

Statement for the
Joint Senate Hearing
Transportation Committee
Environmental Resources & Energy Committee
June 9, 2015

Dr. Allan M Zarembski
Research Professor and Director of the Railroad Engineering and safety
Program
University of Delaware

Thank you Mr. Chairman,

My name is Dr. Allan M Zarembski and I am Research Professor and Director of the Railroad Engineering and Safety Program at the University of Delaware. I have been retained by the Office of the Governor to look at issues related to safety of Crude By Rail (CBR) shipments in the State of Pennsylvania. My team and I have just begun this activity and we are currently in the data collection phase of the activity.

By way of personal background, I have been actively involved in the railroad industry for almost 40 years. Prior to my joining the faculty of the University of Delaware in 2012, I was President of ZETA-TECH, Inc. a railway technical consulting and applied technology company, which I established in 1984 and sold to Harsco Corp. in 2007. Prior to that, I served as Director of R&D for Pandrol Inc., Director of R&D for Speno Rail Services Co. and Manager, Track Research for the Association of American Railroads. I have a PhD in Civil Engineering from Princeton University, and am a registered Professional Engineer in five states. I am an Honorary Member of AREMA, a Fellow of ASME, and a Life Member of ASCE. I have authored or co-authored over 180 technical papers, over 120 technical articles, and two books. My areas of research include

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failure and risk analysis of the track and its key components to include rails, ties, fastener, ballast, and turnouts; safety and derailment prevention; improved track inspection technology and applications; vehicle-track dynamic interaction; and track maintenance planning. I have been personally involved in derailment and safety analyses and investigation, including development of methodologies to reduce derailment risk for several major track and operating derailment areas.

My activity will address three major areas of CBR Safety in the State of Pennsylvania:

1. Derailment Risk
2. Tank Car Breach/Rupture Risk
3. Regulatory Oversight

I would like to point out, that for a catastrophic CBR event to take place, several elements are necessary: First a derailment must occur, usually unrelated to the CBR equipment itself (in general over 85% of derailment causes in the US are not related to the cars or their commodities). Second a breach or rupture of the tank car shell must occur and a release of the crude take place. Third, conditions must be present and the volatility of the commodity must be such as to ignite or explode after the rupture of the tank car.

We will be looking at these areas, with a specific focus on the first two areas.

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In the area of Derailment Risk, this assessment will look at the distribution of derailments by major categories (Track, Operations/Human Factors, Equipment, Signals, etc.) and subcategories (e.g. broken rail, wide gauge, etc.) both in the state of Pennsylvania and Nationwide. This will include the distribution of derailments by major and subcategories separately for the two major CBR carriers in the State, NS and CSX. Thus, it should be noted that the Human Factors and Track categories, represent the largest percentage of accidents and derailments in both the United States in general and in the State of Pennsylvania in particular. For those derailment categories that are high risk, i.e. with a significant number of annual occurrences or significant potential for occurrence of major tank car failure (such as a high speed derailment with a potential for a significant tank car breach), the University of Delaware team will identify opportunities for improvement in inspection and/or maintenance practices, based on state of the art industry practice as well as specific practices of railroads operating CBR trains in the State of Pennsylvania; For those categories where a level of risk can be identified (e.g. broken rail derailments, which is a major sub-category of derailments, particularly for main track derailments), recommendations for maximum level of risk will be made (based on potential for catastrophic CBR failure). This in turn can allow for further improvements in inspection practices, such as increasing rail testing on high risk routes.

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In addition, derailment categories where a proposed new technology or operating standard will affect potential for derailment will be identified, e.g. Speed Reduction, ECP Brakes or PTC. Thus, for example as speed decreases the risk that a derailed hazmat car will release its contents decreases.

Note: this activity will make use of the FRA track safety data base to include both national and State of Pennsylvania derailment data.

In the area of Tank Car Breach/Rupture Risk, the assessment will examine the proposed improvements to the tank car such as:

- Improved head shields
- Increased tank shell thickness/external jacket
- Valve Protection (top and bottom valves)
- Reduction in train speed

and will qualitatively identify the potential increases in safety. This assessment is to include the effect of proposed new FRA and industry standards for tank car design and train operations.

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In the area of Regulatory Oversight, the assessment will review the current safety oversight capabilities and resources of the State of Pennsylvania Department of Transportation, as well as those of other states with major rail transportation infrastructure, and in particular those that carry CBR trains. It will identify opportunities for improvement of safety through improved regulations, state inspections, co-ordination with the Federal Railroad Administration, and other areas of opportunity.

I welcome your questions at this time.