BEFORE THE
DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

DOCKET NO. PHMSA 2012—0082(HM-251):
HAZARDOUS MATERIALS: ENHANCED TANK CAR STANDARDS AND OPERATIONAL CONTROLS FOR HIGH-HAZARD FLAMMABLE TRAINS; COMMENT REQUEST

COMMENTS OF
UNION PACIFIC RAILROAD COMPANY

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Union Pacific Railroad Company (Union Pacific),[1] submits the following comments in response to the Pipeline and Hazardous Materials Safety Administration's (PHMSA) request for comments associated with the above Notice of Proposed Rulemaking, Docket No. PHMSA-2012-0082 (HM-251), regarding the transport of flammable liquids.[2] Union Pacific's comments are supported by the verified statements of Thomas C. Haley ("Haley"), Vice President-Network Planning and Operations, and Michael E. Iden ("Iden"), General Director-Car & Locomotive Engineering.

While Union Pacific joins and reasserts the comments made by the Association of American Railroads (AAR), Union Pacific offers these additional comments on certain portions of the proposal that will have a unique and direct effect on Union Pacific and its customers.

Safety is Union Pacific's top priority. Our goal has always been to ensure that all hazardous materials arrive at their destination without incident. Earlier this year, Union Pacific, along with the largest members of the rail industry, voluntarily

[1] Union Pacific is one of America's leading transportation companies, linking 23 states in the western two-thirds of the country and serving the fastest-growing U.S. population centers. Union Pacific provides competitive routes from all major West Coast and Gulf Coast ports to eastern gateways. Union Pacific connects with Canada's rail systems and is the only railroad serving all six major gateways to Mexico. Union Pacific's diverse business mix includes Agricultural Products, Automotive, Chemicals, Coal, Industrial Products and Intermodal. This business diversity allows Union Pacific to serve customers in new and growing markets.

[2] *See* 79 Fed. Reg. 148 (August 1, 2014).

committed to and implemented the following actions regarding trains with 20 or more cars of crude oil:[3]

- Applying its TIH routing tool, RCRMS, to these trains;
- Reducing the speed of these trains to 40 mph through High Threat Urban Areas (HTUAs);
- Equipping these trains with distributed power (DP) or two-way End Of Train (EOT) devices;
- Increasing track inspections and installing wayside detectors on routes used by these trains;
- Reinforcing its Emergency Response Resource Inventory by developing, providing and funding emergency response training for all interested first responders; and
- Working with affected communities as requested.

These commitments are further enhanced by several other safety regulations currently proposed or on the horizon, including: Positive Train Control, Securement of Unattended Equipment, Oil Spill Response Plan, Risk Reduction/System Safety Programs, and Enhanced Training Standards.

Union Pacific supports DOT's efforts to reduce the risks of transporting certain flammable liquids so long as the safety benefits justify the costs. Union Pacific has analyzed the anticipated effects of the rule, and is willing to work with

[3] All references to "crude oil" are intended to refer only to flammable crude oil and not combustible crude oil.

PHMSA to narrow the number of variables and help PHMSA find the right answers to its many questions.

Union Pacific urges PHMSA to (1) adopt a 40 mph speed limit for covered trains in HTUAs; (2) reject imposing a uniform national speed limit of 40 mph that would degrade network fluidity, shift traffic and risk to trucks and impose excessive costs; (3) reject a requirement for ECP brakes; (4) apply any operating restriction only to trains with 20 or more cars of crude oil; or (5) narrow the scope of any rule applied to other flammable liquids to trains with a block of 20 or more cars of those liquids.

I. PHMSA should impose a 40 mph speed restriction through HTUAs for trains covered by this rule

Union Pacific supports a regulation reducing the speed of trains covered by this rule through HTUAs, where risk analyses performed by the Department of Homeland Security have determined the potential for greatest harm exists. A risk based limit that would remain in place until covered trains composed entirely of the enhanced tank cars are operational is the most appropriate standard to apply. Union Pacific is unaware of any risk analysis performed or risk profiles created by PHMSA that would justify speed restrictions through population centers of 100,000 or more. Furthermore, thousands of miles of Union Pacific track are located in unpopulated or lightly populated areas: deserts, forests, range land, and

farm land. PHMSA has not established that public safety would be enhanced by restricting speeds to 40 mph through these areas.

II. PHMSA should not impose a uniform national speed limit because it would degrade network fluidity, shift traffic and risk to other modes and impose excessive costs

The most significant operating provision of the proposed rule is the potential imposition of a national speed limit of 40 mph for trains with 20 or more cars of flammable liquids until all the tank cars in those trains meet new standards. In an effort to model the effects of the rulemaking, Union Pacific identified trains that operated between July 2013 and June 2014 with 20 or more tank car loads of flammable liquids. *Haley at 5.* Approximately 2.6% of the trains on Union Pacific's system met PHMSA's rulemaking criteria. *Id.* We then identified the routes over which these trains operated, as well as the cities with more than 100,000 people and the HTUAs through which the trains traveled. *Id*. As a final indicator, Union Pacific identified all of the other trains that share these routes. *Id*.

A. Imposition of a uniform 40 mph speed limit would degrade network fluidity

The delay caused by the proposed speed restriction would significantly impact Union Pacific and its customers by reducing the capacity of our rail lines. *Haley at 6.* Trains operating at 40 mph take longer to reach their destinations than trains operating at 50 mph, causing extensive delays to following trains, harming service to numerous customers across all commodity groups, far beyond those who

ship flammable liquids. *Id.* Slow trains remain on our tracks longer, and consume a greater share of the available capacity. *Id.* Ironically, imposition of a uniform speed limit would actually increase the number of crude oil trains on Union Pacific's system by 15% because of the cycle time delay caused by the rule. *Id.*

Several of Union Pacific's highest volume rail corridors could lose between 7% and 26% of the capacity that is currently available to support projected increased demand and economic growth. *Haley at 7.* Critical high impact subdivisions, where the traffic is heaviest or capacity is constrained already, would be even more profoundly impacted. *Id.* The proposed regulation would reduce the fluid capacity limits of 14 important subdivisions below current traffic volumes. *Id.* These subdivisions would essentially have no current capacity to grow and volumes would actually need to be reduced to maintain the current service levels. *Id.* The outcome for Union Pacific and its customers would be additional congestion, slower transit times, and less predictable delivery dates. *Id.* In addition to these 14 subdivisions, Union Pacific has identified 22 subdivisions that would be operating within one train per day of their fluid capacity limits. *Id.* The proposed regulation would eliminate, or severely restrict, the ability of Union Pacific's customers to grow their businesses if their products move across any of these 36 subdivisions. *Id.* Moreover, the proposed regulation would severely limit Union Pacific's ability to handle or recover from service disruptions, due to

inclement weather or other unanticipated service interruptions on these 36 subdivisions. *Id.* Obviously, traffic cannot be rerouted or diverted to lines that are operating at or above capacity. *Id.*

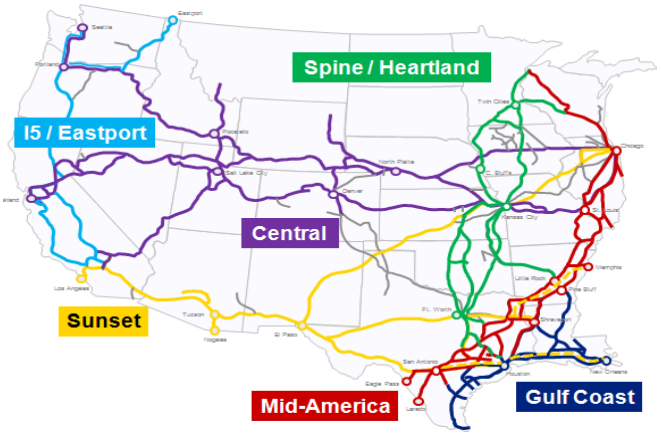
B. Reduced fluidity would slow the network and shift traffic and risk from rail to trucks

As described above, the proposed rule would result in the loss of speed and total capacity of the system. That would create a problem for customers, because in many capacity constrained areas, there is simply no place to go. *Id.* It is likely that some of Union Pacific's customers would not be willing to accept these lower service levels, and would divert their traffic to other modes of transportation. *Id.*

As a result, the rulemaking will have a major unintended and unforeseen consequence: transferring the risk of transporting many commodities by rail, which has an impressive safety rate of delivering materials from origin to destination, to truck. This mode transfer will increase the risk to the public by putting additional trucks on the road, adding hundreds of thousands of additional trucks in areas of the country where highway infrastructure is already at capacity. Not only will these trucks add traffic to the roads, but also with increased truck volume comes increased emissions, increased wear on highways and bridges, increased traffic delays, and predictably increased traffic accidents and highway deaths.

Below is a table and map that summarize an estimated shift of rail car-loadings to truck traffic on Union Pacific's main corridors. *Haley at 8*. These

estimates are based on the train capacity displaced because of the impact of the PHMSA proposal in areas of tight capacity. *Id.* The estimates could be understated because they do not directly address loss to highways caused by the poorer service the PHMSA restrictions would impose across the entire network. *Id.*



Corridor	Estimated Annual Increased Truckloads
Heartland	430,000
Mid-America	260,000
Gulf Coast	230,000
Sunset	130,000
Central	100,000
I-5/Eastport	60,000

C. The costs of PHMSA's proposed uniform speed restrictions far outweigh the benefits of the proposal

Executive Order No. 12866 requires executive agencies to assess all the costs and benefits of available regulatory alternatives, including the alternative of not regulating. While PHMSA proffered a cost-benefit analysis in an attempt to support this proposal, that cost-benefit analysis fails to account for the significant economic, environmental, and safety costs that flow from imposing speed restrictions that would materially impede the fluidity of the rail network and force traffic onto less safe and less fuel-efficient modes. Adoption of rules based on a

cost-benefit analysis that ignores major costs would be an arbitrary and capricious agency action.

1. PHMSA's analysis ignores the costs of a speed restriction to the network

PHMSA itself acknowledges that its analysis of speed restrictions does "not estimate any effects from speed reductions on other types of rail traffic throughout the rail network (e.g., passenger trains, intermodal freight, and general merchandise)."[4] But any analysis of speed restrictions that fails to consider the economic, environmental, and safety costs of decreased network fluidity because of speed restrictions is flawed.[5] The railroad industry is a fluid network of interrelated trains. *Haley at 3*. Slowing one train does not just slow that train. *Id.* It slows all trains throughout that region, and the ripple effect can quickly spread throughout the entire network. *Id.* These network effects will have significant costs for railroads, shippers, and the nation as a whole. *Haley at 4.*

PHMSA's failure to analyze the network effects of its proposed speed reductions is fatal to its cost-benefit analysis of further speed restrictions. Even PHMSA's limited analysis suggests that the total cost of limiting all "HHFTs" to 40 miles an hour would be $2.6 billion over 20 years, whereas the benefits of that

[4] NPRM at 5047

[5] Union Pacific was unable to determine whether PHMSA's cost-benefit analysis took into account the significant increased fuel costs and equipment costs (*i.e.* car and locomotive cost) due to decreased asset utilization and increased fuel consumption due to more train starts and stops. Starting and stopping a train consumes a disproportionate amount of fuel. Failure to include costs such as these would also render the analysis flawed.

analysis range from $200 million to just over $650 million in that same time period.[6] Similarly, PHMSA's analysis also concludes that the cost of imposing a 40 mph speed restriction through population centers of 100,000 is two to eight times as great as the benefit ($240 million cost v. $33 - $108 million benefit).[7] On its face, these speed restriction proposals cannot be supported by the cost-benefit analysis.

2. PHMSA has failed to analyze the cost of adding capacity

To perform a realistic cost benefit analysis, PHMSA must consider the capital costs of offsetting the effects of the proposed rule. It will be very expensive and time consuming for Union Pacific to mitigate the negative impact that the nationwide 40 mph speed restriction would have on its customers. *Haley at 8*. It could take years and cost billions of dollars in additional capital expenditures to restore the capabilities of today's system and the service levels that our customers require. *Haley at 9.* In fact, Union Pacific's initial modeling indicates that the proposal to impose a nationwide 40 mph speed restriction would cost hundreds of millions in locomotives alone. *Id.* At this writing, locomotive manufacturing capacity is booked through 2015. *Id.*

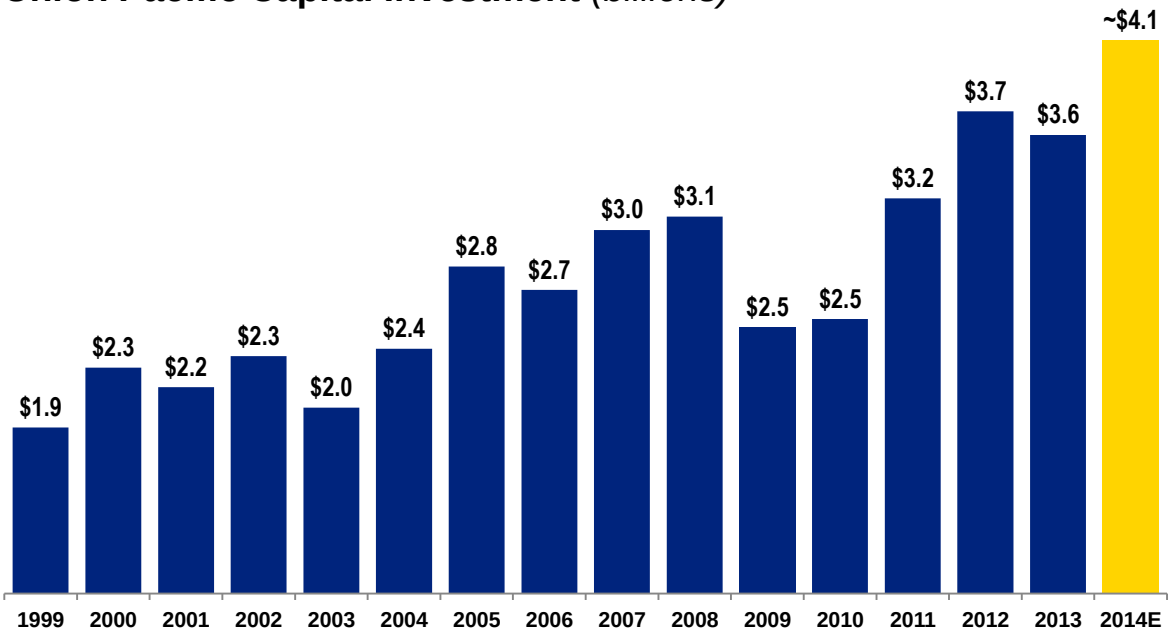
Moreover, our ability to invest in capacity to overcome the proposed regulation would depend on our ability to generate returns at reinvestible levels for

[6] NPRM at 45022, Table 5
[7] NPRM at 45022, Table 5

these projects. *Id.* Investing capital to expand capacity is risky. *Id.* In the years it generally takes to earn a positive return, markets can change in ways that reduce or completely eliminate anticipated returns. *Id.* Among the many risks railroads face are general economic changes, changes in demand for specific commodities, or changes in the economics of alternative transportation modes. *Id.* Infrastructure capacity projects have long lead times, often 2-3 years or more, which adds to their risk. *Id.* Railroads cannot readily redeploy fixed assets to mitigate the effects of these potential changes. *Id.* Thus, before we commit capital we must be satisfied that our return will be high enough to offset the associated risks and costs. *Id*.

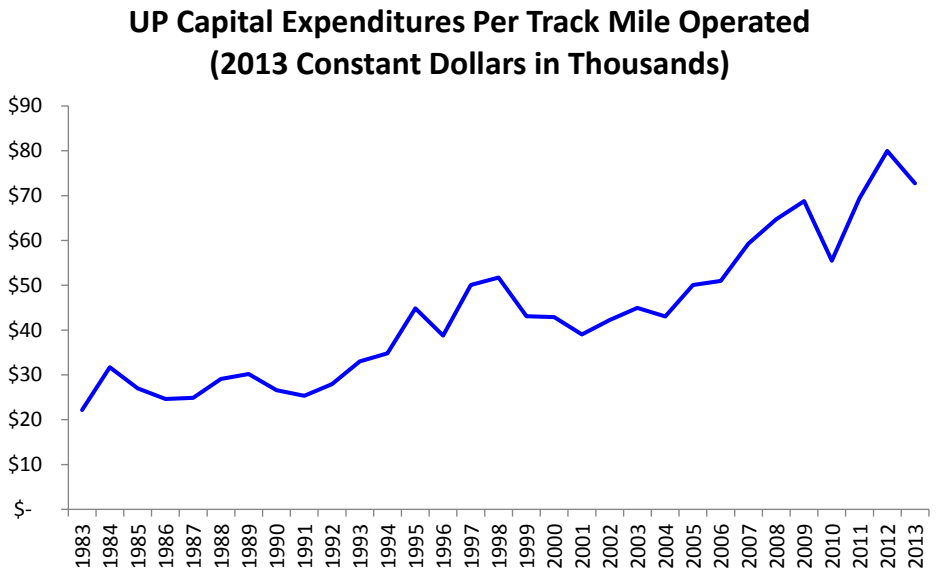
Over the last several years, Union Pacific has been investing in its network at record levels to enhance the service we provide to our customers and the nation. *Id.* These substantial investments reflect Union Pacific's unwavering commitment to operating a safe and reliable rail network. *Id.*

Union Pacific Capital Investment *(billions)*



***Note**: Includes cash capital, leases and other non-cash capital*

The cost of adding incremental capacity is rising and is expected to rise even more in the future. *Haley at 10*. Union Pacific has already added sidings, cross-overs, and connections where they would have the biggest impact per dollar on throughput. *Id.* Additionally, the cost of track materials, signaling systems, and technology, including Positive Train Control, continues to increase. *Id.* In the future, we will have to spend more capital to make an equivalent impact on capacity. *Id.*



Source: AAR Analysis of Class I Railroads and UP Annual Report R-1 data; U.S. Department of Commerce, Bureau of Economic Analysis (GDP implicit price deflator). Historical data include railroads that later merged with UP.

At the same time PHMSA seeks to restrict speeds, Union Pacific is facing growing demands to increase capacity on its network. *Haley at 11*. As the economy picks up speed and America's energy renaissance continues, customers are relying upon Union Pacific to a greater degree than ever. *Id.* This demand is driven both by overall traffic that is approaching record levels and the nature of the demand. *Id.* A significant portion of the increased demand is moving north-south and is concentrated on the eastern third of our network, the same area most likely to be impacted by the PHMSA proposal. *Id.* These markets are tied to geography. *Id.* Union Pacific cannot simply use existing track capacity elsewhere to handle this traffic. *Id.* Moreover, unlike coal traffic that travels from mine to plant, much of the new volume requires handling in yards or terminals that are increasingly

capacity-constrained, and very expensive, if not impossible, to expand. *Haley at 12.*

The cost to add capacity to counteract the proposed rule is also influenced by the fact that many of the areas most likely to be impacted are in congested urban areas where acquiring land is expensive and construction is difficult, if it is even possible. *Id.* And once we acquire the property, construction can be delayed and costly because of environmental and permitting challenges. *Id.* This is particularly true in our Southern Region, which includes locations in Texas and Louisiana that are major destinations for crude oil and other flammable liquids. *Id.*

Finally, as discussed above, given the long lead times to replace the capacity lost from the imposed speed restrictions, it would be impossible to offset the damage this rule would do to Union Pacific's network during the period the tank car fleet is replaced or retrofitted. *Id.*

III. ECP brakes are not a feasible requirement because they do not deliver significantly greater safety benefits than DP

Union Pacific supports, and by many standards, leads the industry in continually seeking new technology to improve rail safety. But the use of technology must be tested, researched and proven to provide a benefit. It should

not be mandated when it has proven unreliable and when the cost of the technology does not deliver meaningful safety gains.

Train handling technology has improved tremendously in the past several decades. *Iden at 7*. DP was first introduced in the 1970s and allows for longer and heavier trains to be operated safely by placing additional locomotives at the rear of a train, within the train, or a combination of both, which are remotely controlled from the leading locomotive. *Id*. With DP, the engineer can manipulate the relative power outputs to minimize coupler slack throughout the train. *Iden at 8*. One DP benefit is a quicker application of standard air brakes. *Id*. It can take several seconds for brake-pipe pressure changes initiated by the engineer to propagate to the rear of the train if all of the braking control is located at the front of a conventional train. *Id*. When DP locomotives are directed to set the brakes simultaneously, the desired air pressure change reaches more cars sooner. *Id.* This is particularly true when the additional power units are located in the middle of the train. *Id.*

ECP braking is not new technology. Union Pacific has been working on ECP brakes since the early 1990s, in conjunction with FRA, AAR, the air brake supply industry, private car owners, and other interested parties including railroad labor organizations. ECP brakes use electrical power and digital commands to control electronic brake valves on the cars. *Iden at 5*. Brake applications and

releases are commanded electronically and are propagated instantaneously through ECP train line cable. *Id.* There are potential benefits of ECP brakes, including the ability to have constant and continuous knowledge of air braking performance and devices. *Id.* However, to effectuate ECP use, any train operating with ECP brakes must have a fully equipped ECP locomotive on its head end and all trailing locomotives and each individual car must be fully ECP equipped. *Id.*

In 2009, Union Pacific conducted testing comparing ECP, DP and conventional braking on a series of intermodal trains with the objective of capturing various data points to compare the performance of the different braking systems. *Id.* Through in-depth analysis of the event recorders of the test trains, Union Pacific concluded that multiple remote trains (DP) have essentially the same stopping performance as ECP, and that it makes little difference whether the brake commands are delivered within 2.5 seconds (ECP) or within 4 seconds (DP*). Iden at 8.* Even though the delay in braking commands with ECP and DP can be as much as 4-5 seconds (a result of the difference in build-up time for the brake cylinder pressure), the difference in stop distance is virtually unnoticeable. *Id.* The testing went on to conclude that braking and train handling were virtually as good as the ECP test train. *Id.*

Moreover, Union Pacific found that increasing its use of DP resulted in benefits nearly identical to using ECP, without the significant operating issues

created by ECP. *Id.* Specifically, there are considerable compatibility and reliability issues with ECP brakes that make them a less effective option for Union Pacific. *Iden at 9.* For example, Union Pacific experienced multiple power failures, voltage issues with the electrical system, and both hardware and software issues. *Iden at 5.* In sum, Union Pacific has found that by strategically placing DP throughout nearly 80% of its bulk trains, it captures similar benefits proffered by ECP, without the implementation, reliability, cost, and interchange issues ECP presents. *Iden at 9.*

IV. The proposed operating restrictions should only apply to trains with 20 or more cars of crude oil

The proposed rule states: "PHMSA does not expect any Class 3 (flammable liquid) other than crude oil or ethanol to be shipped in a "HHFT."[8] This assumption is incorrect. During the second quarter of 2014, Union Pacific operated 350 "HHFTs" that contained 20 or more loads of flammable liquids other than crude and ethanol, so they would have been classified as an "HHFT" under this proposed rule even though the train did not contain any crude oil or ethanol cars. Further, throughout the preamble, PHMSA refers to the expansion in energy production and the challenges that the transportation of energy products create for the rail network. It cites the increased volume of production and transportation of these oil products as factors raising safety and environmental concerns. It

[8] 79 Fed. Reg. 45,018.

continues to cite more statistics about the projected growth of crude oil production in the United States and ends with a projection of the potential for severe train incidents involving crude oil. Nowhere in the proposed rulemaking does PHMSA set forth the rationale or the underlying data to support encompassing all flammable liquids in this rulemaking. PHMSA does state that approximately 68% of flammable liquids transported are either crude oil or ethanol, but it goes no further in justifying or explaining why the other 32% of flammable liquids transported by rail must be subjected to the operating restrictions in this rulemaking.

The genesis of this rulemaking has been the dramatic growth of crude oil transportation by rail and several derailments involving this commodity that have accompanied the growth in traffic, including the tragic events in Lac-Megantic. Federal, state and local officials have all been urging DOT to move as expeditiously as possible to address this market development with new tank car standards and a retrofitting schedule for older tank cars. As discussed above, PHMSA needs to apply *operating* restrictions cautiously given the danger of degrading network fluidity, shifting traffic and risk to other modes, and imposing excessive costs on the railroads and shippers. The nation's recent experience with the sudden growth of crude oil trains merits these temporary operating restrictions until new tank cars are put into service. The acute problem facing PHMSA is how

to address the surge in demand for crude oil transportation. To address that problem and minimize the inherent threat posed by operating restrictions to network fluidity, Union Pacific respectfully urges PHMSA to apply any operating restrictions only to trains carrying 20 or more cars of crude oil.

V. Alternatively, any operating restrictions applied to other flammable liquids should be limited to trains with flammable liquids in blocks of 20 or more cars

When drafting the proposed rule, PHMSA erroneously assumed that the operating restrictions would primarily impact unit train shipments. On Union Pacific's network, the broadly defined "HHFT" actually encompasses many manifest trains[9] transporting smaller blocks of flammable liquids that together exceed the 20-car threshold. Approximately 68% of Union Pacific's manifest "HHFTs" impacted by the rule are trains with this type of grouping.

Flammable liquids transported on manifest trains have a different risk profile than flammable liquids transported on unit trains. Only 32% of Union Pacific's manifest "HHFTs" have 20 or more tank cars with flammable liquids located sequentially on the train. The flammable liquids on the other 68% are separated by other cars. In many cases, the cars with flammable liquids are dispersed throughout the train. As a result, there is a lower probability that multiple cars

[9] A manifest train is a freight train with a mixture of car types and commodities

containing flammable liquids would be breached in the unlikely event of a derailment.

Applying speed restrictions to these types of manifest trains would be operationally difficult to manage, as crews would have to monitor and control car counts throughout each terminal stop. It would be difficult to predict when a train would be subject to a speed restriction, making the adverse effect of a speed limit on network fluidity even worse. Union Pacific encourages PHMSA to modify the scope of the proposed rule and only apply its operating restrictions to trains with 20 or more cars of crude oil, or trains with 20 or more cars of flammable liquids in a block.[10]

VI. Conclusion

Nothing in this proposed rule would have prevented a Lac-Megantic-type tragedy from occurring. The primary cause of that accident, as determined by Canada's Transportation Safety Board, was inadequate securement.[11] FRA has since reinforced its securement requirements, and a proposed rule, drafted with industry consensus, is currently pending. Moreover, the rail industry has long been on record supporting reinforced tank car standards.

[10] PHMSA could also backstop the 20 car block concept by placing a limit of 35 total carloads of flammable liquids.

[11] *See*, Railway Investigation Report R13D0054, Transportation Safety Board

The safety measures currently in place have resulted in considerable progress towards preventing catastrophic crude oil incidents from occurring. Attempting to develop comprehensive policies on the basis of one horrific incident and to impose severe operating restrictions on an entire commodity type, which railroads have a common carrier obligation to transport and which makes up less than 3% of Union Pacific's total shipments, would have reverberations felt throughout our entire rail network and beyond. Rail capacity is already constrained across the network, and service disruptions remain a challenge. This rule, as currently drafted, increases risk and will hurt the railroads, customers, and the broader economy. Union Pacific appreciates the opportunity to comment on the Proposed Rulemaking. We are happy to provide further information on any of the above comments if requested.

Respectfully submitted,

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BEFORE THE

DEPARTMENT OF TRANSPORTATION

PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

DOCKET NO. PHMSA 2012—0082(HM-251):

HAZARDOUS MATERIALS: ENHANCED TANK CAR STANDARDS AND OPERATIONAL CONTROLS FOR HIGH-HAZARD FLAMMABLE TRAINS; COMMENT REQUEST

VERIFIED STATEMENT OF

THOMAS C. HALEY

UNION PACIFIC RAILROAD COMPANY

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I. Introduction

My name is Thomas Haley. I am Vice President – Network Planning and Operations for Union Pacific Railroad Company ("Union Pacific"). I have over thirty years experience in the railroad industry, most of which has been spent analyzing and improving network fluidity. I started in operations with CSX in 1983 and joined Union Pacific in 1989 after earning my MBA in finance and transportation from Indiana University's Kelley School of Business.

I am submitting this statement in response to the Pipeline and Hazardous Materials Safety Administration's (PHMSA) request for comments associated with the above Notice of Proposed Rulemaking, Docket No. PHMSA-2012-0082 (HM-251), regarding the transport of flammable liquids. My statement focuses exclusively on the portion of the proposal concerning train speed restrictions as those speed restrictions will have the most direct and negative impact on Union Pacific and its thousands of customers, most of whom do not ship flammable liquids.

II. Union Pacific is Committed to Safety

Safety is Union Pacific's top priority and is the primary consideration in everything we do. Our goal has always been to ensure that all hazardous materials arrive at their destination without incident. Earlier this year, Union Pacific joined

the rail industry in promoting enhanced tank car standards and applying more restrictive operating practices to trains carrying crude oil.

III. The Cost of Reduced Velocity

In my current role, I share responsibility for the design and development of Union Pacific's rail network, service plans, and capital plan. The Network Planning and Operations group assesses the resources Union Pacific needs to handle present and future demand. In recent years, Union Pacific's spare capacity has diminished as car loadings have increased, and we provide input on how Union Pacific should best use its limited spare capacity for maximum benefit to our thousands of customers. We have our fingers on the pulse of our rail network's capacity to handle traffic, which depends not only upon the overall amount of traffic the network is called upon to handle, but upon the location of the traffic and its operational and service characteristics (*e.g.* speed restrictions).

As described more fully below, our analysis of PHMSA's proposal to impose a 40 mph nationwide speed limit on any train carrying 20 or more cars of Class 3 flammable liquids until all such tank cars meet new regulatory standards demonstrates that the proposal would severely reduce capacity in key areas of our network (*i.e.* existing volumes would need to be reduced to maintain existing service standards) as well as consume all existing growth capacity on other areas.

Such capacity reductions would inhibit economic growth of all of our customers and the nation as a whole.

Our analysis also demonstrates that the proposal would result in huge delay costs across the entire network. These delay costs would dramatically impact customer service and would likely lead to a shift in traffic from rail to truck. The delay costs would also have the unintended consequence of increasing the overall number of trains on our network at any one time, including crude oil and ethanol trains, because it will take them longer to reach destination at slower speeds.

A. The Proposed Speed Restrictions Impact All Customers

PHMSA's proposed speed restrictions would affect the service Union Pacific is able to provide *all rail customers*, whether or not they ship flammable liquids. As drafted, PHMSA's proposal requires reduced speeds on more than unit-trains. In fact, on Union Pacific's network, PHMSA's proposal would apply to more manifest trains, carrying a wide variety of goods, than unit trains of flammable liquids.

The railroad industry is a fluid network of interrelated trains. Slowing one train does not just slow that train. It slows <u>all</u> trains throughout that region, and the ripple effect can quickly spread throughout the entire network. As I discuss further

below, these network effects will have significant costs for railroads, shippers, and the nation as a whole.

Freight trains often operate at speeds between 50 mph and 70 mph. Slowing trains down to 40 mph will create the need for additional passing. In areas with only a single main line, which comprises at least three-fourths of our network, sidings currently utilized to allow trains to meet will be utilized more often for same-directional passing. Where there is double track, but consequently no sidings, the 40 mph train will likely set speed of the flow for the whole network – faster trains must follow the slower ones until a location is reached where both the slower train and trains coming from the opposite direction can be stopped to allow the faster trains to pass. The situation is not unlike being stuck behind a slow driver on a two-lane road with traffic constantly flowing from the other direction – passing is simply not possible. In sum, using sidings and double track to pass slower trains destroys capacity and reduces velocity for all other trains, which harms service to the shippers using those trains.

B. The Cost of Delay: *Lost Capacity, More Trains Hauling Flammable Liquids, Reduced Economic Growth, and Increased Highway Traffic*

In developing our transportation plans, Union Pacific utilizes various modeling tools, including Train Performance Simulator (TPS) and Rail Traffic

Controller (RTC) to quantify the impacts that proposed changes in operating rules or conditions have on capacity and expected train performance. These modeling systems are considered state-of-the-art in the railroad industry and were used to model the effects of the proposed rulemaking.

Union Pacific began the analysis by identifying any trains that operated between July 2013 and June 2014 with 20 or more tank car loads of flammable liquids. Approximately 2.6% of the trains on Union Pacific's system met PHMSA's rulemaking criteria. We then identified the routes that these trains operated over, as well as the cities with more than 100,000 people and the High Threat Urban Areas (HTUAs) through which the trains traveled. As a final indicator, we also identified all of the other trains that share these routes.

Union Pacific then used both TPS and RTC to quantify and analyze the rulemaking's impact. TPS calculates minimum run times based on route and train characteristics. Union Pacific frequently uses TPS to evaluate alternate routes, train consists, schedules, and operating practices. RTC is used by many Class 1 railroads and government agencies to simulate the movement of trains through rail networks. The model generates a suite of performance statistics, including the delays from train interactions. RTC's results, however, tend to be optimistic because the model assumes perfect dispatching decisions and usually does not

simulate many of the real world events like weather and mechanical failures that impede a railroad's operations.

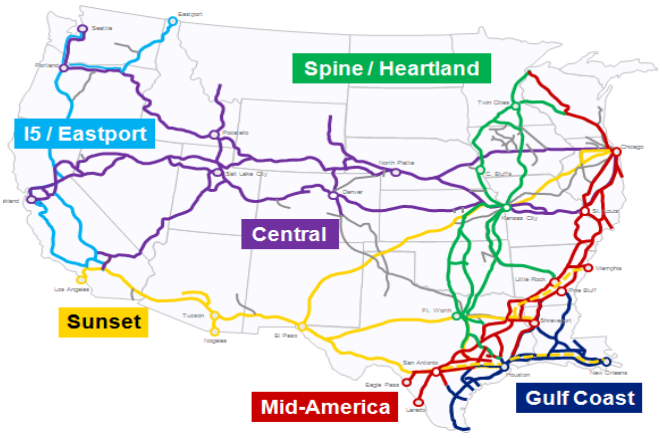
In total we performed over 250 TPS simulations on 104 subdivisions covering the breadth of the Union Pacific network. We also conducted over 300 RTC simulations on 10 different subdivisions representing a full variety of traffic mix and rail capacity configurations. We analyzed the incremental run times for trains for trains carrying over 20 cars of flammable liquids as well as the secondary impacts that the slower flammable liquid trains would have on all other trains.

These extensive simulations and analysis clearly show that the proposed speed restriction would have a significant adverse impact on Union Pacific and its customers by reducing the capacity of our rail lines. Trains operating at 40 mph take longer to reach their destinations than trains operating at 50 mph, causing extensive delays to following trains, harming service to numerous customers across all major commodity groups, far beyond those who ship flammable liquids. Slow trains remain on our tracks longer, so they consume a greater share of the available capacity. Ironically, imposition of a uniform speed limit would actually increase the number of crude oil trains moving on Union Pacific's system at any one time by 15% because of the cycle time delay caused by the rule.

Several of Union Pacific's highest volume rail corridors could lose between 7% and 26% of the capacity that is currently available to support projected increased demand and economic growth. Critical high impact subdivisions, where the traffic is heaviest or capacity is constrained already, would be even more profoundly impacted. The proposed regulation would reduce the fluid capacity limits of 14 important subdivisions below current traffic volumes. In addition to these 14 subdivisions where volumes would have to be reduced to maintain current service levels, Union Pacific has identified 22 subdivisions that would be operating within one train per day of their fluid capacity limits. The proposed regulation would eliminate, or severely restrict, the ability of Union Pacific's customers to grow their businesses if their products move across any of these 36 subdivisions.

The outcome for Union Pacific and its customers would be increased congestion, slower transit times, and less predictable delivery dates. What is more, the proposed regulation would severely limit Union Pacific's ability to handle or recover from service disruptions, in response to events like weather or other unanticipated service interruptions on these 36 subdivisions. Obviously, traffic cannot be rerouted or diverted to lines that are operating at or above capacity. It is likely that some of Union Pacific's customers would not be willing to accept these lower service levels, and would divert their traffic to other modes of transportation.

If PHMSA moves forward with its proposed speed restrictions, it will also shift significant volumes of rail traffic to trucking alternatives. Below is a table and map that summarize an estimated shift of rail car-loadings to truck traffic on Union Pacific's main corridors. These estimates are based on the train capacity displaced because of the impact of the PHMSA proposal in areas of tight capacity. The estimates could be understated because they do not directly address loss to highways caused by the poorer service the PHMSA restrictions would impose across the entire network.



Corridor	Estimated Annual Increased Truckloads
Heartland	430,000
Mid-America	260,000
Gulf Coast	230,000
Sunset	130,000
Central	100,000
I-5/Eastport	60,000

C. The Timing & Cost to Replace Capacity: *Years & Billions*

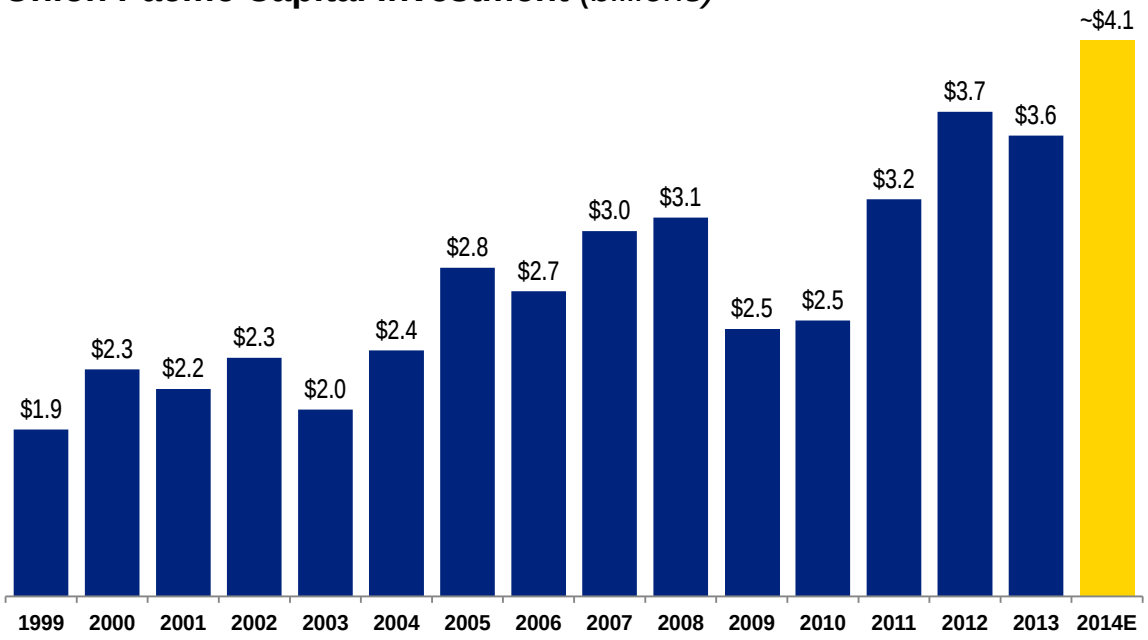
It would be very expensive and time consuming for Union Pacific to mitigate the negative impact that the 40 mph speed restriction would have on its customers. It could take years and cost billions of dollars in additional capital expenditures to restore the capabilities of today's system and the service levels that

our customers require. In fact, Union Pacific's initial modeling indicates that the proposal to impose a nationwide 40 mph speed restriction would cost hundreds of millions in locomotives alone. At this writing, locomotive manufacturing capacity is booked through 2015.

Moreover, our ability to invest in capacity to overcome the proposed regulation would depend on our ability to generate returns at reinvestible levels for these projects. Investing capital to expand capacity is risky. In the years it generally takes to earn a positive return, markets can change in ways that reduce or completely eliminate anticipated returns. Among the many risks railroads face are general economic changes, changes in demand for specific commodities, or changes in the economics of alternative transportation modes. Infrastructure capacity projects have long lead times, often 2-3 years or more, which adds to their risk. Railroads cannot readily redeploy fixed assets to mitigate the effects of these potential changes. Thus, before we commit capital we must be satisfied that our return will be high enough to offset the associated risks and costs.

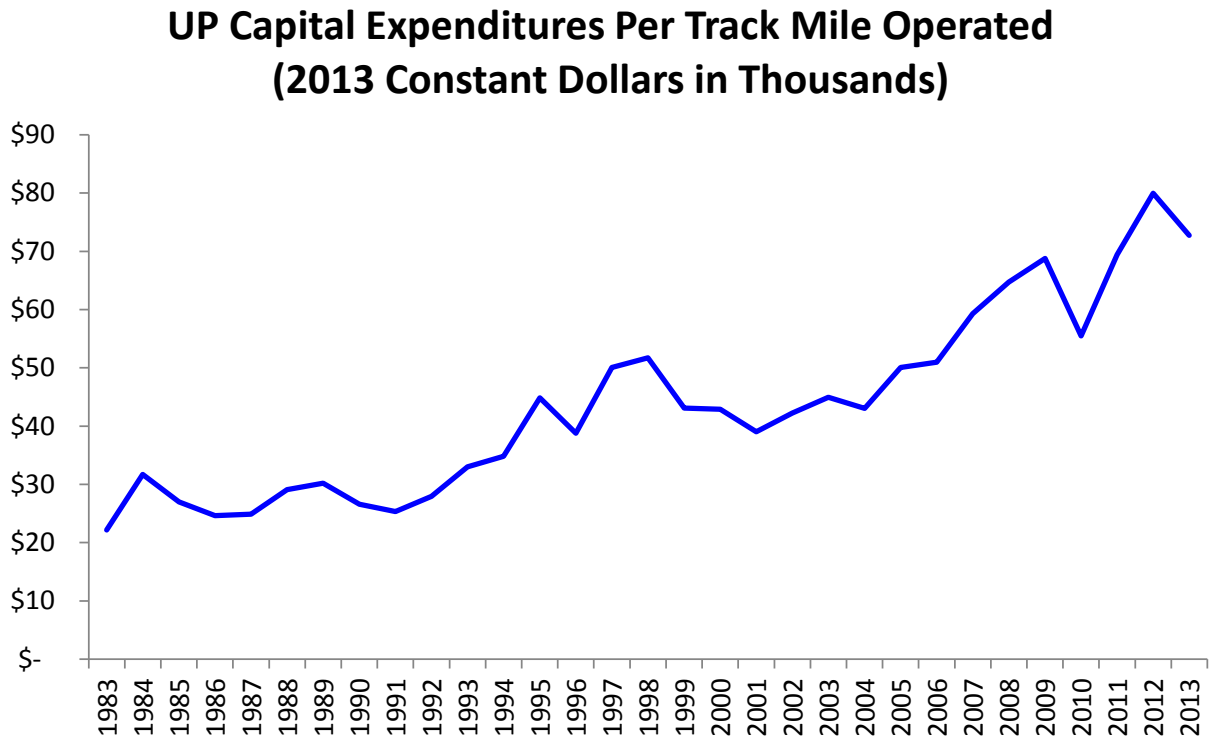
Over the last several years, Union Pacific has been investing in its network at record levels to enhance the service we provide to our customers and the nation. These substantial investments reflect Union Pacific's unwavering commitment to operating a safe and reliable rail network.

Union Pacific Capital Investment *(billions)*



***Note**: Includes cash capital, leases and other non-cash capital*

The cost of adding incremental capacity, moreover, is rising and is expected to rise even more in the future. Union Pacific has already added sidings, cross-overs, and connections where they would have the biggest impact per dollar on throughput. Additionally, the cost of track materials, signaling systems, and technology, including Positive Train Control, continues to increase. In the future, we will have to spend more capital to make an equivalent impact on capacity. For instance, the amount we have invested annually per track mile has increased substantially since 2004. For every mile of track that we operate, we invested 64 percent more in real terms (102 percent more in nominal terms) in 2013 than in 2004.



Source: AAR Analysis of Class I Railroads and UP Annual Report R-1 data; U.S. Department of Commerce, Bureau of Economic Analysis (GDP implicit price deflator). Historical data include railroads that later merged with UP.

At the same time PHMSA seeks to restrict speeds, Union Pacific is facing growing demands to increase capacity on its network. As the economy picks up speed and America's Energy Renaissance continues, customers are relying upon Union Pacific to a greater degree than ever. This demand is driven both by overall traffic levels that are approaching record levels and the nature of the demand. A significant portion of the increased demand is moving north-south and is concentrated on the eastern third of our network, the same area most likely to be impacted by the PHMSA proposal. These markets are tied to geography. Union Pacific cannot simply use existing track capacity elsewhere to handle this traffic.

Moreover, unlike coal traffic that travels from mine to plant, much of the new volume requires handling in yards or terminals that are increasingly capacity-constrained, and very expensive if not impossible to expand.

The cost to add capacity to counteract the proposed rule is also influenced by the fact that many of the areas most likely to be impacted are in congested urban areas where acquiring land is expensive and construction is difficult, if it is even possible. And once we acquire the property, construction is often delayed and costly because of environmental and permitting challenges. This is particularly true in our Southern Region, which includes locations in Texas and Louisiana that are major destinations for crude oil and other flammable liquids.

Given the long lead times to replace the capacity lost from the PHMSA speed restriction, it would be impossible to offset the damage this rule would do to our network during the period the tank car fleet is replaced or retrofitted.

IV. Conclusion

In sum, the 40 mph nationwide speed restriction proposed by PHMSA will have dramatic negative effects on Union Pacific's network and our ability to provide our customers with the level of service they have come to expect and depend upon. It will shift trucks onto our nation's highways. It will increase our

costs, and consume resources that cannot be readily replaced. It will consume precious capacity at a critical time when the national rail network is straining to meet increased demand.

VERIFICATION

I, Thomas C. Haley, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this Verified Statement.

Executed on September 26, 2014.

Thomas C. Haley

BEFORE THE
DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

DOCKET NO. PHMSA 2012—0082(HM-251):
HAZARDOUS MATERIALS: ENHANCED TANK CAR STANDARDS AND OPERATIONAL CONTROLS FOR HIGH-HAZARD FLAMMABLE TRAINS; COMMENT REQUEST

VERIFIED STATEMENT OF
MICHAEL E. IDEN
UNION PACIFIC RAILROAD COMPANY

Contents

I. Introduction

My name is Michael Iden. I am employed by Union Pacific Railroad Company (Union Pacific) as General Director of Car and Locomotive Engineering, reporting to the Chief Mechanical Officer. I am submitting this verified statement in response to the Pipeline and Hazardous Materials Safety Administration's (PHMSA) request for comments associated with the above Notice of Proposed Rulemaking, Docket No. PHMSA-2012-0082 (HM-251), regarding the transport of flammable liquids. My statement is directed at the proposal to mandate Electronically Controlled Pneumatic (ECP) braking systems for certain trains transporting flammable liquids. Based upon my experience testing ECP brakes for Union Pacific, I believe: 1) ECP braking systems create significant operational and resource burdens; and 2) Distributed Power (DP) delivers comparable benefits to ECP brakes.

My 41 years of experience in the railroad industry includes management positions in railroad facility engineering; transportation operations planning, including locomotive design, manufacturing, maintenance and operations; and train operating procedures such as derailment prevention practices. My current job responsibilities are identifying, researching, testing and implementing new locomotive and freight car related technologies—including DP, ECP, Positive Train Control (PTC); and fuel tank crashworthiness.

I graduated from the Milwaukee School of Engineering with a Bachelor of Science degree in mechanical engineering in 1972. I then graduated from Northwestern University Graduate School of Management with a master of management degree in transportation operations and railroad finance in 1978 in the General Motors fellowship program. I am a registered professional engineer in the states of Nebraska and Wisconsin, and have held a federal locomotive engineer's certificate since 1992. At various times in my career, I have also periodically operated locomotives on line-haul freight, yard switching and commuter passenger trains.

I previously provided comments in October 2007 to the Federal Railroad Administration (FRA) regarding ECP brakes, commending FRA for considering methods for developing voluntary rather than mandatory use of ECP braking. I cautioned that ECP braking should begin with high-mileage high-utilization cars, such as intermodal flat cars and heavy-haul cars for transporting coal and other bulk materials in unit trains. In that rulemaking, FRA correctly decided against mandating ECP braking because of the significant economic burdens relative to the benefits

II. Mandating ECP Braking Will Impose Significant Operational and Resource Burdens

Electronically controlled pneumatic brakes use electrical power and digital commands to control electronic brake valves on the cars. Brake applications and releases are commanded electronically through a train line cable, and are propagated at the speed of light, instead of pressure waves. ECP brakes may be standalone wherein the conventional pneumatics are replaced or in an overlay configuration where the ECP brakes are parallel with the conventional air brakes. There are potential benefits of ECP brakes, including the ability to have constant and continuous knowledge of air braking performance and devices.

Throughout 2008 and 2009, I managed an ECP pilot program for Union Pacific on intermodal trains. For the study, Union Pacific used two intermodal stack trains, each of which could transport 250 containers if fully loaded. The study used ECP brakes supplied by both New York Air Brake (NYAB) and Wabtec. The NYAB train operated between Long Beach to Dallas from October 2008 to July 2009. The Wabtec train operated from Oakland to Seattle. During that study, the test trains experienced delays due to multiple ECP power failures, voltage issues with the electrical system, and both hardware and software issues. There were also some significant delays. For example, one delay caused by defective batteries required bringing the train into a terminal for repair, which took two days.

If PHMSA mandates ECP braking systems, Union Pacific estimates it will have to equip approximately 7,000 of its 8,300 locomotives with ECP. In its analysis of this issue, PHMSA concluded that the *entire U.S. freight rail industry* would only need ECP brake installation on 900 locomotives, because PHMSA assumed captive fleet trains haul flammable liquids. This is simply not true.

Union Pacific does not have a "captive" flammable liquids locomotive fleet. In order to ensure network fluidity and customer service, Union Pacific must equip every locomotive that is likely to be part of a train covered by the proposed rule. Locomotives move around the country and are not assigned to a dedicated area. Moreover, locomotives must be interoperable with other railroads. The graph below shows the movement of a single Union Pacific locomotive over a sixty-day period, which essentially travels throughout the entire national rail network on multiple railroads.

Because a locomotive's location or ultimate destination is not predictable, and locomotives are required wherever power is needed, there is no feasible way to dedicate a locomotive to service a single commodity or designated geographical area.

III. Distributed Power Delivers Comparable Benefits to ECP Brakes

Train handling technology has improved tremendously in the past several decades. DP was first introduced in the 1970s and allows for longer and heavier trains to be operated safely by placing additional locomotives at the rear of a train, within the train, or a combination of both, which are remotely controlled from the leading locomotive. With DP, the engineer can manipulate the relative power

outputs to minimize coupler slack throughout the train. One DP benefit is a quicker application of standard air brakes. It can take several seconds for brake-pipe pressure changes initiated by the engineer to propagate to the rear of the train if all of the braking control is located at the front of a conventional train. When DP locomotives are directed to set the brakes simultaneously, the desired air pressure change reaches more cars sooner. This is particularly true when the additional power units are located in the middle of the train.

I participated in and supported Union Pacific's 2009 analysis of the event recorders of the ECP test trains. Through in-depth examination of the event recorders of the test trains, Union Pacific concluded that DP trains have essentially the same stopping performance as ECP, and that it makes little difference whether the brake commands are delivered within 2.5 seconds (ECP) or within 4 seconds (DP). Even though the delay in braking commands with ECP and DP can be as much as 4-5 seconds (a result of the difference in build-up time for the brake cylinder pressure), the difference in stop distance is virtually unnoticeable. The testing concluded that braking and train handling were virtually as good as the ECP test train.

Moreover, Union Pacific found that increasing its use of DP resulted in benefits nearly identical to using ECP, without the significant operating issues created by ECP. Specifically, there are considerable compatibility and reliability

issues with ECP brakes that make them a less effective option for Union Pacific. In sum, Union Pacific has found that by strategically placing DP throughout nearly 80% of its bulk trains, it captures similar benefits proffered by ECP, without the implementation, reliability, cost, and interchange issues ECP presents.

IV. Conclusion

The proposed rule mandating ECP braking systems fails to properly consider operational and deployment burdens, equipment and maintenance costs and accompanying training issues. I do not agree that the potential benefits of ECP are justified--there are many difficulties the industry would face in attempting to implement ECP on their networks. I encourage PHMSA to: 1) reject a requirement for ECP brakes because of the operational and resource challenges; and 2) recognize and adopt the proven safety benefits of DP, a system currently widely used by Union Pacific.

VERIFICATION

I, Michael E. Iden, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this Verified Statement.

Executed on September 30, 2014.

Michael E. Iden