

was extinguished about six hours later, three employees in the plant had been killed, and several other employees required treatment for exposure to the chemicals. About 2,000 residents of the area surrounding the plant were evacuated for about 10 hours.

In the course of its investigation, the National Transportation Safety Board (NTSB or the Board) determined that a contributing cause of the accident and its severity was the plant's reliance on the tank car excess flow valves¹ to activate and stop product flow if a hose or unloading pipe broke.

Also as part of the NTSB investigation, it was determined that both the Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) had required Atofina to develop safety plans for the Riverview facility. As a mandatory part of the plans, the company had to consider safeguards to reduce both the risk and the consequences of a catastrophic release of the hazardous materials present at the plant. Both the risk management plan required by EPA and the process safety management plan required by OSHA dealt specifically with the potential for the failure of a flexible hose used in the tank car unloading process that delivered methyl mercaptan into the plant's industrial process. Under both plans, Atofina stated that the release of methyl mercaptan would be stopped by the automatic closure of the tank car's excess flow valves, specifically noting that this would occur even if a pipeline or unloading hose ruptured.²

Following its investigation into the accident at the Atofina facility in Riverview, Michigan, the Board issued several recommendations. One of them recommended that FRA:

Issue a hazardous materials bulletin to warn companies involved in tank car loading and unloading operations that tank car excess flow valves cannot be relied upon to stop leaks that occur during those operations.³

FRA completely agrees with the safety concerns of the Board in this matter.

The NTSB has previously investigated accidents involving the release of dangerous chemicals during industrial

accidents and, in response to an accident in Baton Rouge, Louisiana, on July 30, 1983, the Board issued a report stating that excess flow valves were not designed to act as emergency shutoff devices during cargo transfer.⁴

Excess Flow Valves in the Railroad Hazardous Materials Regulatory Environment

As a general rule, the specifications for tank cars, at 49 CFR Part 179, include excess flow valves as a permissive feature on what the regulations refer to as "pressure" tank cars and do not mention the devices in the specification for "non-pressure" tank cars. The regulations state:

The interior pipes of the loading and unloading valves shall be anchored and, except as prescribed in § 179.102 or § 179.103, may be equipped with excess flow valves of approved design. (Emphasis supplied.)⁵

The packaging requirements in § 173.314 require excess flow valves for the interior pipes of loading/unloading valves, sampling devices, and gauging devices on tank cars transporting materials with a primary or secondary hazard of 2.1 (flammable gas); excess flow valves are also required on the interior pipes of liquid discharge valves on tank cars transporting chlorine.⁶ FRA believes that most cars built to the pressure car standards have excess flow valves, but the same cannot be said for non-pressure cars, many of which, in fact, transport commodities at pressures greater than the ambient atmosphere.

An excess flow valve is, typically, a metallic device inserted into the interior piping of a tank car, just below the valve(s) used to load and unload the car. In the event that the valves are sheared off in a railroad accident, there will be a sudden rush of product out the opening thus created. With nothing to impede the flow of fluid product, the excess flow valve will move toward the opening and seat, thus sealing off the opening.

In response to concerns that the then-current regulatory provision for excess flow valves might be ambiguous, in 1985 the DOT published a notice of proposed rulemaking to amend the tank car specifications by adopting what is now the contemporary standard. Proponents of the clarification stated that tank-mounted excess flow valves

are not intended to substitute for adequate excess flow equipment in plant loading systems. "The only use of such valves is for protection against loss of lading due to shearing of external closure during transit."⁷

The hazardous materials regulations (HMR) are quite clear that excess flow valves are limited in purpose and scope:

An excess flow valve as referred to in this specification, is a device which closes automatically against the outward flow of the contents of the tank in case the external closure valve is broken off or removed during transit * * *

Excess flow valves, by their nature, must encounter a high-volume, surging flow of product to be activated. If that were not the case, they might function in unintended situations, such as when a tank car is being unloaded with the aid of a strong pump. As designed, essentially any apparatus attached to the outside of the external closure valve will create sufficient internal friction (whether hose or pipe) that the flow of product will not be sufficient to activate the excess flow valve.

Safety Warning

Excess flow valves, by both design and regulation, are intended to function only when the external closure valve is sheared, broken off, or otherwise removed during transit. These devices may also function as a back-up flow control device during tank car loading or unloading activities. While FRA neither regulates nor enforces the risk management plans required by EPA or the process safety management plan required by OSHA, it does have considerable expertise in the design, construction, and use of railroad tank cars and the safety features designed into them. FRA cannot urge strongly enough that the excess flow valve feature commonly included in pressure-type tank cars is not to be relied upon to stop leaks that may occur during loading or unloading operations.

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¹ Excess flow valves appear in the hazardous materials regulations, inter alia, at 49 CFR 179.100-13(c) and (d). The Tank Car Manual, (Specifications for Tank Cars, Manual of Standards and Recommended Practices, Section C-III, Association of American Railroads, Washington, DC, © 2000, Appendix A, Table A1) uses the term "check valve."

² Correspondence dated July 16, 2002, from Marion C. Blakely, Chairman, NTSB, to Allan Rutter, Administrator, FRA, summarizing the Board's investigation, including a public hearing, of this incident.

³ NTSB Safety Recommendation R-02-16.

⁴ NTSB, Vinyl Chloride Monomer Release From a Railroad Tank Car and Fire, Formosa Plastics Corporation Plant, Baton Rouge, Louisiana, July 30, 1983, Hazardous Materials Accident Report NTSB/HZM-85/08 (Washington, DC: NTSB, 1985).

⁵ 49 CFR 179.100-13(b) Venting, loading and unloading valves, measuring and sampling devices.

⁶ 49 CFR 173.314 (j) and (k), respectively.

⁷ Docket HM-166W, NPRM at 53 FR at 36418, September 19, 1988; Final Rule adopting the amendment as proposed, 54 FR 38790, September 20, 1989.

⁸ 49 CFR 179.100-13(d).