



FOCAL POINTES

Rail Safety and Regulatory Perspective

A Conversation with
Wendy Buckley
President and Founder
Specialty Transportation
and Regulatory
Services (STARS)
Philadelphia, PA

Specialty Transportation and Regulatory Services (STARS) consults in all facets of hazardous waste management and materials transportation for rail, air, highway, vessel, and pipeline. The firm works with a range of clients on practical, cost-effective solutions for regulatory compliance that complement present safety programs. STARS helps companies implement cost effective approaches to compliance in order to improve safety for employees and the public, protect property and the environment, and avoid fines and penalties. Several STARS consultants are former Federal Railroad Administration inspectors, supervisors, and specialists – including one employee who worked for the House Subcommittee on Railroads, Pipelines, and Hazardous Materials.

Maine Pointe recruited STARS to contribute their expertise in an engagement with one of the largest Eastern U.S. refinery operators that focused on the optimization of a comprehensive rail strategy. We recently invited Wendy Buckley to offer her perspective on some of the developments in the regulatory landscape that will impact rail logistics.

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MP: *There has been a growing concern around rail car packing classes, the assumed explosive character of crude, and the risks in rail transport. Can you help dispel the rumors and set the facts straight?*

Wendy Buckley: One of our colleagues has a great mantra that captures the context well: “All regulations are written in blood.” The recent major rail car changes go back to 2011 when a new standard was imposed by the Association of American Railroads (AAR) – CPC-1232. A CPC, or Casualty Prevention Circular, is a notice that something is going to be different. While the DOT and AAR have similar requirements, the AAR requirements tend to be a higher standard in today’s industry, though that has not always been the case. The penalties for non-compliance are steep; the AAR will not allow shipments to traverse member railroads if you fail to meet the requirements for CPC 1232 for the transportation of Petroleum Crude Oil. Penalties can range from civil to criminal actions.



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CPC-1232 sets requirements for new tank car construction that the railroads must enforce in order to move cars. It defines three commodities: "Petroleum Crude Oil"; "Alcohols, n.o.s."; and "Ethanol and Gasoline Mixture". Tank cars ordered and built after October 2011 must meet new standards or cannot be used in Crude Oil service. Older cars have been grandfathered in and as of now, can still be used for these commodities. Since the Lac-Mégantic accident in Canada, which resulted in over 50 fatalities and decimated the town's business district, seven more significant derailments involving crude oil trains have occurred.

To dispel some myths: Crude oil in the U.S. and Canada is mostly a PG (Packing Group) I Flammable Liquid. It is no more or less volatile than any other substance in the category. It is not explosive, not a gas, and not particularly corrosive as scientific testing has substantiated. Any intense, rapid compression from packaged crude will make it appear to explode, not some inherent volatility in the substance.

The same is true with Crude Oil tank cars. From all the testing our firm has been involved in, we know with certainty that most samples have a flammability range consistent with PG I, although some are PG II. Packing groups define how strong of a package would be required for transporting this particular material. Packing Group I materials of any applicable hazard class represent the greatest level of danger by that class; PG II is a medium level of danger, and PG III is the lowest level (anything less dangerous is not considered hazardous for transportation). There is no scientific evidence to date that the multiple petroleum crude oils that we have examined in our work would be considered explosive and while we have found some of the materials to be mildly corrosive, they are not corrosive to the level which would require, or allow, it to be declared corrosive for transportation (in excess of ¼ inch per year).

Reid Vapor Pressure is defined as the absolute vapor pressure exerted by a liquid at 100° F. It is still commonly used to measure the volatility of gasoline and was a regulatory test requirement until 1990. Certain segments of the industry have claimed that we need to revert to this standard. The types of pressures we are seeing through the use of a Reid Vapor Test are mostly 10-15 pounds-per-square-inch (psi), although we have seen results as high as 18 psi. The DOT111 railcar, which is currently used to transport this material, is designed to withstand 100 psi of working pressure and 500 psi of burst pressure. The safety valve, which activates when the pressure gets too high inside the car, is typically set at either 75 or 165 psi. Therefore, this number is still well within the limits that the DOT111 tank cars are built to handle.



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History has proven that by the time we have to be concerned about packing failure or an emergency response, it is too late. We need to look at preventing the accidents to a much greater extent than we have until now. The two most common causes of all railroad accidents, and the two causes attributable to every one of the eight crude oil derailments over the past year, are human factor failures and track failures. If we address these two issues, we will significantly reduce the number of train derailments for all materials, not just crude oil.

MP: *What new impositions may be applied now as a direct result of the recent rail accidents? How will those regulations change rail transport standards going forward, from your perspective?*

Wendy Buckley: The DOT is indicating that they are preparing to issue new regulations regarding tank cars, which is the first change of any significance in many years. The industry expects that any new rules will align more with what AAR has already implemented; however, it is unclear yet what the rules will entail.

Additionally, Transport Canada has taken the lead in making changes with the issuance of Protective Direction #34, requiring the phasing out of older cars. At a basic level, the Direction requires that all CTC111, DOT111, or AAR211 tank cars whose shells are made from non-normalized A515-70 steel (phased out of tank car production in the mid-1980s), do not have exterior heater coils, and do not have bottom discontinuity protection for reinforcement, cannot be used to ship any hazardous materials in Canada. (Coincidentally, the cars built with A515 steel are known for having issues with brittle fracture or thermal shock failure in cold temperatures as a consequence of the longer-grain steel).

This new Protective Direction will remove approximately 5,000 rail cars from service immediately in Canada. The USDOT has announced that they are urging the industry to phase out "legacy" tank cars from crude oil service. For now, AAR is updating their database known as UMLER (Universal Machine Language Equipment Register), which contains all specifications for cars operating on North American Railroads. By adding a code to the database, those cars which meet the criteria for exclusion will be flagged from hazardous materials service in Canada. AAR will also be flagging any cars in their database which are suspected of meeting those criteria so that they can be evaluated by the car owner.

There are also some emergency orders and safety advisories which were issued jointly by the USDOT and Transport Canada – stipulating a range of conditions from speed restrictions to the discontinuation of a one-man crew.



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MP: *Obviously there is heightened sensitivity now regarding safety factors. What do shippers who must optimize rail in their logistics strategy need to be most concerned about?*

Wendy Buckley: It starts with an understanding that even with the most recent DOT emergency order, there has not been a major change to anything that producers, shippers, or carriers should already be doing. If you take a closer look at what is outlined in the safety advisories and emergency orders, you will find that there is almost no difference.

For example, the new emergency order had everyone concerned about testing and data analysis to support classification decisions. However, most of the provisions causing concern were already required in the regulations. We have always been required to test our material in order to quantify the hazard: Is a material flammable, corrosive, or poisonous? How flammable or corrosive is it? The real takeaway is that the DOT is starting to strictly enforce the requirement already present in the regulations; anyone shipping a hazardous material must quantify those hazards through testing and documentation.

Classification is very important because it drives all of the decisions you make about a material – packing, labels or placards, markings, shipping papers, etc. but it does not cause accidents. The industry needs to focus on the root cause of these accidents so we can prevent them before they happen. There is too much risk to employees, the public, and the environment.

While it is important to know the hazards of your material so you can properly pack it and communicate the hazards, the reality is that those classification decisions would not have prevented any of the eight crude oil accidents or their consequences. Even after all the focus on classification and packing group selection, a different packing group would not have changed the tank car selected to transport the crude oil.

The Emergency Response Guide, or ERG, is the go-to resource for initial hazardous materials response at nearly every fire and police department in North America. It is a joint publication of the Canadian, Mexican and United States government. The response developed within the guides is based upon the UN ID Number, not the Packing Group. Petroleum Crude Oil, UN 1267, would lead emergency response personnel to Guide #128 in the book. Whether the Crude Oil is PG I or PG III, the guide would not change and the response would be the same. This is also true for most other flammable or combustible liquids. They all lead to Guide 128 and the packing group is not a factor.



Contact Maine Pointe

U.S. (Headquarters):
Independence Wharf
470 Atlantic Ave., 4th flr.
Boston, MA 02210
Telephone: 617.273.8450
Fax: 781.934.0579

Stephen Hamilton
Executive Vice President,
Oil and Gas
Cell: 614.226.4907
shamilton@mainepointe.com



Wendy Buckley has enjoyed an accomplished and diversified career in the hazardous materials industry for over 17 years. She has served as a Railroad Hazardous Materials Safety Inspector for both the Federal Railroad Administration and the New Jersey State Department of Transportation. At Amtrak, Wendy was an Investigator with the Office of Inspector General as well as a Multi-Modal Hazmat Instructor and Auditor with a premier training and consulting company. She also managed the Regulatory Affairs department at a multi-national laboratory supply company. Wendy started her career as a Hazardous Materials Technician and Firefighter. She holds an M.S. in Environmental, Safety, and Health Management along with a Master Certificate in Environmental Management from the University of Findlay in Ohio; a B.S. in International Business (*Magna Cum Laude*) from Strayer University; and advanced certifications in Hazardous Waste Management and Hazardous Materials Regulations.