposals there lacked empirical support and would change long-standing cost allocation factors that were derived from industry studies and that many proposed that the Board conduct special studies to provide the empirical support necessary for the proposed changes. In addressing these legitimate concerns, the Board explains that it does not believe that improvements to its costing system should be ignored when incremental changes can be implemented to address specific problems or concerns that have been identified with a portion of that system. It continues to explain that for the types of changes it advocates, it does not need the types of empirical data suggested by commenters because the proposed changes can be properly supported by reasonable economic judgments based on sound principles of cost causation and cost allocation. Citing the RAPB’s “practicality principle” the Board opines that special studies that would reexamine all of the underlying empirical studies would primarily place a burden on both the rail industry’s and the agency’s resources.

The Board acknowledges in its 2010 Report to Congress that Congress itself, in addition to the ICC and the RAPB intended for URCS to be reviewed and updated periodically in order to ensure that it continues to produce accurate system average costs as the railroad industry evolves over time. Here, the Board’s focus on eliminating the make-whole adjustments, despite all of the effort committed to the process, does nothing to advance the intent of URCS’s stakeholders to modernize it to capture the dramatic changes that have occurred within the railroad industry. In fact, little has been done to update URCS since its adoption in 1989. In that same Report to Congress the Board identified a number of potentially meaningful modifications to URCS that, if

implemented, would update, refine and ultimately improve the cost allocation assumptions and algorithms within the URCS model. Some of the more critical improvements identified include:

- Revisit (not eliminate) the make-whole adjustments to better align with current railroad operations.
- Modify URCS to more appropriately assign relevant costs to hazardous materials shipments.
- Update and expand certain of the railroad Annual Report R-1 reporting requirements to allow for improved cost allocations within URCS.
- Examine the current URCS regressions with the possibility of recalculating using a more recent dataset or conducting a more in depth evaluation of the expense account groupings within each regression equation.

Each of the items listed above would, if properly implemented, improve the ability of URCS to accurately allocate costs to individual shipments. While each would admittedly require the collection and analysis of additional data to develop and implement, the Board included three of the four items in its “Basic Option,” the least extensive and least costly of the three scenarios that they included in the report.³ Rather than take on the challenge, the Board instead proposes modest changes to mitigate problems that it perceives with the current make-whole adjustments. In justifying its decision to not consult the industry for updated and relevant data, the Board explains that it is guided by the “practicality principle” set forth in the Final Report of the RAPB, which states that “cost and related information . . . must generate benefits that exceed the costs of providing it.” It is our view that relying on only reasonable judgment to make changes to URCS undermines the rigorous efforts of all URCS’s stakeholders during its development and adoption phases to make it the most accurate costing tool for the industry and establishes the wrong precedent for future Board actions. In addition, the benefits of the Board’s current proposals are

³ 2010 Report at 17-21.

elusive and as discussed in more detail in the sections below, introduce new problems for URCS. Specifically the Board's proposals:

1. Do not accurately redistribute costs in a manner that aligns with the current URCS allocations.
2. Arbitrarily cap URCS costs for locomotive unit miles and train miles, leaving millions of dollars in variable costs stranded and otherwise unallocated to shipments.
3. Introduce new inconsistencies in the assignment of switching costs to shipments of different sizes, due to differences in the proposed changes to switch engine minute costs and freight car costs during switching.

In addition, the Board has failed to make at least two critical corrections to the URCS allocation of switch engine minutes raised in this proceeding in 2013 that are required to align the URCS costing allocations with current railroad operating practices.

IV. EVALUATION OF EACH OF THE BOARD'S PROPOSED CHANGES

In this section we evaluate each of the Board's Supplemental NPR proposals.

1. Switching Costs Related to Switch Engine Minutes (Use CWB-Based Approach)

The Board proposes to adjust how URCS allocates switching costs to account for economies of scale in a manner that differs from its previous NPR proposal. In the Supplemental NPR, the Board acknowledges that switching costs include both a time component and an event component. Under its proposal, the system-average unit costs would incorporate both the time component of switching (carload basis) and the event component of switching (shipment basis) in a manner that would account for the existing efficiency adjustments without producing a step function, and would reflect economies of scale throughout all shipment sizes. The Board proposes to achieve this outcome using an asymptotic curve, which would be calculated using a

new concept that it labels the Carload Weighted Block (CWB) Adjustment. The Board describes that this adjustment applies a weighting to a block of cars based on a percentage of the number of cars in that block.

Although the Board intends for its new CWB adjustment to align with the current URCS efficiency adjustments used to allocate switching costs, its proposal shifts variable costs among shipment sizes for all switching types. Roughly speaking, average SEM-related variable costs for single-car shipments would increase approximately 2% overall, multi-car shipment switching costs would decrease overall by approximately 27%, and unit train switching costs would decline by approximately 4%. The table below shows the changes in overall relative efficiencies among shipment sizes, expressed as factor of system-average switch engine minutes per switch, for industry switching under the Board’s proposal.

Table 2
Impact of Board’s Proposal on Originating and Terminating SEMs⁴
(System Average = 1.00)

	Existing	Proposed	% Change
Single (1-5 Cars)	2.364	2.406	+2%
Multi (5-49 Cars)	0.500	0.367	-27%
Unit (50+ Cars)	0.250	0.241	-4%

One driver of the shift in overall switch-related costs within each shipment type is the starting point used by the Board in benchmarking the unit train-related efficiency adjustments. Specifically, review of the Board’s workpapers confirms that its calculations benchmark the unit train efficiency adjustment to the low end of the range of unit-train shipments. Conceptually within URCS, as the unit train efficiencies apply across all such shipments, it would be more consistent with the existing cost relationships to align the adjustment with the average unit train

⁴ See Baranowski/Fisher WP “EP431S4_SEMs (AAR OT Impact Analysis).xlsx”

size. The Board provides no explanation of why it chose to peg the efficiency factor only to the low end of the unit-train shipment-size range in order to allocate switching costs. While using the average would improve the accuracy of the total amount of switching costs assigned to unit train shipments, the costs assigned to single-car shipments would be reduced.⁵

In addition, the Board's asymptotic curve proposal creates a new and substantial step function between the URCS costs assigned to 1-car and 2-car shipments that could present opportunity for regulatory gaming. Specifically, under the Board's proposal for industry switching, because of changes to both the allocation of SEMs by shipment size and recalculation of the cost per SEM itself, the URCS variable costs of a 1-car shipment rise 7% compared to existing levels, and the costs for a 2-car shipment fall 42%. This produces a "step function" of 46% between 1-car and 2-car shipments – greater than the 25% difference between multiple-car and unit-train shipments that the Board finds sufficiently large to seek to eliminate.⁶ This new cost differential is ironically the result of the Board's desire to eliminate any step functions in costs, for which it proposed an asymptotic curve approach that assumes that switching costs increase by the same constant increment throughout all shipment sizes.⁷

Further, for inter-train and intra-train (I&I) switching, the Board's proposal creates a cost curve that assumes that switching costs actually decrease as shipment size increases. This illogical result stems from the Board's strict adherence to its asymptotic curve approach and the current recognition by URCS that trains operating in unit train service remain intact from

⁵ See Baranowski/Fisher WP "EP431S4_SEMs (AAR Unit Train Adjustment).xlsx"

⁶ See Baranowski/Fisher WP "EP431S4_SEMs (AAR OT Impact Analysis).xlsx"

⁷ This assumption is demonstrated by the Appendix B chart at page 35 of the Supplemental NPR, as the dotted blue line reflecting the proposed CWB approach has a constant slope throughout all shipment sizes.

origination to destination and receive no I&I switching.⁸ In trying to model this operating reality, the Board has created cost curves that upend the current URCS cost relationships by increasing I&I switching costs for 1-car shipments by about 17% and decreasing I&I switching costs for all larger non-unit shipments from 40% to 100%.⁹ This is because other than eliminating I&I switching for unit trains, URCS makes no efficiency adjustments relative to I&I switching. In other words, I&I switching costs per car for single and multiple car shipments are identical within URCS. As such, absent new empirical data, maintaining the existing cost relationships requires that the Board's proposed arbitrary redistribution of I&I related costs should be rejected.¹⁰

2. Equipment Costs for the Use of Railroad-Owned Cars During Switching

The Board also proposes to change the assignment of costs for railroad-owned equipment used during switching in a manner that differs from its previous NPR proposal. In the Supplemental NPR, the Board proposes to modify the Phase II inputs for car-days and car-miles on an individual car type basis, and only reflect the current efficiency adjustments as they would apply to the predominant shipment size for that particular car type. Specifically, the Supplemental NPR proposes the following: (1) if a majority of shipments for one car type (greater than 50%) move by unit train, then the Supplemental NPR proposes to use the efficiency adjusted inputs for car-days and car-miles even for single-car shipments by that car type; (2) if the predominant shipment size for that car type is single-car, then the Supplemental NPR proposes to use the unadjusted inputs for car-days and car-miles even for unit train shipments by

⁸ In fact, even the Board recognizes the vulnerability of its proposed approach, stating "Although this negative slope for I&I switching may not be perfectly reflective of costs for actual railroad operations . . ." (Supplemental NPR at 11)

⁹ See Baranowski/Fisher WP "EP431S4_SEMs (AAR I&I Impact Analysis).xlsx"

¹⁰ See Baranowski/Fisher WP "EP431S4_SEMs (AAR I&I Alternative).xlsx"

that car type; and (3) if there is no majority of shipments moving by a particular shipment size, the Supplemental NPR proposes to apply the efficiency adjustments depending on whether the particular adjustment reduces costs for multicar shipments or not.

Contrary to its characterization that its proposed approach incorporates the current URCS efficiency adjustments to the extent practicable, the Board's proposal effectively eliminates the relative efficiencies among various shipment sizes and allocates the same costs per carload within each car type to larger shipments as it does to smaller shipments in railroad-provided equipment. Because the Board is in most instances proposing an all-or-nothing application of the efficiency adjustments in the Phase II calculations of unit costs by car type, the proposal creates a mismatch between the Phase II inputs for the amount of time cars spend being switched and the characteristics of the switch itself which is influenced by shipment size. In other words, the URCS costing approaches proposed by the Board in the Supplemental NPR seek to preserve the existing cost relationships and retain the efficiencies of larger shipments for switch engine minute costs, but in fact they eliminate the efficiencies and spread costs evenly across different shipment sizes for equipment costs incurred during switching.

The Board could have avoided this mismatch by employing the same CWB approach for railroad owned equipment costs that it proposes to introduce for SEM costs. Should the Board opt to not undertake the generation of unique asymptotic curves for every car type for each individual carrier, there is an alternative that reflects the relative efficiencies by car type and eliminates the make whole adjustment. As described above, under the approach proposed in the Supplemental NPR, the Board is going to analyze the CWS, determine the predominant shipment size, and use that size's corresponding car-day or car-mile factor in Phase II. For example, car types that predominantly move in unit trains are going to use the adjusted factors – *e.g.*, 2 car

miles per industry switch, rather than 4 – for all shipment sizes. As this efficiency-adjusted factor would be used to assign costs to single-car shipments, the efficiency difference that is currently reflected by URCS would be ignored. The relative cost difference could be retained, however, if instead of substituting the adjusted or unadjusted input – *e.g.*, the “all or nothing” 2 miles or 4 miles – the Board were to use the average number of car days to calculate the unit cost – *e.g.*, 2.5 miles if a majority of a given car type’s carloads were unit trains or multiple-car shipments, or 3.0 if the carloads were split evenly between larger-block and single-car shipments. Then in the Phase III allocation of costs to shipments, the service units that corresponded to the appropriate shipment size could be used. That is, the unit cost that was calculated from the average number of car days or car miles would be assigned to each shipment’s specific number of car days or car miles, *e.g.*, 2 miles for unit trains or multiple-car shipments and 4 miles for single-car shipments.

This alternative would allow the URCS costs to continue to reflect the relative efficiencies of larger shipment sizes, and would do so without requiring a make-whole adjustment. It would also maintain the alignment of switched car days with the specific characteristics of single, multiple car and unit train switches. This approach would not over-ride the input for certain shipments with the factor for a different shipment size – *e.g.*, use the predominant unit-train input for single-car shipments – as the Board’s all-or-nothing proposal would. Importantly, this approach would not require the Board to undertake additional work beyond its current proposal. Under its Supplemental NPR proposal, the Board will analyze a carrier’s shipments for each car type to identify the predominant shipment size; we recommend when they do so, they weight the results, rather than simply pick the attributes for the shipment size with the largest share.

In fact, the inputs to be used in this approach can be constructed from the shipment-size distributions that the Board provided in the Appendix C table on page 43 of the Supplemental NPR. For example, for plain gondolas, the Board's proposal would use their 86% unit-train share to assume that every industry switch be assigned 2 miles per industry switch. This efficiency-adjusted factor would be applied to the 7% of the shipments that are single cars. Under our alternative, we propose that the Board calculate the unit costs in Phase II not with 2 miles, but based on the average of 2.14 car miles ($93\% \times 2 \text{ miles} + 7\% \times 4 \text{ miles}$). Then in Phase III, costs can be assigned to the single-car shipments based on 4 miles, and reflect the relatively higher costs per carload of single-car shipments. Details of these calculations are set forth in our work papers.¹¹

The Board's proposal does eliminate a flaw in the current make-whole process that attributes efficiency-related cost savings to different types of equipment. The use of equipment-specific data in the Board's proposal should be retained. However, the alternative approach that we outlined above – using the average service unit for each car type, rather than that of the predominant shipment size – would also correct the mis-assignment.

3. Station Clerical Costs (Use CWB-Based Approach)

For station clerical costs the Board proposes to continue calculating costs on a per-car basis in Phase II and, for multi-car and unit train shipments, continue applying the same efficiency adjustments that URCS applies now in Phase III. Unlike SEM costs, the efficiency adjustment for station clerical is based on a function where 75% of costs are based on the carloads and 25% of costs are based on the shipment, resulting in an asymptotic curve. However, there is a large break point between single-car and multi-car shipments because URCS applies an

¹¹ See Baranowski/Fisher WP “EP431S4_RR Owned Equipment (AAR Alternative).xlsx”

efficiency adjustment to multi-car shipments, but not to single-car shipments. To eliminate this break point, Phase III would be adjusted to allocate station clerical costs in single-car shipments to account for economies of scale by applying the concept of the CWB Adjustment developed for switching costs. To determine the appropriate percentage split between carload and block in the CWB value for single-car shipments only, the Supplemental NPR proposes to solve for the values that cause station clerical costs to be reduced at the six-car level by the same amount as is currently done by URCS. As with SEMs, this determination would be done annually, by railroad, using data in the Waybill Sample. For intermodal shipments, URCS currently applies a station clerical efficiency adjustment starting at six flatcars. For intermodal shipments with fewer than six flatcars, the Supplemental NPR proposes to apply the CWB Adjustment and solve for the smallest multi-car shipment in order to match the current efficiency adjustment at six cars.

The Board's proposal causes arbitrary shifts in variable costs among single-car shipments. Roughly speaking, station clerical costs for 1-car shipments go up by 3% while costs for 2- to 5- car shipments go down by 25% to 40%.¹² The costs for all shipments above 5-cars remain unchanged. The operational issues raised with SEMs involving whether single cars or blocks are picked up are not relevant for station clerical costs, where the focus is accounting and billing costs, for which URCS already assumes efficiencies for larger shipments.

4. Car-Mile Costs (Use Actual E/L Ratio for Unit Trains)

Based on its review of relevant data, the Board believes that URCS should apply the actual E/L Ratio as computed from the carriers' data to all shipment sizes, including unit train movements in place of URCS's current use of a 2.0 figure for unit train movements that is meant to reflect efficiencies of that service.

We do not object to this Board proposal.

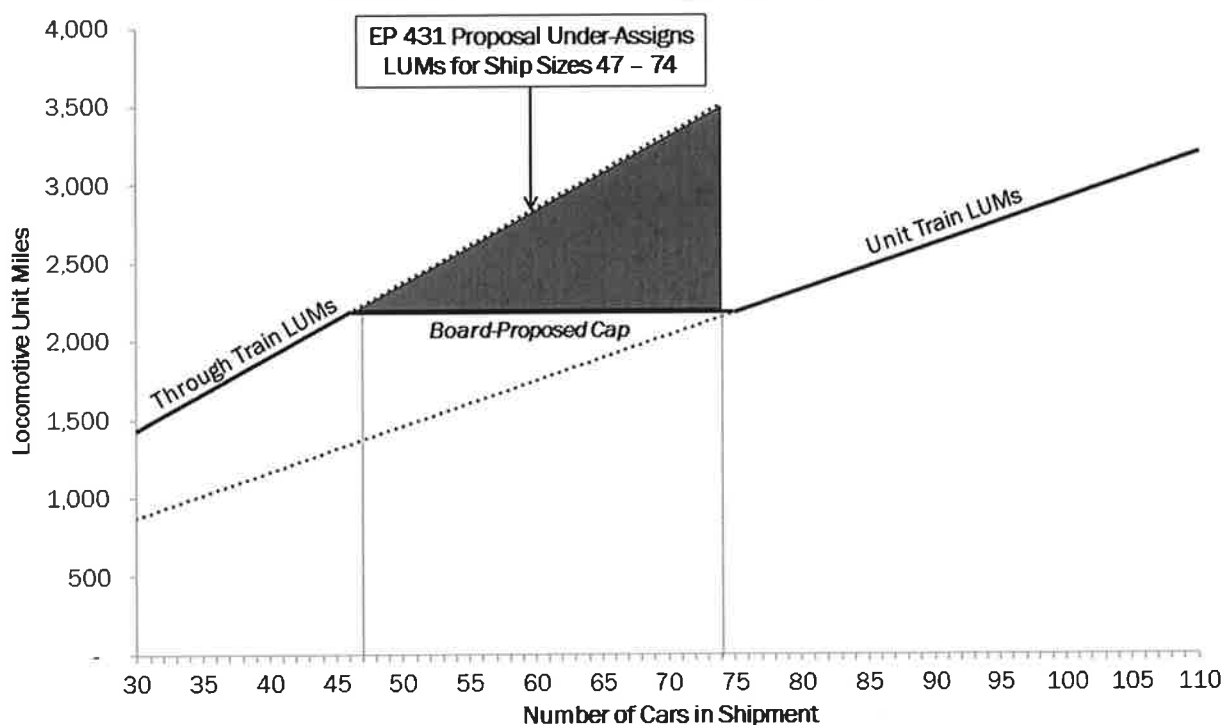
¹² See Baranowski/Fisher WP "EP431S4_StationClerical (AAR Impact Analysis).xlsx"

5. Other Related Changes - Locomotive Unit Miles (Cap at Unit Train Level)

The Board continues to believe that the difference in URCS assignment of locomotive unit miles to through trains and unit trains represents an improper step function that should be eliminated. To accomplish this, the Board proposes in Phase III to cap the LUMs allocated to multi-car shipments to be less than or equal to those allocated to a 75-car shipment (the minimum number of cars under the proposed definition of unit train). According to the Board, this adjustment allows for a continuous slope with no break points between the single- /multi-car slope and the unit train slope.

However, the step function for unit-train shipments is not problematic because it is based on the transition from using through train data to using unit train data to allocate costs. There is no justification for the Board to override differences that are data-driven. As shown in Chart 1 below, the Board's proposal would arbitrarily drop from allocation within URCS costs incurred by the carriers in providing service for multiple-car shipments between 47 and 74 cars.

Chart 1
Depiction of URCS Costs that Would Remain Unallocated to Shipments Under the Board's Locomotive Unit Mile Capping Proposal



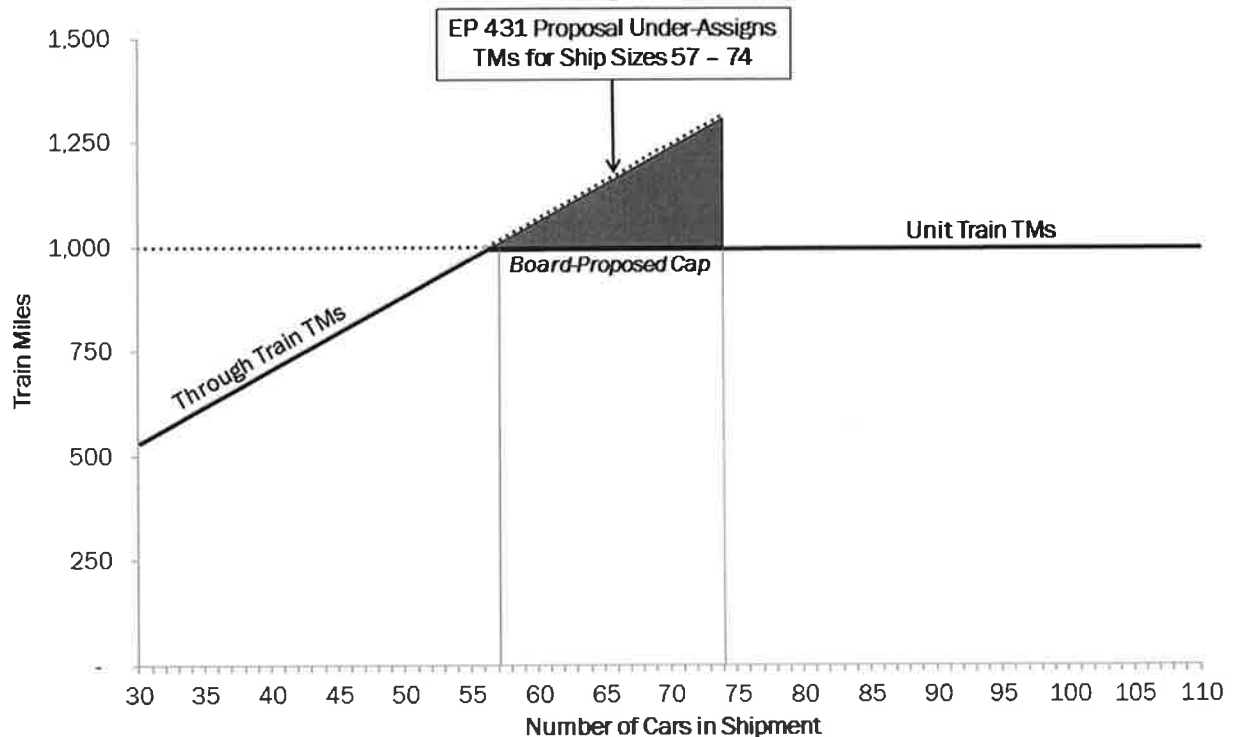
Applying a 75-unit train cap to through train shipments is arbitrary and should not be implemented.

6. Other Related Changes - Train Miles (Cap at Unit Train Level)

According to the Board, the train mile allocation currently in URCS can produce a negative or positive step function between multi-car and unit train shipments (under the current definition of unit train), such that the train miles assigned to a 49-car shipment are lower or higher than the costs assigned to a 50-car shipment. It proposes to eliminate all instances where a negative step function occurs by capping in Phase III the train miles allocated to multi-car shipments to be less than or equal to those allocated to a 75-car shipment (the minimum number of cars under our proposed definition of unit train).

The step function for unit-train shipments is not problematic because it is based on the transition from using through train data to using unit train data to allocate costs. There is no justification for the Board to override differences that are data-driven. As shown in Chart 2 below, the Board's proposal would arbitrarily drop from allocation within URCS costs incurred by the carriers in providing service for multiple-car shipments between 57 and 74 cars.

Chart 2
Depiction of URCS Costs that Would Remain Unallocated to Shipments Under the Board's Train Mile Capping Proposal



Applying a 75-unit train cap to through train shipments is arbitrary and should not be implemented.

7. Mileage Intervals for I&I Switching

The Board proposes two changes related to the intervals used for calculating and assigning costs associated with intertrain and intratrain (I&I) switching. First, the Board

continues to believe that URCS's current 200-mile interval between I&I switch events should be increased. In the Supplemental NPR, the Board refines its analysis and proposes 268 miles. This is a decrease from the 320-mile interval that the Board previously proposed in the NPR. Second, in the Supplemental NPR, the Board acknowledges an error in the URCS's model's allocation of switching costs related to the inconsistent treatment of the interval for intermodal shipments that was identified in the 2013 comments, and proposes to apply the 4,163-mile I&I switching factor previously adopted by the Board for intermodal shipments in Phase II as well as Phase III.

We do not object to these Board proposals.

8. Definition of Unit Train (Use 75+ Cars)

The Board continues to believe that URCS's current definition of a unit train at 50 or more cars should be increased. In the Supplemental NPR, the Board refines its analysis and proposes to treat as a unit train shipments of at least 75 cars. This threshold is a slight decrease from the 80-car cut-off that the Board previously proposed in the NPR.

We do not object to this Board proposal.

V. OTHER CHANGES THE BOARD NEEDS TO MAKE TO CORRECT FLAWS AND IMPROVE THE ACCURACY OF URCS COSTS

1. The Board Should Correct URCS Current Mis-Allocation of Switch Engine Minutes to Interterminal and Intraterminal Switching

The Board's URCS program assigns switching costs in Phase II to five different types of events: 1) industry switching, 2) interchange switching; 3) intertrain & intratrain (I&I) switching, 4) intraterminal switching, and 5) interterminal switching. It uses the actual number of originations, terminations, and interchanges reported by the railroads to determine the number of industry and interchange switching events. It uses the actual number of reported car-miles by

car type reported by the railroads to determine the number of I&I switching events, based on the corresponding mileage intervals for carload and intermodal traffic. While URCS uses the railroads' reported actuals for three types of switching events, it does not rely upon either a current or a verifiable set of inputs for the other two types of events, intraterminal and interterminal switching. For those two, the URCS model simply assumes that such switching be estimated in proportion with the number of industry switching events. As a result, the costs assigned to intraterminal and interterminal switching have increased over time – without any support. This leads to an over-allocation of costs to intraterminal and interterminal switching and a corresponding under-allocation of costs to other switching which should be corrected.

We explained this costing disconnect in URCS in the verified statement we submitted in this proceeding in 2013. We explained then that carriers do not report interterminal and intraterminal switching activity,¹³ and that the URCS model currently assigns a portion of total switching time - and, as a result, switching costs - to this type of switching. We also determined that only a small fraction of these costs is actually assigned to shipments in the waybill sample, based on special criteria.¹⁴ We concluded from our analysis that URCS allocated nearly 1 million hours representing more than \$422 million in variable costs to interterminal and intraterminal switching for the railroad industry in 2011 and that only \$12 million of that total is actually assigned to shipments in the carload waybill sample, leaving over \$400 million in actual switching costs unallocated to shipments. We recommended that the Board address the

¹³ Intraterminal Switching includes the switch from one industry or team track to another industry or team track, both being located on the same carrier within the same terminal. Interterminal Switching includes the switching from an industry or team track of one carrier to the point of interchange (*i.e.*, interchange track) of another carrier for delivery to a team or industry track located on the lines of other carriers within the same terminal.

¹⁴ In its Supplemental NPR, the Board confirmed the limited universe of shipments that are considered to comprise intraterminal or interterminal switching: moves of 8.5 miles or less. (Supplemental NPR at 7-8, footnote 14)

imbalance between the service units and costs allocated to interterminal and intraterminal switching within Phase II and the small portion of those costs that is actually assigned to shipments in the CWS.

In its Supplemental NPR the Board acknowledges our request to correct an under assignment of interterminal and intraterminal switching costs. It however rejected this and other requests for modifications made by parties in the 2013 comments on a number of grounds, including they would greatly expand the scope of this proceeding, they are not related to make-whole adjustments or step functions and they are not necessary to appropriately calculate costs in URCS. The Board's rejection of our recommendation to eliminate the over-assignment of switching costs within URCS to nonexistent interterminal and intraterminal switching events cannot be squared with its professed rationale, particularly in light of its proposals in the Supplemental NPR to correct other flaws in URCS that are unrelated to make-wholes or step functions.

Based on studies reaching back as far as the early 1950s, URCS Worktable A1, Part 5B includes input values for the ratio of intraterminal and interterminal switches to originating and terminating switches. Table 3 below summarizes the values used by car type for the East and West Regions in the Board's 2013 URCS.

However, Table 3 also shows that only a small fraction of the switch engine minutes, and therefore switching costs, distributed in URCS Phase II to intraterminal and interterminal switching are actually allocated to shipments in the carload waybill sample.

Table 3
Ratio of Intraterminal and Interterminal Switches to O&T Switches:
Disconnect between Assignment in URCS Phase II v. the 2013 Carload Waybill Sample¹⁵

Source	Western Region RRs		Eastern Region RRs	
	Intraterminal to O&T Ratio	Interterminal to O&T Ratio	Intraterminal to O&T Ratio	Interterminal to O&T Ratio
URCS ¹⁶	3.3-4.3%	5.6%	3.3%	4.7%
CWS ¹⁷	0.0-0.7%	<0.1%	0.0-1.9%	<0.1%

This disconnect between the Phase II input assumptions and the actual occurrences of intraterminal and interterminal switches in 2013 means that URCS Phase II is improperly allocating costs to intraterminal and interterminal switches that should be allocated to other types of switches in URCS. Table 4 below shows that this disconnect results in over \$400 million in URCS variable costs that should instead be allocated to other switching events in Phase II (originating, terminating, interchange and intertrain and intratrain switches).

Table 4
Intraterminal and Interterminal Switching
in URCS and in Carload Waybill Sample, 2013¹⁸

Region	Total SEM Allocated to Inter- & Intra- Terminal Switching in URCS Phase II (000s)	Total Inter & Intra- Terminal SEM in CWS (000s)	Percent of Inter- & Intra- Terminal SEM Assigned in CWS	Total Variable Costs Allocated to Inter- & Intra- Terminal Switching in URCS and Not Assigned in CWS (000s)
East	26,166	2,403	9.2%	\$144,523
West	27,992	565	2.0%	\$267,750
Total	54,158	2,968	5.5%	\$412,273

¹⁵ See Baranowski/Fisher WP “2013 CWS Ratio of Intraterminal and Interterminal to O&T Switches.xlsx”

¹⁶ Source: URCS Worktable A1, Parts 5A and 5B.

¹⁷ Source: the Board’s workpapers provided in this proceeding. These figures include all car types except general flat cars, for which the Carload Waybill Sample includes no intraterminal and interterminal switching costs in the Eastern region, no interterminal switching costs in the Western region, and total intraterminal costs that are 6.7% of O&T switching costs in the Western region.

¹⁸ See Baranowski/Fisher WP “2013 Intraterminal and Interterminal Switching in URCS and CWS.xlsx”

The remedy is straightforward. The Board can either eliminate entirely the Phase II allocation to intraterminal and interterminal switching, or it can simply replace the Worktable A1 Part 5A and 5B ratios by which the intraterminal and interterminal switch events are estimated with the actual calculated values from the carload waybill sample. As the Board's proposed CWB and equipment cost approaches would already require detailed analysis of the CWS, our proposed alternative would not involve significant additional effort and would correct a significant understatement of costs in the CWS. We include in our workpapers an example of the appropriate factors to replace the decades-old defaults, which we calculated from the workpapers that the Board provided in this proceeding.¹⁹

2. The Board Should Adjust Its Phase II Assignment of Switch Engine Minutes to Reflect the Larger Block Sizes of Intermodal Shipments

In our 2013 verified statement in this proceeding we also expressed concern with the URCS allocation of switch engine minutes to intermodal shipments. Specifically we explained that Board's proposal does not address how to determine the shipment size for the purpose of allocating switch costs to intermodal shipments. We explained that actual intermodal shipment size for originating and terminating intermodal trains is driven by a myriad of factors, including the average size of each intermodal train, the number of blocks on each train destined for different major metropolitan areas, and the lengths of the tracks at each carriers' intermodal facilities used to assemble and disassemble intermodal trains. Data required to develop accurately the actual number of intermodal shipment and therefore calculate the average shipment size would be available from the Board's proposed changes to carrier reporting requirements in the annual Freight Commodity Statistics and the STB Form 54. In the interim, for demonstrative purposes, we used an assumed intermodal shipment size of 10 intermodal flat

¹⁹ See Baranowski/Fisher WP "2013 CWS Ratio of Intraterminal and Interterminal to O&T Switches.xlsx"

cars in our calculations. We also noted in our reply comments that our placeholder assumption of 10 intermodal flats per intermodal shipment was validated when BNSF in its opening comments identified an average intermodal shipment size of 12 intermodal flat cars.

In its Supplemental NPR, rather than address the undisputed notion that for switching-related activities intermodal cars are connected into larger blocks of cars, the Board changes its definition of shipment to be a block of one or more cars or TCUs moving under the same waybill from origin to destination. At the same time, the Board proposes dropping the refinements to the carriers' reporting that would make an accurate determination of intermodal shipment sizes possible.

The Board's proposed revision of the definition of shipment for the proper allocation of URCS switching-related costs to include TCU – like its initial NPR proposal to ignore the time-related component of railroad switching – represents either a deliberate disregard for actual railroad operating practices when proposing modifications to URCS or, more troubling, a fundamental lack of understanding of how railroads work. Unlike carload shipments, which are switched into specific blocks with other comparable carloads as trains are built, intermodal TCUs are grouped with other comparable TCUs when they are lifted and placed on intermodal flat cars. The flat cars themselves, which are coupled into long strings limited only by the length of the track, are then pulled intact by road or switching locomotives to build the intermodal train. As such, the “switching” of the TCUs themselves are accomplished by the intermodal lift cranes, not locomotives. The Board's observation that an intermodal TCU might not fill an entire intermodal flat car misses the mark. The issue that needs to be resolved relates to the number of switch engine minutes that should be ascribed to the intermodal flat car. Once that question is accurately answered, the allocation to an individual TCU on the intermodal flat car is

straightforward. We therefore urge the Board to abandon its new proposed definition of shipment in the context of proper switch engine minute allocation to include TCUs and put back on the table a modification of the carrier reporting requirements to include intermodal flat car block sizes for switching purposes.

VI. THE SUPPLEMENTAL NPR DOES NOT ADEQUATELY CONSIDER THE IMPLEMENTATION OF CHANGES TO URCS

The AAR in its opening comments to the NPR expressed concern regarding how any of the proposed changes would be implemented. It noted that because of the Board's heavy reliance on URCS-based R/VC ratios in a variety of regulatory matters, that the Board should consider the transition to incorporate the proposed changes. Among the variety of applications for URCS, two important uses are the Board's calculation of RSAM and $R/VC_{>180}$ both of which use a four-year average. The changes to URCS Phase II proposed in the Supplemental NPR's to eliminate the make-wholes will change the allocation of URCS variable costs across shipment types and car types in the CWS. This will affect the distribution of R/VC movements falling above and below the 180% threshold and change the calculation of RSAM and $R/VC_{>180}$.

In the Supplemental NPR the Board rejects the need for a transition in multi-year applications of URCS stating "there would be a brief period where the averages included data calculated under URCS current methodology and under the proposed methodology."²⁰ In fact, the time period over which different versions of URCS could be mixed extends four years or more. Assuming the Board were able to implement the Supplemental NPR proposals in time for application to the 2017 CWS, the RSAM and R/VC_{180} four year averages would use different versions of URCS through the 2019 CWS (*i.e.*, until the fourth CWS is processed for 2020, there

²⁰ Supplemental NPR at 30.

will be a mixture of years with current URCS and with revised URCS in the RSAM and R/VC₁₈₀ calculations). Because of the regulatory lag associated with generating URCS and costing the CWS, the implications of the change will extend well beyond 2019 and will likely affect regulatory proceedings through 2022.

VERIFICATION

I declare under penalty of perjury that the foregoing is true and correct. I further certify that I am qualified and authorized to sponsor and file this testimony.

Executed on October 11, 2016


Michael R. Baranowski

VERIFICATION

I declare under penalty of perjury that the foregoing is true and correct. I further certify that I am qualified and authorized to sponsor and file this testimony.

Executed on October 11, 2016



Benton V. Fisher

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Mike Baranowski heads FTI's Network Industries Strategies practice and provides strategic, financial and economic consulting services to the telecommunications and railroad and pipeline transportation industries. He has special expertise in analyzing and developing complex costing and cash flow models, conducting detailed operations analysis, and transportation engineering. Much of his work involves providing oral and written expert testimony before courts, arbitration panels and regulatory bodies.

He is a recognized expert in railroad regulatory economics and has assisted FTI's railroad clients in a broad range of litigation and regulatory engagements involving pricing of services, contract disputes, damage calculations and analyses of the specific effects of pending or proposed changes in policy or regulation.

Some of Mr. Baranowski's representative experience includes:

- Development of strategic litigation approach for large railroad rate proceedings based on the theory of Constrained Market Pricing and the Stand-Alone cost test. Theory assumes the existence of a hypothetical, efficient competitor and involves detailed analysis of railroad operations, expenses, capital expenditures and revenues.
- Development of a suite of modeling tools to assess the regulatory risk of railroad rates for a mix of commodities based on key cost drivers and forecasts.
- Design and development of modeling tools designed to simulate the cost of competitive entry into local telecommunications markets and directing the efforts of a nationwide team of testifying experts presenting the cost model results in multiple proceedings across the country.
- Detailed analysis, critique and restatement of complex cost models developed for the railroad, telecommunications, pipeline and trucking industries.
- Designing modeling tools for use in calculating the costs of competitive entry into railroad, telecommunications and pipeline markets.
- Conducting detailed analyses of railroad operations and developing the associated capital requirements and operating expenses attributable to specific movements and the incremental capital and operating expense requirements attributable to major changes in anticipated traffic levels.

Mr. Baranowski holds a B.S. in Accounting from Fairfield University in Fairfield, Connecticut and has pursued supplemental finance studies at Kean College in Union, New Jersey.

SELECT RAILROAD TESTIMONY

Surface Transportation Board

May 1, 2006	Docket No. Ex Parte 657 (Sub-No. 1) Major Issues in Rail Rate Cases, Verified Statement Supporting Comments of BNSF Railway Company
May 31, 2006	Ex Parte 657 (Sub-No. 1) Major Issues in Rail Rate Cases; Verified Statement Supporting Reply Comments of BNSF Railway Company
June 15, 2006	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
June 15, 2006	Docket No. 41191 (Sub 1) AEP Texas North Company v. BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
June 30, 2006	Docket No. Ex Parte 657 (Sub-No. 1) Major Issues in Rail Rate Cases; Verified Statement Supporting Rebuttal Comments of BNSF Railway Company
February 4, 2008	Docket No. 42099 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSX Transportation, Inc.
February 4, 2008	Docket No. 42100 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSX Transportation, Inc.
February 4, 2008	Docket No. 42101 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSX Transportation, Inc.
May 1, 2008	Docket No. Ex Parte 679 Petition of the AAR to Institute a Rulemaking Proceeding to Adopt a Replacement Cost Methodology to Determine Railroad Revenue Adequacy, Verified Statement of Michael R. Baranowski
July 14, 2008	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Third Supplemental Reply Evidence of BNSF Railway Company
July 14, 2008	Docket No. AB-515 (Sub-No. 2) Central Oregon & Pacific Railroad, Inc. -- Abandonment and Discontinuance of Service -- in Coos, Douglas, and Lane Counties, Oregon (Coos Bay Rail Line)
August 8, 2008	Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. BNSF Railway Company, Fourth Supplemental Evidence of BNSF Railway Company
August 11, 2008	Docket No. 42104 Entergy Arkansas, Inc. and Entergy Services, Inc. v Union Pacific Railroad Company and Missouri & Northern Arkansas Railroad Company, Inc.; Finance Docket No. 32187 Missouri & Northern Arkansas Railroad Company, Inc. -- Lease, Acquisition and Operations Exemption -- Missouri Pacific Railroad Company and Burlington Northern Railroad Company, Reply Evidence and Argument of Union Pacific
September 5, 2008	Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. BNSF Railway Company, Fourth Supplemental Reply Evidence of BNSF Railway Company
September 12, 2008	Docket No. AB-515 (Sub-No. 2) Central Oregon & Pacific Railroad, Inc. -- Abandonment and Discontinuance of Service -- in Coos, Douglas, and Lane Counties, Oregon (Coos Bay Rail Line); Rebuttal to Protests
August 24, 2009	Docket No. 42114 US Magnesium, L.L.C. v. Union Pacific Railroad Company, Opening Evidence of Union Pacific Railroad Company

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October 22, 2009	Docket No. 42114 US Magnesium, L.L.C. v. Union Pacific Railroad Company, Rebuttal Evidence of Union Pacific Railroad Company
January 19, 2010	Docket No. 42110 Seminole Electric Cooperative, Inc. v. CSX Transportation, Inc., Reply Evidence of CSX Transportation, Inc.
May 7, 2010	Docket No. 42113 Arizona Electric Power Cooperative, Inc. v. BNSF Railway Company and Union Pacific Railroad Company, Joint Reply Evidence of BNSF Railway Company and Union Pacific Railroad Company
November 22, 2010	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, BNSF Comments on Remand, Joint Verified Statement of Michael R. Baranowski and Benton V. Fisher
January 6, 2011	Docket No. 42056 Texas Municipal Power Agency v. BNSF Railway Company, BNSF Reply to TMPA Petition for Enforcement of Decision, Joint Verified Statement of Michael R. Baranowski and Benton V. Fisher
October 28, 2011	Docket No. FD 35506 Western Coal Traffic League - Petition for Declaratory Order, Opening Evidence of BNSF Railway Company, Joint Verified Statement of Michael R. Baranowski and Benton V. Fisher
November 10, 2011	Docket No. 42127 Intermountain Power Agency v. Union Pacific Railroad Company, Reply Evidence of Union Pacific Railroad Company
November 28, 2011	Docket No. FD 35506 Western Coal Traffic League - Petition for Declaratory Order, Reply Evidence of BNSF Railway Company, Joint Reply Verified Statement of Michael R. Baranowski and Benton V. Fisher
May 10, 2012	Docket No. 42056 Texas Municipal Power Agency v. BNSF Railway Company, BNSF Reply to TMPA Petition to Reopen and Modify Rate Prescription, Joint Verified Statement of Michael R. Baranowski and Benton V. Fisher
November 30, 2012	Docket No. 42125 E.I. DuPont De Nemours & Company v. Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
December 7, 2012	Docket No. Ex Parte 715, Rate Regulation Reforms, Reply Comments of the Association of American Railroads, Verified Statement of Michael R. Baranowski
January 7, 2013	Docket No. 42130 SunBelt Chlor Alkali Partnership v. Norfolk Southern Railway Company, Reply Evidence of Norfolk Southern Railway Company
March 1, 2013	Ex Parte No. 711 Petition for Rulemaking to Adopt Revised Competitive Switching Rules, Opening Comments of the Association of American Railroads, Verified Statement of Michael R. Baranowski and Richard W. Brown
April 12, 2013	Docket No. 42136 Intermountain Power Agency v. Union Pacific Railroad Company, Reply Evidence of Union Pacific Railroad Company
April 30, 2013	Ex Parte No. 711 Petition for Rulemaking to Adopt Revised Competitive Switching Rules, Reply Comments of the Association of American Railroads, Verified Statement of Michael R. Baranowski and Richard W. Brown
June 20, 2013	Ex Parte No. 431 (Sub-No. 4) Review of the General Purpose Costing System, Comments of the Association of American Railroads, Joint Verified Statement of Michael R. Baranowski and Benton V. Fisher

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September 5, 2013	Ex Parte No. 431 (Sub-No. 4) Review of the General Purpose Costing System, Reply Comments of the Association of American Railroads, Joint Verified Statement of Michael R. Baranowski and Benton V. Fisher
July 21, 2014	Docket No. 42121 Total Petrochemicals & Refining USA, Inc. v. CSX Transportation, Inc., Reply Evidence of CSX Transportation, Inc.
September 5, 2014	Ex Parte No. 722 Railroad Revenue Adequacy, Opening Comments of Norfolk Southern Railway Company, Verified Statement of Michael R. Baranowski
November 4, 2014	Ex Parte No. 722 Railroad Revenue Adequacy, Reply Comments of Norfolk Southern Railway Company, Verified Statement of Michael R. Baranowski
September 4, 2015	Docket No. FD 35743 Application of the National Railroad Passenger Corporation Under 49 U.S.C. § 24308(a) - Canadian National Railway Company, Opening Evidence of Illinois Central Railroad Company and Grand Trunk Western Railroad, Joint Verified Statement of Michael Baranowski and Benton Fisher
October 7, 2015	Docket No. 42121 Total Petrochemicals & Refining USA, Inc. v. CSX Transportation, Inc., Supplemental and Compliance Evidence of CSX Transportation, Inc.
October 23, 2015	Docket No. FD 33760 (Sub-No. 46) BNSF Railway Company - Terminal Trackage Rights -- Kansas City Southern Railway Company and Union Pacific Railroad Company, BNSF Rebuttal Statement, Verified Statement of Michael R. Baranowski
November 20, 2015	Docket No. 42121 Total Petrochemicals & Refining USA, Inc. v. CSX Transportation, Inc., Reply to Supplemental and Compliance Evidence
March 7, 2016	Docket No. 42142 Consumers Energy Company v. CSX Transportation, Inc., Reply Evidence of CSX Transportation, Inc.
July 18, 2016	Docket No. FD 35842 New England Central Railroad, Inc. -- Trackage Rights Order -- Pan Am Southern LLC, Pan Am Southern Reply Evidence, Verified Statement of Michael R. Baranowski
July 26, 2016	Ex Parte No. 704 (Sub-No. 1) Review of Commodity, Boxcar, and TOFC/COFC Exemptions, Comments of the Association of American Railroads, Verified Statement of Michael R. Baranowski and Benton V. Fisher
August 26, 2016	Ex Parte No. 704 (Sub-No. 1) Review of Commodity, Boxcar, and TOFC/COFC Exemptions, Comments of the Association of American Railroads, Verified Statement of Michael R. Baranowski and Benton V. Fisher

US District Court for Northern District of Oklahoma

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February 2, 2007	Case No. 06-CV-33 TCK-SAJ, Grand River Dam Authority v. BNSF Railway Company; Reply Report of Michael R. Baranowski

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Arbitrations and Mediations

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March 28, 2005 Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Rebuttal Expert Report on behalf of BNSF Railway Company

April 12, 2005 Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Supplemental Expert Report on behalf of BNSF Railway Company

April 19, 2005 Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Supplemental Rebuttal Expert Report on behalf of BNSF Railway Company

April/May 2005 Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Hearings before Arbitration Panel

February 20, 2007 In the Matter of the Arbitration between the Detroit Edison Company, et al, and BNSF Railway Company, Expert Report of Michael R. Baranowski on behalf of BNSF Railway Company

March 19, 2007 In the Matter of the Arbitration between the Detroit Edison Company, et al, and BNSF Railway Company, Supplemental Expert Report of Michael R. Baranowski on behalf of BNSF Railway Company

February 12, 2009 In the Matter of the Arbitration between Wisconsin Public Service Corporation and Union Pacific Railroad Company, Rebuttal Expert Report of Michael R. Baranowski on behalf of Union Pacific Railroad Company

October 16, 2009 In the Matter of Arbitration Between Norfolk Southern Railway Company and Drummond Coal Sales, Inc., Expert Report of Michael R. Baranowski on behalf of Norfolk Southern Railway Company

July 25, 2011 American Arbitration Association Case No. 58 147 Y 0031809, BNSF Railway Company and Kansas City Southern Railway Company, Expert Report of Michael R. Baranowski on behalf of BNSF Railway Company

April 25, 2013 JAMS REF #1340009009, Union Pacific Railroad vs. Canadian Pacific and Dakota, Minnesota & Eastern Railroad Arbitration, Expert Report of Michael R. Baranowski on behalf of Union Pacific Railroad Company

September 6, 2013 IN JAMS ARBITRATION, Case No. 1220044715, Union Pacific Railroad Company v. BNSF Railway Company, Expert Report of Michael R. Baranowski

October 25, 2013 IN JAMS ARBITRATION, Case No. 1220044715, Union Pacific Railroad Company v. BNSF Railway Company, Expert Reply Report of Michael R. Baranowski

January 1, 2014 IN JAMS ARBITRATION, Case No. 1220044715, Union Pacific Railroad Company v. BNSF Railway Company, BNSF Post-Argument Submission, Affidavit of Michael R. Baranowski

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Benton V. Fisher is a Senior Managing Director of FTI's Economic Consulting group, located in Washington, D.C. Mr. Fisher has more than 20 years of experience in providing financial, economic and analytical consulting services to corporate clients dealing with transportation, telecommunications, and postal subjects.

North America's largest railroads have retained FTI both to assist them in making strategic and tactical decisions and to provide expert testimony in litigation. FTI's ability to present a thorough understanding of myriad competitive and regulatory factors has given its clients the tools to implement and advance their business. Mr. Fisher has worked extensively to develop these clients' applications for mergers and acquisitions and expert testimony justifying the reasonableness of their rates before the Surface Transportation Board. In addition to analyzing extensive financial and operating data, Mr. Fisher has worked closely with people within many departments at the railroad as well as outside counsel to ensure that the railroads' presentations are accurate and defensible. Additionally, Mr. Fisher reviews the expert testimony of the railroads' opponents in these proceedings, and advises counsel on the course of action to respond.

AT&T and MCI retained FTI to advance its efforts to implement the Telecommunications Act of 1996 in local exchange markets. Mr. Fisher was primarily responsible for reviewing the incumbent local exchange carriers' (ILEC) cost studies, which significantly impacted the ability of FTI's clients to access local markets. Mr. Fisher analyzed the sensitivity of multiple economic components and incorporated this information into various models being relied upon by the parties and regulators to determine the pricing of services. Mr. Fisher was also responsible for preparing testimony that critiqued alternative presentations.

Mr. Fisher assisted in reviewing the U.S. Postal Service's evidence and preparing expert testimony on behalf of interveners in Postal Rate and Fee Changes cases. He has also been retained by a large international consulting firm to provide statistical and econometric support in their preparation of a long-range implementation plan for improving telecommunications infrastructure in a European country.

Mr. Fisher has sponsored expert testimony in rate reasonableness proceedings before the Surface Transportation Board and in contract disputes in Federal Court and arbitration proceedings.

Mr. Fisher holds a B.S. in Engineering and Management Systems from Princeton University.

TESTIMONY

Surface Transportation Board

January 15, 1999	Docket No. 42022 FMC Corporation and FMC Wyoming Corporation v. Union Pacific Railroad Company, Opening Verified Statement of Christopher D. Kent and Benton V. Fisher
March 31, 1999	Docket No. 42022 FMC Corporation and FMC Wyoming Corporation v. Union Pacific Railroad Company, Reply Verified Statement of Christopher D. Kent and Benton V. Fisher
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June 15, 2000	Docket No. 42051 Wisconsin Power and Light Company v. Union Pacific Railroad Company, Opening Verified Statement of Christopher D. Kent and Benton V. Fisher
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June 20, 2013	Ex Parte 431 (Sub-No. 4) Review of the General Purpose Costing System, Comments of the Association of American Railroads, Joint Verified Statement of Michael R. Baranowski and Benton V. Fisher
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July 21, 2014	Docket No. 42121 Total Petrochemicals & Refining USA, Inc. v. CSX Transportation, Inc., Reply Evidence of CSX Transportation, Inc.
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September 4, 2015	Docket No. FD 35743 Application of the National Railroad Passenger Corporation Under 49 U.S.C. § 24308(a) - Canadian National Railway Company, Opening Evidence of Illinois Central Railroad Company and Grand Trunk Western Railroad, Joint Verified Statement of Michael Baranowski and Benton Fisher
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November 20, 2015	Docket No. NOR 42121 Total Petrochemicals & Refining USA, Inc. v. CSX Transportation, Inc., CSX Transportation, Inc.'s Reply to Supplemental and Compliance Evidence
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July 26, 2016	Ex Parte No. 704 (Sub-No. 1) Review of Commodity, Boxcar, and TOFC/COFC Exemptions, Comments of the Association of American Railroads, Verified Statement of Michael R. Baranowski and Benton V. Fisher
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Fisher



Surface Transportation Board Report to Congress Regarding the Uniform Rail Costing System

**Submitted Pursuant to Transportation and Housing and
Urban Development, and Related Agencies Appropriations
Bill, S. Rep. No. 111-69 (2009)**

**By the Board,
Chairman Daniel R. Elliott, III
Vice Chairman Francis P. Mulvey
Commissioner Charles D. Nottingham**

May 27, 2010

EXECUTIVE SUMMARY

In August 2009, the Senate Committee on Appropriations directed the Surface Transportation Board (Board or STB) to submit a report providing basic, moderate and comprehensive options for updating the Board's general purpose costing methodology, the Uniform Rail Costing System (URCS). The Committee's request dovetailed with an initiative the Board began in FY2009 to review URCS, its history and purposes, and its use in performing the Board's statutory functions. The Board evaluated URCS' current functionality and studied criticisms of URCS made by stakeholder groups (including railroads and rail shippers) as well as by transportation economists and other analysts. This report discusses the Board's review and, pursuant to the Committee's request, describes a range of options the Board could consider to update URCS.

The Board uses URCS to calculate, for each large railroad, a system-wide estimate of the proportion of the railroad's costs of providing service that are variable with changes in traffic volume (as opposed to those costs that remained fixed regardless of traffic volume). URCS develops variable costs estimates by relying principally upon a series of statistical estimation tools – regression equations – that were developed by the agency in the 1980s. The resulting URCS variable costs are used in a wide variety of Board proceedings, including those determining whether a railroad's rates are unreasonably high.

There are several compelling reasons for updating URCS. *First*, there has been no significant review of URCS since it was adopted by the Board's predecessor, the Interstate Commerce Commission (ICC), in 1989. URCS should be updated periodically to ensure that it remains reliable.

Second, the Board has increased its reliance on URCS. In the past 5 years, the Board has adopted a number of changes to its rate case methodologies that give URCS a more prominent role in determining whether a rate is reasonable and what relief a rail shipper should receive. The increased reliance on URCS costs should be accompanied by increased vigilance with regard to continued accuracy.

Third, URCS should be more user-friendly for the stakeholders that rely upon it to assess whether to initiate rate reasonableness litigation before the Board. The Board believes that URCS programming can be made simpler and more transparent.

The Board believes that it is time to consider moderate updates to URCS to ensure that the model continues to produce variable costs that are as accurate and reflective of the modern rail industry as practicable. As detailed in Part III, these updates would include (1) updating the legacy computer programs that support URCS and developing a more user-friendly URCS program, (2) revisiting what is known as the "make-whole" adjustment to URCS (which incorporates certain efficiencies obtained when moving goods in higher-volume shipments), (3) examining how URCS allocates the costs associated with the transportation of hazardous materials, (4) changing the annual railroad reporting requirements, (5) considering updates to the historic dataset over which URCS costs are estimated, and (6) reconsidering how URCS treats railroads that consolidate with other railroads during the period over which costs are observed. The Board anticipates these changes to URCS would cost the agency approximately \$625,000 beyond normal operating expenditures and would take approximately 2 years to complete. Many of these suggested changes to URCS would be subject to rulemaking procedures.

At this time, however, the Board is not requesting that Congress appropriate the significant additional funding on top of the \$625,000 needed for the moderate update of URCS, that would allow it to do the most comprehensive review of URCS. An exhaustive review would consider major adjustments to the underlying statistical estimation regressions and updates to the decades-old operational “special studies” that are used in URCS. Although the Board believes that an exhaustive review of all of URCS’ components may ultimately become necessary if URCS is to remain the Board’s costing system, before requesting funds to embark upon that type of review, the Board would like first to explore whether there are cost-effective alternative costing models (described in Part IV of this report) that would better satisfy the Board’s regulatory purposes. These models would use railroad shipment-specific pricing data, either in whole or in part, to infer the costs associated with particular railroad operations and movement types.

The agency has used URCS as its regulatory costing tool for more than 20 years. Although it may have shortcomings, URCS has produced costs sufficient for the Board to make its regulatory determinations. Thus, the Board’s goal in a review of its costing methodology now would be to consider those cost-effective modifications to the model that would make it *more* reliable and *more* reflective of today’s railroad industry.

The Board appreciates the Committee’s willingness to consider additional funding for the Board’s cost modeling. We recognize that this is a challenging economic period and that there are many important federal programs that require significant expenditures. We look forward to working with the Congress to help analyze the Board’s resource requirements for this important project and to ensure that any updates to the Board’s cost modeling are cost-effective and efficient.

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PART I: OVERVIEW OF THE UNIFORM RAIL COSTING SYSTEM

This Report responds to the Senate Committee on Appropriations' request in the Transportation and Housing and Urban Development, and Related Agencies Appropriations Bill, S. Rep. 111-69, at 108-09 (2009), that the Board study its options for updating the general purpose costing methodology known as URCS.¹ The Board commenced an URCS scoping project, examining URCS' history and purposes, its current functionality, and the criticisms of it made by stakeholder groups and other interested parties.

URCS was adopted in 1989 and is the tool the Board uses to estimate the variable costs of individual railroad movements and activities. Because many of the Board's functions – most significantly the determination of whether a rail carrier's rate falls under the Board's jurisdiction and is reasonable – involve the use of URCS variable cost data, URCS plays an important role in the agency's processes and decision-making.

Estimating railroad costs for particular movements with any degree of precision is an inherently difficult task. A railroad uses its physical assets (e.g., rail lines, locomotives, rail cars, yard equipment) to transport hundreds of different commodities between many different locations. Thus, there are many common costs (akin to overhead) that the railroad will seek to recover from all of its customers. The role of URCS is to estimate that portion of the variable costs of providing rail service that can be attributed to any given rail movement. URCS does this by using statistical techniques to estimate a carrier's variable unit cost in a set of defined expense categories on a system-average basis, resulting in one set of average URCS unit costs that can be used anywhere on that carrier's system.

The challenge in any regulatory costing methodology is that there is no accounting process that can precisely attribute costs to particular movements. By necessity, the methodology must incorporate assumptions and generalizations about railroad operations, some of which may not reflect individual situations. Also, the cost structure and operating practices of the railroad industry change over time. Costing assumptions based on past operations or best estimates about the norm for various types of rail operations might become less accurate over time.

Pursuant to both its statutory duty to periodically assess its cost accounting principles and this Committee's request, the Board is considering options to improve the functionality and accuracy of URCS. Though imperfect, URCS has served as the agency's costing tool for more than two decades and has produced costs sufficiently reliable for the Board to make regulatory determinations. Thus, what the Board would seek in any review of URCS are modifications that would make the costing model *more* reliable and *more* reflective of today's railroad industry.

¹ The House of Representatives also referred to a multi-year review of URCS in its appropriations report. See Departments of Transportation, and Housing and Urban Development, and Related Agencies Appropriations Bill, H. Rep. No. 111-218, at 138 (2009).

A. The Development of URCS

URCS was formally adopted by the Board's predecessor, the ICC, as the agency's general purpose costing system in 1989 and was implemented several years later.² However, given that costs have long played a role in the agency's processes, URCS necessarily evolved from earlier costing methodologies.

From 1939 until the adoption of URCS, the ICC used a cost accounting system known as Rail Form A.³ Like URCS, Rail Form A was also used to estimate the variable costs of performing various rail services using statistical techniques and annual expense and operating data reported by the railroads to the ICC. Because the ICC developed Rail Form A before the advent of computers, the statistical techniques and calculations were necessarily relatively simple.

In 1976, in the Railroad Revitalization and Regulatory Reform Act (4R Act), Congress directed the ICC to develop a more accurate costing system.⁴ To emphasize the importance of improving the ICC's cost accounting, four years later in the Staggers Rail Act of 1980, Congress created the Railroad Accounting Principles Board (RAPB) to provide guidance to the ICC. The RAPB's purpose was to evaluate "principles governing the determination of economically accurate railroad costs directly and indirectly associated with particular movements of goods, including the variable costs"⁵ The RAPB was charged with providing a report to Congress within two years containing recommendations for an appropriate ICC costing methodology.⁶ Congress's decision to create and fund the RAPB gave the ICC access to a panel of independent costing experts to make recommendations and to study the agency's proposals.⁷ Over the course of the development of URCS, the RAPB issued a series of reports culminating in a Final Report in September 1987.

With guidance from the RAPB, the first major task the ICC undertook in refining its costing methodology was to revise the accounting system by which railroad cost data were collected, the Uniform System of Accounts (USOA). The USOA, first adopted in 1907, and now promulgated at 49 C.F.R. § 1200, specifies the accounting codes and categories that railroads are required to use for regulatory purposes⁸ and explains the accounting requirements for certain

² Adoption of the Unif. R.R. Costing Sys. As a Gen. Purpose Costing Sys. for All Regulatory Costing Purposes, 5 I.C.C.2d 894 (1989) (Adoption of URCS).

³ Given its subject matter, this report necessarily uses a number of technical terms. The Appendix to this report is a Glossary of terms to aid the Committee and other interested persons.

⁴ Pub. L. No. 94-210, Sec. 307, 90 Stat. 127 (1976).

⁵ Pub. L. No. 96-448, Sec. 302, 94 Stat. 1985 (1980).

⁶ The RAPB consisted of the U.S. Comptroller General and six appointees with accounting, railroad, shipper, economics and regulatory backgrounds.

⁷ The RAPB had an annual budget of \$1 million for each of 3 years (in then-current dollars).

⁸ Railroads may use a different system of accounts for internal business accounting purposes.

types of transactions. Examples of USOA categories include track maintenance costs, capitalization rules, and liability estimates. The changes to the USOA made in response to the 4R Act included reporting of expense data by car type and the separation of each account into four components: salaries and wages, materials and supplies, purchased services, and other expenses.

Rail Form A was not compatible with the refined USOA, necessitating accounting conversions. More importantly, the agency concluded that Rail Form A variable unit costs had become less reliable over time. The Rail Form A variability factors, used to determine the proportion of total costs that are variable, were calculated by regression analysis that used railroad operating practices data from 1966-1970 and then applied them to current year total cost data.⁹ The ICC determined that both the underlying data and the regressions themselves were no longer reflective of the operation of the current rail industry.¹⁰

Between 1980 and 1989, the ICC worked with the RAPB to design a new costing system that would be compatible with the refined USOA. The agency retained an economist, Dr. M. Daniel Westbrook, to evaluate, test, and implement the RAPB's recommendations regarding the design of a new uniform railroad costing regression study. Dr. Westbrook's work established the assumptions underlying the regression model used in URCS today and the econometric methods required to analyze the data.¹¹ The regression model determined the statistical relationship between dependent variables (expense account groups) and the independent variables (capacity and output) in order to separate total expenses into their fixed and variable components. The ICC, using Dr. Westbrook's work and in consultation with the RAPB, reached a number of fundamental conclusions regarding URCS:

- The model should be **linear**: A linear model estimates – for a given change in the independent variable – what proportion of that change is reflected in a change in the dependent variable. Here, the railroad's cost is the dependent variable, and the railroad's output and capacity are the independent variables. As the estimates produced by the linear model are constant, we can assume the relationships between the independent and dependent variables do not change at different levels of output.
- URCS should utilize a **panel dataset**. A panel dataset is one in which the data are available in both cross-sectional and time-series formats; i.e., data are available for

⁹ Regression analysis is a statistical estimation process used to find relationships between a dependent variable and one or more independent or explanatory variables. Regression analysis is used in the Board's URCS costing system to measure the relationship between actual railroad expenses (the dependent variable) to capacity and output factors (the independent variables). The portions of total expenses are divided into "fixed" and "variable" expenses. The levels of variable expenses are used in the development of Revenue to Variable Cost (R/VC) ratios.

¹⁰ Adoption of URCS, 5 I.C.C.2d at 895-96.

¹¹ Dr. Westbrook is an Assistant Professor of Economics at Georgetown University. See Research Report on URCS Regression Equations (Oct. 17, 1988) (Westbrook Report).

individual Class I railroads¹² over a series of years. This differs from a cross-sectional dataset that would depict data for all railroads for only one year, or a time-series dataset that would depict data for a single railroad over a number of years.

- Railroads that merged during the panel dataset period should be treated as a **single merged entity** for the entire period. For example, the Union Pacific Railroad – which, at the time, was the result of mergers between the Union Pacific, the Western Pacific Railroad, and the Missouri Pacific Railroad – appears as a single railroad in every year, even though its carriers were separate entities in the earlier years of the panel dataset period.
- URCS should use 15 **expense account groups** from the **R-1 data** submitted to the Board by Class I rail carriers each year (instead of aggregating those expense account groups into a smaller or greater number of groups).¹³
- URCS should rely in part on **engineering relationships** based on numerous special studies completed by the ICC. These studies, some of which date to the 1930s, measured the time and effort involved in performing various railroad activities, and are the basis of the URCS “special study” factors. For example, the average distances traveled in various switching movements used in URCS were estimated by ICC engineers based on detailed maps for 49 separate railroads in 15 large cities (excluding New York and Chicago) over 60 years ago. Likewise, a figure of 6 MPH has been used to estimate the miles generated by train switching has been used since at least 1963.
- URCS should account for the added efficiencies of unit train, trainload and multi-car movements, over those of single car movements, and use a **“make-whole” adjustment** to redistribute the efficiency savings that a railroad obtains in higher-volume shipments across all of that carrier’s lower-volume shipments. The make-whole adjustment maintains the same total sum of variable costs across all of the carrier’s shipments, while recognizing the efficiency in the carrier’s higher-volume movements.

With the above-described methodology, for each Class I carrier, URCS produces the portion of each category of R-1 costs that represents that carrier’s average system-wide variable unit cost for that category in that year. It is important to note that URCS was not designed to reflect the actual costs of providing any particular service, but rather to develop a cost estimate that could be applied to a service that occurs anywhere on that carrier’s system. Accordingly, the

¹² Railroads are classified by the Board according to annual operating revenue: Currently, Class I railroads are those with \$250 million or more in revenues, Class II railroads are those with less than \$250 million but more than \$20 million in revenues, and Class III railroads are those with \$20 million or less in revenues as measured in 1991 dollars. 49 C.F.R. § 1201, General Instruction 1-1. The current Class I railroads are Union Pacific Railroad Company, BNSF Railway Company, CSX Transportation, Inc., Norfolk Southern Railway Company, Canadian Pacific Railway (Soo Line Railroad Company), Canadian National Railway Company (Grand Trunk Corporation), and Kansas City Southern Railroad Company.

¹³ Class I railroads are required to file annual reports with the STB described as Forms R-1. These reports summarize the operating expenses and statistics for the year.

URCS system-wide average could be higher or lower than the actual cost of any particular movement.

The agency's decision in Adoption of URCS explained that the **statistical techniques** derived from the Westbrook regressions linked approximately 78% of the total expenses reported across 15 different expense account groupings with various output and capacity variables. The resulting "parameter estimates" from the regressions are then used to estimate the percent of a particular cost grouping that is considered variable, which is called the **variability factor**. For example, the fuel regression parameter estimates are used to determine that 96% of the running fuel expenses are variable with locomotive train miles, and so URCS assigns a 96% variability factor to running fuel expenses.

The remaining 22% of expenses are assigned **default variability factors** that are based primarily on prior judgments by the ICC regarding the appropriate variability. This category includes return on road property investment (estimated to be 50% variable) and capital expenditures (also 50% variable).

When it adopted URCS, the ICC concluded that the relative sophistication of URCS' statistical techniques was a significant improvement over the prior Rail Form A regulatory costing system. Indeed, the URCS regressions were generally accepted in the industry and conceptually easy to understand from an econometric perspective.

Despite the improvement of URCS over Rail Form A, however, the ICC recognized that it would need to review URCS regularly, with the first review scheduled just two years after URCS was originally adopted. This review was intended to include a reassessment of the fundamentals of URCS, such as whether a linear model was appropriate, the use of default variability factors, and to determine whether or not there was a superior regression methodology to that used by Dr. Westbrook. However, as discussed in Part II, due to budget and staffing limitations, only one limited review of URCS has ever occurred, and it did not address questions about URCS' underlying fundamentals.

B. URCS Today

1. Processes

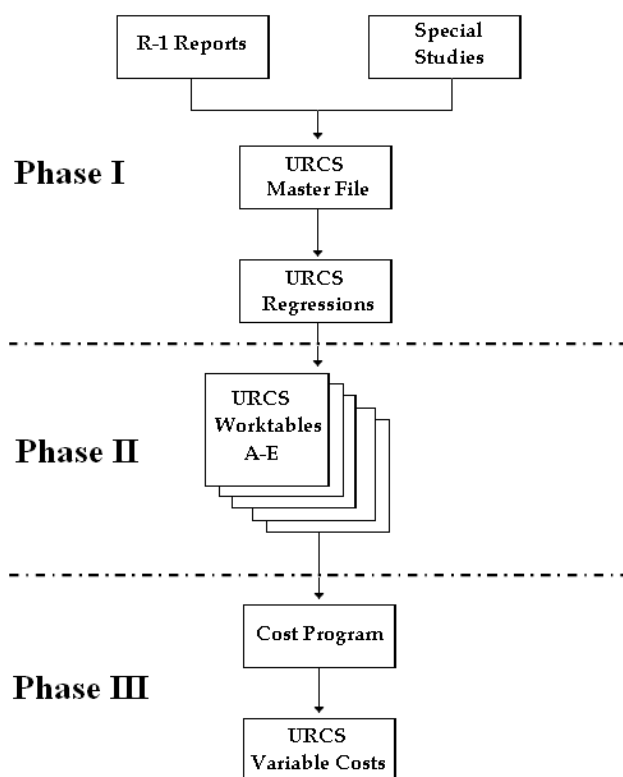
The URCS computer programs and manual procedures are organized into three distinct phases that transform aggregate railroad expense and activity data into estimates of the cost of providing specific services.

In **Phase I**, the STB first compiles the raw data provided by the carriers and data from special studies (the engineering relationships described on p. 4) into a useable format. In the R-1 reports, the carriers allocate their total expenses into several thousand distinct expense accounts and provide details on several hundred different operating activities. These data (and the processes that carriers use to generate them) are then audited by Board staff. After the accuracy of the reports is validated, the Board creates an electronic database known as the URCS Master File (UMF), which contains data for the most recent five-year period. The Board then uses regression analyses to develop equations linking specific expense accounts groupings with particular measures of railroad activities, thereby determining the proportion of specific account groupings that vary with changes in the amount of specific activities.

In **Phase II**, a set of computer programs transforms URCS Master File data and statistical outputs from Phase I into railroad unit costs. The computer programs generate a series of “worktables” that reflect specific tasks or calculations: Worktable A contains input data; Worktable B records various allocations, capital costs, and reconciles the R-1 schedules; in Worktable C, the URCS variability factors are calculated; in Worktable D, the unit costs are calculated; and Worktable E summarizes unit costs and operating statistics. The resulting unit costs provide the factors used to derive the system-average costs associated with specific rail activities.

In **Phase III**, the variable costs associated with particular rail movements are generated. A computer program permits a user to specify the particulars of a given shipment, such as the commodity being transported, the number and type of cars in a movement, the carrier (or carriers) handling the shipment, and the movement length. The program estimates the number of locomotive unit miles, the number of switch engine minutes, etc., that a particular movement requires, and it multiplies these quantities by the unit costs developed in Phase II, to calculate the cost of the movement.

Figure 1: URCS Phases



2. How the Board Uses URCS

URCS is used in a wide variety of Board proceedings. The most prominent use of URCS is in cases where a shipper has challenged the common carrier rate charged by a railroad as

unreasonably high.¹⁴ The Interstate Commerce Act (ICA) provides that the Board has jurisdiction to entertain rate challenges only if the rail carrier has “market dominance” – i.e., where there is a lack of effective competition from other rail carriers or other modes of transportation – over the transportation at issue.¹⁵ The statute directs the Board to conclude that a carrier lacks market dominance (and therefore that the Board lacks jurisdiction) if the rail carrier proves that the revenue it derives from the challenged rate is less than 180% of its variable cost of providing the transportation (referred to as the revenue/variable cost ratio or R/VC).¹⁶ The Board uses URCS to determine what the variable costs of a movement are in order to make this threshold determination.¹⁷

The Board also uses URCS at later stages of its railroad rate proceedings to determine whether the challenged rate is reasonable and, if necessary, to prescribe the maximum rate that can be charged. In rulemakings completed in 2006 and 2007, the Board increased its reliance on URCS across the spectrum of rate cases it adjudicates.

In the largest rate cases, which use the Board’s Stand-Alone Cost (SAC) methodology, URCS is used to allocate revenues and set reparations, if needed. The Board adopted its Average Total Cost (ATC) methodology that uses URCS variable costs to allocate revenues from cross over traffic.¹⁸ The Board also uses URCS variable costs in its Maximum Markup Methodology (MMM) to determine what reparations are due to the complainant when a rate is found to be unreasonable.¹⁹

In medium-sized rate disputes, the Simplified SAC methodology uses URCS in the ATC and MMM methodologies as described above.²⁰ In addition, Simplified SAC uses URCS to develop the total operating expenses for the SARR.²¹

¹⁴ Only common carrier rates (often referred to as tariff rates) may be challenged at the Board under 49 U.S.C. § 10702. The Board does not have jurisdiction to adjudicate the reasonableness of a railroad rate that is the subject of a contract between the rail carrier and a purchaser of rail services. 49 U.S.C. § 10709.

¹⁵ 49 U.S.C. § 10707. For example, if the shipper is transporting a commodity from Point A to Point B, a rail carrier has market dominance if there are no other methods of transporting that commodity, including trucks, barges, and other railroads, that compete effectively for that movement.

¹⁶ 49 U.S.C. § 10707(d)(1)(A).

¹⁷ 49 U.S.C. § 10707(d)(1)(B).

¹⁸ Major Issues in Rail Rate Cases, EP 657 (Sub-No. 1), slip op. at 24-39 (STB served Oct. 30, 2006) (defining “cross-over traffic” at 24), aff’d, BNSF Ry. v. STB, 526 F.3d 770 (D.C. Cir. 2008).

¹⁹ Id. at 9-23.

²⁰ Simplified Standards for Rail Rate Cases, EP 646 (Sub-No. 1), slip op. at 15-16 (STB served Sept. 5, 2007), aff’d CSX Transp., Inc. v. STB, 568 F.3d 236 (D.C. Cir. 2009), vacated in part on other grounds, CSX Transp., Inc. v. STB, 584 F.3d 1076 (D.C. Cir. 2009).

²¹ Id. at 16.

Finally, in the smallest rate disputes, the Three Benchmark (3B) methodology compares the R/VC ratio of the challenged rate against the R/VC ratios for other comparable traffic on that railroad to determine whether or not the challenged rate is reasonable.²²

URCS is also used when a carrier seeks Board authorization to exit a market (i.e., “abandon” or “discontinue” service on a rail line). In such proceedings, the Board considers the “avoidable cost” of the line sought to be abandoned. Avoidable costs are the expenses that the rail carrier would not incur if it stopped providing transportation over the line.²³ These avoidable costs are compared against actual and potential revenues to determine whether maintaining service over a line is economically feasible. The Board uses URCS to calculate the line’s avoidable cost.

The Board also uses URCS in proceedings where it must determine the compensation due to an incumbent railroad when the Board directs that another railroad may operate on the incumbent’s lines or whenever there is a regulatory need to value a rail line, such as for an offer of financial assistance for a rail line proposed to be abandoned.

3. Prior Attempts to Update URCS

It was always the intent of Congress, the ICC, and the RAPB that URCS be reviewed and updated periodically in order to ensure that it continues to produce accurate system-average costs even as the rail industry evolves over time. The RAPB’s Final Report to the ICC recommended that the “[g]eneral-purpose costing systems used by railroads should be reviewed not less than every three years for potential updating through a formal process permitting all interested parties to participate.”²⁴ And in its decision adopting URCS, the ICC called for the first review to occur within two years.²⁵ In the ICC Termination Act of 1995 (ICCTA), Congress required that the Board “periodically review its cost accounting rules and . . . make such changes in those rules as are required to achieve the regulatory purposes of [the rail portions of the ICA].”²⁶

Unfortunately, exhaustive review of URCS within the resource constraints of both the ICC and now the STB has proven elusive. Although the agency has attempted to update URCS several times, no exhaustive review of the methodology underlying URCS has yet occurred. The Board attributes this primarily to financial and staffing constraints.

a. Review in 1990s

The ICC initiated a proceeding to review URCS within two years of its adoption. The agency solicited comments on: (1) the aggregation of expense categories; (2) the treatment of data for railroads that merged during the observation period; (3) economic and statistical issues,

²² Id. at 16-22.

²³ 49 U.S.C. § 10904.

²⁴ RAPB Final Report, Executive Summary at iii.

²⁵ Adoption of URCS, 5 I.C.C.2d at 900, n.16. Dr. Westbrook also believed that work on URCS would continue after its adoption, including statistical adjustments and future exploration of relaxing the linearity of URCS. See Westbrook Report at 54.

²⁶ 49 U.S.C. § 11161.

including the regression analysis used to develop variability factors; (4) whether further engineering studies and other non-regression data should be performed; (5) the proper time horizon for determining the extent to which capacity-related costs are fixed rather than variable; and (6) any other relevant issues suggested by commenters.²⁷

After receiving comments, the ICC declined to make fundamental changes to the underlying statistical methodology. The ICC explained that its evaluation of the regression analysis, and the comments regarding it, had required more time than anticipated in this “technically difficult process.”²⁸ Declining to rush its completion, the ICC instead decided to limit its review to proposed modifications to the statistical procedures that underlie the URCS variability study *database*. These included several of the issues listed above (e.g., account groups and merged railroads), as well as several new issues, such as: (1) the inclusion of Conrail data;²⁹ (2) evaluation of outliers (i.e., those Class I rail carriers whose expense data fell outside of the range of normal rail operations); (3) use of a root mean squared error of forecast;³⁰ (4) use of a weighted average default variability factor;³¹ (5) discontinuance of “plan 40” box car reporting;³² (6) a unit cost updating procedure; (7) an updated Train Switching Conversion factor; (8) allocation of switching and terminal data to individual carriers; and (9) revisions to the treatment of trailer-on-flatcar and container-on-flatcar (TOFC/COFC) in URCS Phase III.³³

In 1997, the Board concluded the review of URCS begun seven years earlier by the ICC with a decision recognizing that the project “ha[d] not been a simple task.”³⁴ Perhaps most significantly, although it recognized that the engineering studies underlying URCS were conducted many years ago, the Board determined that it could not undertake any updates to those

²⁷ Review of the Gen. Purpose Costing Sys., EP 431 (Sub-No. 2) (ICC served Jan. 11, 1990 & Sept. 25, 1990).

²⁸ Review of the Gen. Purpose Costing Sys., EP 431 (Sub-No. 2), slip op. at 1 (ICC served Apr. 20, 1995).

²⁹ The Consolidated Rail Corporation, referred to as Conrail, was created by Congress in the Regional Reorganization Act of 1973 to operate the lines of several bankrupt railroads in the Northeast. Most of its assets were divided between NS and CSXT. CSX Corp.—Control & Operating Leases/Agreements—Conrail, Inc., 3 S.T.B. 196 (1998). The remaining Conrail assets are now jointly controlled by NS and CSXT.

³⁰ The root mean squared error of forecast is a metric that expresses how well the regression fits the data (with a lower error of forecast meaning a better the fit).

³¹ A single weighted average default variability factor would be an assumed value for those expense account groupings that are not regressed (e.g., return on road property investment). So rather than using multiple variability factors for these groupings, as URCS currently does, there would be a single all-inclusive variability factor used for all.

³² The 40 foot box car is a discontinued car-type.

³³ TOFC/COFC traffic moves in containers that are especially designed to be easily transferred between railroads, trucks, and ocean vessels.

³⁴ Review of the Gen. Purpose Costing Sys., 2 S.T.B. 659, 661 n.7 (1997).

studies at that time. The Board cited the expense and time-consuming nature of nationwide studies of railroad operations and the agency's "limited budget and staff resources."³⁵ It also noted that the ICC had proposed a new engineering study in the 1980s that would have examined railcar switching operations, but that the cost of that study (estimated then at \$1 million) proved prohibitive.

The Board's 1997 decisions made several, more modest, updates to URCS. First, the Board's October 1997 decision modified the costing procedures for TOFC/COFC traffic, recognizing that the movement of containerized freight had undergone a revolution since the late 1960s when the intermodal switching study underlying URCS was done. The Board also stopped treating TOFC/COFC traffic as a single-car movement and began applying to TOFC/COFC certain of the volume adjustments that it applied to trainload traffic.³⁶ These volume adjustments reduce estimated costs to account for the fact that unit-train and TOFC/COFC movements are more efficient and thus have a lower per car (unit) cost than other traffic.³⁷ The Board's December 1997 decision also lowered the "spotted-to-pulled"³⁸ ratio for TOFC/COFC cars to account for the fact that intermodal cars spend more time loaded (in revenue mode) than they do empty compared to cars carrying other types of traffic. It also updated the Train Switching Conversion Factor, modified the costing of RoadRailer operations, and made changes to the methodology for determining the variable cost of using privately owned rail cars.³⁹

b. Review in 2009

In 2009, the Board initiated two proceedings aimed at updating URCS. First, in an Advance Notice of Proposed Rulemaking (ANPR), the Board sought comments on whether it would be appropriate to update URCS to better capture the operating costs of transporting

³⁵ Id. at 661.

³⁶ A trainload movement is a multi-car shipment of at least 50 cars. Coal unit-train movements often consist of more than 100 cars that stay together as a "train set" and are referred to as unit-train movements.

³⁷ The volume adjustments include: (1) a 75% reduction in origin and destination switching costs; (2) a 50% reduction in interchange costs; (3) elimination of way train costs, and, in the case of trainload movements only: (4) a 25% reduction in station clerical costs for each car; and (5) a change in the assumption that inter- and intra-train switching costs occur every 4,163 miles instead of every 200 miles. Way train refers to trains operated primarily to deliver or pickup cars between local way stations and classification yards.

³⁸ A revenue car is spotted when it is placed on the property of the shipper or consignee for unloading. It is pulled when it is removed from that property empty. A spotted-to-pulled ratio of 1.5 assumes that 50% of the time cars are pulled empty.

³⁹ The Train Switching Conversion Factor converts the wages for all road train crews across carriers to a common mileage basis. RoadRailer operations involve the movement of highway trailers with retractable or detachable rail wheels directly over the tracks of the rail system. Review of the Gen. Purpose Costing Sys., 2 S.T.B. 754, 756 n.6 (1997).

hazardous materials.⁴⁰ The ANPR indicated that there might be unique costs associated with transporting hazardous materials (such as higher insurance premiums) and that URCS currently spreads those costs across all traffic of a railroad rather than allocating them more directly to hazardous materials movements. The Board also solicited comments on how it could identify the costs of hazardous materials operations through the Board's accounting and reporting rules. Comments to the ANPR have been received and the proceeding remains pending at the Board.

Second, in April 2009, the Board noticed a public hearing to solicit comments on whether it should embark upon a comprehensive review of URCS.⁴¹ The hearing notice solicited comments on a broad range of difficult URCS issues, including the historical special studies, treatment of TOFC/COFC and unit train movements, and the Train Switching Conversion Factor. It also sought comment on the various statistical relationships used in URCS, including the variability factors for URCS expense groupings. In response to its notice and hearing, the Board received comments from a wide variety of interests including railroads, shippers, government agencies, economists and transportation analysts. We discuss the general themes of the substantive comments in Part II, which explores criticisms of URCS. The URCS public hearing docket, which was for information gathering purposes, was discontinued in January 2010.⁴² Since then, the Board has continued its internal review of URCS.

⁴⁰ Class I R.R. Accounting & Fin. Reporting—Transp. of Hazardous Materials, EP 681 (STB served Jan. 5, 2009).

⁴¹ Review of the STB's Gen. Costing Sys., EP 431 (Sub-No. 3) (STB served Apr. 6, 2009).

⁴² Review of the STB's Gen. Costing Sys., EP 431 (Sub-No. 3) et al. (STB served Jan. 19, 2010).

PART II: CURRENT EVALUATION OF URCS

Even though URCS produces numerical results, costing railroad operations is an art as well as a science.⁴³ That is because the development of system-wide variable costs associated with a particular rail movement requires that any costing methodology incorporate many assumptions and generalizations about railroad operations. The costing system is only as good as those assumptions, the appropriateness of which can change over time. Accordingly, the Board remains committed to seeking the resources it needs to review URCS.

In its FY2010 budget request, the Board requested additional appropriations to allow it to begin a review of URCS, advising the Committee that it anticipated that the review would take several years and require additional funding in subsequent years. The Congress's FY2010 budget allocated \$350,000 in additional funding for the Board to begin scoping the URCS update process. The Board has used that funding to hire a transportation econometrician as a temporary Board employee to supplement the Board's existing econometric capabilities and to dedicate STB Section of Economics' staff to the URCS project.⁴⁴ The goal of the URCS team is to assess recent and longstanding criticisms of URCS and to evaluate both URCS and the alternative costing models described in Part IV.

A. Assessment of URCS Criticism

There have been criticisms of URCS since it was adopted in 1989. The ICC recognized the validity of some of those criticisms at the time of URCS' adoption but nonetheless determined that URCS represented a significant improvement over Rail Form A. The Board's 2009 public hearing on URCS provided the most recent opportunity to solicit broad-based comments regarding URCS. We summarize the themes of the most common criticisms and provide our assessment of those criticisms below.

1. Statistical and engineering methods used by URCS are outdated.

One pervasive criticism of URCS is that it has become outdated. Numerous parties, including the U.S. Departments of Transportation and Agriculture, have urged the Board to conduct a comprehensive review of URCS to determine those elements of the model that require updating in order to produce more accurate results.⁴⁵ The chief argument is that the statistical

⁴³ Review of the Gen. Purpose Costing Sys., 2 S.T.B. at 659.

⁴⁴ The Board hired Dr. Wesley Wilson on a temporary basis to assist the Board in its efforts to evaluate costing system methodologies. Dr. Wilson is a professor of Economics at the University of Oregon, specializing in transportation and applied econometrics. He has published widely in the transportation field and is the former President of the Transportation and Public Utilities Group of the American Economics Association. Dr. Wilson's team included two part-time research assistants.

⁴⁵ Many other parties with diverse perspectives also endorse this view, including Class I railroads BNSF Railway and Union Pacific Railroad; shipper interests Montana Wheat & Barley Committee and Arkansas Electric Cooperative Corporation, and transportation analysts Dr. Gregory Bereskin and Robert Leilich.

relationships used in URCS, including the Westbrook regressions, have not been reviewed in many years. Interested parties also point out that URCS relies on special studies that date back to the 1930s-1960s and most likely do not reflect current railroad operations.

The Board believes that a review of the statistical relationships and the special studies used in URCS is an important step in ensuring that URCS costs continue to be as reliable and accurate as practicable. While a comprehensive review of the statistical relationships could lead the Board to propose significant changes to URCS, it could also reaffirm the decision to use many of URCS' existing variability factors. With regard to the special studies and the engineering relationships underlying URCS, it is certainly true that nationwide studies of railroad operations have not been conducted for many years and those used in URCS might not represent current railroad operations as accurately as possible. As discussed in Part III, it is not yet clear, however, which special studies warrant the expense of updating. Should the Board maintain URCS as its general purpose costing system, it may become necessary to revisit both the special studies and the underlying URCS regressions.

2. There are fundamental flaws in URCS and its underlying data that make it less suitable for use as a railroad costing system.

Some parties argue that a system-average regression model might be inappropriate for estimating the cost of specific movements. Others argue that URCS' linear regressions are not sufficiently reflective of actual railroad costs, that the Board should test functional forms other than linear, and that the Board should take traffic density and productivity into account. Many advocate that particular variability factors should be changed or better supported by econometric analysis, with the most common targets of criticism being the default variability factors. Some also claim that the R-1 operating statistics used in URCS are "flawed."

In addition, an independent report commissioned by the Board opined that the URCS based R/VC ratios were only weakly correlated with other measures of market power.⁴⁶ The Christensen Report noted that a large number of rail shipments moved at R/VC ratios either below 100 percent or above 300 percent, suggesting to Christensen that there are R/VC extremes because variable costs are not closely aligned with shipment costs.⁴⁷

Many of the criticisms go to the fundamental structure and functions of URCS. But these would only be appropriate to explore in an exhaustive review of URCS if undertaken, just as the ICC reviewed them when it considered whether to adopt URCS in the first place. Several of the URCS expense category variability factors that have proven most problematic were the ad hoc "default" factors (i.e., not based on regression analysis) adopted reluctantly by the ICC in 1989, for example, the 50% variability factor of road property investment. The ICC recognized at the time that while stakeholder arguments against adopting default variables had "some merit," the

⁴⁶ A Study of Competition in the U.S. Freight Railroad Industry and Analysis of Proposals that Might Enhance Competition, Laurits R. Christensen Associates, Vol. 2, at 11-24 (November 2009) (Christensen Report). The report is available on the STB's website at stb.dot.gov/stb/elibrary/CompetitionStudy.html.

⁴⁷ Id.

agency lacked a sufficient empirical foundation to act otherwise.⁴⁸ The ICC (incorrectly as it turns out) anticipated that it would be able to build a more complete record and fully address these factors in its first review of URCS.⁴⁹

3. Certain elements of URCS should be revised to better reflect actual railroad costs.

Over the years, parties have made many suggestions for revisions to URCS, several of which have resulted in the initiation of Board proceedings (e.g., the changes to TOFC/COFC costing in the 1990s and the pending ANPR considering hazmat costing). Other suggested changes to URCS or the way URCS is used have been rejected by the Board (e.g., allowing parties to adjust URCS calculations in individual rate cases to reflect the movement-specific, rather than system-average, cost of providing a particular service). More recently, in the April 2009 public hearing on URCS, parties submitted comments requesting that URCS be revised to, among other things: (1) use replacement costs;⁵⁰ (2) allow carriers to submit costs to the Board using their internal railroad accounting procedures rather than the USOA;⁵¹ (3) change the cost treatment for privately owned railcars; (4) improve the make-whole adjustment; (5) change the treatment of fuel surcharges; and (6) adjust the circuitry factors.⁵²

There are likely to be as many requests for small revisions to URCS as there are parties with interests in the outcomes of regulatory proceedings that use URCS. Some of the proposed revisions have been addressed by the Board in prior proceedings. Others are new proposals, which can be further developed within the framework of a more extensive URCS review.

⁴⁸ Adoption of URCS, 5 I.C.C. 2d at 919-20.

⁴⁹ Id. at 920.

⁵⁰ A “replacement cost” methodology judges the value of an asset based on the current cost to replace it with a similar asset. In contrast, the “book value” methodology determines value of an asset based on the original price paid for the asset less depreciation. The Board uses book value in making most regulatory determinations, (e.g., whether a rail carrier is earning adequate revenues as defined by 49 U.S.C. § 10704) because it has not yet identified a practical way to estimate the current value of individual assets in the rail industry given the absence of actual comparable transactions. See Ass’n of Am. R.R.—Petition Regarding Methodology for Determining R.R. Revenue Adequacy, EP 679, slip op. at 2 (STB served Oct. 24, 2008).

⁵¹ Railroads do not use the USOA for their internal accounting. Rather, they use proprietary accounting systems and then translate those costs to the USOA. There is no standard railroad accounting system in the business world and each railroad is free to use whatever system it chooses.

⁵² The circuitry factors account for the extra distance a railroad car travels in excess of the shortest possible route between two points. It is only used in URCS Phase III costing if the actual miles are not known.

B. Evaluating URCS' Underlying Data and Programming

In addition to developing the options for updating URCS described in Part III of this report, the Board has undertaken an extensive review of the data and processes used to create URCS. The Board is replicating the legacy programs and regressions underlying URCS in order to better assess them, and to consider improvements to the datasets. The following describes the steps the Board has taken to prepare for a review of URCS.

1. Historical R-1 Database

During the past year, the STB has carefully examined the R-1 schedules that are used in Phases I and II of URCS to confirm their accuracy and appropriateness. As a result of this review, the STB has created an updated electronic historical database containing “as-filed” R-1 data (for selected schedules) from 1983 to 2008.⁵³ This expanded time series includes all railroads that were categorized as Class I and submitted a complete R-1 form containing 12 months of data for a particular year. The Board envisions that these data will be posted on the STB website and could be used by practitioners and academics for research purposes.⁵⁴

2. URCS Input Data

The Board reviewed and updated the computer programs used to create URCS input data, reflecting the more sophisticated programming and computational methods available to the Board today than at the time of URCS' adoption and development.⁵⁵ The Board also mechanized certain processes that were previously performed manually.⁵⁶ These changes have considerably increased the transparency and accuracy of the data found in the URCS Master File and URCS Worktable A.⁵⁷

⁵³ In 1983 the industry adopted depreciation accounting in place of betterment accounting. Therefore, the industry accounting data from before 1983 is not strictly comparable to the 1983 and later data.

⁵⁴ This dataset will slightly differ from the data currently used in the first two phases of URCS for three reasons: (1) expense data are not indexed for inflation by the Railroad Cost Recovery Index provided by the AAR; (2) special charges are not removed from the data; and (3) the carrier may have revised a particular year's data in the following year(s).

⁵⁵ For example, the Board replaced the program that compiles URCS data into the URCS Master File and improved the calculation of inflation indices.

⁵⁶ For example, R-1 used to be manually entered by the Association of American Railroads, the industry's trade association, and then manually audited by the Board, a process that was error prone. The Board has now limited the amount of manual inputs. The Board also developed mechanized procedures for non-R-1 data such as loss and damage reports, quarterly commodity statistics, and CS-54 (an annual report filed with the STB providing origination and termination information for cars loaded and unloaded by car type).

⁵⁷ The URCS Master File contains all of the URCS input data. URCS Worktable A contains a collection of the data required by the other Phase II worktables. Every year, the STB posts URCS worktables on its website.

3. URCS Worktable C

URCS Worktable C contains computations of variability factors based on the output and capacity parameter estimates from the URCS regressions. As discussed earlier, these regressions incorporate 15 different expense account groupings, which are based on the operating expenses reported by the railroads. Over the last year, the Board independently replicated the Westbrook regressions for each expense account grouping to better understand some of the issues raised in the Board's most recent hearing on URCS.

4. URCS Indices

Finally, the STB has independently verified the calculation and application of the inflation indices that URCS uses to put various expenses in current dollar terms.

Each of the preparatory steps listed above will greatly aid the Board in a review and update of URCS.

PART III: OPTIONS FOR UPDATING URCS

In its Report, the Committee requested that the Board identify a range of solutions consisting of at least three cost-effective options – Basic, Moderate, and Comprehensive – for updating URCS. In this section, we describe the potential options, identify the advantages and disadvantages of each, and provide estimates of the resources needed to pursue them. Because the Board has merely scoped the options for updating URCS – some of which require further sensitivity testing to determine the magnitude of the project – we cannot yet identify every resource challenge the Board might face in pursuing any particular strategy. Accordingly, this report provides preliminary cost estimates for more efficient options for updating URCS.

The Board's goal in this report was to examine potential modifications to URCS that could increase its functionality and accuracy. Based on its review, the Board believes that the most appropriate option to pursue at this time is the Moderate Option described at pp. 22-24. Under the Moderate Option, the Board would consider a number of targeted changes to URCS' programming and methodology to make it more accurate and user-friendly. The Moderate Option stops short of considering the major changes to the underlying fundamentals of URCS as these changes would be very costly and time-consuming.

The Board has also begun a study of alternative costing models to determine whether they have the potential to generate appropriate costs estimates, are more self-updating than is URCS, and better utilize of the wealth of revenue data that the Board already maintains. Based on its preliminary review, the Board sees potential in two alternative models. But we also recognize that a complete departure from URCS presents its own risks, such as concerns about theoretical underpinnings, suitability to railroad costing, and disruptions to the regulatory process. Because the Board's scoping of non-URCS costing models is just beginning, Part IV of this report describes how the Board intends to continue its examination of alternative costing models as it simultaneously considers moderate updates to URCS.

We stress that in requesting funding to pursue the Moderate Option, the Board has not yet adopted any particular change to URCS, nor has it foreclosed other options that have been or may be suggested by stakeholders during the course of any URCS review. Future determinations to adopt changes to URCS would only be made after the appropriate administrative processes and Board consideration of comments filed by interested parties. Moreover, should the Committee decide to fund the Board's consideration of URCS changes and the Board ultimately decide not to adopt an alternative costing methodology, an exhaustive review of the URCS statistical regressions and special studies may become necessary in the future.

A. Basic Option

Under a Basic Option, the Board would update the legacy computer programs currently used in URCS, thereby providing for more accurate and transparent data. The Board could also consider revisiting the make-whole adjustment, updating the USOA to more directly reflect hazardous materials movement costs, and make changes to other railroad reporting requirements. The four components of the Basic Option are discussed below.

1. Description

a. *Update Legacy Computing Programs*

The general computing architecture and platform of URCS has remained largely unchanged for more than 20 years despite the substantial advancements in computer technology since 1989. URCS programs were originally developed for mainframe computers. These mainframe computers lacked the speed, storage space, power, and flexibility of modern computers. The URCS program was initially structured to account for those mainframe limitations and, as a result, URCS uses a number of computer programs, some of which are now obsolete. For example, URCS still uses the FORTRAN programming language, even though the Board currently uses Visual Basic Access for many of its database management applications.⁵⁸

The calculations and flow of the URCS computer programs are critical to the accuracy of the estimated costs and the continued use of older and less transparent programs reduces the Board's ability to spot and correct calculation errors. Revisions to the legacy computing programs would increase URCS' functionality and accuracy.⁵⁹

The Board believes that both it and stakeholders would benefit from a re-programmed URCS that uses modern computer languages, has fewer component pieces, and is simpler to execute. Use of updated computer programming would also make URCS more adaptable to modification, as necessary.

b. *Revisit the Make-Whole Adjustment*

The make-whole adjustment is used to redistribute the efficiency savings that a railroad obtains in higher-volume shipments across all of that carrier's lower-volume shipments.⁶⁰ Currently, the Board uses a three-step process in applying the movement costing portion of URCS to estimate the cost of each shipment in the Waybill Sample. The first step computes the cost of each movement as if it were a single-car shipment and does not account for the extra efficiencies that result from trainload, unit train, and multi-car shipments. Because the costs associated with switching, circuitry, and way train are less for these higher-volume shipments than they are for single-car shipments, the agency makes an appropriate efficiency adjustment.

In the second step, the agency applies appropriate efficiency adjustments to the volume shipments in the Waybill Sample to account for their lower costs. The cumulative amount of the efficiency adjustments is called the "shortfall." The third step spreads this "shortfall" over the single-car movements, increasing the cost of each of these movements, resulting in the make-whole adjustment. The make-whole adjustment allows for the efficiency adjustments while

⁵⁸ URCS also uses other programming languages such as C++, VB Net and VB 6.

⁵⁹ The most significant task associated with updating the legacy computer systems would be the necessary recoding of the URCS Phase II worktables.

⁶⁰ The efficiency savings arise because the costs associated with switching, circuitry, and way train are less for higher-volume shipments than they are for single-car shipments. Investigation of R.R. Freight Rate Structure—Coal, EP 270 (Sub-No. 4) (ICC served Mar. 14, 1975).

maintaining the same URCS total variable costs across all shipments derived from the R-1 data. Thus, the URCS total variable costs are “made whole.”

There is some concern among stakeholders that the make-whole adjustment does not accurately reflect current railroad operations. Railroads have been encouraging shippers to move product in longer trains, which the railroads can move more cost-effectively and thus better utilize assets. This is particularly true in coal, grain, and intermodal markets.

Because more traffic moves in volume shipments, there are ever-fewer single-car shipments left to absorb the “shortfall,” a value that increases with the number of volume shipments. Accordingly, a study of this issue might reveal that the current method for allocating the “shortfall” and modern shipments practices results in an upward distortion of the single-car shipment variable costs. In an extreme hypothetical, if only one shipment were transported as a single car shipment, resulting in a large shortfall, all of the shortfall costs would be added to that lone single-car shipment, providing a nonsensical result.

Should the Board determine that the make-whole adjustment warrants revision, one potential change could be to allocate the shortfall to all shipments, not just the single-car shipments. This would result in smaller cost reductions for the volume shipments (as they get some of the shortfall added back to them) and smaller cost additions to the single-car shipments (because a portion of the shortfall is set aside and added back to the volume shipments instead). Therefore, if unit trains constitute the overwhelming majority of a carrier’s traffic, they will closely resemble the system average and URCS will not overly burden the few single-car movements with a large cost allocation.

c. Toxic Inhalation Hazards & Hazardous Materials

In recent years, rail carriers have questioned whether URCS properly allocates the costs assigned to hazardous materials and especially dangerous hazardous materials such as chlorine and anhydrous ammonia, which are Toxic Inhalation Hazards (TIHs). The primary question is whether URCS takes into account any particular handling and separable requirements of TIH movements, or the risk and insurance costs directly associated with these movements.

In an ANPR pending at the Board, the agency sought comment on whether it would be appropriate to update URCS to better attribute costs to the specific hazmat movements, and how to identify the costs of hazmat operations.⁶¹ Any change to URCS to account for hazmat transportation costs may involve obtaining more detailed accounting and reporting of expenses and operating statistics associated with hazmat transportation from the railroads, and developing methods to calculate system average unit costs and operating statistics. The Board is currently evaluating comments submitted in response to the ANPR and as yet has made no determination about whether to pursue a rulemaking on this issue.⁶² The Basic Option would include further analysis of this issue.

⁶¹ Class I R.R. Accounting & Fin. Reporting—Transp. of Hazardous Materials, EP 681 (STB served Jan. 5, 2009).

⁶² The Board also recently proposed a rule that would require railroads to report all of their TIH movements in the Waybill Sample. Waybill Data Reporting for Toxic Inhalation Hazards, EP 385 (Sub-No. 7) (STB served Jan. 28, 2010).

d. Railroad Reporting Requirement Changes

In hearings before the Board, stakeholders identified a number of modifications to the railroads' reporting requirements that would automatically flow through into the costs developed by URCS. These include changes in how the railroads report intermodal (TOFC/COFC) expenses and operating statistics and changes to reporting statistics on new car types, among others. Should the Board decide to adopt such R-1 reporting changes, they could be relatively easily incorporated into the existing framework of URCS.

2. Costs and Analysis

a. Costs of the Basic Option

Because some of the components of the Basic Option are already under consideration by the Board, a portion of the costs associated with pursuing the Basic Option would be subsumed in the Board's current operating budget (e.g., TIH-related changes to URCS). However, should the Board determine that it will pursue the Basic Option in its entirety, the most significant external cost to the agency would be the extensive update of the legacy computer programs and any changes to URCS programming required by a Board decision to modify the treatment of any URCS cost category. The Board would require the services of a programming firm or contractor to assist in the re-design of URCS' programming platform. The Board would also need to acquire additional hardware and software licenses for those Board employees who work with URCS. We estimate these external costs would be approximately \$550,000 in 2010 dollars.

The Basic Option would require continuation of the Board's in-house URCS team for a period of at least two years, and the addition of STB information technology professionals to the team. These key employees would focus nearly all of their time on URCS, and thus would not be available to work extensively on other agency matters.

b. Pros and Cons of the Basic Option

Consideration by the Board of the Basic Option would address certain areas of stakeholders' past concerns with URCS and could make URCS better able to attribute the costs of transportation to the activities incurring those costs. In addition, the Basic Option might provide a solution that is less disruptive to regulatory processes than the more extensive options discussed in the Moderate and Comprehensive sections below. The majority of the changes outlined in the Basic Option, if warranted, could be accomplished using mostly the existing STB staff. The changes would be relatively inexpensive to the Board and could be implemented relatively quickly following appropriate administrative procedures.

The main drawback of the Basic Option is that it would still employ the URCS regressions that were developed in the 1980s over the same historic dataset. The STB therefore would not be considering more modern, and potentially more powerful, econometric techniques, which might generate more accurate estimates of the variable costs of particular railroad activities. Finally, the Basic Option would not address the concerns regarding the use of old engineering studies.

B. Moderate Option

1. Description

The Moderate Option to update URCS would include all aspects of the Basic Option with consideration of two significant additional changes: re-estimating the URCS regressions using a newly updated dataset (employing data from 1983-2008); and re-evaluating and potentially changing the assumptions regarding the treatment of railroad mergers used in developing the 1979-87 database (i.e., the years included in the original URCS regression database).

a. *New Time Series (1983-2008)*

The original URCS regressions were estimated using data from an 8-year period (1979-1987) across the 14 Class I railroads existing at the time.⁶³ In order to account for the decline in the number of railroads due to consolidation, the original URCS methodology consolidated the data of railroads that would eventually join together during the years prior to their mergers.⁶⁴ This translates to a total number of 126 observations used to estimate the regression equations (14 railroads multiplied by 9 years). Given that this dataset ends in 1987 and includes railroads that have since merged with others, the original URCS regression estimates may not reflect the current railroad industry.

Additionally, in 1983, there was a change from betterment to depreciation-based accounting in the railroad industry.⁶⁵ To avoid any issues arising purely from the betterment-to-depreciation change in accounting methodology, the Moderate Option would re-estimate the URCS regressions using the updated R-1 database from 1983 to 2008. This approach would replicate Westbrook's original methodology but over a much longer time period (albeit with a decreased number of Class I rail carriers). This would result in 182 observations that could be used to estimate the regression equations (7 railroads multiplied by 26 years), an increase of 56 observations over the current method.

b. *Reconsider the Treatment of Merged Firms*

The Moderate Option would also revisit the original URCS approach to merged railroads and examine the potential impact of maintaining pre-merger firms as separate entities in the

⁶³ In 1987, there were actually 18 Class I railroads but the URCS regression database excluded four of these railroads because of size and/or special circumstances which caused them to differ from the other Class I railroads. These railroads included Conrail, Delaware and Hudson, Boston and Maine, and Florida East Coast.

⁶⁴ Between 1979 and 1987 (the years included in the original URCS regression database), the railroad industry experienced a number of mergers, reducing the number of Class I carriers from 41 to 18. To maintain consistency in the URCS regression database, the R-1 data for the carriers that eventually merged were added together, creating merged historic data for predecessor railroads. The URCS regression database therefore reflects simple aggregation of historic reported data (for the carriers that merged or filed consolidated reports).

⁶⁵ Using betterment accounting methods, long-term investments often were included as expenses. Under depreciation-based accounting standards, such items are depreciated and only a portion of the investment is included as expenses.

URCS regression analyses. Due to merger-related efficiencies, the firm formed after a merger could theoretically have a very different cost structure from its pre-merger railroads. Therefore, treating the pre-merger entities separately would acknowledge that the merged entity is not just the sum of its parts.

There might also be a practical statistical benefit to maintaining pre-merger firms as separate entities in URCS. It would provide for more observations on which to base the regressions. By maintaining the pre-merger firms as separate entities the number of usable observations upon which the regressions are based would increase by approximately 40%, potentially strengthening the results of the regression estimates.

2. Costs and Analysis

a. Costs of the Moderate Option

Consideration of the Moderate Option would entail all of the costs listed in the Basic Option, with the addition of an outside econometric consultant to assist with validating the updated URCS regressions and re-estimating the URCS regressions over the new panel dataset. Although the Board has in-house econometric expertise, it believes that utilization of an outside consultant, as the agency used in 1987 when it hired Dr. Westbrook during Adoption of URCS, would help the agency more efficiently consider issues likely to be raised during notice and comment. We estimate the additional external costs associated with the limited use of an econometric consultant over the course of 2 years to be \$75,000, bringing the total cost of the Moderate Option to \$625,000 in additional funding (in 2010 dollars).

b. Pros and Cons of the Moderate Option

Consideration of the Moderate Option would address some of the concerns about URCS' oversimplification of merged firms. The Moderate Option would also incorporate more recent data to address the concern that the results of the Westbrook Report on the URCS regressions have become stagnant in the modern railroad industry.

As noted above, by treating firms that eventually merge as separate entities until the actual merger, URCS would expand its cross-sectional observations, which could in turn increase the reliability of its regression estimates. Empirically, it is usually desirable to incorporate all available information in a model. The larger the number of observations, the greater the degree of confidence in the regression estimates.

There are some disadvantages to limiting an URCS review to just the components of the Moderate Option. First, there is no guarantee that the approach would provide estimates of relationships that make sense logically and empirically. If the updated regression results appear to be inconsistent with logic, theory, or the current URCS results, the Board would need to consider whether further, more comprehensive changes to URCS are necessary. Second, treating each pre-merger firm as a separate entity may be problematic because it could lead to outliers in the dataset.⁶⁶ There could be systematic differences in the cost/output relationships of merger

⁶⁶ An observation (or a set of observations) that appears to be inconsistent with the remainder of the dataset. Tests to determine whether or not outliers matter ask the question whether the inclusion of additional observations would yield significantly different results in a regression analysis.

partners that are very different from those of a firm that remains independent. These differences could be modeled but such modeling may require the Board to move away from using the techniques used by Dr. Westbrook. The Moderate Option does not provide for in-depth analysis and resolution if the regression estimates on more recent data – while relaxing the underlying assumptions – provide unreasonable results.

Finally, the Moderate Option does not address the criticisms of URCS regarding the specifications of the underlying regressions, the default variability factors, and the special engineering studies used in URCS.

C. Comprehensive Option

1. Description

The Comprehensive Option for updating URCS would include all aspects of the Basic and Moderate options plus two additional components. The first additional component involves evaluating, updating, and potentially replacing the URCS regression equations. The second additional component would examine the engineering special studies used in URCS.

a. Changes to the URCS Regression Equations

This component would involve an extensive review of the methodology used to estimate the URCS variability factors, including both those variability factors that are currently derived from regressions and those that are default factors. In short, the STB would identify and estimate new cost equations for a series of potentially new rail expense accounts. Each cost equation would be estimated separately, relating levels of costs to measures of intermediate rail activity (output) and size/capacity of the railroad. The estimates from these equations would then be used to calculate new variability factors.

i. Expense Account Groupings

Expense account groupings and their relationships to the output and capacity variables in URCS were determined over 20 years ago. Railroad operations have changed materially during that time, which may impact the cost relationships. Reviewing and updating the expense account groupings and their relationships could yield more accurate results by more directly allocating costs to particular movements.

Currently, URCS assumes that each expense category is a composite of several related accounts. Each expense group is then regressed on a single output and capacity variable. For example, the transportation fuels expenses category is regressed on miles of running track (capacity variable) and locomotive unit miles (output variable).

There is a possibility that splitting up certain cost categories might better represent the actual cost of providing service. For example, URCS currently assumes that one train mile is the same as any other. But if one sub-divided an expense category such as running crew wages into three separate categories representing train miles for unit train, manifest, and local delivery traffic, the results might be better tailored.

As discussed above, the variability factors for some expense categories were default factors adopted by the ICC because it lacked a better option at the time (see discussion at p. 5 above). Rather than continuing to use these default assumptions, the STB could consider estimating those categories that are not currently captured by URCS regression analysis.

An increase in the number of expense categories might provide greater specificity in developing cost equations. For example, the Board could consider adding an expense account that includes the costs of providing specialized services such as loading and unloading TOFC/COFC units, automobiles, coal, and ore, as well as TOFC/COFC pickup and delivery services. The revision/addition of accounts may also result in greater homogeneity⁶⁷ within the cost accounts regressed by the Board, yielding more comprehensive and reliable results.

ii. *Capacity/Output Variables*

Because of both the changes in the railroad industry operations and the potential new expense accounts described above, it might also be necessary to re-examine which capacity and output variables have a causal relationship with a particular expense category. The STB could explore the possibility of using more than one output variable and/or whether or not there is a need for a capacity variable in a particular cost equation.

iii. *Additional Variables*

The inclusion of additional variables in the URCS regressions might be necessary. For example, if the Board were to begin treating each Class I carrier as a separate entity as opposed to aggregating the past data for firms that later merged (see p. 22), that structural change could necessitate the inclusion of other variables.

iv. *Alternative Functional Forms*

Some interested parties have argued that the linear regressions used in URCS are not consistent with actual railroad costs, i.e., railroad costs are non-linear. The STB could investigate alternative functional forms addressing a variety of issues including, but not limited to (1) comparing and contrasting alternative functional forms to those currently used in the URCS regressions; or (2) determining whether different functional forms could be used for different cost accounts.

v. *Methodology – Identifying the “Best Model”*

The selection of the best model and most appropriate variables is not just a mechanical, statistical process. It is also necessary to draw on economic theory and established industry experience to guide the selection of variables to be included in the regression. R-1 data show that there is a high degree of correlation between the operations and expenses. Therefore almost any one of the operating statistics can be plugged into an equation, and the variable could turn out to be statistically significant – even though there might be a more appropriate variable from a theoretical, explanatory point of view. An overstatement or understatement of a particular railroad’s costs could result due to a misallocation of costs. Accordingly, should new expense categories and variables for output, capacity, and shifts in operations be introduced into URCS, the STB would need to develop a systematic, rigorous set of criteria to evaluate the changes.⁶⁸

⁶⁷ A homogenous cost pool is a group of costs that are governed by the same set of determinants and that respond to changes in output in an identical manner.

⁶⁸ In order to assess the adequacy of any updated URCS regression equations, the STB would need to establish a hierarchical set of statistical tests. These criteria include, but are not limited to, the following: sign and significance, goodness of fit, and coefficient stability. Sign

(continued . . .)

b. Updating the Engineering Special Studies

As discussed earlier, the engineering relationships in URCS are based on special engineering and time-and-motion studies, many of which were conducted or revised between the 1930s and 1960s. Given the significant increases in unit-train traffic as well as the rationalization and enhanced productivity of operations in recent decades, it is likely that the engineering relationships have changed over time. Pursuit of an exhaustive revision of URCS would encompass conducting sensitivity testing on all the special studies used in URCS to determine which studies have a significant impact on the resulting estimated costs. Only those relationships that materially impact costs and are shown not to reflect current railroad operations would need to be updated. Moreover, railroads may already capture some of the information reflected in the special studies such that the STB could simply consider modifying the R-1 reporting requirements. On the one hand, it is possible that not all of the approximately 15 special studies would need to be updated, but it is also possible that additional studies might be desirable.

New studies would better reflect railroad operations as they are carried out today. Efficiencies and innovation that have decreased the time or number of railroad personnel required to perform tasks could also be expected to lower the costs associated with particular rail operations.

2. Costs and Analysis

a. Costs of the Comprehensive Option

In addition to the costs of the Basic and Moderate options, pursuing the Comprehensive Option would require significantly increased use of external consultants. With regard to updating the regressions, the consultants would assist the Board with proposing new URCS regression models and testing their validity. Because this would be a substantial endeavor, the Board anticipates that the chosen consultants would work closely with Board staff over at least 2-3 years. Until the Board begins an exhaustive review of URCS, however, it is difficult to put a dollar figure on the resources that would be necessary to develop and implement any changes, with the most significant factors being how long it would take to complete the review, develop and test any new regressions, test alternative methodology changes proposed by commenters, and implement any necessary changes to the model. When the ICC adopted URCS in 1989, it had the benefit of both guidance from the RAPB over three years (with an annual budget of what would be \$2,300,000 in 2010 dollars) as well as the services of Dr. Westbrook. Our rough

(. . . continued)

and significance checks ensure that the output and capacity variables should have the correct sign (e.g., + or –) and are not due to random chance. Intuitively, it would not make sense for an increase in activity to decrease the amount of dollars spent. Statistical significance would verify that the effect of the variable in question is likely to result from actual railroad operations. Goodness of fit is a statistical term that explains how much variability of the expense grouping is accounted for by the output and capacity variables. Coefficient stability determines how coefficients and variability ratios change as new data are added or subtracted from the dataset. A robust regression should have both stable coefficients and stable variability ratios as observations are added to the dataset.

estimate for the cost of completing the regression component of the Comprehensive Option is \$2,000,000, which includes obtaining the services of two econometric consultants for at least 2 years, a programming consultant for 1-2 years, as well as the hardware/software expenses described in the Moderate Option.

As the Board has not yet conducted the sensitivity testing to determine the number of studies that would need to be updated, it is also difficult to estimate the cost of updating the studies. The magnitude of updating special studies could require that they be completed by an outside firm, which would be supervised by industrial or cost engineers hired by the Board. To reduce costs, the Board would also consider the use of simulation models and Class I railroad reporting changes in lieu of actual time and motion special studies. Assuming that the Board would need to update only a small number of studies and that the Board could identify a cost-efficient method for doing so, the cost for special study component could be as low as \$2,000,000. However, should the Board determine that a significant number of special studies must be performed, the costs of completing this component would grow significantly, to \$10,000,000 or more.

Accordingly, the broad range of costs potentially necessary for the Comprehensive Option is \$4,000,000 to \$10,000,000 or more.⁶⁹

b. Pros and Cons of the Comprehensive Option

The Comprehensive Option would consider all of the concerns raised by interested parties in recent proceedings examining URCS. By applying modern econometric techniques to current and improved data, the STB may be able to significantly increase the accuracy of the URCS estimates and ensure they are consistent with modern railroad operations. Specifically, the examination of the expense accounts and their relationships to the capacity and output variables may help URCS more appropriately reflect the cost environment of today's carriers.

But the Board cannot predict whether the result of Comprehensive Option would be a relatively straightforward update of URCS or what would essentially be a completely new costing system. Major changes to URCS certainly could also affect the amount of traffic subject to the Board's jurisdiction under the statutory 180% R/VC test, potentially necessitating other regulatory or statutory adjustments.

The major drawback to the Comprehensive Option is the time and resources it would take to develop and implement. Review of the statistical relationships and special studies embedded in URCS is a major project that may take significant time, require assistance from multiple outside consultants, and involve a substantial funding commitment.

Indefinite deferral of examining URCS fundamentals and updating the special studies could eventually lead to a regulatory costing model that bears little resemblance to the "real world" rail industry. However, given the significant investment required to fully implement this

⁶⁹ It is extremely difficult to provide more specificity than this broad range at this time, because there are many unknowns and assumptions that should become clearer as the Board progresses with its work on URCS. A \$10,000,000 upper range estimate presumes no replication of a blue ribbon panel such as the RAPB, yet that might be helpful in future years. The cost of the RAPB was approximately \$2.3 million per year, for three years (in current 2010 dollars).

project, before requesting funds for an exhaustive review of URCS, the Board would first like to explore whether an alternative costing model that may require less updating over time could be developed and could serve the agency's regulatory purposes. Should the alternative models prove unviable, the STB may need to request the additional funding necessary to complete an exhaustive review of URCS. We discuss two possible alternative models in Part IV of this report.

PART IV: OPTIONS FOR REPLACING URCS

In Part III, we described three options for updating the URCS model. Over the past year, as it has considered how URCS could be updated, the Board has also begun to explore the possibility of eventually replacing URCS with a new costing system. This section describes the alternative costing models studied to date.

There are a number of reasons why the Board believes it is important to explore alternatives to URCS within the framework of this URCS review. *First*, as discussed earlier, the Board's costing methodology was intended to be reassessed over time. The Board has a responsibility to ensure that it is fully informed on the most recent cost modeling theories and how they might be used to support the Board's statutory mandates.

Second, because URCS is based in part on observable railroad operations and engineering relationships, it will always need to be updated to ensure that those relationships continue to be relevant and appropriately incorporated into the model. An alternative model that is more reliant on data that is continually updated may not require the same large-scale revisiting that is necessary in URCS.

Third, there is a limited amount of railroad cost data used now to determine the variable cost of transporting goods by rail. The URCS model relies on aggregated annual cost information from just the large Class I railroads, even though the Board adjudicates cases involving Class I, regional, and short-line railroads. A costing model that relies on more disaggregated data that are either collected directly from the railroads and/or the Carload Waybill Sample might result in more tailored cost estimates.

This section describes two alternatives the Board is examining. The theories behind each alternative model hold promise but it is unclear at this time whether the models could be demonstrated to be viable from economic and practical perspectives, and if so, whether they would be an improvement over URCS.

Once the Board's internal review of the alternative costing models is complete, we intend to seek broad public input on the reasons for and against evaluation of these alternatives as a potential replacement for URCS. We recognize that replacing URCS with a new model would delve into the unknown and may result in criticism from stakeholders on that basis alone. We believe that, however, early critiques of alternative models could aid the Board in any potential development of such a model. Pursuing either of these alternative costing models would require additional funding for the Board to hire an outside consultant(s) to fully develop, program, test and document such a model.

A. New Empirical Industrial Organization

The New Empirical Industrial Organization approach, or NEIO, infers an estimate of incremental costs for a particular movement by examining the pricing for those kinds of movements. In short, NEIO would use the *pricing* data collected by the Board from all rail carriers to estimate *costs* by separating out the portion of the price that is attributable to the carrier's market power.

To explain NEIO, we start with the basic economic concept that in a market where there is perfect competition, prices will reflect what are referred to as “marginal” costs. Marginal costs are those costs that are required to produce one additional unit of the item being sold.⁷⁰

In a perfectly competitive market, marginal costs will be equal to the price of a good. However, many markets are not perfectly competitive and, as such, prices reflect not only marginal costs but also a “markup.” This markup, according to the economic theory, reflects the degree to which the seller has pricing power over its buyer and is able to raise prices beyond marginal costs to increase its profit. A large number of academic papers examine prices in non-competitive markets, including a 1989 Stanford University study by noted economist Timothy Bresnahan that referred to “New Empirical Industrial Organization” models.⁷¹

NEIO’s basic premise is that price is equal to marginal cost plus a market power markup. The NEIO approach recognizes that prices and outputs differ across markets not only because of differences in demand and cost, but also because of differences in competitive conditions (i.e., behavior, conduct, and rivalry). Assuming similar demand and costs, prices generally will be lower in highly competitive markets than in monopolistic markets. But since there are varying degrees of competitive rivalry ranging from perfect competition to complete monopoly, the NEIO model theoretically allows for departures of prices from these marginal costs. The basic idea is that marginal costs can be estimated through prices and an estimation of market power.

In the railroad industry, the “product” that would be analyzed under a NEIO approach is the movement of a good by rail from one location to another. The “price” would be the shipment specific revenue data provided in the Carload Waybill. The “marginal cost” would be the additional cost it would take to carry one additional carload/train of goods between two points.

Rail transportation demand and pricing would play a key role in NEIO. The demand function depends, theoretically, on the prices of the good transported, the prices of that good’s substitutes and complements, the prices of rail transport and its substitutes, and service characteristics such as speed and reliability of service. Pricing is based on the basic economic principle that a firm will price at the level where the incremental revenue from the last unit sold equals the incremental cost of that last unit.

A key to NEIO in the railroad context would be the index of competitiveness that estimates the departure of price from marginal cost. This departure depends critically on the level of market rivalry, i.e., whether the market structure is monopolistic, oligopolistic or competitive. This departure could also depend on the strength of competitive factors that constrain rail pricing. For the purpose of modeling railroad costs under NEIO, it would be very important to measure as accurately as possible the departures of prices from marginal costs as captured in econometric estimation of the market power markup. This is because competitive constraints vary across markets, with some markets served by multiple railroads, or by a single

⁷⁰ These costs are also referred to as incremental costs.

⁷¹ Timothy Bresnahan, Empirical Studies of Industries with Market Power, in Richard Schmalensee and Robert D. Willig (eds), HANDBOOK OF INDUSTRIAL ORGANIZATION at 1011-1057 (Amsterdam: North-Holland, 1989).

railroad that faces other constraints on pricing such as other nearby railroads, trucks, barges, truck-barge combinations, or other product and geographic sourcing options.

From the Board's perspective, the potential advantages of the NEIO approach are clear. The Board already collects a massive dataset of pricing information from the railroads annually via the Carload Waybill Sample. The Carload Waybill Sample is a collection of data from hundreds of thousands of individual rail shipments each year (representing 2-3% of overall rail traffic) that reveal a variety of features of the shipment, including the tonnage, commodity, origin and destination, and price charged by the railroad. This wealth of information could be further tailored to provide even more granular information about representative sample rail shipments. With a dataset of this size, the agency may be able to create a costing model that can be highly tailored to the particulars of a shipment. While the Board can and does make modifications to URCS to tailor it to shipment types, it would not be feasible for the agency to collect shipment specific costing data in the R-1 reports on the same scale as it does for Carload Waybill Sample revenue information.

Also, the NEIO approach might be able to provide a viable means of costing movements on short-line and regional railroads, rather than relying on models developed for the Class I carriers, and may even be able to provide different cost estimates based on the geographic origin and destination of the movement. And once created, a NEIO model might largely automatically adjust to changes in the industry as reflected in the R-1 revenue data (with periodic changes to the different algorithms for calculating market power), making the expense of maintaining the model less costly.

But there are also potential disadvantages to NEIO that would need to be explored further. Most significantly, the approach requires econometric models to estimate the relationship between price, cost, and market power. A key question is whether modelers can develop a suitable and appropriate parameter for market power. Without that parameter, the model would be unable to distinguish whether differences in transportation rates are due to differences in incremental costs or differences in market power, rendering the model unusable as an URCS replacement. As we begin our exploration of the NEIO model, we stress that the parameter for market power in NEIO will never be a perfect proxy for actual market power. For regulatory purposes, the parameter simply needs to be sufficient for the econometric model to use the power of hundreds of thousands of annual observations to draw out a reasonable estimate of marginal costs.

The NEIO approach has also been the subject of some criticisms in the economics literature. For example, economist Kenneth Corts argues that because the departure of price from marginal costs in an oligopolistic market typically involves the reactions of rivals, the NEIO model is logically flawed by its attempt to capture inherently dynamic responses in a static model.⁷² The Board will consider this and other criticisms in its continuing study of alternative models.

⁷² Kenneth Corts, Conduct Parameters and the Measurement of Market Power, 88 Journal of Econometrics No. 2 at 227-50 (Feb. 1999).

B. The Christensen Cost Model

Another alternative under consideration by the agency is the sort of hybrid cost function/pricing model described in the Christensen Report on the state of competition in the railroad industry.⁷³

Christensen developed a hybrid model that incorporates marginal cost estimates from a variable cost function with estimates from a pricing model. The variable cost function portion of Christensen's model assumes that variable inputs (e.g., labor, railroad maintenance of way) are employed at cost-minimizing levels. Rights-of-ways and structure capital are assumed to be partially fixed inputs since they may not always be at cost-minimizing levels in the short-run but can be adjusted in the long run. Christensen developed a method that generates marginal costs from the estimated parameters of their variable cost function. Christensen uses these marginal costs to examine how rail revenue per ton-mile, on average, is marked up over the competitive benchmark of marginal cost and changes over time.

Christensen developed a pricing model to characterize the extent to which cost and market structure features of shipments account for variations in unit revenues at the commodity level. This pricing model could be considered a 'NEIO' type model because it is a profit-maximization model of railroad behavior, subject to constraints from alternative shipping modes that relate reported revenue per ton-mile to cost and market-structure features of sampled shipments.

The Christensen Report explains that the pricing model is limited because it is unable to separate out marginal costs from market power markups. In other words, the model allows for the estimation of factors that cause variations in costs and markups for railroad movements, but not for the levels of costs and markups themselves. Christensen attempts to overcome this limitation by incorporating generic marginal cost information from its variable cost model into estimates from its pricing model. This step allows Christensen to examine the adjusted costs and revenue per ton mile for "typical" shipments in order to analyze costs and markups at the commodity level. Additional work would need to be done to determine whether the model could be used to estimate shipment-specific costs.

As Christensen's model makes use of both aggregated R-1 railroad accounting data as well as Carload Waybill Sample data to generate estimates, we describe it as a hybrid cost function/pricing model. The use of both actual cost data and actual pricing data has appeal because it could be used to create a more robust and complete picture of shipment specific costs than either approach alone. As Christensen explains in its report, however, the hybrid model it developed was not designed to apportion costs for shipment-specific movements. Rather, it was strictly intended to examine and model the trend of railroad rates as they relate to costs across various commodities in order to examine the effects of competition. Accordingly, substantial

⁷³ See supra note 46.

additional research would be needed to determine whether this type of model could be modified to estimate shipment specific costs.⁷⁴

C. STB Assessment of Alternatives to URCS

Both NEIO and the Christensen hybrid approaches warrant further consideration. The NEIO model is both intellectually and theoretically appealing because it uses current pricing data from the Carload Waybill Sample, but there is uncertainty over whether a pricing model can be used to estimate movement specific costs by identifying a market power markup. The hybrid approach, which combines cost data from the R-1 reports and the shipment data from the Carload Waybill Sample, has the advantages of completeness and potential ability to attribute portions of overall cost to very specific types of services. Its disadvantage is the complexity of linking the aggregate cost data to the Carload Waybill data.

There are also two overarching concerns about whether either approach can replace URCS entirely. *First*, both approaches estimate a short run marginal cost, rather than the longer run variable cost used in URCS and specified by Congress in 49 U.S.C. § 10707 to create the 180% R/VC jurisdictional threshold on railroad rate challenges. Although many might view that as a positive feature of the models, it is unclear how the Board would reconcile a move towards either alternative with the statutory 180% R/VC threshold. If the Board were to adopt one of these alternatives, it might have to consider adopting a bridging mechanism to convert marginal costs to variable costs. Another alternative would be for Congress to address the 180% R/VC ratio requirement legislatively.

Second, the agency may need to retain URCS for certain limited purposes in any event. One of our simplified procedures for challenging rail rates depends critically on an estimate of *total* operating expenses (both fixed and variable). The Simplified SAC methodology for medium-sized rate disputes uses URCS to develop that estimate of the total operating expense associated with particular segments of the existing carrier's rail operations. As of the submission of this report, the Board has not identified any obvious way to use either a NEIO or hybrid model for that purpose.

The Board anticipates completing its preliminary study of NEIO and the hybrid approach in the near term and then, if appropriate, seeking comment from the public regarding the advantages and disadvantages of fully developing either of the models as a potential replacement for URCS. Should the Board ultimately determine that it should pursue either model, it would need to hire two types of consultants: econometrician(s) and computer programmer(s). These consultants would assist the Board over several years in developing, testing, programming, documenting and implementing the alternative model. We estimate that it would cost approximately \$2 million to do so.

⁷⁴ The Christensen Report suggests that additional cost data would need to be collected in order to allow shipment-specific estimation. See Christensen Report, Vol. 2, at 11-7.

CONCLUSION

The maintenance of an accurate costing tool that is as reflective of the modern rail industry as practicable is one important step in ensuring that the Board fulfills its statutory duties. The Board's recommendation is that it pursue the Moderate Option, which considers cost-effective potential modifications to URCS that could increase its functionality and accuracy, while also pursuing the development of alternative models that might better serve the Board's regulatory purposes. We believe this dual-track approach will produce the best results for the agency, stakeholders and American taxpayers. The Board would need a total of \$625,000 in additional funding to pursue the Moderate Option (as discussed at pp. 22-24 above).

Appendix: Glossary

Avoidable Cost: The expenses that the rail carrier would not incur if it stopped providing transportation over a line.

Book Value Methodology: A methodology that determines the value of an asset based on the original price paid for the asset less depreciation.

Carload Waybill Sample: A random sample of railroad waybills (i.e., freight bills) for all U.S. rail traffic submitted by those rail carriers terminating 4,500 or more revenue carloads in any of the 3 preceding years, or at least 5% of the revenue carloads terminating in any state in any of the 3 preceding years. This sample represents 2-3% of all railroad traffic.

Circuity Factor: The extra distance a railroad car travels in excess of the shortest possible route between two points. It is only used in URCS Phase III costing if the actual miles are not known.

Coefficient Stability: In regression analysis, a test that determines how coefficients and variability ratios change as new data are added or subtracted from the underlying dataset.

Cross Sectional Dataset: A dataset for multiple entities over a single period of time (e.g., data for all U.S./Class I railroads for one year.) See also Time-Series Dataset.

Dependent Variable: In regression analysis, the variable that will be determined based upon the independent variables. For example, the 15 railroad expense account groupings defined in URCS Worktable C are dependent variables,

Engineering Studies: The engineering relationships in URCS are based on special engineering and time-and-motion studies, some of which were conducted or revised between the 1930s and 1960s. These studies measure the time and effort involved in performing various railroad activities. They serve as the basis of the URCS “special study” factors.

Fixed Costs: Costs that do not vary with changes in the level of railroad traffic.

Goodness of Fit: In regression analysis, a test that explains how much of the variability of the dependent variable (e.g., expense account groupings) is accounted for by the independent variables (e.g., output and capacity variables).

Homogeneity/Homogeneous Cost Pool: A homogenous cost pool is a group of costs that are governed by the same set of determinants and that respond to changes in output in an identical manner.

Independent Variable: In regression analysis, the variable (or variables) that are used to predict the value of the dependent variable. For example, these are the output and capacity variables used to define the expense account groupings in the URCS Regressions.

Interstate Commerce Commission (ICC): The predecessor agency to the Surface Transportation Board.

Linear Regression: A specific type of regression analysis, where the change in the dependent variable is constant, given a change in the independent variables. In other words, a linear model estimates a constant effect of one or more independent variables on one dependent variable.

Marginal Cost: The cost required to produce one additional unit.

Panel Dataset: A dataset of multiple entities (cross-sectional) over multiple periods of time (time-series). URCS originally used a panel dataset to estimate the “URCS Regressions” for 14 Class I railroads over 9 years of data.

Parameter Estimate: In regression analysis, the estimated effect of an independent variable on the dependent variable.

R-1 Reports: Annual reports that Class I railroads are required to submit to the STB that summarize the operating expenses and statistics for a particular year.

Rail Form A: An accounting system devised by the Commission in 1939 that uses statistical techniques to develop variable unit costs from annual expense and operating information.

RAPB: Railroad Accounting Principles Board. The RAPB was created by Congress in the Staggers Rail Act of 1980 to evaluate and recommend an accurate costing methodology to the ICC. The RAPB existed from 1980-87.

Regional Railroad: Generally, Class II railroads. The STB defines Class II railroads as railroads with less than \$250 million but more than \$20 million in revenues, adjusted for inflation from base year 1991. See also Short-Line Railroad.

Regression Analysis: A statistical estimation process used to find relationships between a dependent variable and one or more independent variables.

Replacement Cost Methodology: A methodology that determines the value of an asset by determining the current cost to replace it with a similar asset.

Revenue/Variable Cost (R/VC) Ratio: The revenue earned on a specific rail movement divided by the variable cost of providing the service, expressed as a ratio.

RoadRailer Operations: The movement of highway trailers with retractable or detachable rail wheels directly over the tracks of the rail system.

Root-Mean-Square Error Forecast (RMSEF): A metric that expresses how well a regression fits the data (with a lower error of forecast meaning a better fit). Technically, this is the square root of the sum of the square of differences between the actual observations and those predicted by the regression, divided by the number of observations.

Short-Line Railroad: Generally, Class III railroads. The STB defines Class III railroads as railroads with \$20 million or less in revenues, adjusted for inflation from base year 1991. See also Regional Railroad.

Statistical Outlier: An observation (or a set of observations) that appears to be inconsistent with the remainder of the dataset. Tests to determine whether or not outliers matter ask the question whether the inclusion of additional observations would yield significantly different results in a regression analysis.

Statistical Significance: In regression analysis, the likelihood that a result of the dependent variable is caused by the independent variables, and not by “random” chance.

Switching: The process of placing cars in a specific order (as in a classification yard), placing cars for loading or retrieving empty cars (industrial switching), or the process of adding or

removing cars from a train at an intermediate point. It can also be the movement of cars from one point to another within the limits of an individual plant, industrial area, or a rail yard.

System-Average Unit Costs: See Unit Costs.

Through Train: A train operated between two or more major yards or distribution points on a particular railroad.

Time-Series Dataset: A dataset for a single entity over multiple periods of time. For example, data for a single railroad over a number of years. See also Cross-Sectional Dataset.

TOFC/COFC: Trailer on Flat Car/Container on Flat Car: Any truck trailer or container moving on a railroad flat car in intermodal service.

Toxic Inhalation Hazards (TIH): This classification, which includes chlorine and anhydrous ammonia, is defined in accordance with 49 C.F.R. §§ 171.8, 173.115, and 173.132 to include materials that, when inhaled, are known or presumed on the basis of testing to be so toxic to humans as to pose a hazard to health in the event of a release during transportation. These materials include, but are not limited to, hazardous materials listed at 49 C.F.R. § 172.101 as either Division 2.3 materials, or Division 6.1 materials that can be characterized as an inhalant under § 173.132.

Uniform System of Accounts (USOA): Accounting instructions that specify the accounting codes and categories that railroads are required to use in their R-1 reports for regulatory purposes and explain the accounting requirements for certain types of transactions.

Unit Costs (System-Average Unit Costs): A railroad's costs of performing the intermediate activities required to provide transportation service, developed by dividing the expenses associated with a given activity by its associated service units. Examples of unit costs are: Gross Ton-Mile Operating Cost and Locomotive Unit Mile Operating Cost.

Unit Train: A train operating generally intact between point of origin and final destination, normally hauling a single bulk commodity in similar cars.

Variability Factors/Variability Ratios: A proportion of an activity's total expenditures that are attributable to expenditures on variable inputs. These factors are used to determine the proportion of 15 expense account groupings in URCS that are variable.

Variable Costs: Costs that vary with traffic levels.

Way-Train: Trains operated primarily to deliver or pickup cars between local way stations and classification yards.