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GETTING HAZMAT TRANSPORTATION BACK ON TRACK: THE NEED FOR HAZMAT LIABILITY REFORM FOR RAIL CARRIERS

ZACHARY T. ABEL*

INTRODUCTION

Sometimes, strong performance is a dual-edged sword. As a result of the application of the common carrier doctrine and the modal strengths of freight transportation via rail, railroads are prohibited from refusing shipment of dangerous cargo such as nuclear waste, toxic inhalation hazard chemicals ("TIH chemicals"), and other dangerous shipments (with the exception of nuclear waste, collectively referred to in this note as "hazmat shipments"[1]).[2] The prohibition against refusing hazmat shipments is

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1 *See* 49 C.F.R. § 1580.100(b) (2009) (defining "rail security-sensitive materials").

2 *See* 49 U.S.C. § 11101 (2006) (setting forth rail carriers' common carrier obligation to provide transportation or service on reasonable request as well as to "provide to any person,

unique to the railroad industry.[3] A direct result of the common carrier obligation is the specter of limitless exposure of railroads to financial liability in the event of an accident releasing hazmat shipments that the railroads had no choice in deciding whether to transport in the first place.[4] The dangers of hazmat releases in any context, including rail transportation, implicate environmental, public health, and anti-terrorism concerns.[5] At bottom, an "unfunded mandate" of sorts surfaces, wherein railroads are forced to assume what they perceive as an unreasonable financial risk, while those benefitting from this policy, including hazmat shippers, the government, and the general public, assume few, if any, of its costs.[6] The focus of this note is on the allocation of damages in the event of a catastrophic release of hazmats in a densely populated urban area.

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on request, the carrier's rates and other service terms"); 49 C.F.R. pt. 1300 (2009) (implementing certain provisions of 49 U.S.C. § 11101). *See also* Chicago & Aurora R.R. Co. v. Thompson, 19 Ill. 578, 583 (1858) ("We suppose it is not necessary the charter should provide, in so many words, that the railroad companies created by them shall be common carriers. The authorities are numerous to the point that such companies . . . are common carriers, and liable as such."). Common carrier obligations have gone so far as to require a railroad to publish rates for the carriage of nuclear waste. *See, e.g.*, Akron, Canton & Youngstown R.R. Co. v. ICC, 611 F.2d 1162 (6th Cir. 1979). Despite the applicability of common carrier doctrine to nuclear waste transportation generally, liability issues arising from transportation of nuclear waste are dealt with under the Price-Anderson Act. *See* 42 U.S.C. §§ 2210(n)(1)(B), 2210(n)(1)(E) (2006).

[3] *See, e.g.*, ASS'N OF AM. R.R., HAZMAT TRANSPORTATION BY RAIL: AN UNFAIR LIABILITY 1 (2009), *available at* http://www.aar.org/safety/~/media/aar/backgroundpapers/hazmattransportationbyrailanunfairliability.ashx [hereinafter UNFAIR LIABILITY] ("Unlike trucks, barges, and airlines, railroads are required by current law to transport TIH materials—even if they don't want to and even though transporting TIH materials presents an enormous risk.").

[4] *See id.* In testimony before the Surface Transportation Board ("STB"), a Class I railroad estimated the costs of a "nightmare scenario" release at $4–5 billion. *See* Michael F. McBride, *Is the Price-Anderson Act an Appropriate Model for the Railroads?*, 76 J. TRANSP. L. LOGISTICS & POL'Y 93, 100 n.15 (2009).

[5] These interrelated considerations are apparent throughout this note, although they are most relevant in the discussions of chemical dangers and rail safety improvements. *See infra* Part II.

[6] *See* UNFAIR LIABILITY, *supra* note 3, at 1 ("As long as policymakers continue to require railroads to transport TIH materials, they should address the unfair risk this obligation forces railroads to assume."). *See also* BNSF Ry. Co., Comments to Advance Notice of Proposed Rulemaking, STB Ex Parte No. 681, Class I Railroad Accounting and Financial Reporting—Transportation of Hazardous Materials, at 1–2 (Feb. 4, 2009) (on file with author) [hereinafter BNSF Comments to STB Ex Parte No. 681] ("The transportation of hazardous materials . . . due to the possibility of a significant accident where the costs greatly exceed any commercially available insurance make [sic] BNSF's shareholders the ultimate insurer of TIH shipments.").

Part I of this note discusses the historical genesis and present contours of railroads' designation and regulation as common carriers. Part II examines the necessity of maximizing hazmat transportation by freight rail. This discussion takes place in two subparts. Part II.A examines the applications and dangers of the most common hazmats shipped by rail in order to provide perspective on the true necessity of these substances, and their shipment, to everyday life. Included in this section are examples of two real accidents, demonstrating the human, environmental, and financial costs of accidental hazmat releases while in transit. Part II.B looks at the modal advantages of rail transport that make it the best means of transporting these potentially life-threatening shipments whenever possible. It includes a discussion of the technological and operational measures adopted by the rail industry to help prevent or mitigate future accidents, as well as a discussion of the general environmental benefits of freight rail.

Against the backdrop of the necessity of hazardous materials to our everyday lives and the comparative strength of rail as a means of providing safe transportation of these shipments, Part III examines five methods of addressing the problem caused by the application of the common carrier doctrine to hazmats. It is important to note at the outset that the question of encouraging chemical substitutions—using safer chemicals whenever possible in order to limit the quantity of dangerous chemicals being shipped—is a distinct inquiry from that presented here. As the Committee on Assessing Vulnerabilities Related to the Nation's Chemical Infrastructure points out:

> The most desirable solution to preventing chemical releases is to reduce or eliminate the hazard where possible, not to control it. This can be achieved by modifying processes where possible to minimize the amount of hazardous material used, lower the temperatures and pressures required, replace a hazardous substance with a less hazardous substitute, or minimize the complexity of a chemical process.[7]

Ultimately, use of inherently safer technology would either drastically limit or render this issue moot altogether.[8] The discussion here is limited

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[7] COMM. ON ASSESSING VULNERABILITIES RELATED TO THE NATION'S CHEM. INFRASTRUCTURE, NAT'L RESEARCH COUNCIL, TERRORISM AND THE CHEMICAL INFRASTRUCTURE: PROTECTING PEOPLE AND REDUCING VULNERABILITIES 106 (2006), *available at* http://www.nap.edu/catalog/11597.html.

[8] *See* UNFAIR LIABILITY, *supra* note 3, at 2.

to the short-term question of reforming the current liability regime.[9] The note examines five alternatives, two of which have been suggested by the Association of American Railroads ("AAR").[10] Part III.A examines localized regulation of the routing of hazmat shipments. Part III.B discusses the modification or outright abolition of the common carrier doctrine. Part III.C examines the possibility of a statutory cap on damages in tort cases stemming from rail transport of hazmat shipments. Part III.D looks at reforming the Uniform Railroad Costing System ("URCS") to better capture the costs of hazmat transport for Class I railroads.[11] Finally, Part III.E examines the concept of a "liability backstop" similar to the Price-Anderson Act used in the nuclear energy industry.[12] The note concludes by arguing for the implementation of a liability backstop because of that system's unique ability to simultaneously protect the public, ensure compensation for damages when necessary, encourage railroads to continue to ship the dangerous chemicals that are a key component to everyday life, and encourage chemical producers to develop inherently safer chemicals by including them in a liability backstop system as well.

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[9] Norfolk Southern Railway Company describes the perceived misallocation of costs and benefits of hazmat production, transportation, and use as follows:

> [P]roducers and users of highly hazardous materials are producers and users of their own accord. They are able to make the production or use of highly hazardous materials an economically rational choice and generally have the option to cease the production or use of highly hazardous materials. . . . In contrast, the railroads transport highly hazardous materials primarily, if not exclusively, because the common carrier obligation as currently interpreted gives the railroads no choice but to do so.

Norfolk S. Ry. Co., Comments to Advance Notice of Proposed Rulemaking, STB Ex Parte No. 681, Class I Railroad Accounting and Financial Reporting—Transportation of Hazardous Materials, at 3 (Feb. 4, 2009) (on file with author) [hereinafter Norfolk S. Ry. Co. Comments to STB Ex Parte No. 681].

[10] UNFAIR LIABILITY, *supra* note 3, at 2.

[11] A "Class I Railroad" is defined as a railroad "having annual carrier operating revenues of $250 million or more after applying the railroad revenue deflator formula" based on the Railroad Freight Price Index developed by the Bureau of Labor Statistics. 49 C.F.R. 1201.1-1 (2009).

[12] *See* Price-Anderson Act, 42 U.S.C. § 2210 (2006). The Association of American Railroads ("AAR") has suggested the possibility of a statutory cap on damages, as well as the creation of a liability backstop. UNFAIR LIABILITY, *supra* note 3, at 2. The STB is currently considering the possibility of reforming the Uniform Railroad Costing System ("URCS") to better reflect hazmat shipment costs. *See generally* STB Ex Parte No. 681, Class I Railroad Accounting and Financial Reporting—Transportation of Hazardous Materials, 74 Fed. Reg. 248 (proposed Jan. 5, 2009) (to be codified at 49 C.F.R. pts. 1201, 1242) [hereinafter STB Ex Parte No. 681 ANPR].

I. OVERVIEW OF RAILROADS' COMMON CARRIER OBLIGATIONS

Originally a common law doctrine, railroads' obligations as common carriers were codified by the Interstate Commerce Act.[13] Chief among these obligations is the duty of common carriers to transport all goods offered for transportation.[14] As common carriers, "railroads are held to a higher standard of responsibility than most private enterprises."[15] As a result, railroads may not refuse shipment on the basis of inconvenience or lack of profitability.[16] In the context of this discussion, the common carrier doctrine requires railroads to transport hazmat shipments, despite any objections over the allocation of cost and potential liability for damages caused in the course of these movements.[17]

The common carrier obligations imposed upon railroads are not absolute; in response to a disability on the part of the carrier, it may declare an embargo, which, if validly declared, would relieve it of its common carrier obligations.[18] Typically, an embargo is declared as a result of physical damage such as weather and flood damage, tunnel deterioration, or a lack of equipment.[19] Embargoes are temporary service stoppages, as opposed to the permanent or indefinite termination of service brought about by the abandonment of a rail line.[20] The touchstone of embargo validity is reasonableness,[21] and the Surface Transportation Board ("STB") evaluates the reasonableness of embargoes using a five-factor, fact-intensive balancing test examining: "(1) the cost to repair the railroad; (2) the intent of the railroad; (3) the length of the embargo; (4) the amount of traffic on the line and (5) the financial condition of the carrier."[22] If properly enacted, an embargo forecloses the possibility of damages against a railroad for failure to fulfill its common carrier obligations.[23]

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[13] Am. Trucking Ass'ns v. Atchison, Topeka & Santa Fe Ry. Co., 387 U.S. 397, 406 (1967).
[14] *Id.* at 406 (citing New Jersey Steam Nav. Co. v. Merchs. Bank of Boston, 6 How. 344, 382–383 (1848)).
[15] Gen. Foods Corp. v. Baker, 451 F.Supp. 873, 875 (D. Md. 1978).
[16] *Id.* (citing United States v. Trans-Missouri Freight Ass'n, 166 U.S. 290 (1897).
[17] *See* UNFAIR LIABILITY, *supra* note 3, at 1.
[18] GS Roofing Prods. Co. v. Surface Transp. Bd., 262 F.3d 767, 773 (8th Cir. 2001).
[19] GS Roofing Prods. Co. v. Surface Transp. Bd., 143 F.3d 387, 392 (8th Cir. 1998) (quoting Gen. Foods Corp. v. Baker, 451 F.Supp. 873, 876 (D. Md. 1978)).
[20] ICC v. Baltimore & Annapolis R.R. Co., 398 F. Supp. 454, 462 (D. Md. 1975) (citing ICC v. Chicago, Rock Island & Pac. R.R., 501 F.2d 908, 911 (8th Cir. 1974)).
[21] *GS Roofing Prods.*, 143 F.3d at 392.
[22] Decatur Cnty. Comm'rs v. Surface Transp. Bd., 308 F.3d 710, 715 (7th Cir. 2002) (citing *GS Roofing Prods. Co.*, 143 F.3d at 392).
[23] *Gen. Foods Corp.*, 451 F.Supp. at 876.

The embargo is clearly an inappropriate doctrinal vehicle to address the problems created by the application of the common carrier doctrine to hazmat transportation by rail.[24] First, in the hypothetical case of a railroad refusing to transport highly hazardous shipments, it is doubtful that such a defense for refusal of carriage could successfully be asserted because it would fail to satisfy a number of the criteria used by the STB in evaluating the validity of embargoes.[25] Most likely to defeat any possibility of an embargo in this context are the first two of the STB factors—the "cost of repair" and "intent of [railroad]" elements.[26] A refusal to transport hazmat shipments has nothing to do with physical impossibility on the part of the railroad, and the intent of a railroad in this scenario is clear enough: to avoid the financial risk coming as a result of fulfillment of its common carrier obligations.

Also, a hypothetical refusal to transport hazmats would arguably turn a blind eye to economic reality; each year, American freight railroads transport an average of 1.7 million carloads of hazmat shipments.[27] This figure represents the majority of the 2.04 million carloads of hazardous and non-hazardous chemicals shipped via rail in 2008.[28] In addition to accounting for 6.7% of Class I railroads' carloads, shipment of chemicals accounted for 12.6% of Class I railroads' revenues in 2008.[29] Despite the financial risks posed by transportation of these dangerous chemicals, the notion of Class I railroads taking action that would result in foregoing $7.7 billion in annual revenue is arguably irrational, especially when noting that in 2007, 99.996% of rail hazmat shipments reached their destinations incident-free.[30]

Second, and perhaps more important, use of embargoes in this context will constitute an immense disservice to the general public, as these shipments would be forced onto the nation's highways in greater

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[24] *See* Michael McBride, *Railroad Transportation of Nuclear Waste and Other Hazardous Materials*, ELEC. J., Apr. 2008, at 55, 57–59 (discussing limitations on embargoes).

[25] *See supra* note 22 and accompanying text.

[26] *See* McBride, *Railroad Transportation*, *supra* note 24, at 58 (discussing the limitations on embargoes and providing an example of an embargo declared an unlawful abandonment after consideration of the relevant factors, including cost of repairs).

[27] *Hazmat: FAQ*, Ass'n of Am. R.R., http://www.aar.org/Safety/Hazmat/Hazmat-FAQ.aspx (last visited Feb. 20, 2011).

[28] *See* ASS'N OF AM. R.R., RAILROADS AND CHEMICALS 3 (2009), http://www.aar.org/Home/AAR2/InCongress/~/media/AAR/BackgroundPapers/RailroadsandChemicals.ashx [hereinafter RAILROADS AND CHEMICALS] (this figure pertains to Class I railroads).

[29] *Id.* at 2.

[30] *See id.* at 3–4.

numbers, increasing the risk posed to the general public.[31] For this reason, it is also imperative that the common carrier obligation be maintained. The specific strengths and public benefits of hazmat shipment via rail are discussed in Part II.B below.

II. THE NECESSITY OF HAZMAT TRANSPORTATION BY RAIL

For a variety of reasons, transportation of hazmat shipments via freight rail represents the best public policy for these movements.[32] This is attributable to a number of factors, including operational technological developments,[33] operational safety record,[34] and general environmental strengths.[35] The section below provides a general overview of the common applications and dangers of chlorine and anhydrous ammonia, two of the most common—and most dangerous—hazmats shipped by rail.

A. Commonly Transported Hazmats

Although the term "hazmat shipments" may, for many, initially evoke an image of exotic substances used in uncommon applications, this could not be further from reality.[36] Hazmats have very common uses, making them indispensable to everyday life.[37] As the American Chemistry Council ("ACC") points out:

> Americans expect clean, safe water from our tap, access to life-saving medications and medical devices, protective equipment and body armor for our sons and daughters in

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[31] *See* McBride, *Railroad Transportation*, *supra* note 24, at 56 ("It is in the public interest that railroads be obliged to carry these dangerous but essential substances because the rail mode generally has been found to be the safest mode for that transportation.").

[32] *See* U.S. Dep't of Transp., Comments to Advance Notice of Proposed Rulemaking, STB Ex Parte No. 681, Class I Railroad Accounting and Financial Reporting—Transportation of Hazardous Materials, at 4 (Feb. 4, 2009) (on file with author) [hereinafter USDOT Comments to STB Ex Parte No. 681].

[33] *See infra* notes 113–116 and accompanying text.

[34] *See infra* notes 108–112 and accompanying text.

[35] *See infra* Part II.B.2.

[36] *See PHMSA—Definitions*, U.S. DEP'T OF TRANSP., http://phmsa.dot.gov/public/definitions (last visited Feb. 20, 2011) ("Hazardous materials are vital to the nation's economy, as we all depend on these materials to heat our homes, provide fuel for our transportation system, and deliver chemicals to enhance food production and drugs to diagnose and treat illnesses.").

[37] *See id. See also infra* Parts II.A.1 (chlorine) and II.A.2 (anhydrous ammonia).

> military service and law enforcement, a safe and plentiful food supply, aviation safety systems, computers and phones, energy-saving solar panels, automobile safety systems and child safety seats and more. Hazardous materials help produce the products that fulfill these expectations, and often, there are no acceptable, non-hazardous substitutes that ensure equal safety and performance.[38]

Some of the most commonly-used hazmat chemicals and their respective applications are discussed below.

1. Chlorine

Among the most common hazmat shipments moved by rail is chlorine, a TIH chemical.[39] The American Chemistry Society ("ACS") reports that in 2008, 9.6 million metric tons of chlorine were produced in the United States.[40] Because of the economic recession and plant shutdowns caused by two hurricanes,[41] this figure represents a 10.8% decline in production from 2007.[42] Peak production of chlorine in the United States for the past decade took place in 2000, when nearly 12.7 million metric tons were produced.[43]

Chlorine gas (Cl_2) has an incredibly broad array of modern-day applications. As Brodsky explains:

> The most important use of chlorine itself is as a disinfectant; for example, chlorine is employed worldwide in drinking water treatment facilities. In addition, chlorine derivatives (materials containing chlorine atoms chemically bound to other elements) are used as bleaching agents, construction materials (especially polyvinyl chloride, or PVC), high purity silicon precursors (e.g. trichlorosilane) for use in computer

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[38] *Issue Brief—Hazmat Transportation Safety*, AM. CHEMISTRY COUNCIL, http://www.americanchemistry.com/s_acc/sec_article_acc.asp?CID=634&DID=10020 (last visited Feb. 20, 2011).
[39] *See* 49 C.F.R. §§ 171.8, 172.101 (2009) (listing chlorine in the hazardous materials table).
[40] *Facts & Figures of the Chemical Industry*, CHEMICAL & ENGINEERING NEWS, July 6, 2009, at 29, 56, *available at* http://pubs.acs.org/cen/coverstory/87/pdf/8727production.pdf [hereinafter 2008 Chemical Industry Facts & Figures].
[41] *Id.* at 51.
[42] *Id.* at 56.
[43] *Id.*

> chip manufacture, pharmaceutical compounds (including "blockbuster" drugs such as Singulair, Plavix, and Norvasc), and many other functional materials.[44]

Additionally, the ACC states that a great deal of the products being used in America's push to go green require chlorine for their production; these include "solar cells, wind-powered generators, hybrid cars, fiber optic cables, low-energy appliances and light bulbs, energy-saving insulation, [and] lightweight building materials," among others.[45] Currently, no safer alternatives to chlorine exist for the purposes of manufacturing these products.[46]

The consequences of a chlorine gas release are disastrous.[47] Because it is denser than air, chlorine disperses slowly in the event of a release.[48] It is a green-yellow gas, and it has a suffocating odor which can be detected at a concentration of 0.31 ppm.[49] Due to its water solubility, chlorine gas at a concentration of 3 ppm irritates the mucous membranes.[50] At concentrations from 5–15 ppm, chlorine gas causes upper respiratory irritation, and at a concentration of 30 ppm, chest pain, vomiting, and dyspnea occur.[51]

A 2005 train collision in Graniteville, S.C. demonstrates the very real costs to human life and the overall environment associated with a chlorine gas release. Around 2:39 a.m., a northbound Norfolk Southern Railway Company ("Norfolk Southern") freight train ("train 192") collided with a parked train ("train P22") in Graniteville, S.C.[52] Train P22 was parked on an industrial siding adjacent to Avondale Mills, Inc., a textile manufacturer.[53] The National Transportation Safety Board ("NTSB")

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[44] Benjamin H. Brodsky, *Issue Brief: Industrial Chemicals as Weapons: Chlorine*, NUCLEAR THREAT INITIATIVE (July 31, 2007), http://www.nti.org/e_research/e3_89.html.
[45] *Issue Brief—Chlorine Rail Transportation Safety*, AM. CHEMISTRY COUNCIL, http://www.americanchemistry.com/s_acc/sec_article_acc.asp?CID=634&DID=10018 (last visited Feb. 20, 2011).
[46] *Id.*
[47] *See* Brodsky, *supra* note 44.
[48] *Id.*
[49] *Technology Transfer Network Air Toxics Website: Chlorine*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/ttn/atw/hlthef/chlorine.html#ref7 (last visited Feb. 20, 2011).
[50] Brodsky, *supra* note 44.
[51] *Id.*
[52] NAT'L TRANSP. SAFETY BD., 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 1 (2005), *available at* http://www.ntsb.gov/publictn/2005/RAR0504.pdf [hereinafter GRANITEVILLE ACCIDENT REPORT].
[53] *Id.* at 1–2.

determined the probable cause of the accident was "the failure of the crew of Norfolk Southern train P22 to return a main line switch to the normal position after the crew completed work at an industry track."[54]

At the time of the collision, train 192 was traveling approximately forty-seven miles per hour with two locomotives and forty-two freight cars in its consist.[55] Both of train 192's locomotives and sixteen freight cars derailed as a result of the collision; three of the derailed cars were tank cars carrying chlorine.[56] One of these tank cars ruptured, releasing a cloud of poisonous chlorine gas over the town.[57] As the NTSB points out, "[t]he sudden release and expansion of the escaping gas caused the product remaining in the tank to auto-refrigerate and remain in the liquid state, slowing the release of additional gas."[58]

As a result of the cloud of chlorine gas that settled over Graniteville, nine people died, including the engineer of train 192, six Avondale Mills employees, a truck driver near the plant, and a local resident.[59] Another 554 people were taken to local hospitals complaining of difficulty breathing; of that group, seventy-five were admitted for treatment.[60]

From a financial standpoint, damages were initially estimated as exceeding $6.9 million.[61] This figure, cited in the NTSB accident report, most likely focuses only on physical damage to railroad equipment and other physical damage at the accident site, as Norfolk Southern later estimated overall exposure between $30 and $40 million.[62] The railroad settled a class-action lawsuit with the 5,400 people displaced by the accident, agreeing to pay $2,000 to every household within a one-mile radius for inconvenience and $200 per day for each person kept away from his or her home during the cleanup effort.[63] This settlement did not include those who died or were hospitalized as a result of the chlorine release.[64]

In addition to the class-action lawsuit, Avondale Mills also brought suit against Norfolk Southern seeking over $450 million for remediation

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[54] *Id.* at 56.
[55] *Id.* at 1.
[56] *Id.*
[57] *Id.* at 11. "[T]he cloud extended at least 2,500 feet to the north; 1,000 feet to the east; 900 feet to the south; and 1,000 feet to the west." *Id.*
[58] GRANITEVILLE ACCIDENT REPORT, *supra* note 52, at 11.
[59] *Id.* at 17.
[60] *Id.* at 18.
[61] *Id.* at 20.
[62] *Norfolk Southern Tallies Cost of Train Wreck*, N.Y. TIMES, Jan. 25, 2005, at C4.
[63] *Rail Line Agrees to Pay Some Crash Victims*, N.Y. TIMES, May 28, 2005, at A12.
[64] *Id.*

costs, as well as business interruption and valuation.[65] Avondale Mills also sought punitive damages.[66] After four weeks of trial, this lawsuit was settled for an undisclosed amount, with an unspecified portion of the settlement to be paid directly by Norfolk Southern and added to its operating expenses.[67]

Within weeks of the announcement of the settlement of Avondale Mills' claims, the Department of Justice ("DOJ") brought suit against Norfolk Southern alleging violations of the Clean Water Act ("CWA").[68] Specifically, DOJ alleged that chlorine and diesel fuel reached nearby Horse Creek, injuring and killing plants and wildlife.[69] On March 8, 2010, it was announced that Norfolk Southern agreed to pay a penalty of almost $4 million for the CWA violations, to be deposited in the federal Oil Spill Liability Trust Fund.[70] Additionally, the company agreed to provide special incident training to its personnel and to invest additional money for replacing the lost vegetation and wildlife.[71]

As noted earlier, the accident was caused by the failure of the crew of train P22 to realign the main line switch to the normal position.[72] Because the trackage in this area is non-signaled, train movements are governed by verbal authorities from dispatchers known as "track warrants."[73] In contrast, trackage using automatic block signaling involves trackside signals that indicate to train crews whether the track ahead is clear.[74]

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[65] *Firm Client Norfolk Southern Corporation Reaches Favorable Agreement with Avondale Mills to Settle Claims from Graniteville Accident*, HOLLINGSWORTH, LLP, http://www.hollingsworthllp.com/news.php?NewsID=128 (last visited Feb. 20, 2011).
[66] *Id.*
[67] News Release, Norfolk S. Corp., Norfolk Southern Reaches Agreement with Avondale Mills to Settle Claims from Graniteville Accident (Apr. 7, 2008), http://www.nscorp.com/nscportal/nscorp/Media/News%20Releases/2008/agreement.html.
[68] Glenn Hess, *U.S. Sues Norfolk Southern for Damages from Chemical Spill*, CHEMICAL & ENGINEERING NEWS (Apr. 29, 2008), *available at* http://pubs.acs.org/cen/news/86/i18/8618news4.html.
[69] *Id.*
[70] News Release, U.S. Envtl. Prot. Agency, Railroad Company to Pay $4 Million Penalty for 2005 Chlorine Spill in Graniteville, SC (Mar. 8, 2010), http://yosemite.epa.gov/OPA/ADMPRESS.NSF/d0cf6618525a9efb85257359003fb69d/18e25155f0e3cd90852576e00066a885.
[71] *Id.*
[72] GRANITEVILLE ACCIDENT REPORT, s*upra* note 52, at 56.
[73] *Id.* at 4.
[74] Frank W. Bryan & Robert S. McGonigal, *Railroad Signals: What They Do, What They Mean*, TRAINS MAGAZINE (May 1, 2006), *available at* http://www.trains.com/trn/default.aspx?c=a&id=191.

The display of a "clear" signal is predicated upon the passage of a low-voltage electrical current through the rails of the block ahead.[75] When a train occupies the block, or a switch is not in the normal position, the block is short-circuited, displaying a "stop" signal.[76] Had this technology been employed on the trackage through Graniteville, the crew of train 192 would have encountered a stop signal and had ample time to stop in advance of the switch to the Avondale Mills industrial track.[77]

2. Anhydrous Ammonia

Anhydrous ammonia is most commonly used as an agricultural fertilizer and as an industrial refrigerant.[78] Regarding its use in fertilizer production, The Fertilizer Institute ("TFI") points out, "[a]nhydrous ammonia is the primary ingredient in all nitrogen fertilizers such as,[sic] urea and urea ammonium nitrate solution (UAN) and is also used to produce phosphate fertilizers such as diammonium phosphate (DAP) and monoammonium phosphate (MAP)."[79] As with many applications of chlorine, there is no substitute for anhydrous ammonia in the fertilizer production process.[80] Aside from fertilizer production and industrial refrigeration, anhydrous ammonia is also used in the production of synthetic fibers, in mining operations, and in scrubbing nitric oxide and sulfur from the emissions of coal-fired power plants.[81]

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[75] *Id.*
[76] *Id. See also* GRANITEVILLE ACCIDENT REPORT, *supra* note 52, at 36 ("In signaled territory, the position of the switch is conveyed to the train crew through a corresponding wayside signal.").
[77] *Cf.* GRANITEVILLE ACCIDENT REPORT, *supra* note 52, at 47 (discussing examples of possible means that could be implemented to avoid this type of accident). For additional discussion on protective technology such as positive train control, which works in conjunction with track signaling systems, *see infra* Part II.B.2.
[78] U.S. ENVTL. PROT. AGENCY, CHEMICAL SAFETY ALERT: ANHYDROUS AMMONIA THEFT 1 (2000), *available at* http://www.epa.gov/OEM/docs/chem/csalert.pdf. More than 80% of the anhydrous ammonia produced in the United States is used in agriculture, whereas less than 2% is used as a refrigerant. *Id.* at 2. The EPA also points out that anhydrous ammonia is a target of thieves because of its use as a key ingredient in manufacturing methamphetamines. *Id.* at 1.
[79] THE FERTILIZER INSTITUTE, THE FERTILIZER INSTITUTE STATEMENT: RAIL TRANSPORTATION OF ANHYDROUS AMMONIA MARCH 12, 2008 (2008), *available at* http://www.tfi.org/mediacenter/railstatement.pdf. TFI also points out that one railcar of ammonia makes enough fertilizer to produce "128,000 bushels of corn, which can be used to feed approximately 1,600 head of beef or produce 345,600 gallons of ethanol." *Id.*
[80] *Id.*
[81] *Id.*

The ACS reports that in 2008, over 9.5 million metric tons of anhydrous ammonia were produced in the United States.[82] Similar to the decline in the production of chlorine in 2008, anhydrous ammonia production dropped 11.1% from 2007,[83] with the combination of an economic recession and natural disasters likely to blame.[84]

A release of anhydrous ammonia would pose serious health and safety risks.[85] Like chlorine, anhydrous ammonia affects the eyes, skin, and lungs of humans exposed to it.[86] At concentrations as low as 20 ppm, its odor is detectable to humans, and at concentrations between 15% and 28% by volume in air, it is flammable.[87] In concentrations of approximately 300 ppm, anhydrous ammonia is immediately dangerous to health and safety.[88] Unlike chlorine, anhydrous ammonia is lighter than air; in the event of a release, the gas will rise if the air is dry, but if it is not, it will "react[] immediately with the humidity in the air and may remain close to the ground."[89]

On January 18, 2002, a Canadian Pacific Railway ("Canadian Pacific") freight train derailed near Minot, N.D., causing a release of anhydrous ammonia.[90] Of the 112 cars on that particular train, thirty-one derailed.[91] Fifteen of the train's cars contained anhydrous ammonia, five of which were punctured during the derailment.[92] From these five cars, 146,700 gallons of anhydrous ammonia were released.[93] Immediately before the derailment, the crew recalled traveling over a "rough spot" in the tracks, followed directly by the derailment.[94] The NTSB determined the

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[82] 2008 Chemical Industry Facts & Figures, *supra* note 40, at 56.
[83] *Id.*
[84] *See id.* at 51.
[85] *See Safety and Health Topics: Ammonia Refrigeration*, OCCUPATIONAL SAFETY & HEALTH ADMIN., U.S. DEP'T OF LABOR, http://www.osha.gov/SLTC/ammoniarefrigeration/index.html (last visited Feb. 20, 2011).
[86] *Id.*
[87] *Id.*
[88] *Id.*
[89] *Ammonia Refrigeration—Properties of Ammonia*, OCCUPATIONAL SAFETY & HEALTH ADMIN., U.S. DEP'T OF LABOR, http://www.osha.gov/SLTC/etools/ammonia_refrigeration/ammonia/index.html (last visited Feb. 20, 2011).
[90] *One Man Killed by Toxic Cloud in Rail Wreck*, N.Y. TIMES, Jan. 19, 2002, at A10.
[91] NAT'L TRANSP. SAFETY BD., RAILROAD ACCIDENT REPORT NTSB/RAR-04/01, DERAILMENT OF CANADIAN PACIFIC RAILWAY FREIGHT TRAIN 292-16 AND SUBSEQUENT RELEASE OF ANHYDROUS AMMONIA NEAR MINOT, NORTH DAKOTA, JANUARY 18, 2002, at 1 (2004), *available at* http://www.ntsb.gov/publictn/2004/RAR0401.pdf [hereinafter MINOT ACCIDENT REPORT].
[92] *Id.* at 1–2.
[93] *Id.* at 5.
[94] *Id.* at 3.

probable cause of the accident was "an ineffective Canadian Pacific Railway inspection and maintenance program that did not identify and replace cracked joint bars before they completely fractured and led to the breaking of the rail at the joint."[95] Additionally, the NTSB found that the accident was made more severe by the catastrophic failure of the five tank cars that released the anhydrous ammonia.[96]

As a result of the chemical release at Minot, one man died while trying to flee the area, and 333 others sustained varying degrees of injury associated with exposure to anhydrous ammonia gas.[97] Of these, 312 were residents who sustained non-fatal injuries.[98]

The derailment caused an estimated $2.49 million in damages to railroad equipment, cargo, and track.[99] As of the publication of the NTSB's accident report in early 2004, Canadian Pacific had paid over $8.39 million in environmental remediation expenses including removal of contaminated soil and ice, installation of monitoring wells, installation of groundwater sumps, and installation and operation of a groundwater extraction system at the site.[100] Finally, two houses in a nearby neighborhood sustained damages as a result of the derailment: one was damaged by a piece of a tank car that was propelled over 1/4 mile from the derailment; the other was struck by a vehicle driven by the only person to die as a result of the incident.[101]

B. Modal Advantages of Rail

Transporting hazmats via rail represents the best public policy on two levels: first, the overall safety record for rail freight transportation is superior to that of other modes,[102] and second, rail transportation of freight far exceeds the fuel economy of other modes of transportation, thus giving it the edge in minimizing environmental impacts.[103] Examining the underlying basis for this policy determination is critical to this argument, as it is important to understand that shifting hazmat shipments to other forms

[95] *Id.* at 69. The derailment itself was likely caused by broken joint bars, where the rails then separated. *Id.* at 68.
[96] *Id.* at 69.
[97] MINOT ACCIDENT REPORT, *supra* note 91, at 10–11.
[98] *Id.* at 11.
[99] *Id.*
[100] *Id.* at 12.
[101] *Id.*
[102] *See infra* Part II.B.1.
[103] *See infra* Part II.B.2.

of transportation is *not* in the best interests of the public.[104] Instead, the short-term focus should be on revising the liability regime for hazmat accidents on rail, while simultaneously preventing a shift of hazmat shipments to other, less safe modes of transportation.

1. Technological/Safety Advances

Despite a strong safety record, the rail industry has continually taken steps to develop and implement technology that enhances industry safety, both on its own accord and as a result of government mandates.[105] Advancement in this area is driven by the dual, interrelated purposes of preventing or mitigating hazmat releases in the event of an operational accident (i.e., a derailment),[106] as well as anti-terrorism considerations.[107] The purpose of this section of the note is to provide an overview of railroads' safety record in moving hazmats and discuss the technological and safety advances that continue to place the railroad industry in the best position to deliver hazmats safely.

The AAR points out that "[i]n 2007, 99.996 percent of rail hazmat shipments reached their destination without a release caused by a train accident."[108] The 2007 safety record indicates a decrease of the accident rate by 81% since 1980.[109] The industry's safety record is improved through

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[104] *See* McBride, *Railroad Transportation*, *supra* note 24, at 56 ("It is in the public interest that railroads be obliged to carry these dangerous but essential substances because the rail mode generally has been found to be the safest mode for that transportation."). This also reflects the wisdom inherent in the unique nature of the common carrier doctrine applied only to railroads; specifically, the absence of parallel requirements for other modes of transportation is purposeful, justified today by the unique characteristics of railroads as well as the safety advantages discussed in this section.

[105] *See* Testimony of Association of American Railroads before the U.S. House of Representatives Committee on Homeland Security, Subcommittee on Transportation Security and Infrastructure Protection, Chemical Security: The Implementation of the Chemical Facility Anti-Terrorism Standard and the Road Ahead, at 2–4 (Dec. 12, 2007), http://www.aar.org/en/Safety/~/media/aar/Testimony/Written/AAR_Testimony_ChemSec_121207_FINAL.ashx [hereinafter Chemical Security—Road Ahead].

[106] *See* Rail Safety Improvement Act of 2008, Pub. L. No. 110-432, 122 Stat. 4848 (2008) (codified in scattered sections of 49 U.S.C.). This law endorses a railroad safety strategy with multiple goals, including decreasing the number of derailments and other accidents. *See id.* at § 102.

[107] *See* Implementing Recommendations of the 9/11 Commission Act of 2007, Pub. L. No. 110-53, §§ 1516–1520, 121 Stat. 266, 437–444 (2007) (codified as amended at 6 U.S.C. §§ 1166–1169) (setting forth numerous provisions impacting rail transportation of hazmats, including improved tank car testing and first responder training).

[108] RAILROADS AND CHEMICALS, *supra* note 28, at 4.

[109] *Id.*

two major avenues: emergency preparedness and technological or operational improvements.[110]

The crucial role of emergency preparedness was brought to the fore in the wake of the September 11 terrorist attacks; as a result, Congress passed the Implementing Recommendations of the 9/11 Commission Act of 2007, which, among other things, requires the Secretary of Homeland Security to develop and conduct security exercises for railroads to assess and improve capabilities to "prevent, prepare for, mitigate, respond to, and recover from acts of terrorism."[111] Although this provision is focused at responding to terrorist acts against railroad targets, it will provide valuable preparation for non-terrorist-caused incidents as well because incidents of both types will share similar characteristics in the railroad context. In addition to legislatively-imposed emergency preparedness training, Class I railroads have partnered with chemical manufacturers and distributors, as well as emergency response and government agencies in TRANSCAER, a national effort aimed at "assisting communities to prepare for and respond to a possible hazardous material transportation incident."[112]

On the technological and operational side are measures that distinguish the rail industry from other modes of transportation. Chief among these is the development and implementation of positive train control ("PTC") technology, mandated by Congress in the Rail Safety Improvement Act of 2008 ("RSIA").[113] In short, PTC technology acts as a layer of protection in addition to human crew members that functions through GPS, radio communications, and on-board computer equipment interfacing with computer systems at a traffic control center.[114] PTC systems generally work by monitoring train speed and position, warning train crews when they are in danger of violating speed or authority limits, and initiating train braking automatically if the train crew fails to respond appropriately.[115] Under RSIA, the Secretary of Transportation is required to provide a plan for the implementation of PTC technology on routes over which hazmats

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[110] *See* Chemical Security—Road Ahead, *supra* note 105, at 3–4.
[111] 6 U.S.C. § 1166(a) (Supp. II 2009).
[112] *Who We Are*, TRANSCAER, http://www.transcaer.com/who-we-are (last visited Feb. 20, 2011).
[113] Rail Safety Improvement Act of 2008, Pub. L. No. 110-432, § 104, 122 Stat. 4848, 4856 (2008) (codified at 49 U.S.C. § 20157).
[114] FED. R.R. ADMIN., COMPARATIVE EVALUATION OF RAIL AND TRUCK FUEL EFFICIENCY ON COMPETITIVE CORRIDORS 100 (2009), *available at* http://www.fra.dot.gov/Downloads/Comparative_Evaluation_Rail_Truck_Fuel_Efficiency.pdf [hereinafter COMPARATIVE EVALUATION].
[115] *Id.*

are shipped or routes shared by freight and regular passenger traffic no later than December 31, 2015.[116]

2. Comparative Advantages

In addition to the emergency preparedness and technological and operational measures that directly impact rail shipment of hazmats are the general efficiency and environmental benefits to shipping freight via rail.[117] The Bureau of Transportation Statistics ("BTS") provides some compelling indicators of the strengths of railroads when compared to trucking, the industry's most direct competitor.[118]

Freight transportation fuel efficiency is calculated on the basis of the number of miles a ton of freight is transported on a single gallon of fuel; this is commonly referred to as a ton-mile per gallon ("TMPG").[119] A variant on the TMPG is the revenue ton-mile per gallon ("RTMPG").[120] The difference between the two is simple: RTMPG captures the fuel efficiency of only revenue movements; in railroading, this is especially important because of the need for movements of both empty cars and the railroad's own maintenance materials, including rail, ballast, and ties.[121] The trucking industry, in contrast, needs to take neither of these considerations into account; trucks are often able to acquire new loads on return trips,[122] and they bear no responsibility for construction or maintenance of the government-provided roadways over which they drive (aside from paying

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[116] 49 U.S.C. § 20157(a) (Supp. II 2009).

[117] *See* ASS'N OF AM. R.R., FREIGHT RAILROADS HELP REDUCE GREENHOUSE GAS EMISSIONS 1 (2010), *available at* http://www.aar.org/~/media/aar/backgroundpapers/freightrailroadsofferasmarteffectivewaytoreducegreenhousegasemissions.ashx [hereinafter FREIGHT RAILROADS HELP REDUCE GHG].

[118] *See, e.g.*, *infra* notes 123–124 and accompanying text.

[119] SCOTT M. DENNIS, BUREAU OF TRANSP. STATISTICS, A DECADE OF GROWTH IN DOMESTIC FREIGHT—RAIL AND TRUCK TON-MILES CONTINUE TO RISE (2007), *available at* http://www.bts.gov/publications/special_reports_and_issue_briefs/special_report/2007_07_27/pdf/entire.pdf; COMPARATIVE EVALUATION, *supra* note 114, at 74.

[120] *See Glossary*, BUREAU OF TRANSP. STATISTICS, http://www.transtats.bts.gov/Glossary.asp?index=R (last visited Feb. 20, 2011) (defining Revenue Ton Mile).

[121] Travis Fain, *423 Miles a Gallon*, LUCID IDIOCY (POLITICS) BLOG, Mar. 25, 2008, http://www.reportingforhire.com/2008/03/423-miles-gallon.html (quoting Gary Sease, a CSX spokesman, explaining the difference between TMPG and RTMPG).

[122] *See* Penelope Patsuris, *Wise Load: B2B Hits the Road*, FORBES (Feb. 4, 2000), http://www.forbes.com/2000/02/04/feat.html (pointing out that large U.S. carriers average 12% of "empty miles" and describing how the National Transportation Exchange helps truckers find return loads).

taxes, of course). According to 2006 data from BTS, trucks achieved an efficiency of just over 34 TMPG;[123] railroads, by contrast, achieved an efficiency of just over 422 RTMPG.[124] The AAR reports that for 2009, U.S. freight railroads moved one ton of freight an average of 480 miles per gallon (up from 457 in 2008)," making railroads four times more fuel efficient than trucks.[125]

A recent study provides a direct comparison of railroads and trucking, analyzing and comparing fuel efficiency data for a selected group of twenty-three "competitive corridors."[126] The results showed a stark contrast in the respective fuel efficiencies of rail and trucking; over the course of the study, the rail movements examined produced a fuel efficiency range of 156–512 TMPG, while comparable truck movements produced a fuel efficiency range of 68–133 TMPG.[127] In terms of actual fuel consumption differences, this means that "[r]ail results in fuel savings when compared to their counterpart truck movement, ranging from 18 to 1,108 gallons per carload."[128] The report also provides a useful overview of the technology that enables the stark differences in fuel efficiency between freight rail and trucks.[129]

In addition to overall fuel efficiency considerations are disparities in greenhouse gas emissions that further justify maximizing the utilization of railroads for shipment of hazmats and other freight.[130] For example, in 2008, freight railroading was responsible for 2.4% of the transportation sector's greenhouse gas emissions; by contrast, trucking was responsible for 21.5%.[131] In terms of overall greenhouse gas emissions in the United States in 2008, the freight rail industry contributed only 0.6%; trucking contributed 5.8%.[132]

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[123] *Truck Profile*, BUREAU OF TRANSP. STATISTICS, http://www.bts.gov/publications/national_transportation_statistics/html/table_truck_profile.html (last visited Feb. 20, 2011) (calculated by dividing "Ton-miles" by "Fuel consumed, all trucks").
[124] *Rail Profile*, BUREAU OF TRANSP. STATISTICS, http://www.bts.gov/publications/national_transportation_statistics/html/table_rail_profile.html (last visited Feb. 20, 2011) (calculated by dividing "Revenue ton-miles of freight" by "Fuel consumed in freight service").
[125] ASS'N OF AM. R.R., RAILROADS: GREEN FROM THE START 1 (2010), *available at* http://www.aar.org/~/media/aar/backgroundpapers/railroadsgreenfromthestart.ashx.
[126] COMPARATIVE EVALUATION, *supra* note 114, at 2.
[127] *Id.* at 4.
[128] *Id.* at 8.
[129] *See id.* at 92–101.
[130] *See* FREIGHT RAILROADS HELP REDUCE GHG, *supra* note 117, at 1–2.
[131] *Id.* at 2.
[132] *Id.* at 1.

III. ADDRESSING THE PROBLEM

As briefly mentioned in the introduction to this note, it is important to keep in mind the scope of the argument presented here. The focus of this note is a solution to the problem of potential tort liability forced upon railroads by virtue of their status as common carriers. Tort reform to address this problem is immediate, but short-term. The best long-term solution is the substitution of safer chemicals wherever possible.[133] Such substitutions, over time, have the potential to either drastically limit the scope of the problem as it exists today, or to render it altogether moot.

Important background considerations to any policy change in the allocation of hazmat transportation costs were recently addressed by the United States Department of Transportation ("USDOT") and Norfolk Southern.[134] On one side is the policy judgment that rail is the safest mode of transportation for hazmat shipments,[135] and on the other is the understanding that development and implementation of inherently safer technologies is the ultimate solution to the poorly-allocated costs of hazmat shipment present under the current liability regime.[136] In light of this issue, any reform, in order to be effective, must incentivize development and implementation of inherently safer chemicals by chemical manufacturers and users[137] and simultaneously avoid disincentivizing shipment of hazmats via rail while reforming rail carrier exposure.[138] Others, including Union Pacific Railroad ("Union Pacific"), advocate the development of on-site chemical production where feasible.[139]

A. Localized Regulation of Route Selection

A natural response to the problem discussed above is to allow local governments to prevent the shipment of hazmat cargo through their respective jurisdictions.[140] Doing so would presumably minimize the potential

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[133] *See* UNFAIR LIABILITY, *supra* note 3, at 1–2.
[134] *See* USDOT Comments to STB Ex Parte No. 681, *supra* note 32, Norfolk S. Ry. Co. Comments to STB Ex Parte No. 681, *supra* note 9.
[135] USDOT Comments to STB Ex Parte No. 681, *supra* note 32, at 4; *see also supra* Part II.B.
[136] UNFAIR LIABILITY, *supra* note 3, at 1–2.
[137] *See supra* note 7 and accompanying text.
[138] *See* USDOT Comments to STB Ex Parte No. 681, *supra* note 32, at 4.
[139] *See* Union Pacific Ry. Co., Written Testimony (Corrected) to Public Hearing STB Ex Parte No. 677 (Sub No. 1), Common Carrier Obligation of Railroads—Transportation of Hazardous Materials, at 6–8 (July 10, 2008) (on file with author).
[140] *But see* UNFAIR LIABILITY, *supra* note 3, at 2.

harms to concentrated population centers, a solution that is especially attractive given the increasingly-salient concerns of terrorism.[141] Second (and more importantly here), this policy also has the potential to limit the probability of an incredibly expensive hazmat accident in a dense urban center; as a result, the financial risk posed to railroads in shipping these chemicals would arguably decrease.[142]

However, taking a broader view of the impacts of local bans on hazmat shipments quickly reveals the fallacy of such a policy. Localized bans on hazmat shipments create externalities in two important ways: first, they lengthen the in-transit time for these shipments, which increases the window in which a mishap can occur and is economically inefficient for railroads and shippers alike; second, they merely shift the risks associated with a hazmat release from one region and its population to another, doing nothing to increase public safety on the whole.[143]

The experience of Washington, D.C. in the wake of the 9/11 terrorist attacks provides an example of the shortcomings of using local prohibition of hazmat shipments to protect the general public. On February 1, 2005, the District of Columbia City Council passed the Terrorism Prevention in Hazardous Materials Transportation Emergency Act of 2005 ("D.C. Act").[144] The D.C. Act created the Capitol Exclusion Zone covering the area within 2.2 miles of the U.S. Capitol building.[145] Within this zone, shipment by rail or truck of hazardous materials was prohibited without first obtaining a permit from the D.C. Department of Transportation.[146] Class I railroad CSX operates major north-south and east-west rail arteries in the Washington, D.C. area, both of which pass through the Capitol Exclusion Zone.[147]

After unsuccessfully seeking a preliminary injunction in the district court to enjoin the enforcement of the D.C. Act, CSX appealed to the D.C.

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[141] *See, e.g*, Implementing Recommendations of the 9/11 Commission Act of 2007, Pub. L. No. 110-53, § 1551, 121 Stat. 266, 469 (2007) (codified as amended at 6 U.S.C. § 1201 (Supp. II 2009)) (requiring railroads to examine hazmat routing, as well as identify and analyze alternative routings).

[142] *See* Ass'n of Am. R.R., Written Testimony to Public Hearing STB Ex Parte No. 677 (Sub. No. 1), Common Carrier Obligation of Railroads—Transportation of Hazardous Materials, at 17–18 (July 10, 2008), *available at* http://www.aar.org/Safety/~/media/aar/Testimony/Written/080722_STB_ERH_CommonCar_test.ashx (explaining that in densely populated regions there is a greater potential for mass injury and billions of dollars in damages).

[143] *See* UNFAIR LIABILITY, *supra* note 3, at 2.

[144] CSX Transp., Inc. v. Williams, 406 F.3d 667, 669 (D.C. Cir. 2005).

[145] *Id.*

[146] *Id.*

[147] *Id.*

Circuit Court.[148] Noting that the four-part test for preliminary injunctive relief is flexible[149] and that a particularly strong argument for one factor may justify a preliminary injunction despite weak arguments for the others,[150] the D.C. Circuit reversed.[151] In doing so, the court only addressed CSX's argument that the D.C. Act was preempted by the Federal Railroad Safety Act ("FRSA").[152] Pursuant to section 434 of FRSA, "'[l]aws, regulations and orders related to railroad safety and laws, regulations, and orders related to railroad security shall be nationally uniform to the extent practicable.'"[153] States are permitted to regulate in this area, if USDOT or the U.S. Department of Homeland Security ("DHS") has not yet done so, and even if a federal regulation exists, states may enact more stringent regulations to address local safety or security hazards as long as they are not incompatible with the existing federal regulation and "'do[] not unreasonably burden interstate commerce.'"[154] Ultimately, the court held that CSX would likely prevail on the merits on the grounds that the D.C. Act did not satisfy the requirements of this narrow exception.[155]

Despite its narrow scope, this ruling should serve as a bellwether to other municipalities considering similar local bans. Although it was the preemption argument that won the day for CSX, the negative public policy effects of the course of action pursued by the D.C. City Council are readily apparent. The D.C. Circuit observed, "[t]he effect of the D.C. Act, however, is simply to shift this risk, or at least some of this risk, to other jurisdictions."[156]

Local bans on hazmat shipments have the effect of creating two-tiered problems for rail carriers. First are the problems railroads could face when reconciling these bans with their existing, federally-imposed common carrier obligation to ship hazmats. Second are the onerous burdens dictated by legislatively-imposed rerouting, which include increased manpower, costly infrastructure upgrades, and an inevitable increase in

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[148] *Id.* at 669–70.
[149] *CSX Transp., Inc.*, 406 F.3d, at 670 (citing Serono Labs., Inc. v. Shalala, 158 F.3d 1313, 1317–18 (D.C. Cir. 1998)).
[150] *Id.* (citing CityFed Fin. Corp. v. Office of Thrift Supervision, 58 F.3d 738, 747 (D.C. Cir. 1995)).
[151] *Id.* at 674.
[152] *Id.* at 669 & n.3 (noting that CSX also challenged the D.C. Act under the Hazardous Materials Transportation Act, the Interstate Commerce Commission Termination Act, and the Commerce Clause of Article I, section 8 of the Constitution).
[153] *Id.* at 670 (quoting 49 U.S.C. § 20106).
[154] *Id.* at 670–71 (quoting 49 U.S.C. § 20106).
[155] *CSX Transp., Inc.*, 406 F.3d at 669 & n.3.
[156] *Id.* at 674.

in-transit time and travel distance for hazmat shipments.[157] Additionally, localized hazmat routing regulation will increase costs from the standpoint of having to ensure both initial and continuing compliance with possibly hundreds of local ordinances such as the D.C. Act.[158]

The detriment caused by locally-imposed bans on hazmat transportation is a separate inquiry from the effects of the federally-imposed requirement that railroads engage in evaluation of hazmat routing.[159] The key difference is that instead of handling the difficult task of achieving compliance with route restrictions imposed by a potential multitude of localities, this method allows railroads to engage in a more global, system-wide analysis of the route selections used for hazmat shipments, guided by a single set of criteria.[160] Taking this approach will allow railroads to strike an appropriate balance between utilizing the fastest routes and avoiding densely-populated areas, where possible, which will in turn theoretically minimize both in-transit time and the number of people who could be affected in the event of a release-causing accident. The railroads, not individual municipalities, are best suited at the task of hazmat route analysis because of their ownership and operation of their routes and the broader perspective they must have in transporting hazmats.

B. *Modifying/Abolishing the Common Carrier Obligation*

Another suggested reform is to simply limit the scope of the common carrier obligations imposed on railroads with regard to hazmat shipments. This would presumably give railroads greater freedom in choosing whether to accept these potentially dangerous shipments, but more negative effects will likely result. However, as discussed above, abolition of the common carrier requirement is neither likely as a matter of public policy nor as a reflection of economic reality.[161]

Recently, Union Pacific Railroad Company sought to limit the effect of its common carrier obligations by petitioning the STB for a declaratory order that it did not need to provide shipper rates for the transportation of

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[157] *See, e.g.*, Ind. Harbor Belt R.R. Co. v. Am. Cyanamid Co., 916 F.2d 1174, 1180 (7th Cir. 1990) (discussing the difficulties of rerouting).
[158] Presumably, ordinances could come from any trackside town or city concerned about the possibly devastating effects of an accidental release of hazmat shipments while passing through their respective jurisdictions. These concerns are almost certainly heightened by devastation caused by the Graniteville or Minot accidents. *See infra* Part II.A.
[159] *See* 49 C.F.R. § 172.820 (2009).
[160] *See id.*
[161] *See supra* notes 27–31 and accompanying text; *see also* Part II.B.

chlorine where other chlorine producers were closer in proximity to the destinations of the shipments.[162] Union Pacific's request has generated a flurry of criticism on a number of grounds. For instance, chemical producers argue that granting Union Pacific's petition would set a precedent whereby railroads could gain de facto control over the scope of the markets served by chemical producers.[163] This is especially problematic given that chemical producers are largely concentrated in the Gulf States, the Delaware Valley, and the Midwest.[164] On June 11, 2009, the STB ruled that Union Pacific must provide transportation rates and services for the movements for which it originally denied service.[165]

Had the STB granted Union Pacific's request for a declaratory order allowing the company not to provide service and rates, it would have set a dangerous precedent and given railroads far too much power. Accepting Union Pacific's argument would allow railroads to force—by selectively refusing to ship hazmats from location A to location B—chemical producers to decide whether to relocate facilities to more populated locations, close existing facilities, or lose revenue from the sales in which the railroad refuses to provide delivery.[166] Additionally, this scenario would allow railroads to micromanage the distribution decisions of the chemical industry, effectively regionalizing it.[167]

In the case of U.S. Magnesium, allowing Union Pacific to refuse shipment of chlorine from its Rowley, Utah facility to thirty-five Union Pacific-served users would threaten the survival of the company as the only producer of magnesium in the United States.[168] This is due to the fact that chlorine is a by-product of magnesium production, and if U.S. Magnesium were unable to sell it, the company would be forced to "incur

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[162] *See* Union Pac. R.R. Co., Petition for a Declaratory Order, STB Finance Docket No. 35219, at 1 (Feb. 18, 2009) (on file with author).

[163] *See, e.g.*, U.S. Magnesium, LLC, Comments in Opposition and Request for Order Compelling UP to Provide Common Carrier Rates, STB Finance Docket No. 35219, at 8–11 (Mar. 23, 2009) (arguing that it is the common carrier doctrine that allows chemical producers in "remote locations" to remain economically viable entities) [hereinafter U.S. Magnesium Comments in STB FD No. 35219].

[164] RAILROADS AND CHEMICALS, *supra* note 28, at 1.

[165] Surface Transport. Bd., Decision in STB Finance Docket No. 35219, Union Pac. R.R. Co. Petition for Declaratory Order, 2009 WL 1630587, at *4 (June 11, 2009). In reaching its decision, the Board noted, "[i]n sum, [Union Pacific] has not shown that USM's requests for rates and service are unreasonable." *Id.*

[166] *See* U.S. Magnesium Comments in STB FD No. 35219, *supra* note 163, at 9–11.

[167] *See* Verified Statement of Dr. Howard Kaplan to Surface Transp. Bd., STB Finance Docket 35219, *in* U.S. Magnesium Comments in STB FD No. 35219, *supra* note 163, at 7–8.

[168] *See id.* at 2,4; U.S. Magnesium Comments in STB FD No. 35219, *supra* note 163, at 4–5.

the costs of scrubbing the chlorine, or pay monetary penalties," changing the character of its chlorine by-products from a revenue-generator to a source of additional operating expenses.[169]

C. Capping Damages

A statutory cap on damages is suggested as a means of preventing railroads from suffering ruinous tort damages stemming from cargo for which they were prohibited from denying carriage.[170] This could take place in one of two ways: first, a cap can be placed on the damages to be paid by a railroad on a per-incident basis, or second, a cap can be placed on the damages to be received by individual successful litigants.

Either proposal is subject to criticism in that it is extremely difficult to devise a meaningful method of determining the maximum damages to be awarded in the event of a future release of hazmats while on rail.[171] As a result, placing a cap on damage awards is nothing more than a case of arbitrary line-drawing. Consider, for instance, the gap between the estimated costs of the railroads' "nightmare scenario" ($5–6 billion)[172] and the $10.88 million spent by Canadian Pacific in rectifying damages resulting from its 2002 derailment in Minot.[173] Given the disparity of these two figures, devising a meaningful damages cap at either the individual litigant or accident levels may be impossible.

Capping the damages to be paid by a railroad on a per-incident basis is problematic. A multitude of factors directly affect the damages caused by a release, including the population density in which the release occurred, the hazmat released (and its individual properties), as well as the quantity released.[174] It necessarily follows that it will quickly become virtually impossible to create a statutory cap that balances the public interest in being compensated for injuries it sustains with the interest of railroads in being forced to pay only reasonable damage awards.

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[169] U.S. Magnesium Comments in STB FD No. 35219, *supra* note 163, at 3.

[170] *E.g.*, Stephen J. Foland, Note, *Common Carriage and Liability in the Rail Transportation of Toxic Inhalation Hazard Materials*, 8 AVE MARIA L. REV. 197, 219 (2009).

[171] *Cf.* Ryan T. Emery, *Unwise and Unnecessary: Statutory Caps on Non-Economic Damages in Medical Malpractice Cases and the Appellate Review Alternative*, 69 ALB. L. REV. 913, 926 (2006) (discussing similar difficulties of determining a reasonable statutory cap on damages in the context of medical malpractice).

[172] McBride, *supra* note 4, at 100 & n.15.

[173] *See supra* notes 99–101 and accompanying text.

[174] *See, e.g.*, Foland, *supra* note 170, at 197, 205–06, 209–10 (discussing the various factors and results involved in a series of rail accidents involving hazmats).

The second method addresses some of the uncertainties of the first, but capping damages at the individual litigant level has its own shortcomings. These can be seen when this method is analogized to existing damage award caps in medical malpractice suits in some states.[175] Most often, the problem targeted by these caps is noneconomic damages awards considered unpredictable, excessively large, and further departed from their doctrinal roots.[176]

It is important to note that Mississippi's cap on medical malpractice excludes punitive and exemplary damages from its damage cap.[177] Likewise, a cap on railroads' damages resulting from hazmat releases could leave punitive damages available to litigants in the hypothetical case whose facts meet the hornbook tort definition for punitive damages: "conduct that is outrageous, because of the defendant's evil motive or his reckless indifference to the rights of others."[178]

If one were to apply a limit to punitive damages in this context, however, it would do little to address the problem, as between January and October 2009, only 31.8% of the 1722 railroad accidents occurring during that period were caused by "human error."[179] The most prevalent accident causes are track defects and human error (31.8% each), followed by miscellaneous causes (13.0%), equipment failures (13.0%), highway-rail collisions (8.0%), and finally, signal malfunctions (2.4%).[180] Additionally, it is unclear how many of the above-referenced human-error-caused accidents involve conduct that rises to the level of "evil motive or . . . reckless indifference" necessary to justify the imposition of punitive damages. It is more likely that most, if not all of these, are a result of conduct that is better described

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[175] *See, e.g.*, MISS. CODE ANN. § 11-1-60 (West 2010) (defining and limiting noneconomic damages in medical malpractice cases).

[176] *See, e.g.*, Victor E. Schwartz & Leah Lorber, *Twisting the Purpose of Pain and Suffering Awards: Turning Compensation into "Punishment,"* 54 S.C. L. REV. 47, 48, 50–52 (2002) (discussing the departure of American courts from "the historical 'intentional tort' moorings of punitive damages").

[177] MISS. CODE ANN. § 11-1-60(1)(a) (West 2010) ("The term 'noneconomic damages' shall not include punitive or exemplary damages.").

[178] RESTATEMENT (SECOND) OF TORTS § 908 (1979).

[179] *See Accident Causes*, OFFICE OF SAFETY ANALYSIS, FED. R.R. ADMIN., http://safetydata.fra.dot.gov/officeofsafety/publicsite/Query/inccaus.aspx (select the month "January" and the year "2009" as the "start date" and select the month "October" and the year "2009" as the "end date.") (last accessed January 21, 2010) (calculated by adding the totals in each individual accident type category). Note these numbers are current as of January 21, 2010. Because additional information about accidents during the relevant period may be reported to the administration at later times, slight fluctuations of these data are possible in the future.

[180] *Id.* These categories are also defined at this site.

as negligence, at worst.[181] Given this limitation and the prevalence of accidents caused by something other than human error, targeting punitive damage awards against railroads in hazmat accident cases would do little to nothing to address the hypothetical accidents in which a hazmat release could occur.

In a hazmat release, like in other toxic torts, a particularly important damages issue involves emotional distress claims. As Tuohey and Gonzalez point out, "[t]he fear and horror of personally being exposed to a cloud of poison gas, or knowing that family members have been exposed, are absolute emotional trauma in its purest form."[182] This added dimension further complicates—perhaps prohibitively so—the already complex task of meaningfully estimating damages for the purpose of devising a statutory cap. This is due in large part to the skepticism of the law toward the genuineness of emotional distress claims generally, and this skepticism remains present in toxic tort cases.[183] As a result, the law generally requires physical manifestations in order for a plaintiff to succeed on a claim of emotional distress.[184] The subjective nature of emotional distress, coupled with the sizeable role of emotional distress in hazmat accidents further undermines the case for a statutory cap on damages in these accidents.

Aside from the method of capping damages chosen in a hypothetical system, and in addition to the difficult task of meaningfully estimating damages, there remain serious questions as to the constitutional validity of a cap on damages. Recently, in *Lebron v. Gottlieb Memorial Hospital*, the Illinois Supreme Court overturned a state statute limiting non-economic damages in a manner similar to that found in Mississippi.[185] The *Lebron* court reached its conclusion on separation of powers principles, stating that the cap on damages "violates the separation of powers clause of the

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181 *See, e.g.*, GRANITEVILLE ACCIDENT REPORT, *supra* note 52, at 56; MINOT ACCIDENT REPORT, *supra* note 91, at 69 (describing the probable causes of each accident). The NTSB's accident report for the Minot accident provides a useful illustration of this point. There, the Board identified the failure of Canadian Pacific's inspection and maintenance program to detect deteriorating track conditions as probable cause of that accident. MINOT ACCIDENT REPORT, *supra* note 91, at 69. This characterization clearly satisfies the Restatement's definition of negligence: "conduct which falls below the standard established by law for the protection of others against unreasonable risk of harm." RESTATEMENT (SECOND) OF TORTS § 282 (1965).

182 Conrad G. Tuohey & Ferdinand V. Gonzalez, *Emotional Distress Issues Raised by the Release of Toxic and Other Hazardous Materials*, 41 SANTA CLARA L. REV. 661, 721 (2001).

183 *Id.* at 724.

184 *Id.* (citing RESTATEMENT (SECOND) OF TORTS § 436A (1984)).

185 Lebron v. Gottlieb Mem'l Hosp., 930 N.E.2d 895, 914, 917 (Ill. 2010) (applying the Illinois constitution).

Illinois Constitution"[186] because it "unduly encroaches upon the fundamentally judicial prerogative of determining whether a jury's assessment of damages is excessive within the meaning of the law."[187]

While the *Lebron* decision represents one state supreme court's interpretation vis-à-vis its own constitution, the broad principle of separation of powers, relied upon by the court, poses a real threat to the validity of any statutory cap on damages in the context of rail transportation of hazmats. Similarly, it is foreseeable that a cap on damages is subject to attack from aggrieved plaintiffs, under the very same arguments adopted by the court in *Lebron*.

The flaws of a statutory cap on damages in this context, including the difficulty in devising a meaningful damages cap, the issue of emotional distress damages (especially relevant in toxic tort cases such as hazmat transportation), and questions of constitutional validity on separation of powers grounds necessitate looking to other means to reform rail carrier liability for hazmat accidents.

D. Redefining Shipping Rates for Regulatory Purposes

Another alternative is to redefine railroad shipping rates for hazmat cargo in order to better share the costs of transportation with the producers and users of these chemicals.[188] This proposal, currently before the STB, entails a redefinition of the STB's accounting mechanisms for hazmat shipments.[189] Although at first glance this proposal appears to implicate no more than private party contract negotiations between railroads and shippers, in practice, implementation of this proposal requires government action because shipping rates are regulated by the STB.[190] The existing accounting system and its regulatory uses are best explained by the USDOT:

> Class I rail carriers file accounting and financial information into the Board's Uniform System of Accounts ("USOA") on an annual basis, which is used by the agency's Uniform

[186] *Id.* at 903.
[187] *Id.* at 906 (quoting Best v. Taylor Machine Works, 179 Ill.2d 367, 414 (1997)).
[188] *See generally* STB Ex Parte No. 681 ANPR, *supra* note 12.
[189] *See id.*
[190] *See, e.g.*, Surface Transp. Bd., Adoption of the Uniform Railroad Costing System as a General Purpose Costing System for All Regulatory Costing Purposes, 5 I.C.C.2d 894, 898–99 (Sept. 8, 1989) ("Accordingly, we are adopting and implementing URCS . . . as the Commission's general purpose costing system for all regulatory costing purposes.").

> Railroad Costing System ("URCS") to determine the carriers' variable costs for regulatory purposes, including adjudication of charges that rail rates are unreasonably high.[191]

As the period for comment has closed,[192] discussion and evaluation of the prudence of amending the URCS to allocate for hazmat shipment costs has the benefit of several industry voices.[193]

In its current form, the URCS fails to take into account several unique costs incurred by railroads arising from routine hazmat transportation movements. These include increased operating costs caused by a government-mandated maximum speed limit for hazmat shipments that can cause congestion and delays on lines operating near capacity and the requirement that hazmat-containing cars never be "left unattended" while "being transferred within a High Threat Urban Areas [sic]."[194]

One clear benefit of a revision to the URCS is that it would enable railroads to separate costs associated with shipment of hazmats; doing so would allow the hazmat shippers to pay the costs generated by their shipments, while preventing shippers of other, non-dangerous materials from bearing these costs.[195] However, the glaring, fatal flaw in the revision of URCS to redefine hazmat shipment costs is that it fails to consider the possibility of a catastrophic chemical release[196] on a scale greater than the

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[191] USDOT Comments to STB Ex Parte No. 681, *supra* note 32, at 1.

[192] STB Ex Parte No. 681 ANPR, *supra* note 12, at 1 (indicating that the period for comment closed on February 4, 2009).

[193] *See List of Filings in STB Ex Parte No. 681*, SURFACE TRANSP. BD., http://www.stb.dot.gov/filings/all.nsf/(Personal-128.239.166.99)?OpenView&Count=300 (last visited Feb. 20, 2011). These include: Class I Railroads Norfolk Southern, Union Pacific, BNSF, and Canadian Pacific; the Association of American Railroads; and a shippers' group comprised of the American Chemistry Council, the Chlorine Institute, the Fertilizer Institute, and the Edison Electric Institute; and other interested parties. *Id.*

[194] Ass'n of Am. R.R., Comments to Advance Notice of Proposed Rulemaking, STB Ex Parte No. 681, Class I Railroad Accounting and Financial Reporting—Transportation of Hazardous Materials, at 11–12 (Feb. 4, 2009) (on file with author) [hereinafter AAR Comments to STB Ex Parte No. 681].

[195] Canadian Pac. Ry. Co., Comments to Advance Notice of Proposed Rulemaking, STB Ex Parte No. 681, Class I Railroad Accounting and Financial Reporting—Transportation of Hazardous Materials, at 4 (Feb. 4, 2009) (on file with author). The URCS, in its current form, inevitably leads to the costs of hazmat shipments being passed on to all rail shippers, because of the inability of this model to accurately capture the unique costs associated with hazmat shipment. *Id.* (quoting the transcript from Public Hearing STB Ex Parte No. 677 (Sub No. 1), Common Carrier Obligation of Railroads—Transportation of Hazardous Materials (July 10, 2008)).

[196] *See* AAR Comments to STB Ex Parte No. 681, *supra note* 194, at 10.

one that took place in Graniteville, S.C. in 2005[197] or near Minot, N.D. in 2002.[198] In such a scenario, even a revised URCS is ill-equipped to provide meaningful change.[199] Because URCS is only designed to allocate transportation costs resulting from shipment of freight, a revision to URCS to address hazmat shipment costs by railroads still fails to address the greatest problem associated with these movements: insurance costs.[200]

An additional problem presented by a proposed revision to the URCS model is the sheer complexity associated with devising a new model that actually captures the costs associated with hazmat shipments.[201] As BNSF Railway Company ("BNSF") observes:

> [An attempt to adjust URCS] would require complicated and potentially burdensome special studies to identify the full range of TIH-specific costs, to determine methodologies for allocating portions of railroad operating and capital expenditures to TIH and non-TIH commodities and to determine appropriate adjustment factors within URCS to allocate those costs to individual TIH movements.[202]

Further problems in such an undertaking include the inability of railroads to meaningfully estimate their regulatory compliance costs, as these frequently evolve.[203]

Additionally, a coalition of shippers has attacked the idea of reforming the URCS for hazmat shipments as being a far too focused endeavor that overlooks broader systemic flaws in the URCS model.[204] For example, they point out that the most recent adjustment to the URCS model for intermodal traffic[205] occurred in 1997, and it failed to take into account the

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[197] *See supra* Part II.A.1.
[198] *See supra* Part II.A.2.
[199] *See, e.g.*, BNSF Comments to STB Ex Parte No. 681, *supra* note 6, at 6–7. As BNSF Railway Company points out, revising the URCS still does nothing to change the shortfall in insurance coverage faced by railroads shipping hazmats, let alone the allocation of these costs to the shippers who truly generate them. *Id.*
[200] *See id.* at 6.
[201] *Id.* at 8.
[202] *Id.*
[203] *See id.*
[204] *See generally* Shipper Orgs.' Joint Submission, Comments to Advance Notice of Proposed Rulemaking, STB Ex Parte No. 681, Class I Railroad Accounting and Financial Reporting—Transportation of Hazardous Materials (Feb. 4, 2009) (on file with author) [hereinafter Shipper Organizations' Comments to STB Ex Parte No. 681].
[205] Intermodal traffic is defined as "the long-haul movement of shipping containers or truck trailers by rail, combined with a (usually much shorter) truck movement at one or both

now common practice of double-stacking containers.[206] This is especially problematic given that intermodal shipments accounted for over 20% of rail revenue in 2009.[207] As further support for their argument that the entire system is flawed, the shippers group cited an independent study of railroad costs finding that the URCS model overestimated actual costs by over double in some cases.[208]

Despite the competing arguments for and against revising the URCS model for hazmat movements, the model is ill-suited to address the allocation of liability in the event of a catastrophic release, the problem on which this note focuses. Separate and apart from catastrophic release costs, there appears to be agreement between the railroads and the shippers that the URCS model is in dire need of comprehensive review and revision, for other reasons.[209]

E. *Liability Backstop*

The final policy proposal this note discusses is the creation and implementation of a liability backstop that mirrors the structure and function of the Price-Anderson Act in the nuclear energy industry. This section provides an overview of the basics of the Price-Anderson Act, criticism of the Act, discussion of the function of the Act in response to the Three-Mile-Island Incident, as well as discussion of importing this model into the railroad industry, thereby creating a liability backstop for rail transportation of hazmats.

1. The Price-Anderson Act

In the United States, nuclear energy producers benefit from a liability backstop created by the Atomic Energy Damages Act in 1957.[210] The Act had dual purposes: first, it aimed to "encourage development of the nuclear [power] industry by providing . . . financial protection" in the

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ends." ASS'N OF AM. R.R., RAIL INTERMODAL KEEPS AMERICA MOVING 1 (2010), *available at* http://www.aar.org/InCongress/~/media/AAR/BackgroundPapers/Intermodal%20Nov%202009.ashx [hereinafter RAIL INTERMODAL KEEPS AMERICA MOVING].

[206] Shipper Organizations' Comments to STB Ex Parte No. 681, *supra* note 204, at 3.

[207] RAIL INTERMODAL KEEPS AMERICA MOVING, *supra* note 205, at 1.

[208] Shipper Organizations' Comments to STB Ex Parte No. 681, *supra* note 204, at 8.

[209] *See* AAR Comments to STB Ex Parte No. 681, *supra* note 194, at 16–17; Shipper Organizations' Comments to STB Ex Parte No. 681, *supra* note 204, at 2.

[210] Atomic Energy Damages Act, Pub. L. No. 85-256, 71 Stat. 576 (1957) (codified as amended at 42 U.S.C. § 2210 (2006)). The statute is most commonly referred to as the Price-Anderson Act.

event of an accident; second, it intended to protect injured members of the public by "assuring that funds are available to compensate victims . . . in the event of a nuclear incident."[211]

The United States Department of Agriculture succinctly described the basic procedural contours of the liability regime created by the Price-Anderson Act:

> - Jurisdiction is automatically transferred to federal courts no matter where the accident occurred.
> - All claims from the same incident are consolidated into one Federal court, which is responsible for prioritizing payouts and sharing funds equitably should there be a shortfall.
>
> . . .
>
> - An open-ended time limit is applied, which allows claimants three years to file a claim starting from the time they discover damage.[212]

In addition to these characteristics is the waiver of defenses for licensed nuclear reactor operators that the Nuclear Regulatory Commission ("NRC") is empowered to require to be incorporated in nuclear insurance contracts.[213] Specifically, it provides that indemnified entities are required to waive "any issue or defense as to conduct of the claimant or fault of persons indemnified" as well as "any issue or defense as to charitable or governmental immunity."[214] The waiver of defenses mandated by the Act imposes upon licensees the tort concept of strict liability.[215] Finally, the Act provides that attorneys' fees may be recovered under the Act, provided that specified conditions are met.[216]

Another key defining feature of the Price-Anderson Act is the two-tiered insurance program it implements. First, the Act requires licensees

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[211] U.S. DEP'T OF ENERGY, REPORT TO CONGRESS ON THE PRICE-ANDERSON ACT 4–5 (1999), *available at* http://www.gc.energy.gov/documents/paa-rep.pdf.
[212] U.S. Dep't of Agriculture, Comments to Public Hearing, STB Ex Parte No. 677 (Sub No. 1), Common Carrier Obligation of Railroads—Transportation of Hazardous Materials, at 4 (July 22, 2008) (on file with author).
[213] *See* 42 U.S.C. § 2210(n)(1) (2006).
[214] *Id.*
[215] Michael G. Faure & Tom Vanden Borre, *Compensating Nuclear Damage: A Comparative Economic Analysis of the U.S. and International Liability Schemes*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 219, 263 (2008).
[216] *See* 42 U.S.C. §§ 2210 (o)(1)(D), (o)(2) (2006).

to obtain the maximum available insurance, currently $300 million, as well as secondary coverage, in the event that primary coverage is insufficient to cover damages resulting from a nuclear accident.[217] Secondary coverage is achieved through "an industry retrospective rating plan providing for premium charges deferred in whole or major part until public liability from a nuclear incident exceeds or appears likely to exceed the level of the primary financial protection required of the licensee involved in the nuclear incident," subject to several conditions.[218] The most important of these conditions is that a licensee cannot be required to pay a deferred premium of more than $95.8 million in any given incident.[219] The financial advantage of the current structuring of the secondary insurance pool is that no premiums are paid, as long as a covered accident does not occur.[220]

With 103 commercial reactors operating in the United States today, the two-tiered system would absorb nuclear accident liability up to $10.17 billion.[221] In the event that damages exceed the maximum amount covered by the primary and secondary layers of insurance, public liability is capped at approximately $500 million.[222] Finally, in the event that the first three layers of financial protection are insufficient, Congress is empowered to take action to ensure the public is compensated for all claims resulting from the accident.[223]

Critics such as the interest group Public Citizen have attacked the Price-Anderson Act as a "Billion Dollar Bailout for Nuclear Power Mishaps" (long before the term "bailout" became a common part of today's vernacular),[224] while supporters such as the Nuclear Energy Institute defend it as imposing zero cost on consumers of nuclear energy.[225] Comparing the Price-Anderson Act to analogous European liability regimes, Faure and Vanden Borre observe:

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[217] *See* 10 C.F.R. § 140.11(a)(4) (2009).
[218] 42 U.S.C. § 2210(b)(1) (2006).
[219] *Id.*
[220] Faure & Vanden Borre, *supra* note 215, at 271.
[221] McBride, *supra* note 4, at 99 & n.14. This is calculated by adding the required primary insurance amount ($300 million) to the total capability of the secondary insurance available (the product of $95.8 million times 103 licensees). *Id.*
[222] 42 U.S.C. § 2210(e)(1)(C)(i) (2006).
[223] 42 U.S.C. § 2210(e)(2) (2006).
[224] *See, e.g.*, PUBLIC CITIZEN, PRICE-ANDERSON ACT: THE BILLION DOLLAR BAILOUT FOR NUCLEAR POWER MISHAPS 1 (2004), *available at* http://www.citizen.org/documents/Price%20Anderson%20Factsheet.pdf.
[225] *See, e.g.*, *Price-Anderson Act Provides Effective Liability Insurance at No Cost to the Public,* NUCLEAR ENERGY INSTITUTE (June 2010), http://www.nei.org/resourcesandstats/documentlibrary/safetyandsecurity/factsheet/priceandersonact.

> Even though we have indicated that it is hard to make a final, positive judgement on the U.S. compensation regime given the fact that the real costs of a nuclear damage can still be higher than the compensation available, the U.S. regime seems in many respects to be more in line with the law and economics literature with respect to nuclear liability.[226]

Aside from these defenses and criticisms of the Price-Anderson Act, there is at least limited, practical evidence that the system succeeds in achieving its function.[227]

The Price-Anderson Act has only been used once, in response to the Three-Mile Island incident in 1979.[228] At the time of that incident, the primary insurance pool was $140 million.[229] Upon receiving news of the accident, nuclear industry insurers organized a central claims office in nearby Harrisburg, PA where they advanced living expenses to those displaced from their homes.[230] Additionally, 636 people received compensation for lost wages resulting from the accident.[231] As the last of the litigation involving this accident concluded in 2003, it is clear now that $71 million in damages and litigation costs were paid.[232] This amount is only slightly more than half of the primary level insurance required at the time.[233]

2. Creating an Analogue to the Price-Anderson Act

Drawing upon the experience gained through the creation, implementation, and administration of the Price-Anderson Act, an analogous "Railroad Hazmat Transportation Act" can successfully address the problem created by railroads' common carrier obligations as applied to hazmats, while still remaining responsive and sensitive to the sometimes competing interests of consumers, shippers, and of course, the railroads.[234] While nuclear energy production and rail transportation of hazmat shipments do not seem to lend themselves to an "apples to apples" comparison, enough parallels between the two exist to nonetheless provide a meaningful

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[226] Faure & Vanden Borre, *supra* note 215, at 276.
[227] *See id.* at 287.
[228] *See Price-Anderson Act Provides Effective Liability Insurance*, *supra* note 225.
[229] *Id.*
[230] *Id.*
[231] *Id.*
[232] *Id.*
[233] *See id.*
[234] *See generally* McBride, *supra* note 4.

analogy.[235] At the broader policy level, a railroad analogue to the Price-Anderson Act could easily import the Act's guiding principles by protecting the public in the event of a catastrophic release while simultaneously providing railroads protection for socially beneficial, but dangerous, hazmat transportation in order to keep these shipments on rail, where the public is best protected.

McBride makes a critical observation in considering whether and how to import the liability backstop model found in the Price-Anderson Act to railroad transportation of hazmats:

> [T]he Price-Anderson Act, as amended, is not simply a limit on the liability of those involved with nuclear power plants and transportation of nuclear materials (including railroads). . . . [I]t is part of a comprehensive regulatory, safety, insurance and waiver of defenses approach intended to assure safety of nuclear facilities and expedite compensation if accidents occur.[236]

In that vein, it is important to keep in mind the disparity in the respective resources and scope of the FRA and the NRC, which is "considered by nearly all accounts the most comprehensive regulator of any American industry."[237] This is likely explained by the difference in perceived risk between nuclear power generation and freight railroading.

Employing the two-tiered Price-Anderson structure in this context encounters some difficulties, due to the major difference between the number of nuclear reactor licensees (103) and the number of Class I freight railroads (7).[238] This difference becomes especially problematic in the context of the secondary level of coverage, where other industry members share the burdens of indemnification. First, McBride explains that based on testimony before the STB, railroads are able to obtain primary "commercial hazard insurance in excess of $1 billion per event."[239] To cover the remaining $4–5 billion of outstanding liability from the "nightmare scenario," he suggests $600–700 million per railroad to provide the secondary level

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[235] *See id.* at 99.
[236] *Id.* at 93.
[237] *Id.* at 94.
[238] *See McBride*, *supra* note 4, at 99. McBride also notes that a hypothetical rail analogue to Price-Anderson would necessarily be limited to Class I railroads, given that Class II and III railroads are financially incapable of contributing significantly to the second-tier of insurance. *See id.*
[239] *Id.* at 100 n.15.

of insurance.[240] Comparing that figure—$600–700 million—to the $30–40 million incurred by Norfolk Southern as a result of the Graniteville collision[241] or the $10.88 million incurred by Canadian Pacific as a result of the Minot derailment,[242] it becomes plainly obvious that the secondary level of insurance described in McBride's hypothetical makes little practical sense. In order to lower secondary-level exposure to more realistic amounts, the risk pool should be expanded to include hazmat chemical producers who utilize rail transportation. This can be accomplished through a licensing requirement where permission to ship hazmats in interstate commerce via rail is conditioned upon acceptance of the two-tiered liability backstop and its waiver of defenses approach.

Conceptually, legislatively aligning the interests of the Class I railroads by creating a secondary retrospective insurance pool would not set a new precedent with regard to railroad industry cooperation; it already takes place in equipment sharing and leasing, as well as through participation in joint community preparedness programs such as TRANSCAER.[243]

Including hazmat producers who ship by rail in the second level is the key to making a liability backstop system work for rail transportation of hazmats. Their inclusion makes second-level exposure more realistic than it would be with only the seven Class I railroads. It also recognizes the key difference between nuclear power generation and hazmat transportation; while both are dangerous, hazmat transportation is unique in that producers presumably have the ability to develop the inherently safer chemicals that could one day replace the highly dangerous chemicals currently in use.[244] Imposing the possibility of secondary-level liability for chemical producers is a financial incentive to chemical companies to produce safer chemicals. By doing so, they will also necessarily limit their own exposure in this secondary level of insurance, because fewer hazmats will travel over the rails as these replacements occur.

Creation of an analogue to the Price-Anderson Act to address rail transportation of hazmats would not break new ground by foreclosing railroads from asserting certain defenses in litigation, although the liability backstop proposed here does so much more broadly. The Federal Employers' Liability Act ("FELA") does just that in a more limited sense, as it prevents railroads from asserting the defense of assumption of the risk

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[240] *Id.*
[241] *Norfolk Southern Tallies Cost of Train Wreck*, *supra* note 62.
[242] *See supra* notes 99–101 and accompanying text.
[243] *See supra* note 112 and accompanying text.
[244] *See* UNFAIR LIABILITY, *supra* note 3, at 2.

when sued by employees for negligence.[245] In addition, importing the other procedural basics of the Price-Anderson Act (federal district court jurisdiction, consolidation of claims, and a three-year statute of limitations[246]) pose little problem in this context.

In the post 9/11 era, terrorist acts present a problem that, although certainly not unique to hazmat transportation, should be considered more closely in this context than it is in the nuclear energy industry.[247] The reason for this is based on the nature of each industry: the rail network is largely open,[248] whereas nuclear power facilities are required to be extensively protected and fortified.[249] Comparing the CSX freight line through Washington, D.C. which passes within four blocks of the U.S. Capitol building with the aircraft-resistant nuclear power plants illustrates this point.[250] In the Price-Anderson Act, "an act of war" is excluded from the definition of "public liabilities" that trigger the Act's claims process.[251] While consideration of the issue of "what is war" is incredibly important when deciding whether terrorist acts are included in the indemnification provisions of the Price-Anderson Act, it is beyond the scope of this note. However, this definitional difficulty and the problem of a third party cause of what would otherwise be a strict liability tort must be taken into consideration when considering the mechanics of a liability backstop for rail transportation of hazmats.

The benefits to be reaped by developing and implementing a liability backstop for the rail transportation of hazmats include: the lack of a need for the difficult line-drawing associated with modifying the common carrier obligation of railroads; the ability of railroads to fulfill their common carrier obligation without the economic uncertainty of not having adequate insurance coverage; a streamlined, statutory-driven claims process; and a better allocation of the costs of hazmat shipments between shippers, users, and carriers.

Additionally, implementing a liability backstop will actually address one of the shortcomings of a statutory cap on damages. A cap on damages requires making a policy judgment that balances the directly contradictory interests of injured parties seeking redress for damages resulting from a

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[245] 45 U.S.C. § 54 (2006).
[246] *See supra* note 212 and accompanying text.
[247] *See, e.g.*, Brodsky, *supra* note 44 (discussing the use of industrials chemicals as weapons).
[248] *Id.*
[249] *See generally* 10 C.F.R. § 73.50 (2009).
[250] *See* Brodsky, *supra* note 44.
[251] 42 U.S.C. § 2014(w)(ii) (2006).

hazmat-related railroad accident and railroads seeking to limit their exposure for a financial risk they had no choice in undertaking at the outset. If properly devised, a liability backstop will allow both of these parties to protect their respective interests. Members of the general public will be assured, knowing that in the event they sustain damages as a result of a hazmat-related railroad accident, they will receive compensation for their injuries. Railroads transporting hazmat shipments will be able to operate with the certainty of knowing the extent of their financial exposure resulting from hazmat transportation.

CONCLUSION

The common carrier doctrine, when applied to the shipment of hazmats, gives rise to the potential for liability in the billions of dollars for the railroads required to undertake this transportation.[252] The solution is not as simple as simply ceasing use of these chemicals; they play a key role in water purification, manufacturing processes, and agriculture, just to name a few.[253] The availability—and hence, shipment—of these chemicals is absolutely necessary to everyday life as it is known today, but past accidents involving hazmats released in the course of rail transportation demonstrate the human, environmental, and financial dangers these movements pose.[254]

Despite accidents in the past, railroads are best suited for hazmat transportation because of their overall safety record, the development of safety technology that improves upon railroad operations, and environmental benefits related largely to fuel efficiency.[255] The only true "solution" to the problem caused by the liability potential resulting from common carrier doctrine applied to hazmats is the development and implementation of cost-effective, safer chemicals.[256] In the interim, the liability regime for rail accidents involving hazmat releases must be reformed in order to restore some semblance of financial predictability to this incredibly integral component of everyday life.

Allowing local municipalities to regulate route selection through "hazmat bans" or stringent permitting processes brings far more detriments than benefits, as it would cause much higher compliance costs by

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[252] *See* UNFAIR LIABILITY, *supra* note 3, at 1.
[253] *See, e.g.*, AMERICAN CHEMISTRY COUNCIL, *supra* note 38.
[254] *See supra* Part II.A.
[255] *See supra* Part II.B.
[256] *See* UNFAIR LIABILITY, *supra* note 3, at 2.

railroads; more importantly, these policies would only serve to shift the risks of hazmat transportation to *other* municipalities.[257]

Modifying or abolishing the common carrier obligation altogether carries its own set of likely, detrimental consequences.[258] These include shifting hazmats to other, less safe modes of transportation and giving railroads de facto control over chemical markets.

Imposing a statutory cap on damages caused by a hazmat release resulting from a railroad accident suffer two major criticisms.[259] First, the variables that determine the scope of the damage of a hazmat release make it nearly impossible to meaningfully devise a damages cap that neither leaves an injured plaintiff without just compensation nor subjects defendant railroads to damages that are unjustifiably high in a given case. Second, legislative caps on damages have come under fire on constitutional grounds, and in the medical malpractice context, at least one such damages cap has been overturned as violating constitutional separation of powers principles.

Some parties involved with hazmat shipment via rail suggest that the STB update the URCS model to better account for unique costs associated with hazmat shipments, including insurance, increased manpower, and route congestion.[260] Although there appears to be some degree of agreement that the URCS model as a whole is out of date, adjusting it for the shipment of hazmats still suffers the fatal flaw of being unable to address the costs of a catastrophic hazmat release.

Finally, the Price-Anderson Act and the liability backstop model it creates provide the best method of reforming hazmat release liability for railroads.[261] In the nuclear power industry, the Act creates a two-tiered insurance system, with primary level coverage coming from licensee-obtained insurance at the maximum available amount (determined by regulators) and secondary level coverage coming from all licensees in the form of retrospective premiums. In addition to the two-tiered insurance system is a system of federal claims consolidation and waiver of defenses.

Importing the principles of the Price-Anderson Act into an analogous liability backstop for rail shipment of hazmats produces a system in which railroads provide primary-level insurance in the amount of $1 billion. Secondary-level coverage in this system would come from all

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[257] *See supra* Part III.A.
[258] *See supra* Part III.B.
[259] *See supra* Part III.C.
[260] *See supra* Part III.D.
[261] *See supra* Part III.E.

seven Class I freight railroads *and* producers of hazmats who ship by rail. First, it is important to point out that doing so would only subject the chemical producers to financial liability in the event of a catastrophic release exceeding the $1 billion in primary-level coverage, an event that has yet to occur. Structuring a liability backstop this way can simultaneously achieve the purposes of limiting railroads' overall liability for a hazmat release and incentivizing both railroad safety improvements (as the waiver of defenses under this system turns hazmat transportation into a strict liability activity) and the development of inherently safer chemicals by the chemical industry, as doing so would reduce the probability of a catastrophic hazmat release.