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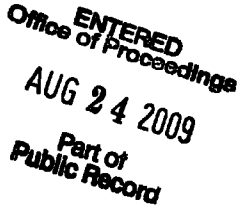
August 24, 2009

BY HAND



The Honorable Anne K. Quinlan
Acting Secretary
Surface Transportation Board
395 E Street, SW
Washington, DC 20423

Re: Docket No. 42114, *US Magnesium, L.L.C. v. Union Pacific Railroad Company*

Dear Secretary Quinlan:

Enclosed for filing *under seal* in the above-reference matter are the original and ten copies of the Highly Confidential version of Union Pacific's Opening Evidence, three compact discs containing an electronic copy of the Highly Confidential version, and three compact discs containing Union Pacific's Highly Confidential electronic workpapers.

We have separately enclosed for filing in the Board's *public docket* the original and ten copies of a Redacted version of Union Pacific's Opening Evidence, three compact discs containing an electronic copy of the Redacted version, and three compact discs containing Union Pacific's Public electronic workpapers.

Additional paper copies of this filing are also enclosed. Please return date-stamped copies to our messenger.

Thank you for your attention to this matter.

Sincerely,

Michael L. Rosenthal

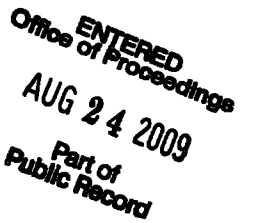
Enclosures

REDACTED - TO BE PLACED ON THE PUBLIC FILE

BEFORE THE
SURFACE TRANSPORTATION BOARD

225596

US MAGNESIUM, L.L.C., Complainant, v. UNION PACIFIC RAILROAD COMPANY, Defendant.	Docket No. 42114



OPENING EVIDENCE OF UNION PACIFIC RAILROAD COMPANY

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August 24, 2009

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Complainant,	)	
v.	)	Docket No. 42114
UNION PACIFIC RAILROAD COMPANY,	)	
Defendant.	)	

OPENING EVIDENCE OF UNION PACIFIC RAILROAD COMPANY

Union Pacific Railroad Company ("UP") hereby submits its Opening Evidence in this rate reasonableness challenge filed by US Magnesium, L.L.C. ("USM"). USM's complaint challenges UP's rates for transporting chlorine from USM's facility at Rowley, Utah, to Sahuarita, Arizona, and Eloy, Arizona. USM has elected to proceed under the Three-Benchmark method set forth in *Simplified Standards For Rail Rate Cases*, STB Ex Parte No. 646 (Sub-No. 1) (STB served Sept. 5, 2007), *aff'd sub nom. CSX Transp., Inc. v. STB*, 568 F.3d 236 (D.C. Cir. 2009). Under the Three-Benchmark method, UP's "presumed maximum lawful rates" for transporting USM's chlorine from March 2009 to March 2014 will be based on UP's rates and costs for traffic that moved from 2004 through 2007. *Simplified Standards* at 17-22.

UP's Opening Evidence is in six parts. Part I provides an introduction and overview of the issues that are addressed in this filing. Part II sets forth the background to this case and describes the issue movements. Part III discusses the criteria that should be used to identify the comparison group for purposes of calculating the R/VC_{COMP} benchmark. *Simplified Standards* at 17-18. Part IV discusses the application of the RSAM and $R/VC_{>180}$ benchmarks

and the confidence interval, in order to develop the "presumed maximum lawful rate." *Id.* at 19-22. Part V provides evidence of "other relevant factors" to demonstrate that the maximum lawful rate should be higher than the "presumed maximum lawful rate." *Id.* at 22.

UP's evidence of "other relevant factors" involves two adjustments to the "presumed maximum lawful rate." First, UP provides evidence that its rates to USM should be allowed to reflect an appropriate contribution by USM to UP's costs to install Positive Train Control. Second, UP provides evidence that the "presumed maximum lawful rate" should be adjusted to reflect that the challenged rates are common carrier rates, whereas all of the movements in the comparison group occurred under contract rates.

As UP concludes in Part VI, the evidence shows that the challenged rates are reasonable.

I. INTRODUCTION

This case presents an important test of the Board's Three-Benchmark method. Specifically, this case will test the Board's promise to address the problem of "regulatory lag" by adjusting the method's "presumed maximum lawful rate" to account for "market changes not reflected in the comparison group or the average RSAM and $R/VC_{>180}$ benchmarks." *Simplified Standards* at 85; *see also CSX Transp.*, 568 F.3d at 247 (upholding the Three-Benchmark method because the Board "recognized the problem of regulatory lag and established a mechanism for addressing it on a case-by-case basis").

In this proceeding, UP's rates to transport USM's chlorine that were established in 2009 will be benchmarked against presumed maximum lawful rates based on traffic that moved from 2004 through 2007. However, the market has changed considerably in recent years. As a result, UP's current rates are considerably higher than the rates that chlorine shippers paid from 2004 through 2007. One important reason why UP's rates are higher now is that the market

has increasingly recognized the significant risks and substantial new costs that railroads are incurring because of their common carrier obligation to transport chlorine and other hazardous materials known as "Toxic Inhalation Hazards" ("TIH").

The most dramatic example of new costs is the requirement that railroads install Positive Train Control ("PTC"). Under the Rail Safety Improvement Act of 2008, UP and other railroads must install PTC on all main line over which TIH material is transported by December 31, 2015. This multi-billion dollar mandate is a fact of life for railroads and shippers in the current market, but because of regulatory lag, it will not be accounted for in this case unless the Board considers factors other than benchmarks based on traffic that moved from 2004 through 2007.

The requirement that railroads install PTC is not the only TIH-related regulatory requirement that has imposed new costs on railroads. UP has been expending substantial operating and capital dollars to prepare for and comply with a series of recent safety and security rules issued by the Transportation Security Administration ("TSA") and the Pipeline and Hazardous Materials Safety Administration ("PHMSA").

With the notable exception of USM, UP's chlorine shippers have recognized the changes in the market as their old contracts expired and they negotiated new contracts with UP. UP's ability to negotiate new, higher rates to reflect changes in the market has been limited somewhat by the existence of multi-year contracts, but its chlorine rates have nonetheless increased steadily since 2004. UP's average revenue per revenue ton-mile for chlorine increased by more than { } percent from 2004 to 2007, from { } mills to { } mills. In 2008, UP's average revenue per revenue ton-mile for chlorine increased even further, to { } mills. Clearly, the market has changed in a way that calls into question the validity of comparisons

between UP's current chlorine rates and R/VC ratios, on the one hand, and UP's older chlorine rates and R/VC ratios, on the other hand.

USM's rates should reflect current market conditions, including the requirement that UP install PTC. However, unless the Board adjusts the Three-Benchmark method's presumed maximum lawful rate to reflect current market conditions, USM's rates from March 2009 to March 2014 might be capped based on rates and R/VC ratios for traffic that moved from 2004 through 2007. A decision that caps USM's rates below current market levels would be unfair to both UP and shippers other than USM. UP would be precluded from recovering from USM a fair share of the costs attributable to USM's shipments of TIH materials, and USM would have a competitive advantage over chlorine shippers who are paying current market rates.

The Board has imposed significant restrictions on evidence of "other relevant factors" that parties can submit "to demonstrate that the maximum lawful rate should be higher or lower" than the "presumed maximum lawful rate." *Simplified Standards* at 22. Ultimately, UP therefore concluded that the most it can do in this proceeding is prevent USM from insulating itself from the market effects of the requirement that railroads install PTC.[1]

UP rates established in 2009 reflect a market in which UP must install PTC, and USM should not be able to avoid the effects of this market change by obtaining a prescription that would cap its rates from 2009 into 2014 based on rates for traffic that moved from 2004

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[1] The Board has recently instituted other proceedings to update and improve its accounting and financial reporting for Class I rail carriers and refine its Uniform Rail Costing System, both in general and to better capture the costs of transporting hazardous materials. *See Review of the Surface Transportation Board's General Purpose Costing System*, STB Ex Parte No. 431 (Sub-No. 3) (STB served Apr. 6, 2009); *Class I Railroad Accounting and Financial Reporting – Transportation of Hazardous Materials*, STB Ex Parte No. 681 (STB served Jan. 5, 2009). However, the Board has not yet issued any proposals for addressing the costs associated with special safety and security measures that railroads have been incurring, and will continue to incur.

through 2007. Viewed from a slightly different perspective, UP has a new need for revenue to fund the substantial costs to install PTC, and this new revenue need is not reflected in benchmarks based on traffic that moved from 2004 through 2007. UP's proposal for adjusting the Three-Benchmark method's presumed maximum lawful rate to account for the requirement that railroads install PTC is discussed in detail in Part V.

UP's Opening Evidence is verified by UP personnel who are knowledgeable about the chlorine market, UP's relationship with USM, the costs of handling TIH materials, and the costs of installing PTC, and by outside experts who are knowledgeable about railroad costing issues and the Board's rules in *Simplified Standards*. *See* Appendix A. UP's Opening Evidence is also supported by a separate Verified Statement from Dr. Marius Schwartz, Professor of Economics at Georgetown University, who explains based on economic efficiency grounds why UP should be allowed the opportunity to recover an appropriate contribution to the costs of installing PTC from TIH shippers. *See* Appendix B.

II. BACKGROUND

USM's Complaint challenges UP's rates for transportation of chlorine from USM's facility in Rowley, Utah, to Sahuarita, Arizona, and Eloy, Arizona. This Part of UP's Opening Evidence first discusses the market for transporting chlorine and then discusses the history of the challenged rates and the operating characteristics of the specific chlorine movements at issue in this proceeding.

A. The Market For Transporting Chlorine

This section first describes the chemical and transportation properties of chlorine, which are important factors in determining the market price for transporting chlorine. Next, it describes recent statutory and regulatory actions that have played a significant role in changing

the market by imposing new costs on railroads that transport chlorine and other TIH materials. Finally, it describes how UP and chlorine shippers have responded to the market changes.

As will be discussed in detail below, chlorine is one of the riskiest materials shipped by rail, and it has become increasingly costly to transport. Chlorine's inherent risks have long been known, but the risks of transporting chlorine and other TIH materials have come into sharper focus in the wake of tragic terrorist attacks that demonstrated the vulnerability of our infrastructure and several high profile railroad incidents involving the release of TIH materials.

UP has expended significant resources in recent years to mitigate the risks associated with transporting chlorine and other TIH materials. Consistent with its well-established history of continuously refining and improving its safety and security practices, and also in response to recent government initiatives, UP has implemented new safety and security processes and procedures over the last several years to ensure that all hazardous materials, and especially TIH materials, are handled safely and securely. These safety and security improvements have required UP to spend substantial operating and capital dollars on activities that exclusively support hazardous material transportation. As a result of the Rail Safety Improvement Act of 2008, UP will have to spend approximately $1.4 billion more to install PTC across most of its network by the end of 2015.

UP's experience is that the market has responded to the heightened awareness of the risks and rising costs of handling chlorine and other TIH materials. Current market rates are significantly higher than they were just a few years ago, and they more accurately reflect the current and future risks and costs of handling chlorine and other TIH materials.

1. Chemical and Transportation Properties of Chlorine

Chlorine is a highly dangerous chemical that is toxic when inhaled. The United States Department of Transportation classifies chlorine as a "material poisonous by inhalation,"

and chlorine is often referred to as a "Toxic Inhalation Hazard" ("TIH"). *See* 49 C.F.R. §§ 171.8, 173.115(c), 173.116(a); *see also* 49 C.F.R. § 172.101 (Hazardous Material Table).

In fact, chlorine is among the most toxic of TIH materials in industrial use. When chlorine is inhaled, it reacts with moisture in the respiratory tract and lungs to form hydrochloric acid, resulting in inflammation of those tissues. Severe exposure can result in pulmonary edema, suffocation, and death.[2] The Center for Disease Control's National Institute for Occupational Safety and Health considers chlorine to be immediately dangerous to life or health at airborne concentrations of just 10 parts per million ("ppm").[3] According to the Environmental Protection Agency, exposure to chlorine can produce life-threatening health effects or death within ten minutes at an airborne concentration of just 50 ppm; it can produce irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape at an airborne concentration of a mere 2.8 ppm.[4]

Chlorine's dispersion properties exacerbate the risks posed by the chemical's inherent toxicity. Chlorine is shipped by rail as a liquefied, compressed gas. If liquefied chlorine is released from a tank car, it will rapidly vaporize. Because chlorine gas is nearly two

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[2] *See* National Transportation Safety Board, Railroad Accident Report, NTSB/RAR-05/04, *Collision of Norfolk Southern Freight Train 192 With Standing Norfolk Southern Local Train P22 With Subsequent Hazardous Materials Release at Graniteville, South Carolina, January 6, 2005* at 28 (Nov. 29, 2005). *See* UP Public electronic workpaper "Graniteville Report.pdf."

[3] *See* Center for Disease Control, National Institute for Occupational Safety and Health, *Documentation for Immediately Dangerous to Life or Health Concentrations*. The comparable figure for anhydrous ammonia, another TIH that often moves by rail, is 30 times higher, or 300 ppm. *See* UP Public electronic workpaper "CDC IDLHC.pdf."

[4] *See* U.S. Environmental Protection Agency, *Acute Exposure Guideline Levels*. For anhydrous ammonia, the comparable figures are 2700 ppm and 220 ppm. *See* UP Public electronic workpaper "EPA Exposure Guidelines.pdf."

and a half times as dense as air, released vapors will spread along the ground and collect in low or confined areas, rather than disperse into the air.

A Department of Energy study that quantified the risk of transporting hazardous materials demonstrates how chlorine's toxicity and dispersion properties contribute to the extraordinary risks involved in transporting chlorine.[5] Rail accidents involving chlorine are exceedingly rare, but the risks associated with transporting chlorine carry extremely high consequences. A catastrophic rail accident involving chlorine, such as the rupture of a tank car containing chlorine near a populated area, can cause massive casualties and significant economic losses.[6]

The Department of Energy study concluded that chlorine was responsible for 59 percent of the total fatality risk, and 58 percent of the total injury risk, associated with transporting TIH.[7] By comparison, the next highest risk was from anhydrous ammonia, which was responsible for 26 percent of the total fatality risk and 15 percent of the total injury risk.[8] Chlorine was found to pose materially greater transportation risks than anhydrous ammonia, even though the study data reflected significantly more shipments of anhydrous ammonia than chlorine.[9] Although chlorine was likely to be involved in fewer incidents than anhydrous ammonia, the results of any one incident were likely to be much more devastating. For example,

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5 *See* D.F. Brown, W.E. Dunn, and A.J. Policastro, United States Department of Energy, Argonne National Laboratory, Decision and Informational Sciences Division, *A National Risk Assessment for Selected Hazardous Materials in Transportation* (Dec. 2000). *See* UP Public electronic workpaper "National Risk Assessment.pdf."

6 The recent accident in Graniteville, South Carolina, underscores that the risks associated with a chlorine incident are not just theoretical.

7 *See* Brown, Dunn & Policastro, *A National Risk Assessment*, *supra*, at 5, Figure S.1.

8 *See id.*

9 *See id.* at 229, App. B, Table B.1 (rail data); *id.* at 107, Tables 4.21 & 4.22 (truck data).

while chlorine was likely to be involved in fewer derailments per year than anhydrous ammonia, the average number of fatalities and injuries per year from such incidents was likely to be more than twice as high for chlorine than anhydrous ammonia because the average number of fatalities and injuries per incident was likely to be so much higher for chlorine-related incidents.[10]

2. Recent Government Actions That Have Changed the Market for Transporting Chlorine

UP has always taken a proactive approach in providing for the safe handling of hazardous materials by continuously refining and improving its safety practices, and it has expended substantial resources to minimize the risks to the company, its employees, and the communities in which it operates. UP now faces an approximately $1.4 billion mandate to install PTC by the end of 2015, but that is only the most dramatic example of how recent government regulation has affected the market by increasing the costs to transport TIH.

Because of the extraordinary magnitude and range of risks to public health and welfare associated with transporting chlorine and other TIH materials, transportation of TIH is subject to stringent safety and security regulations imposed by several government agencies with overlapping jurisdictions. In recent years, this complex regulatory environment has undergone significant change, as the federal government has focused even more closely on the considerable risks associated with transporting chlorine by rail. New rail safety and security regulations have imposed substantial costs upon UP and other freight railroads; costs that materially affect the market for transporting chlorine by rail.

The most expensive of these new regulatory measures is the mandate to install PTC that was included in the Rail Safety Improvement Act of 2008, which will be described in

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[10] *See id.* at 140, Table 5.13; *id.* at 142, Table 5.14.

much greater detail in Part V. However, the requirement to install PTC is not the only recent government initiative that has significantly impacted the market for transporting TIH.

The recent series of government measures designed to improve the safety and security of TIH shipments began with several sets of "Recommended Security Action Items" issued by the Transportation Security Administration ("TSA"). On June 23, 2006, TSA issued a list of twenty-four recommended "action items."[11] The action items included designating an individual with overall responsibility for hazardous materials transportation security planning, conducting audits to verify that security plans are being effectively implemented, restricting access to information about hazardous materials shipments and security measures, and establishing procedures for performing background checks on contractor employees.

On November 21, 2006, TSA issued a supplement to its initial list, recommending that railroads develop site-specific security plans to address the risk posed by transportation of bulk TIH materials in High Threat Urban Areas ("HTUAs"). Specifically, the TSA asked railroads to develop plans that, among other things, would reduce the number of hours TIH cars were held in yards, terminals, and on railroad-controlled leased track in HTUAs, minimize the occurrence of unattended TIH cars in HTUAs, and develop procedures for positive handoff of TIH cars at points of origin, destination, and interchange in HTUAs.[12] On February 12, 2007,

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[11] *See* Transportation Security Administration, *TSA Recommended Security Action Items for the Rail Transportation of Toxic Inhalation Hazard Materials* (June 23, 2006), *available at* http://www.tsa.gov/what_we_do/tsnm/freight_rail/programs.shtm.

[12] *See* Transportation Security Administration, *Recommended Security Action Items for the Rail Transportation of Toxic Inhalation Hazard Materials, Supplement No. 1* (Nov. 21, 2006), *available at* http://www.tsa.gov/assets/pdf/Supplement_No%201_TIH-SAI.pdf.

TSA issued a second supplement, containing specific recommendations on establishing procedures for performing background checks on railroad employees.[13]

TSA and other government agencies also embarked on a series of formal rulemakings. On December 21, 2006, TSA proposed significant new requirements on railroads transporting TIH materials.[14] Among other things, the rules, which became final on November 26, 2008,[15] require railroads to develop systems that allow them to provide location and shipping information for TIH rail cars under their physical custody to TSA within five minutes of a request,[16] and to follow strict "chain of custody and control" procedures when transferring TIH cars to or from shippers or other carriers.[17]

The Pipeline and Hazardous Materials Safety Administration ("PHMSA") also proposed new rules regarding rail transportation of hazardous materials on December 21, 2006.[18] Among other things, the rules, which also became final on November 26, 2008,[19] require railroads to compile data concerning hazardous materials they transport and use those data to

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[13] *See* Transportation Security Administration, *Recommended Security Action Items for the Rail Transportation of Toxic Inhalation Hazard Materials, Supplement No. 2* (Feb. 12, 2007), *available at* http://www.tsa.gov/assets/pdf/sai_for_tih_supplement2.pdf.

[14] *See* Rail Transportation Security, Notice of Proposed Rulemaking, 71 Fed. Reg. 76,852 (Dec. 21, 2006).

[15] *See* Rail Transportation Security, Final Rule, 73 Fed. Reg. 72,130 (Nov. 26, 2008).

[16] *See* 49 C.F.R. § 1580.103(d)(1).

[17] *See* 49 C.F.R. § 1580.107.

[18] *See* Hazardous Materials: Enhancing Rail Transportation Safety and Security for Hazardous Materials Shipments, Notice of Proposed Rulemaking, 71 Fed. Reg. 76,834 (Dec. 21, 2006).

[19] *See* Hazardous Materials: Enhancing Rail Transportation Safety and Security for Hazardous Materials Shipments, Final Rule, 73 Fed. Reg. 72,182 (Nov. 26, 2008).

select the safest and most secure practicable routes for those materials,[20] to work with shippers to minimize the time a rail car containing hazardous materials is placed on a track awaiting pick-up, delivery, or transfer,[21] and to conduct enhanced security inspections of rail cars carrying hazardous materials.[22]

Finally, and most recently, on January 13, 2009, PHMSA issued new rules that impose a 50 mile-per-hour speed limit for all trains transporting loaded cars of TIH.[23]

UP has incurred, and continues to incur, substantial costs to comply with this series of government measures, including costs of complying with new safety and security procedures (*e.g.*, positive hand-off; shipment monitoring and tracking rules), costs associated with special handling procedures (*e.g.*, extra car and track inspections, speed restrictions), and costs of training railroad personnel about special operating and safety procedures. *See generally* Comments of Union Pacific Railroad Company at 6, *Class I Railroad Accounting and Financial Reporting – Transportation of Hazardous Materials*, STB Ex Parte No. 681 (Feb. 4, 2009).

3. UP's and Chlorine Shippers' Responses to Changes in the Market for Transporting Chlorine.

The market has responded to the heightened awareness of the risks and rising costs of transporting chlorine and other TIH materials, and UP has sought to ensure that its rates reflect the current market. UP accepts its obligation as a common carrier to transport TIH in the absence of safer, more logical alternatives, and it is working to make rail transportation of TIH as

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20 *See* 49 C.F.R. § 172.820(b)-(f).

21 *See* 49 C.F.R. § 172.820(g).

22 *See* 49 C.F.R. § 174.9.

23 *See* Hazardous Materials: Improving the Safety of Railroad Tank Car Transportation of Hazardous Materials, Final Rule, 74 Fed. Reg. 1770 (Jan. 13, 2009) (codified at 49 C.F.R. § 174.26(b)).

safe as possible. UP is also urging shippers to reduce TIH movements by substituting safer chemicals and by sourcing hazardous materials from the nearest production facility. However, UP is not using rates to discourage movements of chlorine or other TIH materials; UP's current rates for transporting TIH reflect market conditions.

With the exception of USM, UP's chlorine shippers have recognized the significant changes that have occurred in the market for transporting chlorine since 2004. As a result, rates negotiated between UP and chlorine shippers increased from 2004 through 2007, and they continued to rise in 2008 and early 2009.

The changing market can be seen by examining UP's revenue per revenue ton-mile for chlorine shipments from 2004 through the first quarter of 2009. As shown below in Chart 1, UP's average revenue per revenue ton-mile for chlorine increased from { } mills in 2004 to { } mills in 2007, and then to { } mills in 2008, before holding steady at { } mills in the first quarter of 2009 – a more than { } increase, in less than five years.[24]

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[24] UP used internal data to calculate these revenue per revenue ton-mile figures because they are more complete than the data contained in the Waybill Sample and they permit consideration of trends into 2008 and 2009. However, Waybill Sample data produce consistent results. Based on data from chlorine movements shown as originating and terminating on UP (to avoid using revenues that are based on mileage-based revenue divisions among carriers rather than actual divisions), UP's revenue per revenue ton-mile increased from { } mills in 2004, to { } mills in 2005, to { } mills in 2006, and to { } mills in 2007. *See* UP Highly Confidential electronic workpaper "UP TIH CWS 2004 2007.xls".

CHART 1
CHLORINE REVENUE PER REVENUE TON-MILE

UP data show that the market has changed since 2004. The market in 2007 was not the same as 2004, and the current market has changed further. Those changes make it especially important for the Board to consider other factors in determining what the market rates are now and what they should be for any prescription period.

B. The Challenged Rates

1. History of the Challenged Rates

USM is challenging rates that are consistent with UP's current market rates for transporting chlorine. Before UP established the challenged rates, USM's rates were significantly below the rates paid by other chlorine shippers. {

} *See* Appendix C (USM discovery document USM00289).

In fact, under UP's 2008 rates, UP revenue per revenue ton-mile for movements to Sahuarita and Eloy was { } mills and { } mills, respectively. By comparison, UP's average revenue per revenue ton-mile for chlorine was { } mills in 2008.

Chart 2 shows how UP's revenue per revenue ton-mile for USM's chlorine shipments compared with UP's revenue per revenue ton-mile for all other chlorine shippers before UP established the challenged rates.

CHART 2
CHLORINE REVENUE PER REVENUE TON-MILE
ALL CHLORINE v. USM CHLORINE

UP approached the parties' recent negotiations for a new contract with the objective of bringing USM's rates up to market levels. As discussed above, UP's costs had been rising as a result of recent regulatory requirements associated with transporting chlorine. UP was also faced with a new statutory mandate to spend more than a billion dollars to install PTC on lines used to transport TIH by 2015. Moreover, UP was concerned that its rates might be giving USM an unfair competitive advantage over its other chlorine shippers.

UP hoped to reach a negotiated agreement with USM. UP extended the contract that was initially set to expire at the end of 2008 until March 3, 2009, as part of its effort to reach a new agreement with USM. However, on January 16, 2009, USM asked UP to establish

common carrier rates and service terms for the issue traffic and movements to several other destinations. UP complied with USM's request, and USM began shipping under the tariff rates when the contract extension expired.[25]

2. Transportation Characteristics of the Issue Traffic

USM's complaint in this proceeding challenges two of the thirty-one rates established in UP Tariff 4949, Item 1000-A.[26] One of the challenged rates applies to movements to Sahuarita, Arizona, the other applies to movements to Eloy, Arizona. Both movements originate and terminate at facilities that are exclusively served by UP.

The issue traffic originates at USM's facility at Rowley, Utah, on the Great Salt Lake. USM's facility at Rowley is located at the end of an eleven-mile spur. The traffic moves on a local train from Rowley to Roper Yard. A different local train transfers the cars to Salt Lake City Yard, where they are placed in a manifest train. The manifest train travels south via Las Vegas, Nevada, to Daggett, California. From Daggett, the train moves over trackage rights on BNSF Railway to Colton, and then over UP's line to West Colton Yard. The cars are then switched into a different manifest train. From West Colton Yard, the train moves east to UP's yard in Tucson, Arizona. The traffic destined to Sahuarita then moves south on a local train from Tucson to Sahuarita. The traffic destined to Eloy moves west on a local train from Tucson to Casa Grande, and then east on another local train from Casa Grande to Eloy. Both movements

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[25] UP initially declined to establish rates to four destinations not at issue in this proceeding, but it subsequently established rates to those destinations in compliance with an order by the Board. *See Petition of Union Pac. R.R. for a Declaratory Order*, STB Finance Docket No. 35219 (STB served June 11, 2009).

[26] USM also has filed a separate challenge under the Board's Simplified-SAC method to UP's chlorine rates for seven additional destinations. *See US Magnesium, L.L.C. v. Union Pac. R.R.*, STB Docket No. 42115 (June 25, 2009).

pass through one TSA-designated High Threat Urban Area (Las Vegas), and major population centers in Salt Lake City, San Bernardino, and Tucson.

The Sahuarita movement travels approximately 1250 miles.[27] The Eloy movement travels approximately 1290 miles.[28] The issue traffic moves in UP single-line service, in private tank cars carrying under 22,000 gallons (URCS code 15), and in single-car shipments.

The movement characteristics are summarized below in Table 1.

TABLE 1
URCS PHASE III COST PROGRAM INPUTS

	Sahuarita	**Eloy**
1. Railroad	UP	UP
2. Loaded Miles	1250	1290
3. Shipment Type	Originated & Terminated	Originated & Terminated
4. Cars Per Shipment	1	1
5. Tons Per Car	90	90
6. Commodity	281	281
7. Type of Movement	Single Car	Single Car
8. Car Ownership	Private	Private
9. Type of Car	Tank <22,000 gallon	Tank <22,000 gallon

UP's unadjusted URCS variable cost for the Sahuarita movement, indexed to First Quarter 2009 levels, is $2,485 per carload. The tariff rate for the Sahuarita movement is $10,410. The Sahuarita movement's R/VC ratio is 4.19.

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[27] *See* UP Highly Confidential electronic workpaper "Mileage Calculations.doc" and "Track Charts" and "Timetables" folders.

[28] *See* UP Highly Confidential electronic workpaper "Mileage calculations.doc" and "Track Charts" and "Timetables" folders.

UP's unadjusted URCS variable cost for the Eloy movement, indexed to First Quarter 2009 levels, is $2,549 per carload. The tariff rate for the Eloy movement is $13,396. The Eloy movement's R/VC ratio is 5.26.[29]

The R/VC ratio calculations are summarized below in Table 2.

TABLE 2
URCS PHASE III VARIABLE COSTS PER CAR AND R/VC RATIOS[30]

	Sahuarita	Eloy
1Q09 Rate Per Car	$10,410	$13,396
1Q09 Variable Cost Per Car	$2,485	$2,549
R/VC Ratio	4.19	5.26

UP believes that the challenged rates would be found reasonable under any fair methodology. USM's rates should be among the highest rates for any traffic moving on UP, and they should be at the top of the range of UP's rates for moving chlorine.

UP's rates for moving chlorine should be higher than UP's rates for handling any other commodity because of the costs and risks associated with transporting TIH materials in general, and chlorine in particular. As UP has explained elsewhere, rail carriers should be allowed to set rates that assign a fair share of the costs and risks to producers and consumers of TIH. *See* Comments of Union Pacific Railroad Company at 3, 10, *Class I Railroad Accounting*

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[29] The R/VC ratio for the Eloy movement is noticeably higher than the R/VC ratio for the Sahuarita movement because, as described in the text, the Eloy movement requires more switching and more local train service than the Sahuarita movement, and the costs of those activities are not properly allocated by the system-average approach used in the URCS Phase III costing program.

[30] *See* UP Highly Confidential electronic workpaper "2007 URCS Sahuarita.pdf," "2007 URCS Eloy.pdf," and "STB Index UP 2007 URCS.xls." In its workpapers, UP also includes calculations of variable costs indexed to 2Q09 levels, which are less than 0.1% higher than the 1Q09 results shown in Table 2 above. *See* "STB Index UP 2007 URCS.xls."

and Financial Reporting – Transportation of Hazardous Materials, STB Ex Parte No. 681 (Feb. 4, 2009).

Transporting chlorine presents considerable risks to UP, its employees, its customers, and the communities that it serves. Although the actual cost associated with these risks is difficult to quantify unless an incident occurs, the risks are real and quite different than for non-chlorine shipments.

In addition, UP's quantifiable costs to move chlorine and other TIH materials are higher than UP's costs to move any other commodity because of the steps that UP must take to ensure safe transportation. As discussed above, these costs have increased as a result of recent regulatory changes, and they took a quantum leap higher as a result of the statutory mandate to install PTC. *See supra*, pp. 9-12. These costs associated with TIH movements should be borne by TIH shippers, rather than UP's other shippers, to avoid cross-subsidization of TIH shipments.

USM's rates should be at the top of the range of UP's rates for chlorine because they are common carrier rates, not contract rates. Contract rates are typically lower than common carrier rates because railroads are willing to accept lower rates in return for the stability, flexibility, and relief from regulatory burdens provided by contractual relationships. All of UP's other chlorine traffic currently moves under contract rates.

USM's rates should also be at the top of the range of UP's rates for chlorine because USM's demand for UP service is highly inelastic. UP is the only rail carrier that serves the issue traffic origin and destinations. USM also has little alternative but to ship chlorine by rail. USM's primary business at Rowley is the production of magnesium. USM produces chlorine as a by-product of its magnesium production activities. Prior to 2001, USM vented a significant portion of the chlorine into the atmosphere. As federal environmental standards grew

more stringent, USM was required to reduce its chlorine emissions, and USM implemented technology to capture the chlorine so that it can be sold. According to USM, if it cannot sell its chlorine, it must curtail its production of magnesium.[31]

Railroads are expected to set their prices to shippers based on principles of differential pricing. In recent years, USM has enjoyed relatively low rates because UP has tried to avoid the costs and uncertainty associated with regulatory proceedings. USM's current rates reflect the market for chlorine and an appropriate application of differential pricing principles.

III. IDENTIFICATION OF THE COMPARISON GROUP

This Part of UP's Opening Evidence discusses the criteria that UP used to identify comparable traffic in the Waybill Sample data that the Board released for this proceeding in order to calculate the R/VC_{COMP} benchmark. As described below, UP applied seven basic criteria to the Waybill Sample data to identify comparable traffic.

For the Sahuarita movement, UP's application of the comparability criteria produces a comparison group that consists of twenty-four movements. For the Eloy movement, the comparison group consists of the same twenty-four movements. That the two comparison groups are identical is not surprising, because the two movements both have the same origin, travel approximately the same number of miles, and terminate near Tucson, Arizona. The twenty-four movements in the comparison groups are listed in Appendix D.[32]

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[31] *See* Comments in Opposition and Request for Order Compelling UP to Provide Common Carrier Rates at 2-3 & Verified Statement of Dr. Howard Kaplan at 3-6, *Petition of Union Pacific Railroad Company for a Declaratory Order*, STB Finance Docket No. 35219 (Mar. 23, 2009).

[32] *See also* UP Highly Confidential electronic workpaper "Comparison Group UP - Open.xls."

A. Movements With An R/VC Ratio Greater Than 180 Percent

In accordance with the Board's decision in *Simplified Standards*, UP limited potentially comparable movements to movements with R/VC ratios greater than 180 percent. *Simplified Standards* at 17.

B. Movements Shown As Originating And Terminating On UP

The issue traffic originates and terminates on UP. Accordingly, UP limited potentially comparable movements to movements that are shown in the Waybill Sample as originating and terminating on UP – that is, traffic for which the revenues and variable costs shown in the Waybill Sample reflect UP's rates and costs, without any arbitrary, mileage-based revenue allocation among multiple carriers. UP thus included interline traffic that was rebilled by UP (*e.g.*, pursuant to Rule 11), but excluded interline traffic for which the Waybill Sample process assigns a mileage-based allocation of through revenue to UP. This limitation is consistent with the Board's ruling that it would exclude non-defendant traffic from the comparison group. *Simplified Standards* at 82.

C. Movements In Similar Equipment

The issue traffic moves in tank cars that transport less than 22,000 gallons of product. A tank car is a specialized type of equipment that has different transportation characteristics than other types of cars. In addition, tank cars are used to move different commodities than those that move in other types of equipment. There are also different types of tank cars, and those different types of tank cars have different transportation characteristics and are used to move different commodities. Because of differences in costing characteristics, URCS distinguishes between tank cars that hold under 22,000 gallons (URCS code 15) and tank cars that hold 22,000 gallons or more (URCS code 16). The issue traffic moves in tank cars that hold under 22,000 gallons. *See also* Complaint ¶¶ 5, 6. Accordingly, UP limited potentially

comparable movements to movements that are shown in the Waybill Sample as moving in tank cars that hold under 22,000 gallons. This limitation is consistent with the Board's statement that it will "favor a comparison group that consists of movements of like commodities so the variable cost calculation of the issue movement and the comparison group will be similar." *Simplified Standards* at 17.

D. Movements In Private Cars

The issue traffic moves in private cars. Movements in private cars are not comparable to movements in cars owned by UP because car supply costs are a significant component of rail transportation costs. Accordingly, UP limited potentially comparable movements to movements that are shown in the Waybill Sample as moving in private cars. This limitation is also consistent with the Board's concern that "the variable cost calculation of the issue movement and the comparison group [should] be similar." *Simplified Standards* at 17.

E. Movements Of Similar Distances

The Sahuarita movement travels approximately 1250 miles. The Eloy movement travels approximately 1290 miles. In *Simplified Standards*, the Board stated that one of the factors it would review to determine comparability is "length of movement." *Simplified Standards* at 17. The Board also recognized that the range of comparable movements should not be too broad, in order to avoid the risk that "repeated application of the Three-Benchmark approach could have a feedback effect that could act to lower the mean for future cases." *Id.* at 73. Accordingly, UP limited potentially comparable movements to movements with loaded miles that were within a range of plus or minus 400 miles of the issue movements' loaded miles.

F. Movements Of Chlorine

The issue traffic is chlorine. UP carefully considered whether it would be appropriate to include movements of commodities other than chlorine in the comparison groups.

In particular, UP considered whether it would be appropriate to include movements of anhydrous ammonia, because the Waybill Sample data show that anhydrous ammonia is the second most frequently shipped TIH material on UP, after chlorine. UP concluded that the theory underlying the Board's reliance on the R/VC_{COMP} benchmark requires limiting potentially comparable movements to movements of chlorine: no other commodity moves in a product market similar enough to chlorine that meaningful information about the appropriate demand-based differential pricing levels for chlorine could be derived by comparing R/VC ratios for movements of that commodity with R/VC ratios for movements of chlorine.

The Board's reliance on the R/VC_{COMP} benchmark is based on the theory that "the markups applied to a similar commodity moving under similar transportation conditions can provide some rough indication of the relative degree of demand elasticity for that type of traffic." *Rate Guidelines – Non-Coal Proceedings*, 1 S.T.B. 1004, 1035 (1996).[33] The Board is interested in markups and demand elasticity because those concepts lie at the core of Ramsey pricing principles, and Ramsey pricing principles are "the cornerstone" of the Board's "rate reasonableness tenets for the railroad industry." *Rate Guidelines – Non-Coal Proceedings*, 1 S.T.B. at 1007.

"Under Ramsey pricing principles, carriers are expected to price traffic in inverse proportion to demand elasticity, up to the point at which a reasonable, adequate profit level is attained. In other words, a railroad should price its traffic differentially so as to recover a greater percentage of its unattributable costs from the traffic with a greater dependency on its service

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[33] *See also Simplified Standards* at 17 (explaining that the R/VC_{COMP} benchmark is used to provide "evidence on the degree of permissible demand-based differential pricing needed to provide a reasonable return on investment").

(*i.e.*, less price sensitivity for that service)." *Id.* "The R/VC_{COMP} benchmark provides a means of reflecting demand-based differential pricing principles. The benchmark measures the markup taken on >180 traffic that involves similar commodities moving under similar transportation conditions." *Id.* at 1034. Although R/VC ratios do not accurately measure markups over marginal costs, and thus the R/VC_{COMP} benchmark is an "admittedly crude" measure of demand elasticity, it is "the only simple means available to obtain even a rough measure of this very important pricing factor." *Id.* In short, the R/VC_{COMP} benchmark uses markups over variable costs as a crude proxy for markups over marginal costs.

The Board's decision in *Simplified Standards* recognizes that the R/VC_{COMP} benchmark provides a meaningful measure of markups over costs only if the comparison group consists of (i) similar commodities, moving under (ii) similar transportation conditions. *Simplified Standards* at 17. However, almost all of the comparability factors that the Board identified address only the second issue – that is, whether movements operate under similar enough transportation conditions such that "the variable cost calculation of the issue movement and comparison group will be similar." *Id.* The only comparability factor that addresses the issue of similar commodities is "commodity type." *Id.*[34]

The Board did not explain in *Simplified Standards* how to identify commodities of a sufficiently similar "type," but its prior decisions explain that comparison traffic "should involve a similar commodity handled in a similar product . . . market." *Rate Guidelines – Non-Coal Proceedings*, 1 S.T.B. at 1035 n.90. Whether two commodities are in the same product

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[34] The Board does say that comparability will be determined by reviewing "demand elasticity." *Simplified Standards* at 17. However, as the Board has recognized elsewhere, it uses the R/VC_{COMP} benchmark because there is no better, readily available method to measure demand elasticity. *See Rate Guidelines – Non-Coal Proceedings*, 1 S.T.B. at 1034.

market is commonly determined by considering whether two commodities compete such that one would be substituted for the other in the event of a price increase: two commodities are in the same product market if a small but significant and nontransitory increase in price for one commodity would result in the substitution of the other commodity. *See, e.g.*, U.S. Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines* § 1.1 (1997).[35]

The Board has previously relied on a product competition/substitution test to identify sufficiently similar commodities when applying the R/VC_{COMP} benchmark. In *South-West Railroad Car Parts Co. v. Missouri Pac. R.R.*, ICC Docket No. 40073 (ICC served Dec. 12, 1988), the agency initially concluded that movements of retired railroad cars had demand characteristics that were comparable to movements of loaded scrap iron and steel traffic "because scrap from rail cars competes with scrap from other sources when sold to ultimate users." *Id.* at 6. The Board later revisited and reversed its conclusion, but it relied on the same test, explaining that retired railroad cars "were not used entirely for scrap" and also that the retired rail cars were not comparable to the scrap that had been included in the proposed comparison group because the cars' "scrap content was not limited to iron and steel (the only commodities in the comparison group), but included aluminum, brass, and stainless steel." *South-West Railroad Car Parts Co. v. Missouri Pac. R.R.*, STB Docket No. 40073 (STB served Dec. 31, 1996) at 7; *cf. Market Dominance Determination – Product & Geographic Competition*, 3 S.T.B. 937, 937 (1998) (explaining that "product competition" involves "whether the

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[35] *Available at* http://www.usdoj.gov/atr/public/guidelines/hmg.htm. *See also Brown Shoe Co. v. United States*, 370 U.S. 294, 325 (1962) ("The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it.").

complaining shipper can avoid using the defendant railroad by shipping or receiving a substitute product").

Chlorine is in a very different product market than anhydrous ammonia and other TIH materials handled by UP. The primary end users of transported chlorine are manufacturing firms in the plastics industry and the organic and inorganic chemicals industries. The largest portion of chlorine production goes into producing polyvinyl chloride, commonly known as PVC.[36] In addition, about 85 percent of pharmaceuticals contain or are manufactured using chlorine chemistry.[37] Chlorine is also used in smaller amounts in water treatment facilities and in food production and healthcare settings as a disinfectant.[38] According to The Chlorine Institute, in 95 percent of chlorine's uses, there is no ready substitute for chlorine.[39]

Anhydrous ammonia is a very different product than chlorine. Anhydrous ammonia is primarily used in agriculture, as a fertilizer or in manufacturing other fertilizers.[40] UP treats anhydrous ammonia and chlorine differently from a marketing perspective. Within UP's Chemicals group, anhydrous ammonia is marketed by the team responsible for fertilizers, a group of products that includes potash, phosphatic fertilizers, and other nitrogen based fertilizers,

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36 *See* Testimony of The Chlorine Institute, Inc. at 2, *Common Carrier Obligation of Railroads*, STB Ex Parte No. 677 (Apr. 17, 2008).

37 *See id.*

38 *See id.* at 1-2.

39 *See id.* at 2.

40 *See* Testimony of The Fertilizer Institute at 2-3, *Common Carrier Obligations of Railroads – Transportation of Hazardous Materials*, STB Ex Parte No. 677 (Sub-No. 1) (July 10, 2008). A smaller portion of anhydrous ammonia production is used in industrial applications, such as the production of certain pharmaceuticals, adhesives, feed supplements, personal care products, and nylon fibers, but even with respect to its industrial uses, chlorine is not a substitute for anhydrous ammonia. *See id.* at 3.

while chlorine is marketed by the team responsible for industrial chemicals, and the two teams report to different assistant vice presidents.

Other TIH materials that are shipped less frequently on UP also are in different product markets than chlorine. The third most frequently shipped TIH is ethylene oxide. Ethylene oxide is used as an intermediate in the production of products such as ethylene glycol (antifreeze), textiles, detergents, polyurethane foam, solvents, and adhesive. The fourth most frequently shipped TIH, anhydrous hydrogen fluoride, is typically used in synthesizing fluorocarbons such as Freon and Teflon, as well as the production of aluminum fluoride and synthetic cryolite for use in aluminum. Methyl mercaptan is the fifth most commonly shipped TIH, and it is largely used in the production of an amino acid supplement in animal feeds and in the synthesis of jet fuel additives and fungicides. None of these chemicals is a substitute for chlorine.

There are several additional reasons why R/VC ratios for commodities other than chlorine do not shed any light on the appropriate rates for movements of chlorine.

First, as discussed above in Part II, chlorine has characteristics that make it an especially dangerous commodity, even as compared with other TIH materials. In particular, chlorine's toxicity and dispersion properties combine to make chlorine among the riskiest of all TIH materials transported by rail.

Second, shippers have few modal alternatives to rail transportation for chlorine. According to The Chlorine Institute, approximately 85 percent of long-distance delivery of chlorine takes place by railroad tank car.[41] By comparison, a much smaller percentage of

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[41] *See* Testimony of The Chlorine Institute, Inc. at 2, *Common Carrier Obligation of Railroads, supra.*

anhydrous ammonia moves by rail, and a correspondingly larger percentage moves by other modes. According to The Fertilizer Institute, less than half of the anhydrous ammonia that is used for agricultural and industrial purposes is shipped by rail, and more than half moves by barge or pipeline, even excluding anhydrous ammonia that is imported and used at manufacturing plants located near port facilities.[42] Anhydrous ammonia's susceptibility to transportation by other modes makes anhydrous ammonia movements particularly inappropriate for use in a comparison group where the issue traffic is chlorine.[43]

Third, there are few currently available substitutes for chlorine. By contrast, there are fertilizers that are made from anhydrous ammonia but that are less hazardous to transport by rail, including urea (a dry material, usually sold in tiny round grains or pellets) and urea ammonium nitrate solution (a non-pressurized liquid).

Accordingly, UP's limitation of the comparison group to movements of chlorine is consistent with the Board's statement in *Simplified Standards* that comparability will be

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[42] More specifically, according to The Fertilizer Institute, agricultural use of anhydrous ammonia averages approximately 3.94 million tons per year, industrial use averages approximately 6.0 to 6.5 million tons per year, and rail shipments average approximately 4.0 million tons per year. *See* Testimony of The Fertilizer Institute at 4, 5-6, *Common Carrier Obligations of Railroads – Transportation of Hazardous Materials*, *supra.*

It is unclear whether The Fertilizer Institute's data include shipments of anhydrous ammonia used to produce other fertilizers, but if not, then the percentage of anhydrous ammonia that is shipped by rail is even lower. Data from the U.S. Geological Survey indicate that U.S. consumption of nitrogen averaged 14.23 million tons annually between 2000 and 2005, which equates to 11.67 million tons of anhydrous ammonia – about a million tons more than is accounted for by The Fertilizer Institute. *See* UP Public electronic workpaper "USGS Nitrogen Data.pdf."

[43] *See Rate Guidelines – Non-Coal Proceedings*, 1 S.T.B. at 1035 n.90 ("The comparison traffic must involve a commodity that is not readily susceptible to transportation by another available mode (at least at the distances involved in the complaint).").

determined by factors including "commodity type" and that it "will favor a comparison group that consists of movements of like commodities." *Simplified Standards* at 17.

G. Movements Other Than The Issue Traffic

UP's final criterion excludes any of the issue movements contained in the Waybill Sample data. In this case, however, no issue traffic appeared in the Waybill Sample data.

The following table summarizes UP's selection criteria.[44]

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[44] UP would have added an eighth criteria – that the issue traffic should be movements that occurred under common carrier rates, rather than contract rates – except that none of the traffic remaining in the comparison group after application of the first seven criteria moved under common carrier rates. *Cf. Simplified Standards* at 83 ("Thus, holding everything else constant, a comparison group that consists of just common carrier traffic will be selected over a group that includes contract traffic."). Instead, UP proposes an adjustment to account for the difference between common carrier and contract rates in Part V.C.

TABLE 3
COMPARABILITY CRITERIA

Criteria	Waybill Field	Value
1. R/VC>180%	Unexpanded revenues (F_REV divided by EXP_FACTOR) plus MISC_CHG, divided by unexpanded costs (TOTAL_COST divided by EXP_FACTOR)	>180%
2. UP is Originating and Terminating Railroad	ORIG_RR and TERM_RR	Both fields = UP
3. Tank Cars <22,000 gal.	AAR	First digit = T Last digit = 0 through 5
4. Private Cars	OWNER	P
5. Miles +/- 400	TOTAL_DIST divided by 10	Sahuarita: 850-1,650 Eloy: 890-1,690
6. Chlorine	STCC	2812815
7. No Issue Traffic	STCC, ORIG_CITY, ORIG_ST, TERM_CITY, TERM_ST	2812815 Rowley, UT Sahuarita or Eloy, AZ

IV. CALCULATION OF THE PRESUMED MAXIMUM LAWFUL RATE

Under the Three-Benchmark method, once the comparison group has been identified, the next step is to apply the RSAM and $R/VC_{>180}$ benchmarks to each movement in the comparison group, and then calculate a confidence interval around the estimate of the mean of the "adjusted comparison group." *Simplified Standards* at 21.

In this case, UP's RSAM for the four-year period from 2004 to 2007 is 326 percent; UP's $R/VC_{>180}$ for that period is 231 percent.[45] Accordingly, UP adjusted the R/VC

[45] *See Simplified Standards For Rail Rate Cases – 2007 RSAM and $R/VC_{>180}$ Calculations*, STB Ex Parte No. 689 (STB served May 12, 2009), Tables I & II.

ratio of each movement in the comparison group by 1.41. UP then calculated the mean and standard deviation of the R/VC ratios for the adjusted comparison groups, and it constructed a confidence interval based on the comparison group sample size and standard deviation.

UP is submitting workpapers showing the calculations described above. The results of the calculations are summarized in Table 4.

TABLE 4
PRESUMED MAXIMUM LAWFUL RATES[46]

	Sahuarita	**Eloy**
1Q09 Per Car Rate (UP Tariff)	$10,410	$13,396
1Q09 Variable Cost Per Car	$2,485	$2,549
1Q09 Actual R/VC Ratio	4.19	5.26
Presumed Maximum R/VC Ratio	4.33	4.33
Presumed Maximum Lawful Rate	$10,760	$11,037

Using UP's initial comparison group, the presumed maximum lawful rate for the Sahuarita movement is higher than the challenged rate. Thus, using UP's initial comparison group, the challenged Sahuarita rate is reasonable.

V. OTHER RELEVANT FACTORS

In *Simplified Standards*, the Board recognized that the Three-Benchmark method was subject to the problem of "regulatory lag." *Simplified Standards* at 85. The problem of regulatory lag exists because each of the three benchmarks used to calculate the presumed

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46 *See* UP Highly Confidential electronic workpaper "STB Index UP 2007 URCS.xls"

maximum lawful rate is based on data reflecting market conditions that existed several years before the defendant established the challenged rate. *Id.* In this case, for example, UP established the challenged rates based on the market conditions that existed in 2009, but the Waybill Sample data that will be used to calculate the three benchmarks are from the years 2004 through 2007. In other words, UP's current rates for USM's chlorine shipments will be tested for reasonableness using data reflecting market conditions that existed as long as five years ago. Moreover, those five-year-old data will potentially affect the maximum rates UP can charge USM from March 2009 to March 2014.

The Board has said that it will address the problem of regulatory lag by allowing parties to use the catch-all category of "other relevant factors" to present "evidence that the presumed lawful rate should be higher, or lower, due to market changes not reflected in the comparison group or the average RSAM and $R/VC_{>180}$ benchmarks." *Id.* At the same time, however, the Board established limits on the evidence that it would accept. Parties must present evidence that allows the Board "to quantify the impact of these 'other relevant factors' on the presumed maximum lawful rate." *Id.* at 22. The Board prohibited parties from introducing evidence of product and geographic competition associated with particular movements, as well as evidence of movement-specific adjustments to URCS. *Id.* It also reserved the right "to prohibit other categories of evidence if experience demonstrates that the introduction of such evidence would or does unduly complicate this process." *Id.*

There is overwhelming evidence that the current market for transporting chlorine is very different from the market that existed from 2004 through 2007. As discussed above, UP's costs of transporting chlorine and other TIH materials have increased significantly, as UP has been spending substantial operating and capital dollars to prepare for and comply with a

series of recent safety and security rules issued by the TSA and PHMSA. *See supra*, pp. 9-12. UP's rates for transporting chlorine have also increased significantly. *See supra*, pp. 12-14.

UP has struggled with the challenge of quantifying the effect of market changes while remaining within the established bounds of the Three-Benchmark method. UP did not want to introduce evidence that could be characterized as a collateral attack on the Board's requirement that the parties draw comparison groups from the Waybill Sample data released by the Board, *see Simplified Standards* at 18, or the Board's prohibition against movement-specific adjustments to URCS, *see id.* at 22. In addition, attempting to account for all of the costs of recent TIH-related regulatory requirements would be exceptionally difficult because TIH-related costs are not separately identified and captured by railroad accounting rules or the Uniform Railroad Costing System ("URCS"). *See Class I Railroad Accounting & Financial Reporting – Transportation of Hazardous Materials*, STB Ex Parte No. 681 (STB served Jan. 5, 2009).

Ultimately, UP lowered its sights. UP concluded that the most it can hope to do in this proceeding is prevent USM from insulating itself from the market effects of the requirement that railroads install PTC. UP rates established in 2009 reflect a market in which UP must install PTC, and USM should not be able to avoid the effects of this market change by obtaining a prescription that would cap its rates from 2009 into 2014 based on rates for traffic that moved from 2004 through 2007.

Neither UP nor the Board can force shippers to pay rates above those allowed by current market conditions. However, UP is asking the Board to take into account the requirement that it install PTC by ruling that the maximum reasonable rate UP can charge USM is the "presumed maximum lawful rate" based on 2004 through 2007 Waybill Sample data, *adjusted* to reflect an appropriate contribution to UP's costs to install PTC.

In Section A below, we describe in more detail the justifications for adjusting the presumed maximum lawful rate to account for UP's obligation to install PTC. We present two alternative methodologies that could be used to make an appropriate adjustment in Section B.

Finally, in Section C, we propose an additional adjustment to reflect the fact that the challenged rates are common carrier rates, whereas the comparison group consists entirely of movements that were made under contract rates.

A. The Board Should Adjust The Presumed Maximum Lawful Rates To Account For UP's Obligation To Install PTC On Lines Used To Transport TIH.

As discussed above in Part II, one important reason why UP's chlorine rates have increased significantly since 2004 is that the market has increasingly recognized the substantial new costs that railroads are incurring because of their common carrier obligation to transport chlorine and other TIH materials.

The most recent dramatic example of these new costs is the requirement that railroads install PTC. Under the Rail Safety Improvement Act of 2008, UP and other Class I railroads must install PTC on all main line over which TIH is transported by December 31, 2015. UP's obligation to install PTC is already affecting the transportation market. UP must expend funds to install PTC, and it must set rates that will allow it to earn sufficient revenue to fund that expenditure. However, because of regulatory lag, the market effect of this new obligation will not be reflected in the Board's R/VC_{COMP}, RSAM, or $R/VC_{>180}$ benchmarks in this proceeding, all of which reflect market conditions before this new federal mandate. Thus, the market effect of PTC will not affect the rates UP is allowed to charge USM, unless the Board accounts for UP's obligation to install PTC as an "other relevant factor."

In the sections below, we describe the statutory mandate to install PTC, UP's plans for complying with the mandate, and UP's expected costs to install PTC. We then explain

why UP should be allowed the opportunity to recover an appropriate share of its PTC costs from shippers of TIH, and why UP should be allowed to recover those costs through the rates it charges shippers in the current market.

1. The Statutory Mandate to Install PTC

As a result of a congressional mandate, UP must install PTC on thousands of miles of its lines because those lines are used to transport TIH. Specifically, Congress is requiring each Class I railroad to implement a PTC system by December 31, 2015, on:

> "(A) its main line over which intercity rail passenger transportation or commuter rail passenger transportation, as defined in section 24102 [of U.S. Code Title 49], is regularly provided;
>
> (B) its main line over which poison- or toxic-by-inhalation hazardous materials, as defined in parts 171.8, 173.115, and 173.132 of title 49, Code of Federal Regulations, are transported; and
>
> (C) such other tracks as the Secretary [of Transportation] may prescribe by regulation or order."

Rail Safety Improvement Act of 2008, Pub. L. No. 110-432, § 104(a), 122 Stat. 4848, 4856-57 (2008) (codified at 49 U.S.C. § 20157(a)(1)). Congress has defined the term "main line" to mean "a segment or route of railroad tracks over which 5,000,000 or more gross tons of railroad traffic is transported annually." *Id.*, 122 Stat. at 4858 (codified at 49 U.S.C. § 20157(i)(2)).

The legislative history of the Rail Safety Improvement Act of 2008 confirms what is apparent in the Act's language: Congress was concerned about incidents involving passenger traffic and incidents involving TIH, as reflected in repeated references to tragic accidents in

Chatsworth, California, and Graniteville, South Carolina, to justify the mandate that railroads install PTC.[47]

2. UP's Plan to Install PTC

PTC is a predictive collision avoidance technology that can stop a train before an accident occurs. It is designed to keep a train under its maximum speed limit and within the limits of its authority to be on a track. It requires sophisticated computer software, reliable communication systems, and other complex technologies to monitor current train conditions, detect upcoming track conditions, and take control of the train when needed. One of the most challenging issues in the development of PTC is creating a braking algorithm that integrates information about train length, weight, speed, and braking characteristics, and track grade, curvature, and other track conditions to predict braking distance accurately enough to enforce a stop before a train goes past a target, but that will not stop a train far short of the target.

UP has devoted considerable effort over almost two decades to exploring the potential benefits and challenges involved in developing and implementing moving block (or "standalone") PTC. In addition to producing safety benefits, standalone PTC has the potential – at least in theory – to create economic benefits for railroads and shippers by increasing railroad track capacity and reducing operating costs.[48] However, the PTC technology that UP will install

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[47] *See, e.g.*, S. Rep. No. 110-270, at 6 (2008) ("Collisions like the one that occurred in Graniteville, South Carolina, on January 6, 2005, in which an employee's failure to properly line a track switch resulted in the derailment of several railroad cars and the release of chlorine gas, killing nine people, could have been prevented by a PTC system."); H.R. Rep. No. 110-336, at 29-30 (2007) (discussing accidents involving the release of chlorine in Graniteville and Macdona, Texas, and the release of anhydrous ammonia in Minot, North Dakota).

[48] The moving block concept means that a train could receive movement authority between any two locations, rather than being constrained to the fixed block boundaries of conventional signaling. This might, at least according to theory, allow train spacing to be reduced when one train is following another, thus effectively increasing track capacity.

to comply with Congress's mandate will not be standalone PTC. Many more years of work would be required before UP could hope to implement a standalone system, and UP could not meet the statutory deadline. The PTC system that UP will install will be an "overlay" PTC system – it will be overlaid on UP's existing signal systems. An overlay system does not provide the same potential for benefits as standalone PTC. It cannot increase track capacity; in fact, it can only degrade capacity because the braking algorithm and any defects that trigger a fail-safe response impose additional operating constraints beyond those imposed by the existing signal system.[49] Moreover, an overlay system adds to the cost of existing wayside devices rather than eliminating those costs: UP now must upgrade its existing wayside devices so the information they provide can be integrated into the PTC system, and it must maintain the overlay system in addition to its existing system.

UP had not planned to install an overlay PTC system across its network before Congress enacted Rail Safety Improvement Act of 2008. Now, it has no choice. UP is developing a plan for implementing PTC in accordance with the Act, which provides that carriers shall, "to the extent practical, implement [PTC] in a manner that addresses areas of greater risk before areas of lesser risk." 49 U.S.C. § 20157(a)(2). UP has committed to installing PTC in the Los Angeles Basin area by the end of 2012. Beyond that commitment, it is certain that UP will install PTC everywhere required under law by the end of 2015.

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[49] A "fail-safe response" means that the result of a hardware failure or the effect of a software error will either prohibit the system from assuming or maintaining an unsafe state, or will cause the system to assume a state known to be safe. Thus, for example, if a signal fails, the system will assume that it was a stop signal and stop the train.

3. UP's Costs to Install PTC

UP has been working for many years to develop and test PTC, and thus its estimates of the costs to install PTC reflect that accumulated experience and information. The cost estimates presented below were not generated for this litigation. They are the results of a systematic effort by UP, undertaken in the course of business, to calculate the costs it will incur to comply with the congressional mandate to install PTC. They reflect the actual data that UP is using for business planning purposes.

UP's PTC system, which UP calls the Vital Electronic Train Management System ("VETMS") will involve the interaction of four "segments": wayside, locomotive, telecommunications, and back office. A summary of UP's costs to install PTC by 2015 is provided in Table 5. The segments and associated costs are described in more detail below.

TABLE 5
UP COSTS TO INSTALL PTC BY YEAR-END 2015[50]

Segment	Costs (in Millions)
Wayside	{ }
Locomotive	{ }
Back Office	{ }
Telecommunications	{ }

a) Wayside Segment

The wayside segment will be the most expensive segment of PTC. The most expensive component of the wayside segment will be the installation of wayside interface units

[50] *See* UP Highly Confidential electronic workpaper "PTC Investment Summary - Open.xlsx."

("WIUs"). WIUs will monitor the state of wayside devices (*e.g.*, signals, switches, and broken rail detectors) and communicate that status information to the locomotive and office segments.

Based on an inventory of the wayside devices on its lines, UP estimates that it will have to install { } WIUs by December 31, 2015.[51] The cost per WIU installation will vary depending on whether the WIUs will be installed at control points (*i.e.*, switches that are controlled by UP dispatchers) or intermediate locations (*i.e.*, wayside devices between control points); whether the wayside devices at those locations rely on newer solid state technology or older relay technology; whether the track at those locations is single-, double-, triple-, or quadruple-track; and whether WIUs will be installed in "dark territory," where there currently is no currently existing electricity source to power the units. In addition, UP has determined that it will have to upgrade old transistor-based track circuits at certain control points and intermediate locations and replace old-style poleline and relays.

UP's cost estimates for the wayside segment account for the costs of labor and materials. The labor costs include costs of surveying its wayside to determine precisely what new equipment must be installed and where it must be installed, physically installing the new equipment, and then testing the new equipment. The material costs are primarily the costs of the new equipment required at control points and intermediate locations so existing wayside devices can transmit the status information required to operate PTC. The material costs also include smaller amounts associated with upgrading track circuits and replacing poleline and relays.

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[51] UP's calculation of the precise number of WIUs that will be required is based on a track-specific analysis. UP identified the track to be included in the analysis using 2007 traffic data, because it began the process of preparing detailed estimates of its likely costs after Congress passed the Rail Safety Improvement Act of 2008 in late 2008 – before full-year data were available for 2008. UP believes that the use of 2008 traffic data would not change the results of its analysis; it is not aware of any significant changes with respect to the lines used by TIH and passenger traffic between 2007 and 2008.

b) Locomotive Segment

The locomotive segment continually accepts, processes, and validates data that it receives from the office and wayside segments, as well as data obtained "locally," such as locomotive control settings and global positioning satellite data. It validates data by comparing the information it receives from the office segment with the information it receives from the wayside segment. It also continuously calculates the train's on-track location, speed, and direction. All of these data are then incorporated into a display that provides the locomotive crew with information about movement authority limits, speed restrictions, and work zone limits. The data are also used to enforce stops at the limits of the train's movement authority, to prevent unauthorized incursions into work zones, and to enforce speed restrictions by initiating brake application to stop the train, if necessary to prevent a violation of authority or speed limits.

UP expects to install PTC equipment on { } locomotives by the end of 2015, which includes { } six-axle road locomotives and { } four-axle locomotives in local fleets. The components of the locomotive segment include, for each locomotive: an on-board train management computer and two displays, which together cost { } per locomotive; two communications management units, which allow the locomotive to communicate with the back office and wayside segments and which together cost { }; a mobile access router, which costs { }, as well as other equipment. Installation costs add another { } to the cost per locomotive of complying with the mandate to install PTC.

c) Back Office Segment

The back office segment is the interface between UP's existing dispatching and management information systems and the locomotive segment of VETMS. The back office segment receives train sheet data and train consist data from UP's management information system, and information regarding operating authorities, temporary speed restrictions, work zone

limits, and control point status from UP's dispatching system, and then transmits that information to the locomotive segment.

The physical components of the back office segment include multiple computers that must operate in a high-availability environment, but the most expensive aspect of the back office segment will be the work required to develop the systems necessary to integrate PTC with UP's existing technology and to perform the testing required to insure system integrity.

d) Telecommunications Segment

Finally, the telecommunications segment provides the data communications between the back office segment, the locomotive segment, and the wayside segment. The components of the telecommunications segment include, among other things, radios for each of the { } WIUs, with costs that vary depending on whether the sites have an existing mast and antenna that are sufficient for transmitting the data needed to operate PTC; and base stations to transmit signals between WIUs and locomotives, on the one hand, and the back office segment, on the other hand, with costs that vary depending on whether UP is upgrading existing base stations to handle digital signals as well as voice transmissions, or constructing new base stations to provide digital coverage in areas that are beyond the range of existing base stations.

e) Training and Maintenance Expense

UP has also estimated that it will cost approximately { } to train its employees, including locomotive engineers, dispatchers, and maintenance workers, to operate and maintain the new systems associated with PTC. In addition, UP estimates that annual costs to maintain the new PTC systems will amount to approximately { } per year of the initial installation costs. UP has not included these costs in the totals calculated for this proceeding because its calculations in this proceeding focus solely on UP's investment cost to install PTC.

4. The Board Should Allow UP the Opportunity to Recover PTC Costs in Setting Rates for TIH Shippers.

A large portion of UP's costs to install PTC is caused by UP's transportation of TIH. As a matter of economic efficiency and regulatory precedent, it is reasonable and appropriate for UP's rates to TIH shippers to reflect the PTC costs caused by TIH, and the Board should adjust the Three-Benchmark method's "presumed maximum lawful rate" to give UP the opportunity to recover an appropriate contribution to its PTC costs from USM.

a) A Large Portion of UP's Costs to Install PTC Are Caused by TIH.

A large portion of UP's costs to install PTC results solely from UP's transportation of TIH. As discussed above, the Rail Safety Improvement Act of 2008 requires UP to install PTC on all main line over which it transports passenger traffic or TIH. UP has determined that the statute will require it to install PTC on approximately { } miles of track, based on the Federal Railroad Administration's current proposal to use traffic data from 2008.[52] On less than { } miles of track on which it must install PTC, UP transports passenger traffic, but not TIH; on approximately { } miles, UP transports both passenger traffic and TIH; and on approximately { } miles, UP transports TIH, but not passenger traffic. In short, on more than { } percent of the track miles subject to Congress's mandate to install PTC, UP is installing PTC solely because of TIH.[53]

A substantial percentage of UP's costs to install PTC relates to the miles of track on which UP must install PTC. In particular, UP's costs for the wayside segment of PTC are

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[52] *See* Positive Train Control Systems, 74 Fed. Reg. 35,950, 36,013 (proposed July 21, 2009) (to be codified at 49 C.F.R. § 236.1005(b)(2)).

[53] *See* UP Highly Confidential electronic workpaper "PTC Territory for TIH.xls" and "PTC Passenger Miles.xls."

largely determined by the number of WIUs that UP must install, which is determined by the number of wayside devices along its track. Although the number of wayside devices does not correspond precisely to the number of track miles – UP has relatively more wayside devices on more heavily used routes and on tracks with more control points – UP's wayside costs would be much lower if UP carried no TIH and installed PTC only on track where it transports passengers. UP's costs for the locomotive segment of PTC would also be lower if UP carried no TIH and equipped only enough of its locomotive fleet to run over the portions of its network where it transports passengers. Finally, UP's costs for the communications segment of PTC would also be lower if UP carried no TIH and obtained only enough communication equipment to cover the portions of its network that transport passengers.

In short, if UP did not transport TIH, its costs to install PTC would be substantially lower than the approximately $1.4 billion that will actually be required to install PTC.

b) TIH Rates Should Reflect PTC Costs Caused by TIH.

As discussed above, UP's experience has been that most TIH shippers understand that UP is incurring PTC costs because it transports TIH. These shippers recognize that their rates should reflect the costs to install PTC. As a result, UP has successfully negotiated new contracts with many of these shippers. The common sense notion that UP's rates for TIH should reflect an appropriate contribution to the PTC costs caused by TIH is also consistent with principles of economic efficiency.

Dr. Marius Schwartz explains in more detail in his accompanying Verified Statement that "there are strong economic efficiency reasons to recover service-specific costs from the services that cause them." Schwartz V.S. at 4. He confirms that, from an economic standpoint as well as a practical one, "a large portion of the costs that freight railroads will incur

to install PTC systems is caused by TIH traffic." *Id.* That is, UP is incurring substantial PTC costs to provide service to TIH traffic, and it would not be incurring those costs if it were not providing that service. *See id.* at 4-5. Thus, he concludes that it is reasonable and appropriate to allow railroads "an opportunity to charge higher rates to TIH shippers than to shippers of other freight in order to recover PTC costs." *Id.* at 22.

Dr. Schwartz explains that allowing railroads to charge "rates that recover from TIH traffic *all* of the service-specific costs, including the costs of PTC, provides a valuable market test." *Id.* at 7. "If TIH shippers are willing to pay these costs, they reveal that their benefits exceed the costs and, hence, that the costs are worth incurring for society as a whole . . . ." *Id.* "PTC investments must be incurred on individual lines to support TIH shipments on those routes, but it is not obvious whether investments are worthwhile on particular lines. Requiring TIH shippers to pay the full cost would provide incentives for TIH shippers to reveal such information." *Id.* at 9.

Moreover, as Dr. Schwartz observes, these economic efficiency considerations apply even if UP must install PTC based on past shipping patterns rather than patterns that reflect new, higher rates. "Since maintenance comprises more than half of the estimated total PTC costs over the next 20 years . . ., considerable costs could potentially be avoided in the future if TIH shipments on certain lines ceased as a result of TIH shippers being faced with rates that reflect the cost of PTC systems." *Id.* at 7. "Thus, adopting rates that require TIH shippers to cover the cost of PTC systems provides TIH shippers appropriate incentives to reveal through their market behavior whether their benefits exceed the costs." *Id.* at 7-8.

Finally, Dr. Schwartz suggests an additional reason why it would be reasonable and appropriate for a railroad to charge higher rates to TIH than for other traffic: "the negative

safety externalities created by TIH movements." *Id.* at 14. Congress mandated that railroads install PTC to reduce the risks associated with transporting TIH, but PTC cannot eliminate all the risk associated with transporting TIH. Under those circumstances, "TIH shipments will continue to exert a negative externality" and charging higher rail rates to TIH shippers can further the goal Congress sought to achieve by mandating PTC and "promote economic efficiency by addressing this externality." *Id.* at 15.

c) Regulatory Precedent Supports Setting Maximum Lawful Rates for TIH That Reflect Costs Caused by TIH.

Dr. Schwartz's conclusion that UP should be allowed the opportunity to recover the PTC costs caused by TIH from TIH shippers is consistent with regulatory policies that have been pursued by the Board and other administrative agencies.

(1) Board Policy and Precedent

The Board has consistently held that regulated rates should be free of the effects of cross-subsidies: a captive shipper's rates should not subsidize other traffic, and they should not be subsidized by other traffic.

A fundamental principle of the Board's Constrained Market Pricing ("CMP") approach to rate regulation is that "a captive shipper need not bear the costs of any facilities or services from which it derives no benefits." *Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520, 528 (1985), *aff'd sub nom. Consol. Rail Corp. v. United States*, 812 F.2d 1444 (3d Cir. 1987). "Indeed, a primary purpose of the SAC test is to avoid costs associated with such cross-subsidization." *PPL Montana, LLC v. Burlington N. & Santa Fe Ry.*, 6 S.T.B. 752, 757 (2003), *aff'd sub nom. PPL Montana, LLC v. STB*, 437 F.3d 1240 (D.C. Cir. 2006). The Board's Simplified-SAC method focuses entirely on the question "whether a captive shipper is being forced to cross-subsidize parts of the defendant's existing rail network the shipper does not use."

Simplified Standards at 14. In fact, the Board's prohibition against cross-subsidies would prevent UP from recovering the costs to install PTC from shippers who do not transport TIH. A non-TIH shipper could challenge UP's rates and construct a stand-alone railroad that did not include the costs to install PTC, as long as the stand-alone traffic group did not include passenger traffic or TIH.

The Board has also recognized that the prohibition against cross-subsidies must run both ways: "It would turn the CMP principle against cross subsidization on its head to protect a captive shipper from subsidizing other traffic, while at the same time allowing that shipper's rates to be subsidized by other traffic." *PPL Montana*, 6 S.T.B. at 757. As the Board has explained, its approach to rate regulation does "not envision that a captive shipper may shift responsibility for paying for facilities it uses to shippers who do not benefit from those facilities." *Id.* at 757-58. "A shipper should not seek to have its rate reduced by shifting any part of the costs of the lines or facilities that it needs onto traffic that does not use those lines or facilities." *Id.* at 758.

The joint and common nature of many railroad costs makes it difficult to attribute costs to specific traffic, but the Board's accounting rules and URCS reflect a recognition that service-specific costs should be attributable to those services when feasible. Thus, for example, the Board requires railroads to report certain operating costs associated with intermodal traffic separately from other costs, and URCS assigns those costs exclusively to intermodal traffic. Specifically, the Board requires railroads to report intermodal terminal operating costs in Schedule 417 of their Annual Report R-1, and intermodal terminal activities in Schedule 755, and then it assigns those costs only to intermodal traffic when movements are costed using URCS. The Board uses the same approach for motor vehicle loading and distribution costs.

The Board also excludes railroad operating costs associated with passenger traffic when it calculates costs for freight traffic: the operating expenses associated with passenger traffic that are shown in Column (f) of Schedule 410 are not assigned to freight traffic in URCS. The Board also distinguishes among operating costs for different commodities by assigning commodity-specific loss and damage expenses to particular movements in URCS, and by calculating car type-specific empty return ratios and freight car repair and acquisition costs in URCS.

The Board takes a similar approach to capital investment costs. The Board's accounting rules require railroads to report certain investments in road property separately based on the service involved, and then it assigns the associated costs to that service only. The most significant example is intermodal terminal investments, which are reported to a separate account in Schedule 330. The Board then assigns the capital costs associated with intermodal terminals to intermodal traffic only. Unlike most of the other investment costs reflected in Schedule 330, URCS does not assign intermodal terminal costs to all traffic on a gross ton-mile basis; instead, it assigns those costs to intermodal movements based on intermodal terminal operating statistics from Schedule 755. The Board applies the same approach to railroad investments in coal and ore wharves.

The Board's concern for attributing service-specific costs to the services that cause them can also be seen in the Board's Advance Notice of Proposed Rulemaking in STB Ex Parte No. 681, *Class I Railroad Accounting and Financial Reporting – Transportation of Hazardous Materials* (STB served Jan. 5, 2009). In the Advance Notice, the Board began the process of considering whether and how it should modify its accounting requirements and URCS

"to better identify and attribute the costs of hazardous-material transportation movements." *Id.* at 2.[54]

(2) Other Regulatory Precedent

Dr. Schwartz points to two other recent examples of regulatory initiatives that have adopted the principle that service-specific costs should be recovered from the services responsible for causing those costs. His first example involves the Federal Communication Commission ("FCC") and the agency's *Local Competition Order*, which established a methodology for setting the prices that new competitors have to pay to lease facilities on an unbundled basis from incumbent local telephone companies ("ILECs"). *See* Schwartz V.S. at 10. As Dr. Schwartz explains, the FCC adopted its specific pricing methodology (known as "TELRIC"), rather than alternative methodologies that had been proposed, because using TELRIC would "increase the share of costs that could be attributed to the competitors' use of ILEC facilities." *Id.* at 12. As Dr. Schwartz observes, "The FCC viewed it as desirable that '[a] properly constructed TELRIC methodology will attribute costs to specific elements to the greatest possible extent, which will reduce the common costs.'" *Id.* (quoting FCC *Order* ¶ 695.) "In short," Dr. Schwartz explains, "the FCC *Order* endorsed the proposition that costs should be charged to the customers that cause the costs." *Id.*

Dr. Schwartz also observes that Congress affirmed the principle that service-specific costs should be recovered from the responsible customers in the Postal Accountability and Enhancement Act. *See id.* at 13. The Act directs the Postal Regulatory Commission to take

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[54] UP's proposal to consider PTC costs as an "other relevant factor" is consistent with the considerations that led the Board to issue the Advance Notice, but UP's proposal does not require any changes to URCS or the use of movement-specific URCS. However, UP does intend to file additional comments at an appropriate time in Ex Parte No. 681 to suggest changes to the Board's accounting rules and URCS to more accurately assign PTC costs to movements of TIH.

into account in regulating rates "'the requirement that each class of mail or type of mail service bear the direct and indirect postal costs *attributable to each class or type of mail service through reliably identified causal relationships* plus that portion of costs of the Postal Service reasonably assignable to such class or type.'" *Id.* (quoting § 3622(c)) (emphasis added). In other words, Congress directed the Postal Regulatory Commission to set rates that ensure that each regulated postal service generates revenue that at least covers "the service-specific costs of supplying the service in question." *Id.*

Of course, the question is not just whether UP should be able to set rates for TIH that reflect an appropriate contribution to PTC costs, but when UP should be allowed to begin charging such rates. As discussed in the next section, UP should be allowed, and even encouraged, to begin charging such rates immediately.

5. The Maximum Rates UP Is Permitted to Charge in the Current Market Should Reflect Its Obligation to Install PTC.

Unless the Board adjusts the Three-Benchmark method's calculation of presumed maximum lawful rates to reflect UP's obligation to install PTC, the market impact of this new obligation will not be reflected in the rates UP will be permitted to charge USM. The R/VC_{COMP}, RSAM, and $R/VC_{>180}$ benchmarks in this proceeding do not reflect the new requirement that UP install PTC because they are all based on UP's rates and costs from 2004 through 2007.

UP's obligation to install PTC is an appropriate and important factor to be considered in this proceeding, which will affect the maximum rates that UP will be allowed to charge USM from March 2009 to March 2014. The maximum rates UP is permitted to charge USM should take into account UP's obligation to install PTC for at least three reasons. *First*, UP's current rates to other chlorine shippers reflect the congressional mandate to install PTC, and those rates would be reflected in the Three-Benchmark approach if not for the problem of

regulatory lag. *Second*, UP needs the flexibility to set rates sufficiently high when market conditions are favorable to recover the costs to install PTC, which have created a revenue need that is not reflected in the RSAM and $R/VC_{>180}$ benchmarks. *Third*, UP should be encouraged to spread the costs to install PTC across time as a matter of economic efficiency. These three reasons are discussed in more detail in the sections below.

a) UP's Current Market Rates Reflect the Congressional Mandate to Install PTC.

UP's current market rates reflect an environment in which UP must install PTC by the end of 2015. UP marketing personnel with responsibility for TIH commodities are well aware of the requirement that UP install PTC, and it has been an important consideration in new contracts that they have negotiated with TIH shippers. UP marketing personnel have told TIH shippers that the obligation to install PTC is one of the market factors affecting UP's contract proposals, and shippers have acknowledged that it is a legitimate consideration in establishing rate and service terms. In the ten months since Congress mandated that railroads install PTC, UP has negotiated {

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The Three-Benchmark method is premised on the idea that current market rates of comparable captive traffic provide a meaningful proxy for the maximum lawful rate a railroad can charge for a particular captive movement. *Simplified Standards* at 73.[55] Current market rates for chlorine traffic reflect UP's obligation to install PTC. However, because of the problem of regulatory lag, the new contract rates are not reflected in the Waybill Sample data released for this proceeding by the Board. Unless the Board accounts for UP's obligation to install PTC as an

[55] According to the Board, the rates for comparable captive traffic should reflect the rate level permitted by the stand-alone cost constraint. *Id.*

"other factor" in its Three-Benchmark method analysis, USM's rates will not reflect current market rates. As a consequence, USM will have a competitive advantage over other chlorine shippers, and UP will not have an opportunity to recover an appropriate contribution to its PTC costs from USM.[56]

b) UP Needs Flexibility to Set Current Rates High Enough to Support Mandated Spending on PTC.

UP marketing personnel must consider the requirement to install PTC when dealing with shippers in the current market because UP has an immediate need to generate revenue to support its spending on PTC. This new revenue need is not reflected in the RSAM and $R/VC_{>180}$ benchmarks calculated using Waybill Sample data from 2004 through 2007, but as a result of the congressional mandate to install PTC, UP has been placed in a position where it needs approximately $1.4 billion in additional revenue between now and the end of 2015 simply to install PTC. UP cannot wait until PTC has been installed before seeking to recover the costs to install PTC; it must begin immediately to generate the cash flow necessary to support spending on PTC through the rates it charges current shippers.

A congressional mandate that UP spend approximately $1.4 billion on its railroad is an unusual development, but relying on revenue generated by current traffic to help fund new capital projects is not unusual. As UP has explained in other proceedings, UP typically uses its

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[56] It would be no response to claim that the impact of UP's current, higher rates, and thus a higher R/VC_{COMP} benchmark, would be offset by a reduction in the ratio of RSAM ÷ $R/VC_{>180}$. The same statutory mandate that has allowed UP to charge higher rates for chlorine has also created a new need for revenue that is not reflected in the 2004-2007 RSAM or $R/VC_{>180}$ benchmarks. In short, UP's current, higher rates may offset part of UP's revenue need, but UP's revenue need is now higher than before, and USM should be paying rates that are in line with UP's current rates to offset a fair share of the costs to install PTC.

The current benchmarks do not reflect either UP's current, higher rates or its current, higher revenue need, and thus UP is doubly disadvantaged unless the Board adjusts the presumed maximum lawful rates to reflect the costs to install PTC.

ability to recover higher rates from certain traffic as funding for new investment to benefit that traffic: UP recognizes that it can charge higher rates because of shippers' strong demand for service or limits on its capacity to supply service, and the higher rates both signal a need for additional investment and help pay for the new investment. *See* Reply Submission of Union Pacific Railroad Company, Verified Statement of John J. Koraleski at 7, *Major Issues in Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1) (May 31, 2006).

In the case of PTC, however, UP has a much greater present need to generate revenue to support its planned spending than in the case of typical capital projects. Typically, UP makes decisions to invest in capital projects based on the expected returns on its investments in those projects. In other words, UP invests in capital projects when it determines that the investment will help it generate higher income in the future. For example, when UP invests in new capacity, it expects to earn returns because the new capacity allows it to attract and accommodate additional traffic. As a result, UP can look to the future income stream generated by an investment to help pay for that investment; in effect, UP can borrow against the promise of future income to fund its current projects.

UP's spending to install PTC is different from UP's spending for typical capital projects because UP will not generate a return on its "investment" in PTC. UP will not be able to attract or accommodate additional traffic by installing PTC. In fact, as discussed above, the overlay PTC system that UP must install to meet the statutory deadline will tend to decrease its capacity. *See supra*, p. 37. Because UP cannot pay for PTC by borrowing against the promise of future income generated by PTC, it must begin generating revenue to support its mandated spending on PTC whenever market conditions allow. UP cannot wait until after it has installed

PTC because there is no guarantee it will be able to recover its costs from future shippers: the Board cannot require future shippers to pay above-market rates, even to pay for PTC.

Thus, the Board should allow UP to recover its costs to install PTC whenever market conditions would allow such recovery. Indeed, the Board should encourage UP to recover its costs when market conditions are favorable in furtherance of the national policy "to allow, to the maximum extent possible, competition and the demand for services to establish reasonable rates for transportation by rail" and "to promote a safe and efficient rail transportation system by allowing rail carriers to earn adequate revenues." 49 U.S.C. §§ 10101(1), (3). Moreover, Congress is requiring UP to make a capital investment in PTC, and thus the Board should take special account of Congress's direction to assist carriers in attaining revenue levels adequate "to provide a flow of net income plus depreciation adequate to support prudent capital outlays." *Id.*, § 10704(a)(2)(A).

c) UP Should be Encouraged to Spread Recovery of Its Costs to Install PTC Over Time as a Matter of Economic Efficiency.

UP's decision to consider the costs to install PTC in setting current rates is not only consistent with sound financial planning and regulatory policy, it should be encouraged as a matter of economic efficiency. As Dr. Marius Schwartz explains in more detail in his accompanying Verified Statement, there are two distinct reasons why economic efficiency would be improved if railroads adopt higher rates to recover PTC costs in advance of completing their investments in PTC. First, to the extent it is possible to avoid upfront investment in PTC on routes where TIH shippers would not be willing to pay rates that reflect a contribution to the mandate to install PTC, "those shippers should be given the appropriate price signals before the investment must be made." Schwartz V.S. at 15.

Second, by adopting higher rates earlier rather than later, railroads could recover the costs of PTC investment "in a less distortionary manner, that is, in a way that reduces the economic inefficiency from any reduction in TIH shipments as a result of higher rail rates." *Id.* at 16. That conclusion follows from an application of Ramsey pricing principles – which seek to identify the pattern of markups necessary to cover a certain fixed cost while causing the smallest decrease in overall welfare – to pricing decisions that must be made across multiple periods of time. *See id.* at 17-18.

As Dr. Schwartz explains, "[b]y implementing higher rates earlier, the cost recovery can be spread over more periods," which "would permit smaller rate increases in future periods (i.e., after the investment is made) than if the cost had to be recovered solely in those later periods." *Id.* at 17. Smaller rate increases over more periods would mean, in turn, that any resulting decrease in consumption would affect "relatively low-valued units of consumption in more periods, instead of higher-valued units in fewer periods." *Id.* at 18. Such an outcome is preferable as a matter of allocative efficiency because "as consumption is reduced in one period, the [efficiency] loss grows more-than-proportionately with the size of the decrease" in consumption. *Id.* at 19. In addition, as Dr. Schwartz explains, the reduction in total quantity of consumption will be smaller if rate increases are spread over more periods, because a revenue need can be met "with a smaller average markup if lower markups are charged in more periods than if larger markups are charged in fewer periods." *Id.*

In sum, given a choice between recovering PTC costs using smaller rate increases over a longer period of time or higher rate increases over a shorter period of time, the less distortionary, more efficient approach is to encourage smaller rate increases sooner.

In the next section, UP describes how the Board can apply these principles in this proceeding by allowing UP the opportunity to recover an appropriate contribution to its costs to install PTC from USM.

B. Methodology For Reflecting An Appropriate Contribution To The Costs To Install PTC In Establishing Maximum Lawful Rates

UP has developed two possible approaches the Board could use to account for UP's costs to install PTC when establishing the maximum lawful rates that UP can charge USM for the issue movements. Both approaches are designed to increase the Three-Benchmark method's "presumed maximum lawful rate" to allow UP the opportunity to recover an appropriate contribution to its PTC costs from shippers of TIH. Both approaches rely on extremely conservative assumptions about the share of UP's costs to install PTC that are appropriately attributed to TIH traffic.

As we describe below in more detail, both approaches begin with the calculation of a "PTC annualized-revenue requirement." The PTC annualized-revenue requirement represents the amount of revenue that UP would have to earn each year to provide a return of and return on UP's total investment in PTC. Both approaches then calculate a "PTC/TIH net revenue requirement." The PTC/TIH net-revenue requirement represents the TIH share after allocating the PTC annualized-revenue requirement between the two types of traffic that are causing UP to incur the costs to install PTC – that is, passenger traffic and TIH traffic. At that point, the two approaches diverge.

The first alternative, which we call the "revenue need alternative," is based on the Board's RSAM ÷ $R/VC_{>180}$ adjustment. It involves creating a special, TIH-based RSAM ÷ $R/VC_{>180}$ adjustment that accounts for UP's need to recover the PTC/TIH net revenue requirement. The TIH-based RSAM ÷ $R/VC_{>180}$ adjustment would be substituted for the

standard RSAM ÷ $R/VC_{>180}$ adjustment in calculating the maximum lawful rates that UP could charge USM.

The second alternative, which we call the "revenue supplement alternative," is more straightforward to apply. It involves spreading the PTC/TIH net-revenue requirement across UP's TIH traffic on a per car-mile basis to create a "TIH supplement." The TIH supplement would be added to the "presumed maximum lawful rate" to determine the maximum lawful rates that UP could charge USM.

In the sections below, we first discuss how we developed the PTC annualized-revenue requirement, then how we calculated the PTC/TIH net-revenue requirement, and then how to implement the alternative methodologies. Both methodologies produce similar results, and either would be a reasonable means of adjusting the "presumed maximum lawful rate" to account for UP's costs to install PTC.

1. The PTC Annualized-Revenue Requirement

The PTC annualized-revenue requirement represents the amount of revenue UP would have to earn each year to provide for a return of and return on UP's investment in PTC. To develop the PTC annualized-revenue requirement, UP's costs to install PTC were separated into their specific Surface Transportation Board road property and equipment accounts – Communications Systems, Signals and Interlockers, Locomotives, and Computer Systems and WP Equipment – and run through the Board's standard discounted cash flow ("DCF") model. The DCF model solves for an annual revenue requirement that provides for return of and return on investment over the projected useful life of each asset and for prospective replacement. For 2009, the first year of UP PTC investment, the annualized revenue requirement produced by the DCF is { }. This amount was used as the starting point for the calculation of the PTC annualized-revenue requirement.

Three changes were made to the DCF model to address minor variations between the stand-alone cost test for which the Board's model is typically used and UP's projected investment in PTC. First, the model was changed to permit recovery of investment while the investment is being made, instead of computing the annual recovery once all of the investment construction has been completed. This also required changes to certain of the DCF schedules, specifically, the calculation of interest deductible for tax purposes and accelerated depreciation, to accommodate the prospective staging of investment.

Second, the assumption in the stand-alone DCF model that limits tax benefits to those that can be used by the stand-alone entity was relaxed to allow for negative tax benefits that will likely be used by UP. Third, interest during construction, which allows for return on outstanding investment before assets are placed into service, is eliminated. These latter changes reduce the calculated annual revenue requirement. Details of these calculations are set forth in the work papers.[57]

2. The PTC/TIH Net-Revenue Requirement

After calculating the PTC-annualized revenue requirement, UP used extremely conservative assumptions to allocate PTC costs between TIH traffic and passenger traffic. As discussed above at page 42, on more than { } percent of the track miles subject to Congress's mandate to install PTC, UP is installing PTC solely because of TIH. UP thus assumed that 100 percent of its costs to install PTC on those lines should be attributed to TIH. On approximately { } track miles, UP is installing PTC on lines used solely by TIH traffic and Amtrak traffic or solely by Amtrak. UP assumed that 75% of the costs should be attributed to TIH. On

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[57] *See* UP Highly Confidential electronic workpaper "PTC DCF - Open.xlsm."

approximately { } track miles, UP is installing PTC on lines used by commuter railroads, either alone or with some combination of TIH traffic and Amtrak traffic. UP assumed that none of the costs should be attributed to TIH. Based on these assumptions, the share of costs assigned to passenger traffic was { } percent.[58]

UP's assumptions for allocating PTC costs between TIH traffic and passenger traffic are conservative because they imply that Amtrak can be expected to pay for 25 percent of the costs to install PTC, and commuter railroads can be expected to pay for 100 percent of the costs to install PTC, where their trains operate on track that also transports TIH. In fact, it is highly unlikely that UP will ever recover that much of its cost to install PTC on passenger lines from Amtrak and commuter carriers. Amtrak appears to be taking the position that it is not required to contribute to the cost to install PTC where it operates on lines owned by UP. Amtrak's Fiscal Year 2010 Grant and Legislative Request appears to assume that Amtrak will pay the costs to install PTC on Amtrak-owned track and on its locomotives that operate over freight railroads' lines, but that it will not contribute to the costs to install PTC on track owned by the freight railroads over which Amtrak operates.[59]

3. The Revenue Need Alternative

The revenue need alternative reflects the concept that the Three-Benchmark method's RSAM ÷ $R/VC_{>180}$ adjustment does not reflect UP's additional need for revenue associated with the mandate to install PTC because it is based on data from 2004 through 2007. The revenue need alternative involves constructing an alternative RSAM ÷ $R/VC_{>180}$ adjustment

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58 *See* UP Highly Confidential electronic workpaper "PTC Passenger Miles.xls."

59 *See* UP Public electronic workpaper "Amtrak FY 2010 Request.pdf."

for TIH traffic that allows UP the opportunity to set rates for TIH traffic high enough to recover an appropriate share of the cost to install PTC.

UP has taken a conservative approach in developing the revenue need alternative by assuming that all TIH traffic would contribute to PTC costs. If UP had followed an approach that was analogous to the Board's calculation of the RSAM ÷ $R/VC_{>180}$ adjustment, UP would have assumed that only TIH traffic with an R/VC ratio greater than 180 percent would contribute to PTC costs, which would have resulted in a substantially larger adjustment.

The revenue need alternative is easy to implement. Mechanically, the revenue need alternative involves calculating TIH-specific RSAM and $R/VC_{>180}$ benchmarks for each year from 2004 through 2007 – that is, using just TIH traffic to calculate the $REV_{>180}$ and $VC_{>180}$ components of the standard RSAM and $R/VC_{>180}$ benchmarks – but adding to the $REV_{short/overage}$ portion of the TIH-specific RSAM benchmark the PTC/TIH net-revenue requirement. The TIH-specific RSAM ÷ $R/VC_{>180}$ adjustment is then applied to the movements in the comparison group to calculate the R/VC_{COMP} benchmark. The details are set forth in the accompanying workpapers.[60]

4. The Revenue Supplement Alternative

The revenue supplement alternative reflects the concept that the Three-Benchmark method's "presumed maximum lawful rate" should be increased to allow UP the opportunity to recover an appropriate share of the costs to install PTC from TIH shippers on a per car-mile basis.

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[60] *See* UP Highly Confidential electronic workpaper "UP PTC RSAM Revenue Adj Calculations - Open.xlsx."

UP also has taken a conservative approach in developing the revenue supplement alternative by assuming that all TIH traffic would contribute to PTC costs. Under the same theory that drives the Board's RSAM ÷ $R/VC_{>180}$ adjustment, UP can expect to look only to traffic with an R/VC ratio greater than 180 percent to help meet any revenue shortfall. If UP had adopted that approach, it would have allocated the PTC costs over fewer car-miles of traffic, which would have resulted in a substantially larger adjustment.

The revenue supplement alternative is also easy to implement: for each year from 2004 through 2007, the PTC/TIH net-revenue requirement is divided by the number of TIH car-miles in the Waybill Sample associated with traffic that was handled by UP to calculate a per car-mile adjustment. The adjustment amount is then multiplied by the number of loaded miles for each issue movement, and the result is added to the "presumed maximum lawful rate." The details are set forth in the accompanying workpapers.[61]

5. Results

The effects of adjusting the "presumed maximum lawful rates" to reflect the application of the "revenue need alternative" and "revenue supplement alternative" are shown in Table 6.

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[61] *See* UP Highly Confidential electronic workpaper "UP PTC RSAM Revenue Adj Calculations - Open.xlsx."

TABLE 6
MAXIMUM REASONABLE RATES
AFTER ADJUSTING FOR COSTS TO INSTALL PTC[62]

	Sahuarita	Eloy
1Q09 Per Car Rate (UP Tariff)	$10,410	$13,396
"Presumed Maximum Lawful Rate"	$10,760	$11,037
Maximum Rate, Adjusted to Reflect Revenue Need	$16,799	$17,231
Maximum Rate, Adjusted to Reflect Revenue Supplement	$16,104	$16,552

After adjusting the "presumed maximum lawful rates" to allow UP the opportunity to obtain an appropriate contribution to its costs to install PTC from USM, the challenged rates are shown to be reasonable.

6. The Potential Future Impact of PTC Costs on URCS Costs Is No Barrier to Considering UP's PTC Costs in This Proceeding.

UP recognizes that its costs to install PTC might ultimately be reflected in its URCS system average costs, but that should not be a barrier to considering those costs directly in determining the maximum reasonable rates that UP can charge USM.

The UP URCS costs that are being used to determine the reasonableness of the challenged rates are UP's 2007 URCS costs. UP's costs to install PTC are not reflected in UP's 2007 URCS costs. Thus, USM cannot claim that UP's adjustments to reflect PTC costs reflect any double-counting of costs or requires any adjustment to URCS. Moreover, if the Board

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[62] *See* UP Highly Confidential electronic workpaper "UP PTC RSAM Revenue Adj Calculations - Open.xlsx."

adopts either of UP's proposed PTC-related adjustments, it should find that the challenged rates are reasonable, and there will be no need to consider the possibility that the costs to install PTC will one day be reflected in URCS.

Even if the Board adopts a different comparison group than the one proposed by UP, such that the challenged rates would be found unreasonable even after adopting UP's proposed adjustments, the Board should consider that none of UP's costs to install PTC can possibly be reflected in UP's URCS costs before the Board releases UP's 2009 URCS, which is not likely to occur until late in 2010. As a result, any prescribed rates would be based on indexed 2007 URCS or indexed 2008 URCS, and thus would not reflect any PTC costs, until at least the fourth quarter of 2010.[63]

UP is optimistic that, before its costs to install PTC would be reflected in URCS, the Board will have updated its accounting and financial reporting and refined URCS to better capture the costs of transporting hazardous materials, and that those changes will allow railroads to attribute PTC costs to TIH traffic in a manner that is consistent with UP's proposals in this proceeding. *See Class I Railroad Accounting and Financial Reporting – Transportation of Hazardous Materials*, STB Ex Parte No. 681 (STB Decision served Jan. 5, 2009). In fact, if the Board had not already taken the initial steps by issuing an Advance Notice of Proposed Rulemaking in Ex Parte No. 681, UP would be petitioning the Board to commence such a rulemaking to ensure that PTC costs are appropriately attributed to TIH traffic. If the Board has

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[63] *See Oklahoma Gas & Elec. Co. v. Union Pac. R.R.*, STB Docket No. 42111 (STB Decision served July 24, 2009), at 11 (describing the process for updating maximum lawful rates that will apply to all rail rate cases).

not refined URCS before UP's costs to install PTC would be reflected in URCS, the Board could reopen this proceeding and allow the parties to propose an appropriate solution.

C. Common Carrier Rate Adjustment

As discussed above in Part II, one reason why USM's rates should be at the top of the range of UP rates for chlorine is because they are common carrier rates, not contract rates. As Board precedent recognizes, contract rates are typically lower than common carrier rates because railroads are willing to accept lower rates in return for the stability, flexibility, and relief from regulatory burdens provided by contractual relationships. *See, e.g.*, *Railroad Transportation Contracts*, 4 I.C.C.2d 228, 231 (1988) ("While it might be argued that a carrier has little to lose by delay or risk of disapproval since it would be able to then collect the (presumably higher) tariff rate, we assume that locking in its benefits under the bargain it has struck with the shipper is a sufficient incentive to file the contract expeditiously."); *Exemption from Regulation – Shipments Subsequently Made Subject to a Contract Rate*, 1 I.C.C.2d 966, 967-69 (1985) (exempting railroads from the requirement to seek permission to waive undercharges or pay reparations in order to implement contract rates before contracts were filed).

In this case, all of the movements in UP's proposed comparison group were made under contract rates.[64] The Board recognized in *Simplified Standards* that contract rates are not necessarily comparable to common carrier rates, and thus it stated that "holding everything else constant, a comparison group that consists of just common carrier traffic will be selected over a group that includes contract traffic." *Simplified Standards* at 83. In this case, however, it is impossible to select a comparison group that consists of just common carrier traffic, or even one

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[64] This can be determined from the "Calculated Rate Flag" in the Waybill Sample data released by the Board. *See* 49 C.F.R. § 1244.3(a) ("All railroads should identify (flag) contract shipment waybills.").

that includes a substantial amount of common carrier traffic. Accordingly, UP has developed an adjustment to account for the need to develop a comparison group from movements that were made under contract rates.

UP developed its proposed common carrier rate adjustment by comparing the R/VC ratios of contract and common carrier traffic for movements in the Waybill Sample data released for this proceeding by the Board. Specifically, UP selected carload movements from the 2004 through 2007 Waybill Sample data (i) with R/VC ratios above 180 percent; (ii) that were shown as originating and terminating on UP. UP then (i) calculated the average R/VC ratios for common carrier and contract traffic for groups of like shipments by commodity and car type within each year; and (ii) calculated the percentage difference between the average R/VC ratios for common carrier and contract traffic for each traffic group.

UP's calculations show that common carrier rates produce R/VC ratios that are approximately { } percent higher than R/VC ratios for contract rates.[65] Applying this common carrier rate adjustment to the results in Part V.B. produces the results shown in Table 7, which confirm that the challenged rates are reasonable.

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[65] *See* UP Highly Confidential electronic workpaper "2004-2007 CWS Summary for Common Carrier Adjustment.xls" and "Common Carrier Adjustment.xls."

TABLE 7
MAXIMUM REASONABLE RATES
AFTER ADJUSTING FOR COSTS TO INSTALL PTC AND
APPLYING THE COMMON CARRIER RATE ADJUSTMENT[66]

	Sahuarita	**Eloy**
1Q09 Per Car Rate (UP Tariff)	$10,410	$13,396
"Presumed Maximum Lawful Rate"	$10,760	$11,037
Maximum Rate, Adjusted to Reflect Revenue Need and Common Carrier Adjustment	{ }	{ }
Maximum Rate, Adjusted to Reflect Revenue Supplement and Common Carrier Adjustment	{ }	{ }

VI. CONCLUSION

UP's evidence demonstrates that when all relevant factors are considered, the challenged rates are reasonable. Accordingly, the Board should dismiss USM's complaint.

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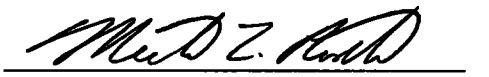
[66] *See* UP Highly Confidential electronic workpaper "UP PTC RSAM Revenue Adj Calculations – Open.xlsx."

Respectfully submitted,



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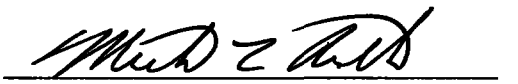
Attorneys for Union Pacific Railroad Company

August 24, 2009

CERTIFICATE OF SERVICE

I, Michael L. Rosenthal, certify that on this 24th day of August, 2009, I caused copies of the Highly Confidential and Public versions of the Opening Evidence of Union Pacific Railroad Company to be served by hand on:

Thomas W. Wilcox
Jason M. Setty
GKG Law, P.C.
Canal Square
1054 31st Street, N.W., Suite 200
Washington, DC 20007



Michael L. Rosenthal

A

WITNESS QUALIFICATIONS AND VERIFICATION

1. Robert G. Worrell

Robert G. Worrell is Senior Assistant Vice President - Chemicals for Union Pacific Railroad Company ("UP"), located at 1400 Douglas Street, Omaha, Nebraska, 68179. He currently has full marketing and sales responsibility for UP's plastics and industrial chemicals markets and customers. Industrial chemicals (basic, intermediate, and specialty chemicals) include all Toxic Inhalation Hazard ("TIH") commodities except anhydrous ammonia. Mr. Worrell has been closely involved in UP's efforts to promote the safe and secure transportation of TIH materials and to comply with government regulations regarding the transportation of TIH materials. US Magnesium, L.L.C.'s customer relationship with UP falls within Mr. Worrell's area of responsibility, as he is responsible for the overall chlorine market, as well as US Magnesium from a sales accountability perspective.

Mr. Worrell has been employed by UP since 1978. He began his career as a management trainee, and he has held management positions in the Intermodal and Agricultural Products groups in UP's Marketing and Sales Department, and in UP's Finance and Strategic Planning departments. He was promoted to his current position in 2006.

Mr. Worrell is sponsoring evidence relating to the market for transporting chlorine, the history of the challenged rates, and the transportation characteristics of the issue traffic. His evidence is incorporated into Sections II.A., II.B., and V.A. of UP's Opening Evidence. A copy of Mr. Worrell's verification is attached hereto.

2. Thomas F. Jacobi

Thomas F. Jacobi is Vice President - Operating Systems and Practices for Union Pacific Railroad Company ("UP"), located at 1400 Douglas Street, Omaha, Nebraska, 68179. Mr. Young is responsible for UP's Network Reliability project, which implements technology driven operations such as Positive Train Control ("PTC") and other strategic initiatives for all aspects of field operations and operating practices.

Mr. Jacobi began his railroad career with the Missouri Pacific Railroad in 1977 as a brakeman and has held numerous operating roles at UP, including Regional Vice President-Operations for the Western Region, Vice President-Premium Operations, and Assistant Vice President-Safety and Operating Practices. Mr. Jacobi was appointed to his current position in August, 2008.

Mr. Jacobi is sponsoring evidence related to UP's implementation of PTC. His evidence is incorporated into Section V.A. of UP's Opening Evidence. A copy of Mr. Jacobi's verification is attached hereto.

3. Michael R. Baranowski

Michael R. Baranowski is a Senior Managing Director at FTI Consulting, Inc., an economic and financial consulting firm with offices located at 1101 K Street, NW, Washington, DC 20005. Since 1990, Mr. Baranowski has been involved in many aspects of transportation consulting, including operational analysis, terminal switching studies, facility and equipment valuation, liquidation studies, merger studies, as well as a variety of cost studies including the development of both short and long run marginal costs, variable costs, and standalone costs. He has been responsible or developing costs and working with the Surface Transportation Board's

discounted cash flow model in stand-alone cost proceedings since 1987 and has sponsored testimony in a number of those proceedings.

Mr. Baranowski received his Bachelor of Science in Accounting degree from Fairfield University in 1980. In 1988, he joined Klick, Kent & Allen, Inc. ("KK&A"), which was acquired by FTI Consulting in 1998. While with KK&A and FTI, Mr. Baranowski has conducted a wide range of studies in both the transportation and telecommunications industries and testified in proceedings before the Interstate Commerce Commission, Surface Transportation Board, Federal Communications Commission, and various state utility commissions.

Mr. Baranowski is sponsoring evidence regarding the attribution of Union Pacific Railroad Company's costs to install Positive Train Control to movements involving Toxic Inhalation Hazard materials. His evidence is incorporated in Section V.B. of the Opening Evidence. A copy of Mr. Baranowski's verification is attached hereto.

4. Benton V. Fisher

Benton V. Fisher is a Senior Managing Director at FTI Consulting, Inc., an economic and financial consulting firm with offices located at 1101 K Street, NW, Washington, DC 20005. Mr. Fisher has been involved in various aspects of transportation consulting, including economic studies involving costs and revenues, traffic and operating analyses, and work with performance measures and financial reporting systems.

Mr. Fisher holds a Bachelor of Science in Engineering degree from Princeton University. In 1990, he served as the Deputy Controller for the Bill Bradley for U.S. Senate Campaign. In 1991, he joined Klick, Kent & Allen, Inc., which was acquired by FTI Consulting in 1998. While with the firm, Mr. Fisher has performed numerous analyses for and assisted in the preparation of expert testimony related to merger applications, rate reasonableness

proceedings, contract disputes, and other regulatory costing issues before the Interstate Commerce Committee, Surface Transportation Board, Federal Energy Regulatory Commission, Postal Rate Commission, federal courts, and state utility commissions.

Mr. Fisher is sponsoring evidence relating to Phase III URCS costing of the issue traffic movements, the identification of the comparison group, the calculation of the "presumed maximum lawful rate," and the calculation of the proposed common carrier rate adjustment. His evidence is incorporated in Section II.B., Part III, Part IV, and Section V.C. of the Opening Evidence. A copy of Mr. Fisher's verification is attached hereto.

STATE OF NEBRASKA)
)
COUNTY OF DOUGLAS)

VERIFICATION

Robert G. Worrell, being duly sworn, deposes and says that he has read the Opening Evidence that he has sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct to the best of his knowledge and belief.

Robert G. Worrell

Subscribed and sworn to before me on this 20th day of August, 2009.

Notary Public

GENERAL NOTARY - State of Nebraska
MARY R. HOLEWINSKI
My Comm. Exp. Oct. 15, 2012

My Commission expires: October 15, 2012

STATE OF NEBRASKA)
)
COUNTY OF DOUGLAS)

VERIFICATION

Thomas F. Jacobi, being duly sworn, deposes and says that he has read the Opening Evidence that he has sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct to the best of his knowledge and belief.

Thomas F. Jacobi

Subscribed and sworn to before me on this 21st day of August, 2009.

Notary Public

GENERAL NOTARY - State of Nebraska
MARY R. HOLEWINSKI
My Comm. Exp. Oct. 15, 2012

My Commission expires: October 15, 2012

DISTRICT OF COLUMBIA)

VERIFICATION

Michael R. Baranowski, being duly sworn, deposes and says that he has read the Opening Evidence that he has sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct to the best of his knowledge and belief.

Michael Baranowski

Michael R. Baranowski

Subscribed and sworn to before me on this 24 day of August, 2009.

Elizabeth B Stedman

Notary Public

My Commission expires: ELIZABETH B. STEDMAN NOTARY PUBLIC DISTRICT OF COLUMBIA My Commission Expires November 30, 2009

DISTRICT OF COLUMBIA)

VERIFICATION

Benton V. Fisher, being duly sworn, deposes and says that he has read the Opening Evidence that he has sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct to the best of his knowledge and belief.

Benton V. Fisher

Subscribed and sworn to before me on this 24 day of August, 2009.

Notary Public

ELIZABETH L. STEDMAN
NOTARY PUBLIC DISTRICT OF COLUMBIA
My Commission Expires

My Commission expires:

B

VERIFIED STATEMENT

OF

MARIUS SCHWARTZ

Professional Background and Qualifications

My name is Marius Schwartz. I am a Professor of Economics at Georgetown University. I hold a B.Sc. degree from the London School of Economics with first class honors, and a Ph.D., also in economics, from The University of California, Los Angeles. My teaching and research specialties are in industrial organization, a branch of applied microeconomics that encompasses the study of competition and regulation. I have taught courses on these topics and have published in numerous professional journals, including the *American Economic Review*, *Antitrust Bulletin*, *Antitrust Law Journal*, *International Journal of Industrial Organization*, *Journal of Industrial Economics*, *Oxford Economic Papers*, *Quarterly Journal of Economics*, *Rand Journal of Economics*, and the *Review of Network Economics*.

Besides my academic career, I have also held positions in government. From April 1995 to June 1996, I served at the President's Council of Economic Advisers as the Senior Economist for industrial organization matters. My major assignments included work on the Telecommunications Act of 1996 and restructuring of the electric utility industry. This work involved numerous regulatory issues, such as cross-subsidies and stranded costs. From September 1998 to April 2000, I served at the Antitrust Division of the U.S. Department of Justice (DOJ) as the Economics Director of Enforcement, and for six months also as the Acting Deputy Assistant Attorney General for Economics (chief economist). In these positions I oversaw the DOJ's economic analysis of major competition issues in diverse industries such as telecommunications, agriculture, and health care.

I have also served as a consultant to government agencies and the private sector in competition and regulatory proceedings. From 1996 to 1997, I was the DOJ's main outside economic expert on Bell Company entry into long-distance services under section 271 of the Telecommunications Act, a complex area at the intersection of competition and regulation policies. As part of this assignment, I submitted on behalf of the DOJ two affidavits to the Federal Communications Commission (FCC). I also participated in FCC proceedings on other major matters, including restructuring of the international satellite consortium, Intelsat, and more recently, Net Neutrality. My curriculum vitae is attached to this Verified Statement.

Scope of Assignment and Overview of Conclusions

Large U.S. railroads have been required to undertake a costly investment program in Positive Train Control (PTC) systems to help prevent train collisions on lines carrying passengers or hazardous materials known as PIH or TIH (Poison Inhalation Hazards or Toxic Inhalation Hazards). In connection with this new requirement, I have been asked by Union Pacific Railroad Company to provide my public policy perspectives as an economist on two issues. First, would it be reasonable and appropriate for railroads to charge higher rates for TIH traffic than for other freight traffic in order to recover PTC costs? Second, would it be appropriate for railroads to begin charging higher rates even before they complete the investments required to implement PTC? I have not been asked to discuss specific magnitudes of appropriate rates, but to analyze the relevant economic principles.

My analysis is based on the criterion of economic efficiency as measured by "total surplus" or "total welfare".[1] As used by economists, total surplus from an activity denotes the

[1] Standard textbook references on the material in this paragraph and the next include: W. Kip Viscusi, Joseph E. Harrington, Jr., and John M. Vernon, *Economics of Regulation and Antitrust*, Fourth Edition, MIT Press, 2005, pp. 80-85; Michael L. Katz and Harvey Rosen, *Microeconomics*, Third

sum of the *net benefits* generated by that activity to all the affected parties. For consumers, net benefit is their maximum willingness to pay minus what they actually pay (the difference is known as "consumer surplus"); for producers, net benefit is the revenue they receive minus the minimum they would have accepted, i.e., their revenue minus their cost (the difference is known as "producer surplus"). Since payments from consumers to producers are a pure transfer (they cancel when aggregating the net gains to these groups), total surplus is also equal to the total willingness to pay of consumers minus the total cost incurred by producers. Total surplus thus depends on the total quantity supplied and its allocation among consumers, both of which depend on prices.[2] (I should note that the total surplus calculation must also incorporate any positive or negative *externality* that may occur to third parties not involved in a market transaction for this activity, e.g., the environmental harm from a train collision.)

By definition, a policy change that increases total surplus will create a total gain to the parties that benefit from the change exceeding the sum of the losses (if any) to any parties that suffer loss from the change. The policy change therefore passes the "compensation test": if the change is adopted, it is possible (in particular, the government has the option) to tax the gainers sufficiently to compensate the losers and make all parties better off than before. The economic efficiency/total surplus criterion is used widely by economists to evaluate regulations or other policies in various industries.[3] Using this criterion to evaluate the requirement that railroads

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Edition, Irwin McGraw-Hill, 1998, pp. 359-362; and Richard E. Just, Darrell L. Hueth, and Andrew Schmitz, *Applied Welfare Economics and Public Policy*, Prentice-Hall, 1982, pp. 5-8.

[2] A familiar implication is that total surplus is maximized by choosing the quantity at which consumers' marginal willingness to pay—the willingness to pay for that last unit—equals producers' marginal cost (a condition that, in turn, holds if the market is competitive and price is at the level that equates supply and demand).

[3] See Richard E. Just, Darrell L. Hueth, and Andrew Schmitz, *Applied Welfare Economics and Public Policy*, Prentice-Hall, 1982, p. 45 ("[T]he compensation principle has emerged as the criterion that is empirically the most widely applicable."); W. Kip Viscusi, Joseph E. Harrington, Jr., and John M.

install PTC, I conclude that there are strong reasons (1) to allow railroads an opportunity to charge higher rates to TIH shippers than to shippers of other freight in order to recover PTC costs, and (2) to encourage railroads to implement such rates before they complete their investments in PTC. The bases for these conclusions are set forth in Sections 1 and 2 of this Statement, respectively.

1. Charging Higher Rates for TIH than for Other Freight

The majority of this section explains why it would be reasonable and appropriate for railroads to charge higher rates for TIH traffic than for other traffic in order to recover PTC costs from TIH shippers. First, a large portion of PTC costs is properly viewed as being caused by TIH shipments. Second, there are strong economic efficiency reasons to recover service-specific costs from the services that cause them. Third, important regulatory precedents support such a policy.

Lastly, I note a different reason to charge higher rates for TIH traffic beyond recovering PTC costs from TIH traffic. Even with PTC systems in place, accidents can still occur. Hence, TIH traffic imposes a *negative externality* on other shippers and the community at large, and setting higher rates for TIH traffic could help mitigate this externality.

1.1 A Large Portion of PTC Costs Is Caused by TIH Traffic

From an economic standpoint, costs are "caused" by, or are "specific" to, a service (or group of services) if those costs are incurred in order to provide that service and could be avoided otherwise. Viewed in this light, a large portion of the cost that freight railroads will incur to install PTC systems is caused by TIH traffic. I base this conclusion on several points discussed

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Vernon, *Economics of Regulation and Antitrust*, Fourth Edition, MIT Press, 2005, p. 80 ("A generally accepted alternative standard in applied microeconomics is the *compensation principle*, which is equivalent to choosing policies that yield the highest total *economic surplus*.").

in the Notice of Proposed Rulemaking (NPRM) issued this year by the Federal Railroad Administration (FRA) on the deployment of PTC systems.[4]

First, the Railroad Safety Improvement Act of 2008 (RSIA) mandates that, by year end 2015, a PTC system be installed and operated on those main lines of a Class I railroad over which passenger trains are operated or any PIH materials travels. (NPRM, pp. 3, 18, 51.) "As a corollary, PTC systems are not required on a Class I railroad's lines over which no PIH materials are transported and no passenger trains are operated." (NPRM, p. 51.)

Second, prior to the RSIA, freight railroads "continued to plan very slow deployments of PTC system technologies" despite the apparent technical successes of some prototype systems. (NPRM, p. 16.) Safety or other benefits notwithstanding, the railroads on their own apparently would *not* have adopted PTC systems nearly as widely or as fast as required by the RSIA (be it due to high capital costs or to a desire to evolve systems that would have additional functionalities). Therefore, the prospective PTC investment is largely caused by the RSIA's requirements governing lines that carry passengers or TIH traffic, prompted by a desire to avoid collisions that involve either type of traffic.[5]

Finally, the bulk of PTC costs are not a fixed overhead cost (such as research and development costs) but instead vary with the number of lines and their distance. Such route-sensitive costs include wayside equipment, on-board equipment, and maintenance (see Section 2.1 below for the estimated cost breakdown contained in the NPRM). Furthermore, the FRA estimates that of the 69,000 track miles that carry either passengers or TIH traffic, only 6,000

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[4] Department of Transportation, Federal Railroad Administration, 49 CFR Parts 229, 234, 235, and 236 [Docket No. FRA-2008-0123, Notice 1], Positive Train Control Systems ("NPRM").

[5] The NPRM's discussion of the legislative history of the RSIA notes the significant role played by two high profile and severe crashes, one involving a train carrying TIH traffic (in Graniteville, SC, 2005) and the other involving a passenger train (Chatsworth, CA, 2008).

miles carry just passengers, and 18,000 carry both passengers and TIH. The remaining 45,000 miles—almost two thirds of the total 69,000—are freight only and the PTC obligation applies solely because of TIH traffic. (NPRM, p. 55.)

Thus, even if all the PTC costs on the dual passenger-and-TIH lines were assigned to passenger traffic and none to TIH, the cost of PTC on two thirds of the total miles would still be incurred solely because of TIH traffic. Prima facie, this suggests that a large portion of all PTC costs is caused by TIH traffic.

1.2 Efficiency Reasons to Recover Service-Specific Costs from Those Services

In a market economy, prices play a vital role in guiding the efficient allocation of scarce resources. They do so by conveying to consumers and producers valuable information about the costs and benefits of various alternatives and providing these decision-makers incentives to act on this information.[6] These information and incentive considerations also apply to the current matter. They provide a strong reason to charge users of particular services prices that are sufficient to recover all the costs incurred to provide those services—variable (volume-sensitive)

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[6] For a classic statement, see Friedrich A. Hayek, "The Use of Knowledge in Society," *American Economic Review*, vol. 35, no. 1, September 1945, pp. 519-530. A lucid modern exposition appears in Paul R. Milgrom and John Roberts, *Economics, Organization and Management*, Prentice-Hall, 1992, chapter 6. To illustrate the role of prices, consider the familiar result that the price which equates supply and demand in a competitive market—call it p*—yields the efficient level of output for society (the level that maximizes total surplus). To consumers, p* represents the sacrifice they must incur (measured in dollars, as a proxy for other goods) per unit purchased of this good. Thus, taking p* as given, each consumer is induced to demand the quantity at which the value (s)he derives from the last unit (the marginal value, or marginal willingness to pay) equals p*. To producers, p* represents the benefit they obtain per unit that they sell of this good. Thus, taking p* as given, each producer is induced to supply the quantity at which the cost to the producer of the last unit (the marginal cost) equals p*. Since p* equates demand and supply, consumers succeed in executing their plans and so do producers. Thus, p* induces the quantity at which the marginal value to consumers equals the marginal cost to producers, satisfying the condition for overall efficiency.

costs as well as service-specific fixed costs (costs that would be avoided if the service were discontinued entirely).

Consider rail lines that do not carry passengers, only freight, including some TIH. PTC equipment must be installed on those lines, and ongoing maintenance expenses must be incurred, only because of TIH traffic. Since the great majority of the total cost is comprised of expenses that vary with the number and length of such lines (see section 2.1 below), substantial costs could be avoided if TIH shipments could be curtailed on some lines. This conclusion would hold even if the lines on which PTC equipment must be installed initially (i.e., by year-end 2015) were largely predetermined. Since maintenance comprises more than half of the estimated total PTC costs over the next 20 years (see section 2.1), considerable costs could potentially be avoided in the future if TIH shipments on certain lines ceased as a result of TIH shippers being faced with rates that reflect the cost of PTC systems.

How can we know whether for society as a whole the cost is worth incurring on particular lines? Charging rates that recover from TIH traffic *all* of the service-specific costs, including the costs of PTC, provides a valuable market test. If TIH shippers are willing to pay these costs, they reveal that their benefits exceed the costs and, hence, that the costs are worth incurring for society as a whole (i.e., incurring the costs will raise total surplus).[7] If they are not willing to pay the costs, there is no assurance that the costs are worth incurring, because the revenue shortfall is borne by other parties who do not necessarily benefit from these services either at all or to the same degree. Thus, adopting rates that require TIH shippers to cover the cost of PTC systems

[7] An important exception to this conclusion arises if the service imposes negative externalities, as discussed below in section 1.4.

provides TIH shippers appropriate incentives to reveal through their market behavior whether their benefits exceed the costs. [8]

This "market test" issue was at the core of an important debate in the economic regulation literature, known as the marginal cost controversy.[9] The generic issue involved pricing by a regulated utility whose marginal cost is below average cost. For example, suppose that marginal cost is constant and there is a fixed cost that must be incurred if the good or service is produced, but can be avoided otherwise. The prevailing view among economists was that to maximize total surplus, price should be set at marginal cost so as to avoid an inefficient reduction in the quantity of the good, and the utility's resulting deficit (total cost minus total revenue) should be covered from taxpayers at large.[10] Coase (1946) challenged this proposition by identifying an important shortcoming. Marginal cost pricing yields the efficient quantity *assuming* that the good is worth producing at all. But since consumers would not be paying for the total cost, there is no guarantee that their benefit justifies the cost; the consumer surplus generated if the good is priced at marginal cost may be less than the fixed cost that could be avoided by foregoing the good altogether. Coase argued that requiring consumers to cover the entire cost attributable to the service—instead of recovering the deficit from taxpayers or other parties—would provide such valuable assurance.

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[8] Of course, customers of TIH shippers also benefit from TIH products, and an increase in rail rates to TIH shippers can be expected to raise prices for TIH products. But requiring shippers of other freight to bear some of the PTC costs would likely raise prices to users of their product, and it is not evident why users of TIH products should be protected at the expense of other users.

[9] See Ronald H. Coase, "The Marginal Cost Controversy," *Economica*, vol. 13, no. 51, August 1946, pp. 169-182; Ronald H. Coase, "The Theory of Public Utility Pricing and Its Application," *The Bell Journal of Economics and Management Science*, vol. 1, no. 1, Spring 1970, pp. 113-128; and Jean-Jacques Laffont and Jean Tirole, *A Theory of Incentives in Procurement and Regulation*, MIT Press, 1993, pp. 23-29.

[10] See, for example, Harold Hotelling, "The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates," *Econometrica*, vol. 6, no. 3, July 1938, pp. 242-269.

It is accepted by leading scholars on economic regulation that Coase's objection to marginal cost pricing is "well taken for activities whose existence is in question."[11] That scenario seems to fit the case at hand. Although some PTC investment will be required, it is less clear how much and where. PTC investments must be incurred on individual lines to support TIH shipments on those routes, but it is not obvious whether investments are worthwhile on particular lines. Requiring TIH shippers to pay the full cost would provide incentives for TIH shippers to reveal such information.

Coase recognized that if users of a service were required to cover its total cost via a uniform per-unit price (set to equal average total cost) this would reduce the quantity consumed below the efficient level. (Assuming the good is worth producing—the focus of Coase's critique—the efficient level is where demand intersects marginal cost, so any price above marginal cost would inefficiently discourage consumption.[12]) However, he stressed that the distortion can be mitigated with multi-part pricing (also known as non-linear pricing), for example, a fixed fee plus a per-unit charge set at or close to marginal cost. Thus, multi-part pricing can be used to (a) charge all service-specific costs to the relevant customers, thereby revealing which services are worth producing at all, while (b) mitigating the quantity reduction in those cases where a service is offered. (Coase 1946, pp. 173-174.)[13] In the freight railroad

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[11] Jean-Jacques Laffont and Jean Tirole, *A Theory of Incentives in Procurement and Regulation*, MIT Press, 1993, p. 29.

[12] If the activity generates a negative externality, such as the safety risk posed by TIH shipments, the efficient level will be lower than described above, and a per-unit price above marginal cost can be preferable to marginal-cost pricing. Section 1.4 below elaborates on this point.

[13] The fact that multi-part pricing can greatly reduce the tension between these two objectives—revealing whether the good is worth producing while inducing the efficient quantities in cases where it is produced—is also relevant to the debate over *cross-subsidies* by a multiproduct firm, such as a freight railroad. A service (or group of services) is said to be cross-subsidized if its users pay less than the incremental cost of providing it, including any service-specific fixed costs; in order for the firm's overall revenue to cover its total cost, users of other services—the cross-subsidizing services—must

industry, multi-part pricing, for example, through volume discounts (sliding-scale pricing), would seem quite feasible.

In sum, based on the facts discussed above, there is a strong economic case for charging most or all of the PTC costs to TIH shipments, at least on routes that carry TIH and no passengers.

1.3 Regulatory Precedent for Recovering Service-Specific Costs from Those Services

The principle that service-specific costs should be recovered from the responsible services has been reflected in important recent regulatory initiatives involving telecommunications and the postal service.

The Telecommunications Act of 1996[14] was the first major overhaul of the nation's telecom laws in over half a century. The Act imposed obligations on incumbent local telephone companies (ILECs) to provide competitors with access to ILEC networks on an unbundled basis, that is, to allow competitors to lease from the ILEC selected functions or facilities (such as local

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pay more than the stand-alone cost of serving them (i.e., the cost that would be required if the cross-subsidized services were ended). See, for example, Gerald R. Faulhaber, "Cross-Subsidization: Pricing in Public Enterprises," *American Economic Review*, vol. 65, no. 5, December 1975, pp. 966-977; Bridger M. Mitchell and Ingo Vogelsang, *Telecommunications Pricing: Theory and Practice*, Cambridge University Press, 1991, p. 119. If only per-unit prices are used, then the set of prices that maximizes total surplus subject to letting the firm break even (known as Ramsey prices) may well entail cross-subsidies. See Faulhaber, 1975, pp. 968, 972-973; Mitchell and Vogelsang, 1991, pp. 125-126. Intuitively, recovering some of the service-specific fixed cost of one service by adding markups also on other services allows a smaller markup on the cross-subsidized service and thereby reduces the overall inefficiency from the drop in consumption caused by pricing above marginal cost (the logic behind this "smoothing" idea is discussed in section 2.2 below). With non-linear pricing (such as menus of two-part tariffs), however, maximizing welfare while enabling the firm to break even can be achieved without cross-subsidies if the underlying cost function satisfies fairly mild conditions. See Mitchell and Vogelsang, 1991, p. 130. Non-linear pricing helps because, as noted, revenue can be extracted from a particular group of consumers to cover their service-specific costs without distorting their consumption at the margin.

[14] Pub. L. No. 104-104, 110 Stat. 56 (1996).

loops).[15] The broad rules for implementing this complex unbundling task, including the pricing principles, were spelled out in the Federal Communication Commission's *Local Competition Order*,[16] after a landmark proceeding that elicited considerable thought and commentary by leading academics, regulators, practitioners, and industry. The key provisions for purposes of this analysis, and the FCC's rationale for adopting those provisions, are summarized next.[17]

The *Order* requires lease prices charged to competitors to be "no lower than the forward-looking incremental costs directly attributable to provision of a given element." (¶ 620.) Specifically, prices "shall recover the forward-looking costs directly attributable to the specific network element, as well as a reasonable allocation of forward-looking common costs." (¶ 682.) To implement that approach, the FCC adopted a pricing methodology it termed Total Element Long-Run Incremental Cost (TELRIC). The FCC used the term "incremental cost" of a network element to denote the additional cost an ILEC incurred as a result of providing the particular element in its entirety versus not providing the element at all. (¶¶ 675, 677.) The FCC used the term "long run" to reflect its adoption of a planning horizon long enough that all costs associated with a particular element that could be avoided by not providing the element at all. (¶ 677.) The

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[15] The rationale was that competitors may be able to efficiently self-provide some network elements required for entry, while others could be more efficiently shared with the ILEC. For background on the 1996 Telecommunications Act, the issues it addressed, and the challenges see Marius Schwartz, "Telecommunications Reform in the United States: Promises and Pitfalls," in Paul J.J. Welfens and George Yarrow, Eds., *Telecommunications and Energy in Systemic Transformation*, Springer Publishers, 1997.

[16] *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket No. 96-98, *Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers*, CC Docket No. 95-185, First Report and Order, FCC 96-235 (released August 8, 1996).

[17] In addition to the specific passages from the *Order* identified shortly, see generally its Section VII, Pricing of Interconnection and Unbundled Elements, especially subsections A (Overview) and B (Cost-Based Pricing Methodology).

basic underlying idea is that the prices charged to competitors must be high enough to allow for sustainable investment in leased elements.

It is particularly interesting that the FCC chose a base-pricing unit of a network "element" rather than a network "service" by opting for its TELRIC methodology over the alternative of Total Service Long-Run Incremental Cost (TSLRIC). The FCC's stated reason for choosing TELRIC was primarily to increase the share of costs that could be attributable to the competitors' use of ILEC facilities.[18] The FCC viewed it as desirable that "A properly conducted TELRIC methodology will attribute costs to specific elements to the greatest possible extent, which will reduce the common costs." (¶ 695.) "Because it is difficult for regulators to determine an economically-optimal allocation of any such joint and common costs, we believe that pricing elements ... is more reliable from the standpoint of economic efficiency ... ." (¶ 678.)

In short, the FCC *Order* endorsed the proposition that costs should be charged to the customers that cause the costs. This proposition received explicit support in several statements in the *Order*. The *Order* states: "More broadly, certain shared costs that have conventionally been treated as common costs (or overheads) shall be attributed directly to the individual elements to the greatest extent possible." (¶ 682.) The *Order* stresses that "[a]ll costs associated with ... the element shall be included in the incremental cost." (¶ 690.) It also states: "Costs must be attributed on a cost-causative basis. Costs are causally-related ... if the costs are incurred as a direct result of providing the network elements, or can be avoided, in the long run, when the

[18] "More fundamentally, we believe that TELRIC-based pricing of discrete network elements or facilities, such as local loops and switching, is likely to be much more economically rational than TSLRIC-based pricing of conventional services, such as interstate access service and local residential or business exchange service. ... separate telecommunications services are typically provided over shared network facilities, the costs of which may be joint or common with respect to some services. ... By contrast, network elements ... largely correspond to distinct network facilities. Therefore, the amount of joint and common costs that must be allocated among separate offerings is likely to be much smaller using a TELRIC methodology than a TSLRIC approach that measures the costs of conventional services." (¶ 678.)

company ceases to provide them. Thus, for example, the forward-looking costs of capital (debt and equity) needed to support investments required to produce a given element shall be included in the forward-looking direct cost of that element." (¶ 691.) The FCC also stressed the flip side that causally-related costs should not be allocated those elements that did not cause the costs: "For example, shared maintenance facilities and vehicles should be allocated only to the elements that benefit from those facilities and vehicles." (¶ 694.)

A more recent regulatory affirmation of the principle that service-specific costs should be recovered from the responsible services is found in the 2006 Postal Accountability and Enhancement Act.[19] Section 3622(c) of the Act states that in "establishing or revising [a] system" for regulating the rates charged for market-dominant products in the U.S. postal industry, "the Postal Regulatory Commission shall take into account ... the requirement that each class of mail or type of mail service bear the direct and indirect postal costs attributable to each class or type of mail service through reliably identified causal relationships plus that portion of all other costs of the Postal Service reasonably assignable to such class or type." In other words, the Postal Regulatory Commission is required to set a price for each regulated postal service that generates revenue in excess of the service-specific cost of supplying the service in question.

My understanding is that this principle has also been followed in the freight railroad industry. For example, I understand that Surface Transportation Board (STB) accounting and regulatory costing rules require railroads to assign certain costs caused by intermodal traffic (such as operating costs for terminals to handle intermodal traffic) exclusively to that traffic. The flip side of this principle is also acknowledged in the STB's *Guidelines* for regulating the prices paid by captive shippers in the rail industry, which state that "[a] captive shipper should not bear

[19] Pub. L. No. 109-435, 120 Stat. 3198 (2006).

the cost of any facilities or services from which it derives no benefit."[20] To be sure, shippers of non-TIH freight do derive *some* benefit from the decrease in the likelihood of train collisions enabled by PTC. However, as discussed above in section 1.1, the impetus for requiring PTC systems was to avoid collisions involving trains carrying passengers or TIH materials, as evidenced by the fact that PTC systems were not required on lines that do not carry such traffic. Thus, the appropriate contribution from such other freight traffic towards PTC costs would appear to be relatively minor and does not materially affect my analysis.

1.4 Safety Externalities Caused by TIH Shipments

There is an additional reason unrelated to recovery of PTC costs why it would be reasonable and appropriate for a railroad to charge higher rates to TIH than to other freight: the negative safety externalities created by TIH movements. A negative externality from an activity occurs when that activity harms third parties that are not compensated through a market transaction by the entities generating the initial activity. In such situations, if the activity is provided under competitive conditions its quantity will be *excessive* from the standpoint of society as a whole (instead of optimal as in the case with no externalities – see fn. 6 above). The reason is that producers and consumers of this activity do not internalize the harm imposed on third parties.[21] A standard corrective policy towards negative externalities is a tax on the relevant activity to induce a reduction in its level.[22]

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[20] *Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520, 523 (1985), *aff'd sub nom. Consol. Rail Corp. v. United States*, 812 F.2d 1444 (3d Cir. 1987).

[21] See, for example, Richard E. Just, Darrell L. Hueth, and Andrew Schmitz, *Applied Welfare Economics and Public Policy*, Prentice-Hall, 1982, pp. 269-272.

[22] Such a tax is known as a Pigouvian tax, named for the economist A. C. Pigou who originated the idea. Richard E. Just, Darrell L. Hueth, and Andrew Schmitz, *Applied Welfare Economics and Public Policy*, Prentice-Hall, 1982, pp. 275-276.

In the case at hand, TIH movements pose a safety risk to other traffic on those lines and to adjoining communities. While the adoption of PTC systems will reduce the risk of incidents involving TIH, it is unlikely to eliminate the risk completely. Thus, TIH shipments will continue to exert a negative externality. In the absence of government taxes on TIH movements, charging higher rail rates to TIH shippers can promote economic efficiency by addressing this externality. The higher rates can reduce TIH shipments and, hence, lower the risk of incidents involving such traffic.

2. Adopting the New Rates Before PTC Investments Are Made

Assuming that railroads have the opportunity to charge higher rates for TIH shipments in order to recover PTC costs, sections 2.1 and 2.2 below discuss two distinct reasons why economic efficiency would be improved if railroads adopted such rates in advance of completing their investments in PTC.

2.1 Allowing Price Signals to Guide Investments

The first reason is a direct implication of the analysis presented in section 1.2 above. To avoid upfront PTC investments on routes where TIH shippers would not be willing to pay the PTC costs, those shippers should be given the appropriate price signals before the investment must be made. This requires implementing the higher rates sufficiently in advance of the investment to test if demand by TIH shippers would be sufficient to cover the requisite costs.

It is relevant in this regard that the bulk of the PTC costs do not seem to be a fixed overhead cost. Rather, they depend heavily on the number and length of the lines on which TIH shipments will be carried. Curtailing TIH shipments from some lines therefore could potentially avoid considerable costs. The NPRM (pp. 198-199) presents an estimated breakdown of the

present value of PTC costs system-wide over 20 years under a discount rate of 3% or 7%. Using the NPRM's dollar figures, I calculated the following percentage shares of total cost for various cost categories at a 3% or 7% discount rate (shares in parentheses are for a discount rate of 7%):

- Central Office and Development 2.0% (or 2.6% if the discount rate is 7%);
- Wayside Equipment 22.5% (or 25.8%);
- On-Board Equipment 11.9% (or 14.2%);
- Maintenance 63.6% (57.3%).

Central Office and Development equipment comprises a very small fraction of the total cost, less than 3%. The great majority of costs seem to be route sensitive. Of those, Wayside Equipment, which is likely a durable and route-specific upfront investment, accounts for over 20%; such a cost is potentially avoidable by curtailing TIH traffic before the equipment must be installed.[23]

2.2 Spreading Smaller Price Increases Over a Longer Period

The above reason for encouraging railroads to adopt higher rates to TIH shippers before PTC investments are made is to potentially reduce the size of investment by revealing the routes on which the investment might not be justified. There is an additional advantage of adopting charges early on: doing so would allow a given total cost of PTC investment to be recovered in a less distortionary manner, that is, in a way that reduces the economic inefficiency from any reduction in TIH shipments as a result of higher rail rates.

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[23] Another striking point, noted in section 1.2 above, is that Maintenance accounts for more than half of the total cost. This is significant because maintenance is an ongoing activity. Thus, even if a large portion of the lines have already been required to have PTC systems, so that much of the upfront investment in Wayside Equipment cannot be avoided, considerable costs could potentially still be avoided in the future if TIH traffic ceases on various routes, obviating the need for continued maintenance.

Consider a route that will entail PTC systems. The present value of the various PTC costs can be viewed as a fixed and common cost attributed to TIH shipments on this route. By implementing higher rates earlier, the cost recovery can be spread over more periods. This would permit smaller rate increases in future periods (i.e., after the investment is made) than if the cost had to be recovered solely in those later periods. Spreading a rate increase over a longer duration is economically efficient, by the well-known logic of Ramsey pricing.

Ramsey pricing addresses the following situation.[24] A regulated firm sells multiple services, whose provision requires a fixed and common cost, in addition to any service-specific marginal costs. The cost conditions are such that recovering the fixed cost requires setting prices above marginal cost for at least some of these services.[25] Such markups, in turn, will reduce the quantities of the affected services below the efficient (first-best) levels. Ramsey pricing identifies the pattern of markups that will cover the fixed cost—thereby allowing the firm to break even—while causing the smallest decrease in overall welfare (i.e., in total surplus).[26]

The Ramsey insights, identified shortly, apply straightforwardly to the present matter by viewing the fixed cost as the present value of the PTC expenses, and the services responsible for this joint and common cost as TIH shipments in all periods. As Laffont and Tirole point out:

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[24] The original analysis of Frank Ramsey analyzed the choice of tax rates to raise a given amount of revenue while minimizing the economic inefficiency (deadweight loss). Frank Ramsey, "A Contribution to the Theory of Taxation," *Economic Journal*, Vol. 37, No. 145, March 1927, pp. 47-61. The insights extend to the case involving choice of prices for a regulated multi-product firm to achieve the twin goals of (a) covering its fixed and common cost while (b) minimizing the economic distortion that arises because prices for at least some products or services must exceed the respective marginal costs. See, for example, Jean-Jacques Laffont and Jean Tirole, *Competition in Telecommunications*, MIT Press, 2000, pp. 61-68 (henceforth "Laffont and Tirole, 2000"); and Sanford V. Berg and John Tschirhart, *Natural Monopoly Regulation*, Cambridge University Press, 1988, pp. 53-59 (henceforth "Berg and Tschirhart, 1988").

[25] Markups above marginal costs will be needed to cover total cost if (but not only if) marginal costs are either decreasing or constant.

[26] For simplicity I will discuss per-unit prices, but the Ramsey principles extend to nonlinear pricing. See Laffont and Tirole, 2000, pp. 68-69.

"The Ramsey-Boiteux model is apparently a static, 'one-period' model. ... Economists, however, have long realized that one way to think about intertemporal aspects is to consider that the same service offered at different dates should be thought of and treated as different services."[27]

Unless the demands in various periods exhibit very large differences (technically, differences in the demand elasticities), Ramsey pricing to recover from TIH shipments the fixed cost of PTC investment in general will involve charging significant margins for TIH shipments in all periods rather than higher margins in fewer periods: "pricing distortions [markups over marginal costs] should be spread out over time so as to least distort consumptions."[28] The logic behind this is explained next, and illustrated later in Figure 1.

Consider the benchmark case in which the PTC investment is recovered over T periods after the investments are made by charging PTC-related markups only in those T periods. Spreading the recovery over additional periods by starting it in advance of the investments will permit lower markups in each of those T periods. This induces a smoothing over time of the profile of reductions in quantities consumed as compared to having larger quantity reductions in the T periods by levying higher markups only then. Consumption smoothing is efficient for two reasons.

(a) *Improved allocation.* For a given decrease in total quantity across periods, the efficiency loss is reduced by spreading this reduction across periods. Doing so gives up relatively low-valued units of consumption in more periods, instead of higher-valued units in fewer periods. This property follows from the simple fact that demand curves are negatively sloped,

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[27] Laffont and Tirole, 2000, p. 67. The intertemporal interpretation is also emphasized by Berg and Tschirhart, 1988, pp. 60-61.

[28] Laffont and Tirole, 2000, p. 68.

that is, the marginal willingness to pay diminishes as consumption expands, meaning that successive units of consumption are valued less and less and, on the flip side, as consumption is reduced in one period, the loss grows more-than-proportionately with the size of the decrease.

(b) *Smaller reduction in total quantity.* Less obviously, the reduction in the total quantity of the service will be smaller if the markups are spread over more periods. This is because the total net revenue needed to cover the fixed cost can be obtained with a *smaller average markup* if lower markups are charged in more periods than if larger markups are charged in fewer periods. The intuition is that smaller markups leave a larger base of total consumption on which these markups apply (a larger "tax base"), enabling a lower average markup and, hence, a smaller reduction in total quantity.[29]

Figure 1 below illustrates these ideas. I make several simplifying assumptions, but the underlying logic is much more general: the service (TIH shipments) is provided in two periods (before the PTC investment is made and after) under symmetric and independent conditions; in each period, marginal cost is constant (MC), and the demand curve, D(p), is a linear function of the price p charged to TIH shippers that period. For simplicity, ignore discounting and suppose that in the absence of the need to recover the fixed cost of PTC, prices would be set at marginal cost and per-period quantity would be at the efficient (first-best) level q*. (In reality, of course,

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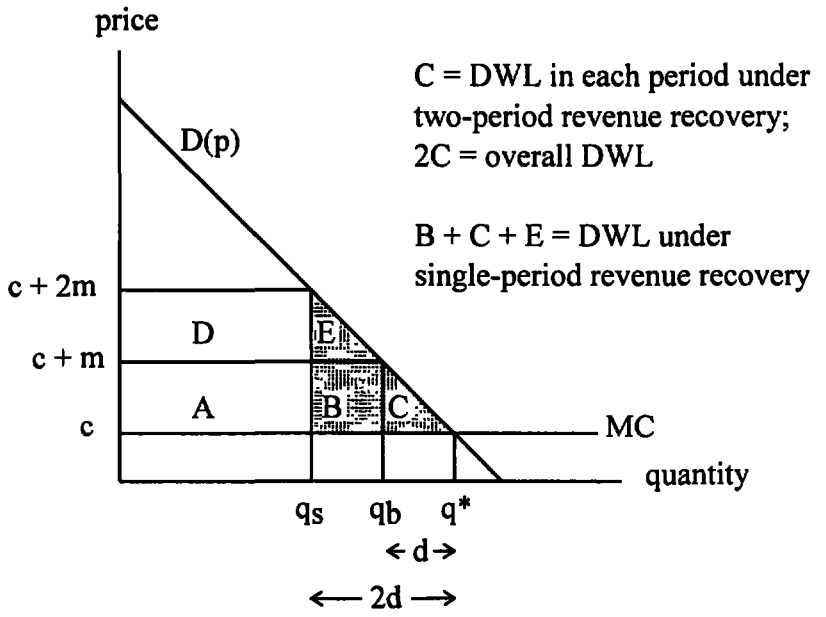
[29] If TIH shipments generate negative externalities (due to a remaining risk of collisions even with PTC systems, as discussed in section 1.4), then effect (b) may not be beneficial, since the total quantity of TIH shipments may exceed the socially efficient level even under a shorter recovery period. However, advantage (a) remains: the superior allocation across periods of any given total quantity. That is, safety externalities from TIH shipments may call for raising rail rates to reflect the externality, and this will reduce total shipments. But for a given total quantity of shipments, efficiency can be improved by spreading the reduction over more periods instead of concentrating it on fewer. A sufficient condition for smoothing to remain beneficial when TIH shipments generate negative safety externalities is that the expected cost of accidents is no higher when a given quantity of TIH shipments is spread over more periods than if it is concentrated in fewer periods.

railroads must price above marginal cost to recover other fixed costs beyond PTC; but this extension would complicate the graph without altering the qualitative analysis below.)

Figure 1



Suppose that charging an equal margin of size m above marginal cost in both periods would yield total revenue in excess of variable costs (net revenue) just sufficient to cover the fixed cost of PTC. The price to shippers per period is then c+m, and the quantity shipped per period drops from the efficient level q* by an amount d to the new level q_b. (The subscript b indicates collecting a markup in *both* periods.) The loss in overall welfare (total surplus), also known as the deadweight loss (DWL), in each period is then triangle C,[30] yielding a total welfare loss across both periods of 2C. Instead, consider imposing double the markup, 2m, in only one period (the second). Price to shippers is then c+2m and (given linear demand) the drop in

[30] The value lost to shippers is the area under their demand curve—whose height reflects their marginal willingness to pay—between the initial quantity q* and the lower one q_b. The cost savings to producers is the area under the marginal cost curve over the same output interval, so the loss in total surplus (the difference between the reduction in total willingness to pay and the savings in cost) is C.

quantity below q* is now twice as large, 2d, bringing second-period quantity to q_s. (The subscript s indicates that cost recovery this time occurs only in a *single* period.) In the first period, price equals marginal cost, quantity is q*, and there is no welfare loss. However, in the second period the loss now equals the larger triangle C+B+E, which is equal to 4C. Thus, the DWL that results from limiting recover to a single period is twice what occurs when recovery is spread over both periods. This reflects effect (a) described earlier: two-period recovery yields an improved consumption allocation, because the drop in consumption is d in each period instead of 2d concentrated in the second period, and losing the marginal unit of consumption in each period is less harmful than losing two units in a single period.[31]

Moreover, since a margin of size m in each period is just enough to cover the fixed cost (by assumption), it follows that a margin of 2m only in the second period would *not* suffice. A margin of m in both periods yields net revenue of 2m X (q*–d), whereas a margin 2m in only one period yields 2m X (q*–2d), which is lower. This reflects the reduced "tax base" effect of loading the markup on a single period. Thus, to generate the same net revenue under single-period recovery would require a margin larger than 2m.[32] Accordingly, limiting recover to the second period would depress second-period consumption by more than 2d and exacerbate the deadweight loss. Spreading the recovery mitigates the harm by enabling a smaller reduction in total quantity (effect (b) discussed earlier).

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[31] The pattern of equal margins in both periods is optimal only under the special assumptions noted earlier. For example, to the extent that installing PTC systems would increase TIH shippers' willingness-to-pay for rail service, demand in the second period (post PTC) could increase relative to demand in the first. If so, efficiency would call for a higher markup in the second period than in the first. But the basic insight that some markup should be charged also in the first period would still apply.

[32] If c+2m lies at or above the simple monopoly price, the fixed cost could not be recovered in a single period because once price is raised above the monopoly level, net revenue will start declining.

3. Conclusions

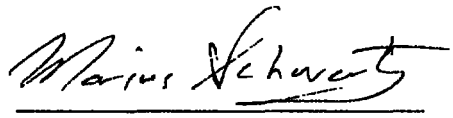
The conclusions from my analysis can be summarized as follows:

1. TIH shipments are responsible for a large share of the total projected PTC cost of freight railroads because many routes carry no passengers and, hence, would be exempt from the PTC requirement but for the TIH traffic.
2. On economic efficiency grounds, there is a strong case for allowing railroads an opportunity to charge higher rates to TIH shippers than to shippers of other freight in order to recover PTC costs.
3. The principle of charging costs that are attributable to a service to the users of that service has been adopted in major regulatory decisions in recent years.
4. Apart from cost recovery for PTC, allowing railroads to charge higher rates for TIH traffic than for other traffic on the same or comparable route may be justified on grounds of negative externalities: even with PTC systems in place, TIH shipments still pose a risk of very costly mishaps to the extent that PTC systems do not entirely eliminate the danger of incidents involving trains carrying TIH materials.
5. Implementing higher rates for TIH shipments in advance of PTC investments instead of only after all investments have been completed can promote economic efficiency for two distinct reasons: (a) it can help avoid some investments whose costs would outweigh the corresponding benefits; and (b) for investments that will be made, it promotes recovery of their cost in a way that is less distortionary by spreading the recovery over a longer period.

VERIFICATION

I, Marius Schwartz, declare under penalty of perjury that the foregoing Statement is true and correct to the best of my knowledge. I further certify that I am qualified and authorized to file this Statement.

Executed on August 21, 2009



Marius Schwartz

MARIUS SCHWARTZ

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Washington, DC 20015

EDUCATION

University of California, Los Angeles: Ph.D. in Economics, September 1982
University of California, Los Angeles: M.A. in Economics, March 1978
London School of Economics: B.Sc. in Economics (1st Class Honors), August 1976

PROFESSIONAL EXPERIENCE

Georgetown University, Department of Economics

Professor, June 1993–present
Associate Professor, August 1987–May 1993
Assistant Professor, January 1983–July 1987 (part time in fall 1982)

Excellence in Undergraduate Teaching Award, Economics Department, 2001
Director of Graduate Studies: spring 1993-spring 1995

Courses Taught: *Graduate*—Industrial Organization, Microeconomics for executives and policy makers, Macroeconomic Theory I and II, Monetary Policy. *Undergraduate*—Antitrust, Industrial Organization, Mergers & Corporate Control, Microeconomics (Principles, and Intermediate), Topics in Competition and Regulation, International Economics, Macroeconomic Theory

President's Council of Economic Advisers

Senior Staff Economist, June 1995–May 1996 (part-time consultant April & May 1995, June 1996)

Served as the senior economist responsible for antitrust, regulated industries, and other industrial organization matters. Work included: Telecommunications Act of 1996, competition in international satellite services, competition in the electric utility industry, reforming the patent and trademark office, intellectual property rights, international trade disputes, health care.

U.S. Department of Justice, Antitrust Division

Acting Deputy Assistant Attorney General for Economics, January 1999–June 1999

Economics Director of Enforcement, September 1998–April 2000

In these positions, I was responsible for overseeing economic analysis at the Antitrust Division of numerous mergers and non-merger matters in various industries, including:

Mergers & Joint Ventures—Ameritech/SBC, Bell Atlantic/GTE, AT&T/BT, Cargill/Continental, Aetna/Prudential, CBS/Viacom

Monopolization—suit against American Airlines for predatory pricing

Regulatory—Bell entry into long-distance telecommunications services

Outside Expert

UPM-Raflatac/Bemis-MACtac merger, 2003—testified at trial

News Corp-DirecTV partial acquisition, 2003

General Electric/Honeywell merger, 2000-2001

WorldCom/Sprint merger, 2000 (economic expert on the Internet backbone issues)

Bell entry, 1996–1997—DOJ's outside economic expert on Bell entry into long-distance services under section 271 of the Telecommunications Act, and submitted two affidavits to the FCC

Economist, January 1983–May 1995 (part-time), October 1980–December 1982 (full-time).

Expert Testimony: Presented written and oral court testimony in successful challenges of merger and of consent decree

Mergers: Investigated mergers in several industries and helped to design appropriate relief

Business Practices: investigated vertical-restraints (tying, exclusive dealing, resale price maintenance, exclusive territories) and horizontal conduct (collusion and predation)

Legislation, Congressional Matters, Division Reports: Provided input to Antitrust Division's Horizontal Merger Guidelines (1992) and Vertical Restraints Guidelines (1984). Helped draft Division comments on various Congressional legislation and drafted responses to inquiries in several areas, including price discrimination and dealer termination.

Cooperation with Foreign Competition Authorities: Subjects included predatory pricing, price discrimination, distribution systems, sole import distributorships, joint R&D, and the interaction between trade and competition policies

Other Professional Experience

Bates White LLC, senior Academic Affiliate (2007-present)

New Zealand Commerce Commission: Consultant (2005-6)

Consultant in private antitrust and regulatory matters—details and references available on request

OECD: Lecturer in Seminar on Vertical Restraints for competition officials from Czech Republic, Hungary, Poland, and Slovakia in Cracow, Poland, November 20-22, 1995

ILADES: Participated in designing and teaching a short course in industrial organization to policy makers and executives in Santiago, Chile, June 1994

Pew Freedom Fellows Program: Taught short course in microeconomics to twenty Fellows from transition economies, annually, January 1993–1999. (Fellows hold middle-level or upper-level positions in government and private business.)

Center for Economic Development, Slovakia: Academic Advisory Board

World Bank: Consultant

Abt Associates/USAID: Advised Government of Zimbabwe in Harare on formulating antitrust law, summer 1993 (consultant to Abt, work funded by USAID's Implementing Policy Change Project)

LANGUAGES

French, Hebrew, Romanian (speak and read Hebrew fluently; proficient in French and Romanian)

HONORS

U.S. Department of Justice, Antitrust Division: Special Achievement Awards
Brookings Institution: Research Fellow, 1979-1980
University of California, Los Angeles: Earhart Fellowship, 1977-1978
University of California, Los Angeles: Regents Fellowship, 1976-1977
London School of Economics: Premchand Prize in Monetary Economics, 1976

PUBLICATIONS

Refereed Journals

"Reforming Telecom Regulation: An Essay Review of Nuechterlein and Weiser's *Digital Crossroads*," *Review of Network Economics*, 7, issue 2 (2008): 415-447. <http://www.rnejournal.com/artman2/uploads/1/schwartz_RNE_sept08.pdf>

"Compatibility Incentives of a Large Network Facing Multiple Rivals," (with David Malueg), *Journal of Industrial Economics*, 54 (2006): 527-567. <http://ssrn.com/abstract=876084>

"The No Surcharge Rule and Card User Rebates: Vertical Control by a Payment Network," (with Daniel Vincent), *Review of Network Economics*, 5, issue 1 (2006): 72-102. <http://www.rnejournal.com>

"Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity: Reply," (with R. Preston McAfee), *American Economic Review*, 94 (2004): 802–803.

"International Telecom Settlements: Gaming Incentives, Carrier Alliances, and Pareto-Superior Reform," (with David Malueg), *Journal of Industrial Economics*, 49 (2001): 335-377.

"The Economic Logic for Conditioning Bell Entry into Long Distance on the Prior Opening of Local Markets," *Journal of Regulatory Economics (Practitioners' Section)*, 18, no. 3 (2000): 247-288.

"A Quality-Signaling Rationale for Aftermarket Tying," (with Gregory J. Werden), *Antitrust Law Journal*, 64 (1996): 387-404.

"The Non-Existence of Pairwise-Proof Equilibrium," (with R. Preston McAfee), *Economics Letters*, 49 (1995): 251-259

"Equity as a Call Option on Assets: Some Tests for Failed Banks," (with Behzad Diba, Chia-Hsiang Guo), *Economics Letters*, 48 (1995): 389-397.

"Parallel Imports, Demand Dispersion, and International Price Discrimination," (with David Malueg), *Journal of International Economics*, 37 (1994): 167-195.

"Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity," (with R. Preston McAfee), *American Economic Review*, 84 (1994): 210–230.

"Preemptive Investment, Toehold Entry, and the Mimicking Principle," (with David Malueg), *RAND Journal of Economics*, 22 (1991): 1–13.

"Patent Protection through Discriminatory Exclusion of Imports," *Review of Industrial Organization*, 6, no. 3 (1991): 231–246.

"Third–Degree Price Discrimination and Output: Generalizing a Welfare Result," *American Economic Review*, 80 (1990): 1259-1262.
Reprinted in *Readings in Microeconomic Theory*, Manfredi La Manna Ed., Dryden Press, 1997.

"Investments in Oligopoly: Welfare Effects and Tests for Predation," *Oxford Economic Papers*, 41 (1989): 698-719.

"Entry Deterrence Externalities and Relative Firm Size," (with Michael Baumann), *International Journal of Industrial Organization*, 6 (1988): 181-197.

"The Competitive Effects of Vertical Agreements: Comment," *American Economic Review*, 77 (1987): 1063-1068.

"The Nature and Scope of Contestability Theory," *Oxford Economic Papers*, 38 Supplement (1986): 37-57.
This issue of the journal was published in parallel as *Strategic Behavior and Industrial Competition*, Morris et al. Eds., Oxford University Press, 1986.

"The Perverse Effects of the Robinson-Patman Act," *Antitrust Bulletin*, 31 (1986): 733-757.

"Divisionalization and Entry Deterrence," (with Earl Thompson), *Quarterly Journal of Economics*, 101 (1986): 307-321.

"*Illinois Brick* and the Deterrence of Antitrust Violations," (with Gregory J. Werden) *Hastings Law Journal*, 35 (1984): 629–668.

"Contestable Markets: An Uprising in the Theory of Industry Structure: Comment," (with Robert Reynolds), *American Economic Review*, 73 (1983): 488-490.

Book Chapters, Monographs, and Other Publications

"Introduction to a Special Issue on Network Neutrality," *Review of Network Economics*, 8, issue 1 (2009): 1-12. <http://www.rnejournal.com/artman2/publish/vol8_issue1/index.shtml>

"Quantity 'Forcing' and Exclusion: Bundled Discounts and Nonlinear Pricing," (with Daniel Vincent), in W.D. Collins, Ed., *Issues in Competition Law and Policy*, American Bar Association Antitrust Section, 2008. <http://www.wam.umd.edu/~dvincent/abstracts.htm#qfbundle.pdf>

"Monopsony Concerns in Merger Review," (with Susan M. Davies), American Bar Association Antitrust Section, Clayton Act Committee Newsletter, vol. II, no. 1, Winter 2002.

"Conditioning the Bells' Entry Into Long Distance: Anticompetitive Regulation or Promoting Competition?," in Giuliano Amato and Laraine L. Laudati, Eds., *The Anticompetitive Impact of Regulation*, Edward Elgar, 2001.

"Competitor Cooperation and Exclusion in Communications Industries," in H. Davis and R. Dick, Eds., *E-Commerce Antitrust & Trade Practices: Practical Strategies for Doing Business on the Web*, Practising Law Institute, New York, 2001.

Discussant Comments on papers by Andrew Joskow, by Daniel Rubinfeld, and by Janusz Ordover and Margaret Guerin-Calvert, *Review of Industrial Organization*, Vol. 16 (March 2000): 219-223.

Discussant Comments on papers by Patrick Rey and Ralph Winter and by Robert Anderson et al., in Robert D. Anderson and Nancy T. Gallini, Eds., *Competition Policy and Intellectual Property Rights in the Knowledge-Based Economy*, Calgary: University of Calgary Press, 1998.

"Telecommunications Reform in the United States: Promises and Pitfalls," in Paul J.J. Welfens and George Yarrow, Eds., *Telecommunications and Energy in Systemic Transformation*, Heidelberg and New York: Springer, 1997.

"Protecting Intellectual Property by Excluding Infringing Imports: An Economist's View of Section 337 of the U.S. Tariff Act," *Patent World*, Issue 25 (September 1990): 29-35.

Review Essay of: Jean Tirole, The Theory of Industrial Organization, MIT Press, 1988. *Managerial and Decision Economics*, Vol. 11 (May 1990): 131-139.

Book Review of: J. Stiglitz and F. Mathewson eds., New Developments in the Analysis of Market Structure, MIT Press, 1988. *Journal of Economic Literature*, Vol. 36 (March 1988): 133-135.

"Vertical Restraints," published in German by *Forschungsinstitut fur Wirtschaftsverfassung und Wettbewer* by E.V. Koln, Heft 5, 1984.

DISCUSSION PAPERS AND WORK IN PROGRESS

"Product Innovation Incentives: Monopoly vs. Competition," (with Yongmin Chen), Georgetown University, Department of Economics Working Paper 09-02, April 2009. <http://econ.georgetown.edu/research/33243.html>

"Interconnection Incentives of a Large Network Facing Multiple Rivals," (with David Malueg), Georgetown University, Department of Economics Working Paper 03-01, January 2003. <http://econ.georgetown.edu/research/33243.html>

"Same Price, Cash or Card: Vertical Control in Payment Networks" (with Daniel Vincent), Georgetown University, Department of Economics Working Paper 02-01, February 2002. <http://econ.georgetown.edu/research/33243.html>

"Interconnection Incentives of a Large Network," (with David Malueg), Georgetown University, Department of Economics Working Paper 01-05, revised January 2002. <http://econ.georgetown.edu/research/33243.html>

"Exclusive Dealing, Product Differentiation, and Rent Extraction," in progress (with Serge Moresi and Francis O'Toole).

"Option Values of Deposit Insurance and Market Values of Net Worth: Some Evidence for U.S. Banks," mimeo, December, 1992 (with Behzad Diba and Chia-Hsiang Guo).

"Do Sunk Costs Discourage or Encourage Collusion?" U.S. Department of Justice, Antitrust Division, EPO Discussion Paper 85-10 (September 1985).

"Signaling Equilibria Based on Sensible Beliefs: Limit Pricing Under Incomplete Information," (with Maxim Engers), U.S. Department of Justice, Antitrust Division, EPO Discussion Paper 84-4 (May 1984).

ANTITRUST AND REGULATORY FILINGS & PRESENTATIONS

"Hanging Up on *Carterfone*: The Economic Case Against Access Regulation in Mobile Wireless," (with Federico Mini), filed by AT&T in Response to Skype Petition, FCC, RM-11261, May 2007. <http://ssrn.com/abstract=984240>

Declaration of Marius Schwartz for AT&T/BellSouth in FCC, WC Docket 06-74, June 2006.

Reply Declaration of Marius Schwartz for SBC/AT&T in FCC, WC Docket 05-65, May 2005. <http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517601199>

Declaration of Marius Schwartz for SBC/AT&T in FCC, WC Docket 05-65, February 2005. <http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517309104>

"Should Antitrust Assess Buyer Market Power Differently than Seller Market Power?" presented at DOJ/FTC Workshop on Merger Enforcement, Washington DC, February 2004. <http://www.ftc.gov/bc/mergerenforce/presentations/040217schwartz.pdf>

"The National Television Ownership Cap and Localism," paper submitted with Comments of NAB and NASA to FCC in *2002 Biennial Regulatory Review - Review of the Commission's Broadcast Ownership Rules and Other Rules*, FCC 02-249, Notice of Proposed Rulemaking (rel. Sep. 23, 2002), January 2, 2003 (with Daniel R. Vincent).

"Are Spectrum Limits Needed to Preserve Competition?" paper submitted on behalf of CTIA to FCC in *2000 Biennial Regulatory Review Spectrum Aggregation Limits for Commercial Mobile Radio Services*, WT Docket No. 01-14, Notice of Proposed Rulemaking (rel. Jan. 23, 2001), April 13, 2001 (with John Gale).

"The Appropriateness of Nondiscriminatory Access Regulation for Interactive Television," paper submitted on behalf of NCTA to FCC in *Nondiscrimination in the Distribution of Interactive Television Services Over Cable*, CS Docket No. 01-7, Notice of Inquiry (rel. Jan. 18, 2001), March 19, 2001 (with John Gale).

"Buyer Power Concerns and the *Aetna-Prudential* Merger," Address presented at 5th Annual Health Care Antitrust Forum, Northwestern University School of Law, October 20, 1999, posted on web site of Antitrust Division, U.S. Department of Justice. <http://www.usdoj.gov/atr/public/speeches/3924.htm>

"Intelsat Restructuring and Comsat's Non-Dominance: Reply to Dr. Owen and Professor Waverman," paper filed on behalf of Comsat Corporation with the FCC, *In the Matter of Comsat Corporation Petition for Forbearance from Dominant Carrier Regulation and for Reclassification As a Non-Dominant Carrier*, ("Comsat's Forbearance Petition") File No. 60-SAT-ISP-97, March 1998.

"Competition in International Satellite Services: Wither INTELSAT Restructuring?" paper filed on behalf of Comsat with the FCC in Comsat's Forbearance Petition, November 1997.

"Competitive Concerns with Gaming of the International Settlements Process under Asymmetric Liberalization of International Telecommunications and Above-Cost Settlement Rates," Affidavit submitted on behalf of AT&T to FCC, in proceedings on *Rules and Policies on Foreign Participation in the U.S. Telecommunications Market*, IB 97-142, November 18, 1997.

"The 'Open Local Market Standard' for Authorizing BOC InterLATA Entry: Reply to BOC Criticisms," Supplemental Affidavit submitted on behalf of U.S. DOJ to FCC, with DOJ's evaluation of following BOC applications for 271 approval: BellSouth in South Carolina, November 4, 1997 and in Louisiana, December 10, 1997. <www.usdoj.gov/atr/statements/1281.htm>.

"Competitive Implications of Bell Operating Company Entry into Long-Distance Telecommunications Services," Affidavit submitted on behalf of U.S. Department of Justice (DOJ) to FCC, with DOJ's evaluation of following BOC applications for 271 approval: SBC in Oklahoma, May 16, 1997; Ameritech in Michigan, June 25, 1997; and BellSouth in South Carolina, November 4, 1997 and in Louisiana, December 10, 1997. <www.usdoj.gov/atr/statements/Affiwp60.htm>

"Towards Competition in International Satellite Services: Rethinking the Role of INTELSAT," paper distributed at OECD Ad Hoc Meeting of Experts on Competition in Satellite Services, Paris, June 1995 (with Joseph E. Stiglitz and Eric Wolff).

"Competitive Markets in Generation: Economic Theory and Public Policy," presented at conference on "Electric Utility Restructuring: Whither Competition?" organized by International Association for Energy Economics Los Angeles Chapter, and Micronomics Inc., Los Angeles, May 1995.

OTHER SCHOLARLY ACTIVITIES

Seminars Presented

Auburn University
Bellcore
Bureau of Competition Policy, Industry Canada
California State University, Hayward
Center for Strategic and International Studies
Columbia University
ENSAE, Paris
Federal Reserve Bank of Philadelphia
Georgetown University
George Washington University
U.S. International Trade Commission
Johns Hopkins University
New York University – Economics Department
New York University – Stern School of Business
Pennsylvania State University
Simon Fraser University
Tel Aviv University Law School
Tulane University
University of Alberta
University of British Columbia
University of Calgary
University of California, Davis
University of California, Los Angeles
University of Colorado, Boulder
University of Illinois
University of Maryland
University of Montreal
University of Pennsylvania
University of Toronto
University of Virginia
U.S. Department of Justice
U.S. Federal Communications Commission

U.S. Federal Trade Commission

Conferences: Speaker, Discussant, or Panelist

- Bates White, Sixth Annual Antitrust Conference, Washington, DC, June 2009
- American Bar Association, Panel Discussion on "The Google/Yahoo! Agreement and Its Implications for Future Antitrust Enforcement in Online Advertising," Washington, DC, January 2009
- The Interdisciplinary Centre for Competition Law and Policy and Crowell & Moring LLP Annual Conference 2008, "Trends and Developments in Global Competition Law," Brussels, May 2008
- Georgetown University Center for Business and Public Policy, "Spectrum Policy: From its Foundations to its Future," Washington, DC, April 2008
- Bates White, Fourth Annual Antitrust Conference, Washington, DC, June 2007
- International Industrial Organization Conference, Savannah, GA, April 2007
- Georgetown University Center for Business and Public Policy, "What Economics Does and Does Not Tell Us about Net Neutrality," Washington, DC, March 2007
- FTC, Broadband Connectivity Competition Policy Workshop, Washington, DC, February 2007
- George Mason University School of Law, "Stepping Stones or Stumbling Blocks: Lessons from the Telecom Wars," Arlington, VA, September 2006
- Institut d'Economie Industrielle, "Competition Policy in Two-Sided Markets," Toulouse, France, June/July 2006
- Bates White, Third Annual Antitrust Conference, Washington, DC, June 2006
- Federal Reserve Bank of New York, "Antitrust Activity in Card-Based Payment Systems: Causes and Consequences," New York, NY, September 2005
- Institut d'Economie Industrielle, "The Economics of Electronic Communication Markets," Toulouse, France, October 2004
- DOJ/FTC, Merger Enforcement Workshop, Washington, DC, February 2004
- Cosmos' Club, 125th Anniversary Symposium, "The Changing Nature of Business 1878-2003, Washington, DC, December 2004
- DOJ/FTC, Hearings on Health Care and Competition Law and Policy, Washington, DC, April 2003
- International Industrial Organization Conference, Boston, MA, April 2003
- Georgetown University McDonough School of Business, "Integration, Investment and Innovation: Future Directions for the Telecommunications Industry," Washington, DC, February 2003
- University of Colorado School of Law, "The Regulation of Information Platforms," Boulder, CO, January 2002
- Phoenix Center for Advanced Legal & Economic Public Policy Studies, U.S. Telecoms Symposium, Washington, DC, July 2001
- Practising Law Institute, "Antitrust and Trade Practices Issues in Cyberspace," New York, NY, March 2001
- Telecommunications Policy Research Conference, Washington, DC, September 2000
- Schwab Capital Markets LP, Washington Research Group, "Telecom, Internet and Ecommerce Conference," Washington, DC, September 2000
- AEI-Brookings Joint Center for Regulatory Studies and Centre for European Policy Studies, semi-annual meetings, "Experiences with Telecommunications Deregulation," Washington, DC, April 2000
- University of Colorado School of Law, "Telecommunications After Bell Entry," Boulder, CO, April 2000
- American Bar Association Section of Antitrust Law, 48th Annual Antitrust Spring Meeting, Washington, DC, April 2000
- Institute of the Americas, "Telecom-IT Americas '99 Conference," La Jolla, CA, November 1999
- Northwestern University School of Law, 5th Annual Health Care Antitrust Forum, Chicago, IL, October 1999
- OECD, "Regulatory Reform in Japan, Mexico, the Netherlands and the United States," Paris, France, March 1999
- Federal Communications Bar Association Competition Committee, Symposium, Washingto,n DC, January 1999
- Conference on Current Topics in Merger and Antitrust Enforcement, Charles River Associates, Washington DC, December 1998

- Robert Schuman Centre of the European University Institute, Conference on Anticompetitive Regulation, Florence, Italy, September 1999
- American Bar Association Section of Antitrust Law, 47th Annual Antitrust Spring Meeting, Washington, DC, April 1999
- Telecommunications Policy Research Conference, Washington, DC, September 1997
- Canadian Bureau of Competition, Telecommunications seminar series, Ottawa, Canada, September 1997
- The World Bank, Competition Policy Workshop, Washington, DC, June 1997
- Federal Communications Commission, Economics of Interconnection Forum, Washington DC, May 1996
- Canadian Bureau of Competition, Authors' Symposium on Competition Policy and Intellectual Property Rights, Aylmer, Quebec, Canada, May 1996
- Electric Generation Association, Annual Meetings, West Palm Beach, FL, April 1996
- Illinois State University and the Institute of Government and Public Affairs, University of Illinois-Urbana, "Wheeling & Dealing: Opportunities and Challenges in the New Electric Industry," Chicago, April 1996
- OECD, "New Social and Economic Approaches to a Multimedia World," Symposium, Tokyo, Japan, March 1996
- Center for Economic Development, "Telecommunications and Energy Regulation in Transition Economies," Bratislava, Slovakia, October 1995
- International Association for Energy Economics Los Angeles Chapter, and Micronomics Inc., "Electric Utility Restructuring: Whither Competition?" Los Angeles, CA, May 1995
- Canadian Bureau of Competition, "New Learning on Barriers to Entry in Competition Policy," Ottawa, Canada, March 1995
- Southeastern Economic Theory Meetings, Charlottesville, VA, October 1994
- EARIE Conference, Tel Aviv, Israel, September 1993
- Midwest International Economics Meetings, Pittsburgh, PA, October 1992
- Latin American Econometric Society, Mexico City, Mexico, September 1992
- Carleton University, Conference on Industrial Organization, Ottawa, Canada, July 1991
- SUNY at Stony Brook, Workshop on Strategic and Dynamic Aspects of International Trade, Stony Brook, NY, July 1991
- AEI Conference on "Innovation, Intellectual Property and World Competition," Washington, DC, September 1990
- EARIE Conference, Lisbon, Portugal, September 1990
- Conference on International Trade and Technology, Brussels and London, November 1989
- EARIE Conference, Budapest, Hungary, August 1989
- Dundee University, Conference on Strategy and Market Structure, Dundee, Scotland, August 1988
- Stanford University Graduate School of Business, Conference on Firm Ownership and Competition, Palo Alto, CA, Business, June 1987
- EARIE Conference, Berlin, Germany, August 1986
- AEA Annual Meetings, Dallas, TX, December 1984

Referee for Professional Journals

American Economic Review
Canadian Journal of Economics
Economica
Economic Journal
Economics Letters
European Economic Review
European Journal of Political Economy
International Economic Review
International Journal of Industrial Organization
Journal of Business
Journal of Business Economics
Journal of Economic Dynamics and Control

Journal of Economic Education
Journal of Economic Theory
Journal of Economics and Management Strategy
Journal of Industrial Economics
Journal of International Economics
Journal of Law & Economics
Journal of Political Economy
Managerial and Decision Economics
Quarterly Journal of Economics
Quarterly Review of Economics and Business
RAND Journal of Economics
Review of Industrial Organization
Review of International Economics
Scandinavian Journal of Economics
Southern Economic Journal

Outside Evaluator—Research Proposals and Tenure & Promotion Cases

Duke University
INSEAD
National Science Foundation
Northwestern University School of Law
Small Business Administration
Texas A&M University
University of Calgary
University of California at Los Angeles
University of Colorado, Boulder
University of Michigan
University of Virginia

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