



REASSESSMENT OF THE RESPONSE TO TSB RECOMMENDATION R07-04

Non-pressurized tank car construction standards

Background

At approximately 1440 eastern daylight time on 17 August 2004, 18 tank cars of Canadian National train U-781-21-17, a petroleum product unit train travelling from the Ultramar Canada Inc. refinery in Lévis, district of Saint-Romuald, Quebec, and bound for Montréal, Quebec, derailed at Mile 3.87 of the Lévis Subdivision, in the marshy area of the Grande Plée Bleue, near Saint-Henri-de-Lévis. Approximately 200 000 litres of gasoline and diesel fuel spilled into the marshy area, but the spilled product was recovered. There were no injuries.

The Board concluded its investigation and released report R04Q0040 on 27 September 2007.

TSB Recommendation R07-04 (September 2007)

The damage sustained by the Class 111A tank cars involved in this occurrence and the risks posed by the subsequent product release are typical of that identified in previous TSB investigations. In this occurrence, there was a significant spill of hydrocarbons when the tank shells and heads were breached even though the derailment happened in a marshy area where the surrounding terrain was particularly soft. Other occurrences investigated by the TSB have also revealed the vulnerability of this type of car to puncture, even in low-speed accidents (TSB report R99D0159 (Cornwall) and TSB report R05H0011 (Maxville)).

The Class 111A tank cars' weaknesses have been acknowledged by the regulator and industry, resulting in measures to mitigate risk in the event of a derailment. The number of products that these cars are allowed to transport was reduced when the *Transportation of Dangerous Goods Regulations* were amended and new tank car construction standards were established by TC. These standards, which have been incorporated into the Association of American Railroads (AAR) Specifications for Tank Cars, M-1002-2003, require that new Class 111A tank cars with a gross weight of 286 000 pounds be constructed to more stringent criteria, including improved puncture resistance through better material selection and inclusion of half-head shields. However, the safety enhancements included in the standards do not apply to Class 111A tank cars with a maximum gross weight of 263 000 pounds or less, or to other non-pressurized tank cars. Consequently, a large number of the existing tank cars carrying dangerous goods will be vulnerable to puncture, even during derailments at moderate operating speeds.

Considering that the difference in product volume between the two types of car is less than 9%, the risks presented by a product release from a 263 000-pound car would not be significantly

lower than in the case of a 286 000-pound car. Therefore, the Board believes that further attention is required to address the issue of puncture resistance of cars of lower weight and recommends that

the Department of Transport extend the safety provisions of the construction standards application to 286 000 pound cars to all new non-pressurized tank cars carrying dangerous goods.

TSB Recommendation R07-04

Transport Canada's response to Recommendation R07-04 (April 2008)

In response to TSB Recommendation R07-04, TC intends to table this recommendation for discussion and adoption at the upcoming CGSB Standards Committee CAN/CGSB 43.147. This Committee is responsible for drafting and approving Canadian tank car standards related to the "Construction, Modification, Qualification, Maintenance and Selection and Use of Goods by Rail". These standards are referenced in the TDG Regulations as mandatory requirements. The next meeting of the Committee is expected to take place later this year.

TSB assessment of Transport Canada's response to Recommendation R07-04 (June 2008)

TC has acknowledged the deficiency and indicated that they are following up with tank car stakeholders North America wide. As it is too soon to evaluate the outcome of TC's and the efforts of the other stakeholders, the Board assesses the response to Board Recommendation R07-04 as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (June 2010)

TC acknowledged the deficiency and indicated that they are continuing to follow-up with tank car stakeholders North America wide.

TSB reassessment of Transport Canada's response to Recommendation R07-04 (September 2010)

As TC has expanded their address of the safety issue North America wide but have not concluded the issue, the Board reassesses the response to Recommendation R07-04 to remain as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (January 2012)

TDG and the Federal Railroad Administration (FRA) have recently been part of an Association of American Railroads (AAR) task force that was tasked to identify safety enhancements that could be made to new non-pressure tank cars to improve their accident survivability and safety in general.

TDG had requested the Task Force to extend the inclusion of all the safety enhancements currently required for tank cars operating at increased gross rail loads (GT 286 000 pounds vs 263 000 pounds) to all new non-pressure tank cars. The Task Force agreed and the AAR has petitioned the Canadian and United States regulators to adopt it in their respective regulations.

These suggested enhancements also include the mandatory use of normalized steel when carbon or low-alloy steels are used in the construction of the tank car's shell and heads. This use of normalized versus as-rolled steel would represent an important enhancement for the fracture toughness of steel used for non-pressure tank cars.

TDG expects to table the AAR petition at the next meeting of the committee overseeing the soon to be published TC standard on the *Containers for Transport of Dangerous Goods by Rail*. In addition to normalizing, TC will also be introducing for discussion specific fracture toughness requirements which could take the form of additional Charpy test requirements for the steels used in the construction of the tank cars and/or potentially assigning tank cars with a minimum service temperature, with materials of construction having to meet certain fracture toughness requirements at that temperature.

TSB reassessment of Transport Canada's response to Recommendation R07-04 (February 2012)

TC has progressed this issue but has not yet fully addressed the safety deficiency. Therefore, the Board reassesses the response to Recommendation R07-04 to remain as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (January 2013)

TC has reviewed the petition from the AAR and is proposing to modify its tank car requirements so that all new class 111 tank cars for Dangerous Goods in Packing Groups I or II are enhanced relative to the current minimum requirements for class 111 tank cars used at gross weights of 263 000 pounds or less. The enhancements proposed include:

- Protection of service equipment on the top shell.
- The use of reclosing pressure-relief devices.
- A high discharge capacity with a low pressure setting for pressure-relief valves used for petroleum crude oil, UN 1267 or Ethanol/gasoline mixtures, UN 3475 service.
- For carbon steel tank and heads, the steel will have to be normalized.
- The minimum thickness for all tank cars not equipped with an insulation jacket is increased. The minimum thickness for jacketed tanks made of 516-70 steel is increased.
- All tank cars must be equipped with at least ½ in half head shields.
- Coupler forces used to make fatigue calculations must be increased by a factor of 1.09 over those used for tank cars with maximum gross weights of 263, 000 lb.

These changes will be discussed with stakeholders during the next consultative meeting.

TSB reassessment of Transport Canada's response to Recommendation R07-04 (March 2013)

TC has reviewed the petition from the AAR and will address it during a consultative meeting with stakeholders. TC is progressing towards new regulations, but has not yet fully addressed the safety deficiency. Therefore, the Board reassesses the response to Recommendation R07-04 to remain as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (January 2014)

The new standard (Transport Canada Standard TP14877) containing new tank car construction requirements was published in December 2013, and was proposed for adoption in the *Transportation of Dangerous Goods Regulations* in Part I of the *Canada Gazette* on 11 January 2014. A working group was formed at the Ministerial Advisory Council in November 2013 to report with recommendations to the Minister on the TC/DOT111 specification issue. The working group provided its report to the Minister in January 2014. The situation continues to evolve in the United States and Canada regarding the minimal specifications for new and existing TC/DOT111 tank cars as various industries have commented on the Advanced Notice of Proposed Rule Making (ANPRM) published by the US DOT on the subject in September 2013. Transport Canada will continue to intervene in the various governmental and industry forums, such as the Tank Car Committee of the Association of American Railroads and the Regulatory Cooperation Council where these issues are being discussed.

TSB reassessment of Transport Canada's response to Recommendation R07-04 (April 2014)

The promulgation of a new tank car construction standard is a step closer to implementation. However, the TSB is of the opinion that the proposed regulations do not adequately address the proven safety deficiencies with DOT-111 tank cars. The TSB is concerned that the proposed standard TP 14877 (or equivalent PHMSA Petition P-1577 in the US) does not go far enough to mitigate the risks of tank cars being damaged and releasing their contents during an accident and would apply only to new cars.

The TSB has questioned whether the standard that is now being proposed is robust enough to ensure that tank cars will adequately mitigate the risks of carriage of large quantities of flammable liquids. The TSB believes that Transport Canada should reconsider the proposed standards, with the aim of ensuring that tank cars used to transport flammable liquids meet enhanced protection standards that will significantly reduce the risk of product loss when these cars are involved in an accident.

The TSB called on Transport Canada to consider the Association of American Railroads and the American Short Line and Regional Railroad Association expression of support for even more stringent standards for tank cars used to transport flammable liquids. The TSB believes that these more stringent standards should be seriously considered, as they would provide a higher level of risk mitigation. For example, a requirement for full-height, rather than half-height, head shields would further minimize the risk of head puncture in a derailment. Therefore, the Board reassesses the response to Recommendation R07-04 to be **Satisfactory in Part**.

Railway Association of Canada's response to R07-04 (February 2015)

The RAC and the AAR Tank Car Committee have asked TC and PHMSA to legislate a harmonized, higher standard of tank car. The 286 requirement is to account for the added safety features and not increased product. There will be a higher standard of tank car to that required in TP14877 and the industry applauds this.

Transport Canada's response to Recommendation R07-04 (May 2015)

Transport Canada has held ongoing technical discussions with US regulators (PHMSA and FRA) and with industry regarding new tank car standards.

On 02 July 2014, the TP14877 standard, published in the *Canada Gazette*, Part II established a minimum standard of safety for tank cars carrying dangerous goods.

On 18 July 2014, Transport Canada published proposed requirements for a new Class of tank cars for public consultation.

On 11 March 2015, Transport Canada published an update on its development activities relating to new tank car standards (i.e., TC-117 tank cars). The proposed provisions would require all new TC-117 tank cars built for the transport of flammable liquids to be constructed using thicker and more impact-resistant steel and to be equipped with jacketed thermal protection, full height head shields, top fittings protection and improved bottom outlet valves.

On 01 May 2015, Transport Canada announced the *Regulations Amending the Transportation of Dangerous Goods Regulations (TC-117 Tank Cars)* which came into force when published in the *Canada Gazette*, Part II. These regulations require a new tank car standard (TC-117), retrofit requirements and implementation timelines to modernize the Canadian tank car fleet in flammable liquid service. The standards and timelines are generally harmonized with the US regulators (PHMSA and FRA).

With respect to non-flammable dangerous goods, these products typically do not require a thermally protected jacketed tank car as the dangerous goods properties would not benefit from such a safety feature. Where liquid dangerous goods have a much higher risk (e.g., liquids that are Toxic by Inhalation), the TP14877 standard introduces very stringent requirements. Currently, most high hazard dangerous goods (e.g. class 6.1 PG I liquids) are required to be transported in a pressure tank car. Based on recent annual statistics for Canada (2013), approximately 62,700 carloads of non-flammable dangerous goods were transported by tank cars, including Class 111. The majority of these dangerous goods were class 8 products (52,700 carloads) and class 5.1 products (7,200 carloads).

The TP14877 standard will be revisited in 2015/2016. There will be an open forum for considering improvements to Class 111 tank cars for transporting dangerous goods other than flammable liquids. This forum will provide an opportunity to review the specific requirements assigned to individual dangerous goods, with an eye to being more systematic in assigning higher specification tank cars to PG I non-flammable dangerous goods.

TSB reassessment of the responses to Recommendation R07-04 (May 2015)

This recommendation is related to the TSB Watchlist issue of Transportation of flammable liquids by rail. The increase in the transportation of flammable liquids, such as crude oil, by rail across North America has created emerging risks that need to be effectively mitigated. This recommendation is also related to recommendation R14-01, in which the Board recommended that all Class 111 tank cars used to transport flammable liquids meet enhanced protection standards that significantly reduce the risk of product loss when these cars are involved in accidents.

R14-01 is specific to new and existing Class 111 tank cars for the transport of flammable liquids. In May 2015, TC announced the final regulations detailing the new tank car requirements and the retrofit schedule, allowing industry to begin modernizing the tank car fleet. The TC-117 tank car standard requires all new tank cars built for the transport of flammable liquids to be constructed using thicker and more impact-resistant steel and to be equipped with jacketed thermal protection, full height head shields, top fittings protection, improved bottom outlet

valves and appropriate pressure relief devices. These provisions will result in a more robust non-pressurized tank car for the transport of flammable liquids.

R07-04 is for new tank cars only and includes consideration for non-flammable dangerous goods transported in these cars. TP 14877 outlines the current minimum standard of safety for tank cars carrying many of the other types of dangerous goods. However, most high hazard dangerous goods (e.g. class 6.1 PG I liquids) are required to be transported in a pressure tank car. The TP 14877 standard will be revisited in 2015/2016 as part of an open forum to consider improvements to tank cars for transporting dangerous goods other than flammable liquids. Given the progress made over the past year and the planned actions, the Board considers the response to the recommendation as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (January 2016)

In May 2015, Transport Canada published in the *Canada Gazette*, Part II the *Regulations Amending the Transportation of Dangerous Goods Regulations* (TC-117 Tank Cars). The regulation established the requirements for a new flammable liquid tank car standard (TC-117), retrofit requirements for older tank cars in flammable liquid service and implementation timelines to modernize the Canadian tank car fleet. The standards and timelines were generally harmonized with the US regulators (PHMSA and FRA). With the coming into force in the US of the recent FAST legislation, the US has further harmonized with the Canadian requirements.

The Canadian regulations require that all new tank cars built for the transport of flammable liquids be constructed using thicker and more impact-resistant steel and be equipped with jacketed thermal protection, full height head shields, top fittings protection, improved bottom outlet valves and appropriate pressure relief devices.

Transport Canada continues to work with the Canadian industry to consider braking provisions, such as electronically controlled pneumatic (ECP) brakes, in train operating rules rather than requirements within the TC-117 tank car standard. Transport Canada is also following closely the new requirements brought forward by the US FAST legislation, which imposed new research requirements before ECP braking can be brought into effect in the US.

Transport Canada continues to monitor closely the construction of new TC-117 tank cars and the retrofitting of older flammable liquid tank cars.

Railway Association of Canada's response to Recommendation R07-04 (January 2016)

The RAC and the AAR Tank Car Committee have asked TC and PHMSA to legislate a harmonized, higher standard of tank car. The RAC is concerned with retrofitting older tank cars. The 286 requirement is to account for the added safety features and not increased product. There will be a higher standard of tank car compared to that required by TP14877. The RAC and industry support continued improvement to tank car standards.

TSB reassessment of the responses to Recommendation R07-04 (March 2016)

This recommendation is related to the TSB Watchlist issue of "Transportation of flammable liquids by rail". The transportation of flammable liquids, such as crude oil, by rail across North America has created emerging risks that need to be effectively mitigated. This recommendation is also related to recommendation R14-01, in which the Board recommended that all Class 111

tank cars used to transport flammable liquids meet enhanced protection standards that significantly reduce the risk of product loss when these cars are involved in accidents.

R14-01 is specific to new and existing Class 111 tank cars for the transport of flammable liquids.

R07-04 is for new tank cars only and includes consideration for non-flammable dangerous goods transported in these cars.

In May 2015, Transport Canada published in the *Canada Gazette*, Part II the *Regulations Amending the Transportation of Dangerous Goods Regulations* (TC-117 Tank Cars). These regulations established the requirement for a new flammable liquid tank car standard which requires that all new tank cars built for the transport of flammable liquids be constructed using thicker and more impact-resistant steel and be equipped with jacketed thermal protection, full height head shields, top fittings protection, improved bottom outlet valves and appropriate pressure relief devices. TC is monitoring the construction of new TC-117 tank cars. TC is reviewing and considering braking provisions of tank cars such as electronically controlled pneumatic brakes (ECP), but no specific initiatives have yet been identified. The RAC and industry continue to support improvement in tank car standards.

TC is also in the process of updating TP 14877, *Containers for Transport of Dangerous Goods by Rail*, December 2013. This standard covers large means of containment used in the handling, offering for transport and transporting of dangerous goods by rail. The update will focus on incorporating recent regulatory changes and proposals to be considered by the TP 14877 Consultative Committee. This committee is comprised of key stakeholders with extensive knowledge and expertise relating to the transportation of dangerous goods by rail. On 8 March 2016, a public notice was issued seeking input and comments for updating this standard. The Board acknowledges TC's commitment and progress made on the publication of the new tank car standards and the updating of TP 14877. The Board considers the response to the recommendation as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (February 2017)

This recommendation is linked to TSB Recommendation R14-01.

In July 2014, the department had brought forward the TP14877 standard that advanced safety for all 286 000 pound general purpose cars. The TP14877 standard requires enhanced features for newly constructed tank cars used for Packing Group I and II liquids of other dangerous goods classes (e.g., class 8).

Public consultations on TP14877 were launched in March 2016, and the update of this standard is on track to be completed in 2017. Once the final public consultation is complete, the updated standard will be incorporated into the TDG Regulations.

In addition, the new TC-117 regulation established the requirements for a new flammable liquid tank car standard (TC-117), retrofit requirements for older tank cars in flammable liquid service and implementation timelines to modernize the North American tank car fleet. The standards and timelines were generally harmonized with the US regulators (PHMSA and FRA).

On 13 July 2016, the Minister of Transport issued Protective Direction (PD) 38, in accordance with the *Transportation of Dangerous Goods Act*, 1992. This PD further accelerates the phase-out of

both jacketed and unjacketed legacy DOT-111 tank cars from being used for crude oil service in Canada as of 01 November 2016.

In October 2016, a planning session was held with respect to the feasibility of further accelerating the prescribed tank car phase-out schedule. TDG has been examining options to broaden the department's scope of action in terms of the phase-out of DOT-111 and CPC-1232 tank cars. This will include: analyzing the state of the tank car industry; assessing whether sufficient tank cars exist in light of current demand for transporting flammable liquids by rail; recommending potential acceleration of the phase-out schedule where feasible, and developing an impact assessment. This will lead to recommendations on whether to further accelerate the tank car phase-out schedule introduced in May 2015 and ending in 2025. This feasibility study is expected to be completed by late 2017.

Transport Canada continues to monitor closely the construction of new TC-117 tank cars and the retrofiting of older flammable liquid tank cars. Transport Canada continues to study the possibility of further acceleration of the prescribed phase-out schedule. Transport Canada will collaborate with US DOT and industry in monitoring the flammable liquid tank car fleet.

Railway Association of Canada's response to Recommendation R07-04 (March 2017)

The rail industry, shippers and car owners all oppose electronically controlled pneumatic (ECP) brakes and acknowledge that the FAST Act significantly changed the approach to ECP by mandating that testing and proper cost/benefit analysis be conducted. This is more consistent with the approach taken in Canada, which was to not include an ECP mandate in the tank car standard changes, and no consideration should be given to implementing ECP brakes outside of the process mandated by the FAST Act.

TSB reassessment of the responses to Recommendation R07-04 (March 2017)

This recommendation is related to the TSB Watchlist issue of "Transportation of flammable liquids by rail." The transportation of flammable liquids, such as crude oil, by rail across North America has created emerging risks that need to be effectively mitigated. This recommendation is also related to Recommendation R14-01, in which the Board recommended that all Class 111 tank cars used to transport flammable liquids meet enhanced protection standards that significantly reduce the risk of product loss when these cars are involved in accidents. Recommendation R14-01 is specific to new and existing Class 111 tank cars for the transport of flammable liquids. Recommendation R07-04 is for new tank cars only and includes consideration for non-flammable dangerous goods transported in these cars.

In July 2014, TC brought forward the TP 14877 standard that enhanced features for newly constructed tank cars used for Packing Group I and II liquids of other dangerous goods classes (e.g., class 8). In March 2016, public consultations on the TP 14877 standard were launched, and a further update of this standard is expected by late 2017. The updated standard will be incorporated into the TDG Regulations.

In addition, the new TC-117 regulation established the requirements for a new flammable liquid tank car standard (TC-117), retrofit requirements for older tank cars in flammable liquid service and implementation timelines to modernize the North American tank car fleet. The standards and timelines were generally harmonized with the U.S. regulators (PHMSA and FRA).

Transport Canada continues to monitor closely the construction of new TC-117 tank cars. Monitoring the flammable liquid tank car fleet will be conducted in collaboration with the U.S. Department of Transportation and industry. The Board acknowledges TC's commitment and progress made on the publication of the new tank car standards and the updating of the TP 14877 standard.

The Board considers the response to the recommendation as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (February 2018)

TP14877

Consultations have been held and the updated standard will be incorporated into the TDG Regulations in 2018/19.

TC-117

On 25 July 2016, Transport Canada issued Protective Direction 38 (PD 38), accelerating the phase-out of TC/DOT-111 tank cars transporting crude oil to November 1, 2016. The accelerated timeline phased out unjacketed legacy TC/DOT-111 tank cars six months earlier, and legacy jacketed TC/DOT-111 cars 16 months earlier than what was published in the TDG Regulations in May 2015. The more robust TC/DOT-117 tank car, which has been engineered to higher safety standards based on the lessons learned from the Lac-Mégantic disaster, will be the only acceptable tank car for all flammable liquids in Canada after April 30, 2025. The Department is closely monitoring the progress of the phase-out, and is identifying areas where the phase-out could be accelerated as tank car usage and patterns evolve. There have been no recorded non-compliance of dangerous goods being transported in tank cars that are no longer authorized based on the phase-out schedule and requirements of PD 38.

In addition, TDG is examining options to broaden the department's scope of action in terms of the phase-out of DOT-111 and CPC-1232 tank cars. This includes: analyzing the state of the tank car industry; assessing whether sufficient tank cars exist in light of current demand for transporting flammable liquids by rail; recommending potential acceleration of the phase-out schedule where feasible, and developing an impact assessment. This will lead to recommendations on whether to further accelerate the tank car phase-out schedule introduced in May 2015 and ending in 2025. This feasibility study is expected to be completed in Spring 2018.

TDG completed an analysis of the tank car industry in July 2017, in relation to the phase-out of TC/DOT-111 tank cars. The study reviewed key characteristics of the oil and gas industry, with a view to determining the potential future demand of tanker cars, and by extension providing considerations on the feasibility (and desirability) of accelerating the phase-out of TC/DOT-111 tank cars in crude oil service. Results indicate that industry has responded to incidents like the one that occurred in Lac-Mégantic with a precipitous decline in carloads using the DOT-111. This market analysis will help to inform recommendations on further accelerating the phase-out schedule.

TDG is taking risk control measures pending full implementation of the DOT-111 phase-out schedule. Since the Lac-Mégantic tragedy in 2013 TDG has hired 64 new inspectors (as of December 31, 2017). It should be noted that in addition to the 64 new inspectors, TDG's

oversight personnel went up by 91, as some of the engineers also perform inspections. Of the current 133 inspectors, all of them perform inspections of transportation of dangerous goods on rail across the country.

Railway Association of Canada's response to Recommendation R07-04 (January 2018)

The RAC continues to work closely with TC and the U.S. Department of Transportation. The update of the TP14877 standard is expected to be incorporated into regulation in 2018.

TSB reassessment of the responses to Recommendation R07-04 (March 2018)

This recommendation is related to the TSB Watchlist issue of “Transportation of flammable liquids by rail.” The transportation of flammable liquids, such as crude oil, by rail across North America has created emerging risks that need to be effectively mitigated. This recommendation is also related to Recommendation R14-01, in which the Board recommended that all Class 111 tank cars used to transport flammable liquids meet enhanced protection standards that significantly reduce the risk of product loss when these cars are involved in accidents. Recommendation R14-01 is specific to new and existing Class 111 tank cars for the transport of flammable liquids. Recommendation R07-04 is for new tank cars only and includes consideration for non-flammable dangerous goods transported in these cars.

Following the public consultations on the TP 14877 standard that were launched in March 2016, an updated standard was prepared. The updated standard is expected to be incorporated into the *Transportation of Dangerous Goods Regulations* in 2018/19.

The Board acknowledges TC’s commitment and progress made on updating the TP 14877 standard. The Board looks forward to the incorporation of the updated TP 14877 standard into regulations. The Board considers the response to the recommendation as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (February 2019)

Transport Canada agrees with the intent of the recommendation.

Transport Canada has responded to this recommendation by publishing in Canada Gazette Part II in May 2015 the TC-117 standard as well as the recent updating of the TP14877 tank car standard. The following are updates on the Department’s actions regarding standards TP14877 and TC-117:

TP14877

The TP14877 standard establishes the requirements for several pressurized and non-pressurized tank cars including the TC-117 tank car. Following consultations, the new TP14877 standard was published by Transport Canada in January 2018. The regulatory publication to bring the updated TP14877 standard into law is expected in *Canada Gazette*, Part II, in April or May 2019.

Once published in *Canada Gazette*, Part II, the regulation enacting the new TP14877 standard will remove the TC-117 from the regulation and place it in the standards with the other tank car requirements as well as bring all tank car Protective Directions issued before January 2018 into the standard.

TC-117

The TC-117 standard established the requirements for new tank car designed for the transport of flammable liquids. Under TC-117, TC requires a significantly more robust jacketed tank car for transporting flammable liquids in Canada. It also prescribed the retrofit requirements for older DOT-111 and CPC-1232 tank cars as well as established phase-out schedule of these older tank cars.

Following a market study on the availability of tank cars, manufacturing capacity and the volume of flammable liquids being transported, Transport Canada identified further opportunities to accelerate the tank car phase-out schedule.

Consequently, in August 2018 the Minister issued Protective Direction 39 (PD 39) that further accelerated the phase-out timelines for unjacketed CPC-1232 tank cars from April 2020 to November 1, 2018. PD 39 also accelerated the phase-out of condensates used to dilute crude oil to January 1, 2019 from the previous April 30, 2025 timeline prescribed in the original regulation. With the issuance of PD 39, as of November 1, 2018, crude oil can only be transported in a jacketed CPC-1232 tank car or a tank car that meets the TC-117 standard. As of January 1, 2019, condensates must also be transported in a jacketed CPC-1232 tank car or TC-117 tank car.

An industry-led working group is looking at providing recommendations to the Department in early Q2 of 2019 on whether there are enough tank cars available in the marketplace, following the significant increase in the transport of crude oil, to accelerate further the removal of the jacketed CPC-1232 tank car in crude and condensate service prior to the April 2025 timeline.

All other flammable liquids will be required to be transported in the more robust TC/DOT-117 tank car, at the latest, as of May 1, 2025.

TDG is taking risk control measures pending full implementation of the DOT-111 phase-out schedule. Following the implementation of Budget 2016, TDG has hired more than 60 new additional inspectors increasing TDG's oversight by a total of 91 positions, as some of the engineers also perform inspections. The Department continues to closely monitor the progress of the phase-out and verifying compliance with requirements through its risk based inspection program. There have been no recorded non-compliance of dangerous goods being transported in tank cars that are no longer authorized (based on the phase-out schedule) including the new requirements established in PD 39.

Railway Association of Canada's response to Recommendation R07-04 (February 2019)

The RAC continues to work closely with TC and the U.S. Department of Transportation. The update of the TP14877 standard was finalized in 2018 and is waiting to be incorporated into the TDG regulations by Transport Canada.

TSB reassessment of the responses to Recommendation R07-04 (March 2019)

This recommendation is related to Recommendation R14-01, in which the Board recommended that all Class 111 tank cars used to transport flammable liquids meet enhanced protection standards that significantly reduce the risk of product loss when these cars are involved in

accidents. Recommendation R14-01 is specific to new and existing Class 111 tank cars for the transport of flammable liquids. Recommendation R07-04 is for new tank cars only and includes consideration for non-flammable dangerous goods transported in these cars.

The TP 14877 standard was published by Transport Canada in January 2018. This standard establishes the requirements for several pressurized and non-pressurized tank cars, including the TC-117 tank car. The TP 14877 standard is expected to be published in the *Canada Gazette*, Part II, in April or May 2019.

Once published in the *Canada Gazette*, Part II, the regulation enacting the new TP 14877 standard will remove the TC-117 from the regulation and place it in the standards with the other tank car requirements. As well, all Protective Directions for tank cars issued before January 2018 will be brought into the standard.

The Board appreciates TC's commitment and progress with updating the TP 14877 standard. The Board looks forward to the incorporation of the updated TP 14877 standard into regulations. The Board considers the response to Recommendation R07-04 as having **Satisfactory Intent**.

Transport Canada's response to Recommendation R07-04 (December 2019)

Transport Canada agrees with the intent of the recommendation.

The department responded to this recommendation by making enhancements to the Class 111 specification, as well as introducing a new Class 117 specification.

In December 2013, Transport Canada published the tank car standard TP14877, which came into effect in the Transportation of Dangerous Goods (TDG) Regulations following its publication in the *Canada Gazette*, Part II in July 2014. TP14877 extended the provisions applicable to 286 000-pound cars to all newly manufactured Class 111 cars used to service dangerous goods in packing groups I and II.

In June 2015, the Class 117 tank car specification was published in the *Canada Gazette*, Part II. Given that the Class 117 tank car meets and exceeds the 286 000-pound provisions, the amendment made the Class 117 car mandatory for the transportation of all flammable liquids, and prescribed a phase-out schedule for existing Class 111 tank cars in flammable liquid service.

In January 2018, Transport Canada published a new edition of tank car standard TP14877, which consolidated the requirements for the Class 117 tank car for flammable liquids, and re-affirmed the requirements for enhanced Class 111 cars for the remaining non-pressure liquid dangerous goods. This new edition of the standard was published in the *Canada Gazette*, Part II and took effect in the TDG Regulations in July 2019.

Transport Canada believes that it has met the full intent of this recommendation and therefore expects that it will be closed.

Railway Association of Canada's response to Recommendation R07-04 (December 2019)

The RAC continues to work closely with TC and the U.S. Department of Transportation. To satisfy the Board recommendation and latest re-assessment the update of the TP14877 standard

was finalized in 2018 and has been incorporated into the TDG Regulations by Transport Canada under Amendment SOR/2019-101.

TSB reassessment of the responses to Recommendation R07-04 (February 2020)

This recommendation is related to Recommendation R14-01, in which the Board recommended that all Class 111 tank cars used to transport flammable liquids meet enhanced protection standards that significantly reduce the risk of product loss when these cars are involved in accidents. Recommendation R14-01 is specific to new and existing Class 111 tank cars for the transport of flammable liquids. Recommendation R07-04 is for new tank cars only and includes consideration for non-flammable dangerous goods transported in these cars.

In January 2018, Transport Canada published a new edition of tank car standard TP14877, which consolidated the requirements for the Class 117 tank car for flammable liquids, and re-affirmed the requirements for enhanced Class 111 cars for the remaining non-pressure liquid dangerous goods. This new edition of the standard was published in the *Canada Gazette*, Part II and took effect in the TDG Regulations in July 2019.

The Board considers the response to Recommendation R07-04 to be **Fully Satisfactory**.

Next TSB action

This deficiency file is **Closed**.